

ENVIRONMENTAL ASSESSMENT CEDAR BAYOU PLACEMENT AREA 2 EXPANSION HSC-M-7 GALVESTON BAY, TEXAS

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Purpose & Need for Action	2
2	PROPOSED ACTION & PROJECT AREA	3
3	ALTERNATIVES ANALYSIS	4
3.1	No Alternative	4
3.2	Selection Criteria	4
3.2.1	Dredged Material Placement Volume	4
3.2.2	Minimize Impacts to Natural Resources	5
3.2.3	Avoid Impacts to Navigation & Other Federal Projects	5
3.2.4	Avoid Interference with Active Oil & Gas Infrastructure	5
3.3	Alternatives Carried Forward for Environmental Analysis	5
3.3.1	Proposed Action	5
3.3.2	Alternative Actions	6
3.3.3	No-Action Alternative	7
4	AFFECTED ENVIRONMENT & POTENTIAL IMPACTS	9
4.1	General Environmental Setting	9
4.2	Existing Threats to Environment	10
4.3	Resources Eliminated from Further Analysis	10
4.4	Water & Sediment Quality	10
4.4.1	Consequences of the Proposed Action	12
4.5	Sediment Topography & Bathymetry, Shoreline Erosion & Accretion	13
4.5.1	Consequences of the Proposed Action	14
4.6	Wetlands & Special Aquatic Sites	14
4.6.1	Wetlands	15
4.6.2	Oyster Reef	15
4.6.3	Consequences of the Proposed Action	16
4.7	Fish & Wildlife	17
4.7.1	Consequences of the Proposed Action	18
4.8	Federally Protected Species	19
4.8.1	Consequences of the Proposed Action	21
4.9	Essential Fish Habitat	23
4.9.1	Consequences of the Proposed Action	24
4.10	Cultural Resources	25
4.10.1	Consequences of the Proposed Action	25
4.11	Recreation, Aesthetics & Land Use	26
4.11.1	Consequences of the Proposed Action	26
4.12	Socioeconomics	26
4.12.1	Consequences of the Proposed Action	28
4.13	Air Quality	29
4.13.1	Consequences of the Proposed Action	29
4.14	Noise	29
4.14.1	Consequences of the Proposed Action	29
5	CUMULATIVE IMPACTS	31
5.1	Projects Assessed for Cumulative Impacts	32
5.2	Cumulative Effects Assessment	33
5.2.1	Water & Sediment Quality	34
5.2.2	Sediment Topography & Bathymetry, Shoreline Erosion & Accretion	34
5.2.3	Wetlands & Special Aquatic Sites	34

6	Avoidance & Minimization Measures.....	35
6.1	Construction Best Management Practices	35
6.2	Conclusions.....	36
7	COMPLIANCE WITH ENVIRONMENTAL LAWS & REGULATIONS	37
7.1	Interagency Coordination & Consultations.....	37
7.2	Government to Government Consultations.....	37
7.3	Public Review of the Environmental Assessment	38
8	REFERENCES	39

LIST OF FIGURES

Figure 1-1.	Vicinity and Project Location Map	2
Figure 2-1.	Proposed Action: Cedar Bayou PA 2 Expansion Area in Upper Galveston Bay	3
Figure 3-1.	Alternative Actions Constraints Map.....	7
Figure 4-1.	Projected Annual Mean Sea Level (AMSL) and Estimated Land Subsidence Contributions to Relative Sea Level Rise at Galveston Pier 21	14
Figure 4-2.	Oyster Habitats Delineated Within the 100-acre Project Area and 500-foot-wide Buffer Area	16
Figure 4-3.	Socioeconomic Indicator Values for the City of Baytown, Chambers County, and Harris County Compared to the State of Texas	27
Figure 5-1.	Map of Projects Within a 3-mile Radius Considered for Cumulative Impacts	33

LIST OF TABLES

Table 3-1.	Comparison of Selection Criteria Addressed by the Proposed Action Versus Alternative Designs and the No-Action Alternative	8
Table 4-1.	Summary of Federally Protected Species That May Potentially Occur In or Near the Project Area	20
Table 4-2.	Summary of Effects to Federally Protected Species from the Proposed Action.....	21
Table 4-3.	Population Statistics for the City of Baytown, Chambers County, and Harris County Compared to the State of Texas, 2021–2023	28

LIST OF APPENDICES

Appendix A	Special Aquatic Resources Survey Report
Appendix B	Federally Protected Species Assessment
Appendix C	Essential Fish Habitat Assessment
Appendix D	Interagency Coordination
D-1	USFWS Section 7
D-2	NMFS Section 7
D-3	NMFS EFH
D-4	Texas Historical Commission
D-5	TX GLO CZMP
D-6	TCEQ WQC
D-7	Tribal Coordination Letters
Appendix E	404(b)(1) Checklist
Appendix F	Finding of No Significant Impact (FONSI)

ACRONYMS, ABBREVIATIONS & INITIALISMS

AMSL	annual mean sea level
BMP	best management practice
CBNC	Cedar Bayou Navigation Channel
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Information Act
CFR	Code of Federal Regulations
cy	cubic yard
CZMA	Coastal Zone Management Act
DoD	Department of Defense
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act of 1973
FIFR	Final Integrated Feasibility Report
GBEP	Galveston Bay Estuary Program
GLO	Texas General Land Office
GMFMC	Gulf of Mexico Fishery Management Council ¹
GMSLR	global mean sea level rise
HSC	Houston Ship Channel
HTRW	hazardous, toxic, and radioactive waste
LEI	Lloyd Engineering, Inc.
m	meter
MAFMC	Mid-Atlantic Fishery Management Council
MLLW	mean lower low water
NEPA	National Environmental Policy Act of 1969
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
O&M	operations and maintenance
PA	Placement Area
PA 2	Cedar Bayou Placement Area 2
RLR	relative sea level rise
SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
TCEQ	Texas Commission on Environmental Quality
TOC	total organic carbon
TPWD	Texas Parks and Wildlife Department
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area
WRDA	Water Resources Development Act

¹ Note that the “Gulf of Mexico” has been re-named the “Gulf of America” through Executive Order 14172, effective since 20 January 2025, and Secretary’s Order 3423, effective since 07 February 2025.

1 INTRODUCTION

The United States (U.S.) Army Corps of Engineers (USACE), Galveston District has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), Public Law 91–190, regulations for implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500–1508, and USACE NEPA implementing regulation ER 200-2-2 in USACE (1988). This EA evaluates potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area (PA) 2 (PA 2). This EA also evaluates practicable alternatives for the proposed action, assesses anticipated effects, and recommends best management practices (BMPs) and measures to avoid and minimize adverse effects resulting from the proposed action.

1.1 Background

The Cedar Bayou Navigation Channel (CBNC) was established by congress in 1930 from the natural stream course of Cedar Bayou (Rivers and Harbors Act of 1930, Public Law 520). Since establishment, this channel has been maintained by the USACE. The maintenance of the CBNC has been reauthorized by the Water Resources Development Act (WRDA) in 2000, 2007, and most recently in 2022, for improvements to the channel. The Cedar Bayou channel spans approximately 12 miles within Harris and Chambers counties from channel mile 11 to station 03+00 of the Houston Ship Channel (HSC). However, the USACE currently maintains the Bay Reach of the CBNC from the HSC at Mile -2.7 (station 03+00 of the HSC) to the Bayou Reach of the CBNC at Mile 3, totaling a 5.7 mile portion of the channel that is federally maintained. For this EA, the CBNC refers to this federally maintained 5.7-mile portion.

Originally six PAs (named PA 1 through PA 6) were designated for use for placement of material dredged from the CBNC. Three of these (PA 2, PA 3, and PA 4) were for open-water placement. PA 6 is an upland-confined PA which remains in use but has limited capacity for future use. PA 3 and PA 4 also have limited availability and operational restrictions. PA 1 (also called Hogg Island) and PA 5 (also called Boaz Island) are no longer available for material placement due to capacity limitations and the need to avoid encroaching on neighboring federal projects. Therefore, PA 2 is currently the preferred PA for maintenance material originating from the CBNC due to its availability, proximity to the channel, and cost efficiency. Refer to Figure 1-1 for a vicinity map of the project location and existing channels and PAs.

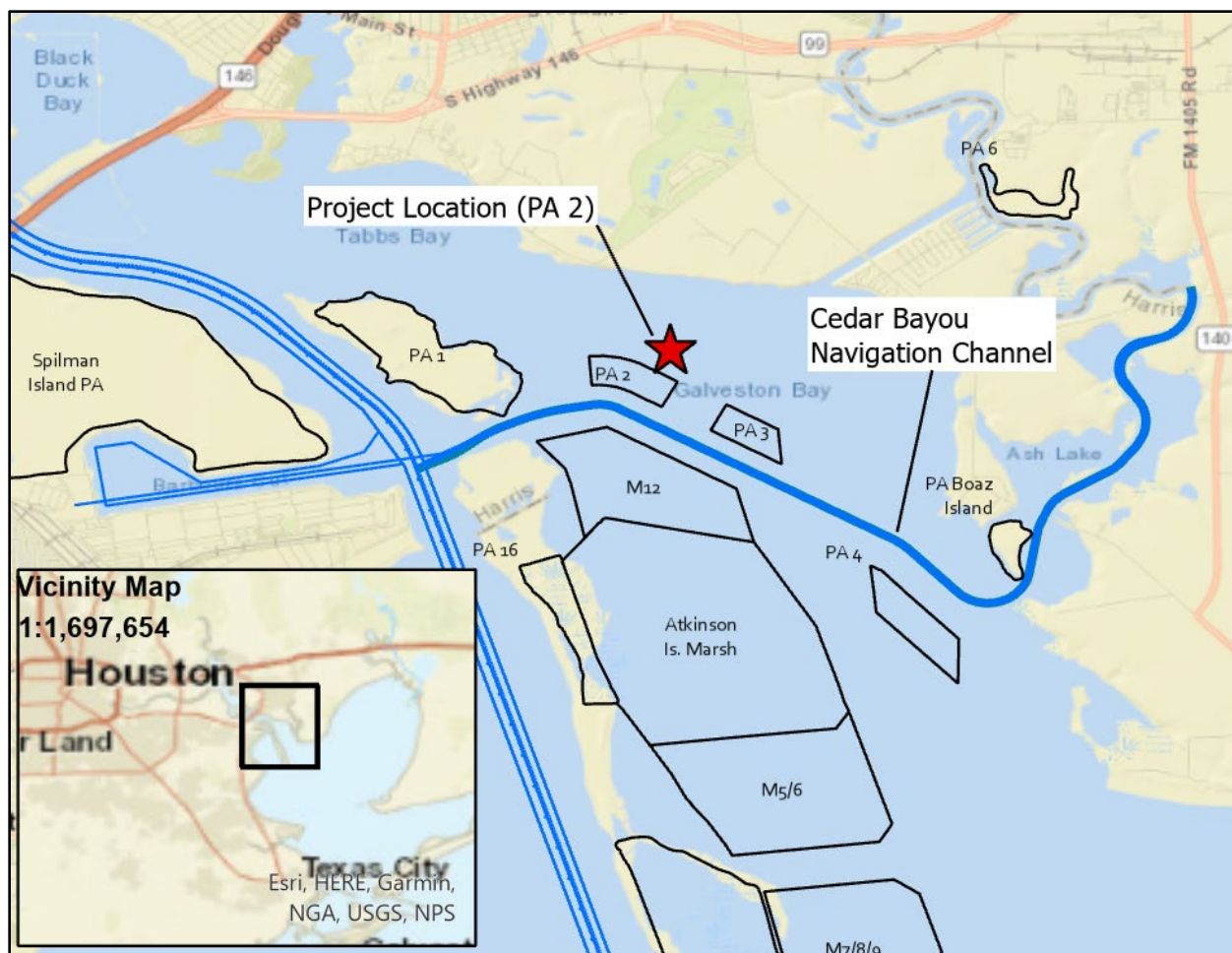


Figure 1-1. Vicinity and Project Location Map

1.2 Purpose & Need for Action

The purpose and need of the proposed action is to provide additional open-water disposal capacity at PA 2 for future operations and maintenance (O&M) dredging events to ensure continued navigational efficiency and safe transit within the CBNC. The objective of this project can be achieved through the identification of a suitable submerged area adjacent to PA 2 for the expansion of the PA 2 limits that can be used for placing O&M dredged material from the CBNC.

2 PROPOSED ACTION & PROJECT AREA

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the CBNC. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

The project area is in upper Galveston Bay, north of Atkinson Island and the CBNC. The project area is submerged land granted from the State of Texas, Texas General Land Office (GLO), to Port Houston Authority via a land grant with Navigation Servitude Easement granted to the USACE. The water depth within the project area is shallow and subtidal, with water depths in the area are typically within the range of 3 to 6 feet with tidal variations. Bottom elevations were from -2 to -4 feet [-0.6 to -1.2 m] mean lower low water (MLLW) based on survey conducted via sounding pole in August 2025 following a recent placement action. Existing PA 3 is approximately 47 acres and is located approximately 1,500 feet east of PA 2. Figure 2-1 shows the proposed expansion area for PA 2 and its location in relation to CBNC, PA 3, and PA 4.

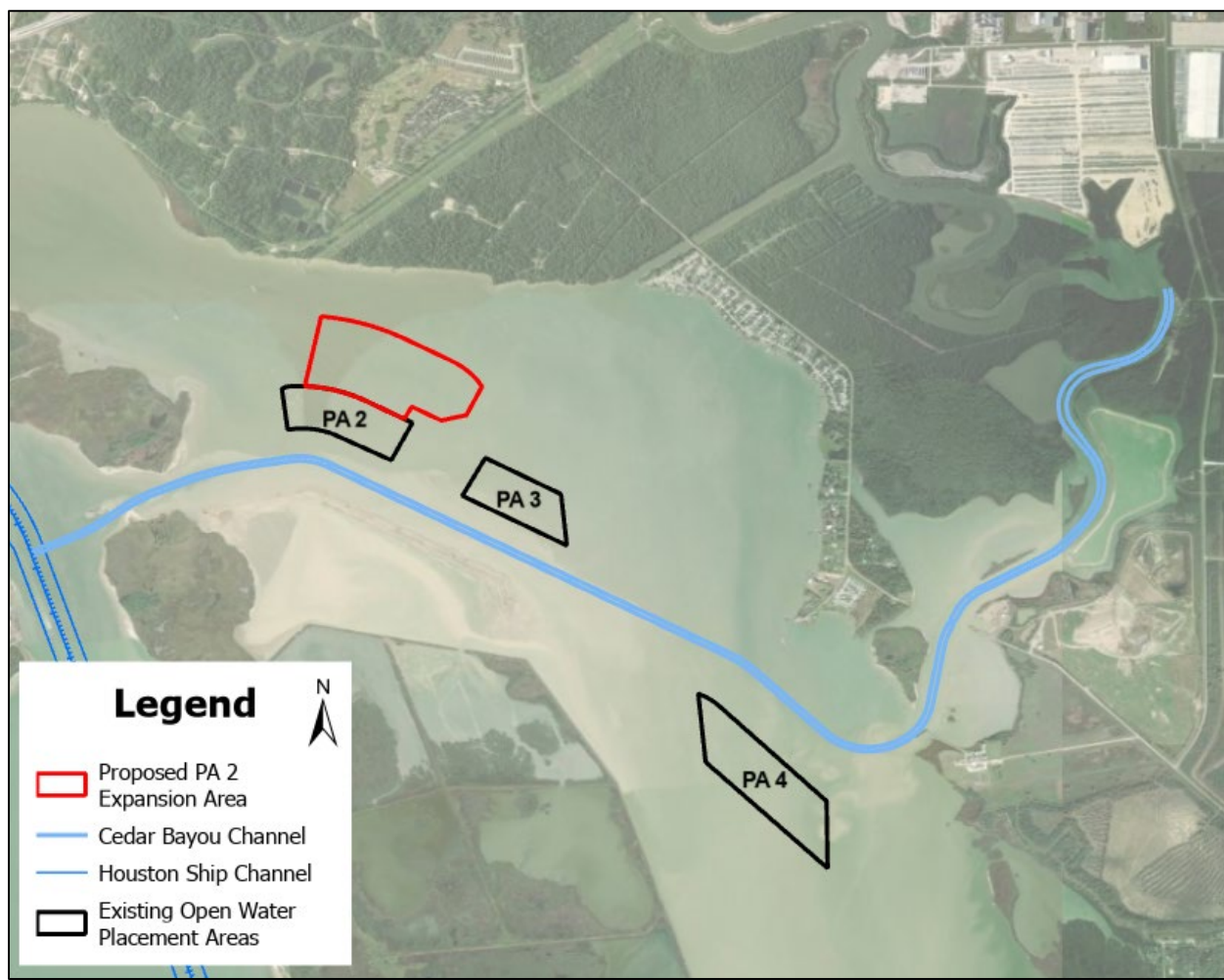


Figure 2-1. Proposed Action: Cedar Bayou PA 2 Expansion Area in Upper Galveston Bay

3 ALTERNATIVES ANALYSIS

In accordance with the NEPA of 1969, the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500–1508), and USACE implementing procedures (33 CFR Part 230), this EA evaluates a reasonable range of alternatives for providing an area sufficiently large enough for material placement for future O&M dredging events to ensure continued navigational efficiency and safety within the CBNC. This alternatives analysis identifies the action that most closely meets the purpose and need of the project, while avoiding or minimizing adverse effects to natural and human environments. The analysis considers the No-Action Alternative, which would maintain existing conditions at PA 2 without expansion, and multiple alternative actions involving varying configurations or footprints of PA 2 expansion. Each alternative was evaluated for its ability to meet the project's objectives while minimizing adverse effects. The results of this evaluation form the basis for identifying the USACE's preferred action for detailed environmental review.

3.1 No Alternative

The no-action alternative consists of the continued use of the existing PA 2 for placement of O&M dredged material to the maximum volumes as water depth allows. The proposed 100-acre expansion area would not be constructed, and the total volume of material able to be placed at PA 2 would remain limited to the existing 48-acre PA 2. The existing PA 2 is estimated to be able to accommodate approximately 150,000 cubic yards (cy) of dredged material per O&M dredging cycle.

Without expansion, available placement capability would be exhausted after a limited number of maintenance events due to the limited water depth, requiring transport of dredged material to more distant and costly disposal locations for subsequent dredging cycles. Examples of such locations include upland confined PAs and ocean disposal. These options involve much greater travel distances, fuel use, overall dredging duration, and costs.

3.2 Selection Criteria

The desired project is one that would expand PA 2 to the maximum extent practicable to allow for the placement of material dredged from the CBNC and best satisfy the selection criteria listed below. The alternatives analysis considered several criteria to determine which alternative action best achieves the project objective while meeting the selection criteria. The following selection criteria were used in the analysis:

1. The project would allow the placement of at least 400,000 cy of O&M dredged material per dredging event in an area allowing material dispersal, accommodating additional O&M material during the next dredge cycle.
2. Avoid or minimize impacts to existing natural resources to the extent practicable.
3. Avoid impacts to other federal projects and navigation.
4. Avoid risk of interference with major active oil and gas related infrastructure.

These criteria are described below and are discussed within the context of the project design that would best satisfy the criteria described.

3.2.1 Dredged Material Placement Volume

Approximately 400,000 cy of O&M material is dredged from the CBNC in a single dredging event. Thus, USACE requires a PA that can accommodate at least this volume of material per dredging event. USACE contractually restricts placement of dredged material above -0.5 feet (-0.15 m)

MLLW at the open water PAs to minimize the occurrence of emergent sediment beyond short periods of time. While dredged material would be allowed to temporarily be exposed above the water surface, the goal is for the site to remain submerged beyond the short term. Material placed at the expanded PA 2 would gradually erode and disperse by waves and currents, eventually making space available for more dredged material to be placed there, ideally in time for the next dredging event. USACE uses bathymetric survey data for planning purposes and to determine the remaining volume available for placement. The existing 48-acre PA 2 has room for only approximately 150,000 cy of material based on recent survey data and placement event records. Therefore, the preferred action is one that would expand the area of PA 2 sufficiently to allow for the placement of at least 250,000 cy of additional material while avoiding the emergence of the sediment above the water line. This would enable the use of the expanded PA 2 to receive at least 400,000 cy of material from the next O&M dredging cycle of the CBNC.

3.2.2 Minimize Impacts to Natural Resources

Any project proposed should avoid or minimize direct and indirect impacts to natural and cultural resources to the maximum extent practicable. This selection criterion aims to identify the project design that would have the least negative impacts to existing aquatic vegetation, oyster reef, wetlands, essential fish habitat (EFH), and federal and state protected species. Surveying is used to identify, quantify, and delineate the resources existing within the project area.

3.2.3 Avoid Impacts to Navigation & Other Federal Projects

The project area for the proposed action is adjacent to the CBNC and existing federal dredged material PAs. This selection criterion favors a design with the least negative impacts to existing navigational uses at the CBNC and recreational channels of the area. Such a preferred design concept is one having a project footprint that avoids intersection of existing navigation channels and does not negatively impact the operation of nearby PAs and other existing or planned federal projects.

3.2.4 Avoid Interference with Active Oil & Gas Infrastructure

The general area around the CBNC contains active and abandoned oil and gas infrastructure such as pipelines, plugged wells, and dry holes (plugged wells that never produced oil or gas). Of these, the infrastructure of greatest concern to the project design are the wells currently in use as material would not be allowed to cover active well infrastructure. Submerged pipelines are of less concern as they are already covered by sediment, and the action does not involve dredging or excavation over the area. Avoiding or minimizing impacts to active well infrastructure would meet this criterion. Refer to Subsection 4.11 (Recreation, Aesthetics & Land Use) for a discussion of active features within the general area and BMPs that relate to these pipelines.

3.3 Alternatives Carried Forward for Environmental Analysis

3.3.1 Proposed Action

The proposed action was designed as the alternative to best meet the selection criteria listed above based on known constraints in the PA 2 vicinity. The proposed action design, sited to extend the PA 2 area to the north and northeast meets the project objectives and best meets the selection criteria. This area has existing water depths typically ranging from -2 to -4 feet MLLW. This would allow for the placement of approximately 325,000 cy of material, meeting criterion 1 for the ability of the entire PA to accept 400,000 cy of material from a single maintenance dredging event. Ability of the PA to accept material from any future dredging events would be determined at the time of dredging based on dispersal of previously placed sediment and current water depths. The proposed action meets selection criteria 2, 3, and 4 by avoiding and minimizing

impacts to oyster reefs, not extending towards any channel or marine traffic areas, and avoiding areas with known oil and gas well infrastructure.

Additionally, the proposed project is an expansion of the existing PA 2 limiting any potential impacts to wetlands and special aquatic sites, threatened and endangered species (*criterion 2*) that might otherwise occur with the establishment of a new upland or open-water PA elsewhere. The proposed action described in Section 2 is carried forward for analysis in Section 4.

3.3.2 Alternative Actions

Alternative actions considered included various expansions of PA 2 to the east, west, or south. These areas have bottom elevations typically in the range of -2 to -4 feet MLLW, potentially satisfying selection criterion 1 to provide for sufficient placement volume potential based on the total area for each alternative. However, several constraints exist that would limit the alternative actions satisfaction of other criteria. Oyster reef habitat has been identified in areas surrounding PA 2, mostly to the west and east (See Figure 3-1); additionally, there is a cluster of oil and gas infrastructure located to the west of PA 2 (See Figure 3-1). The CBNC is directly south of the existing PA 2 and USACE requires a standard setback from the existing CBNC for the safety and integrity of the channel. A southward expansion would also likely exacerbate shoaling of the channel. For these reasons, it is not feasible to expand PA 2 southward. Therefore, any alternative action that expands PA 2 in any area other than the area of the proposed action would not meet certain selection criteria in Subsection 3.2 and in Table 3-1. Specifically, expanding PA 2 to the east, west, or south would not minimize potential impacts to natural resources (*criterion 2*), avoid impacts to navigation and other federal projects (*criterion 3*), and/or avoid interference with active oil and gas wells (*criterion 4*).

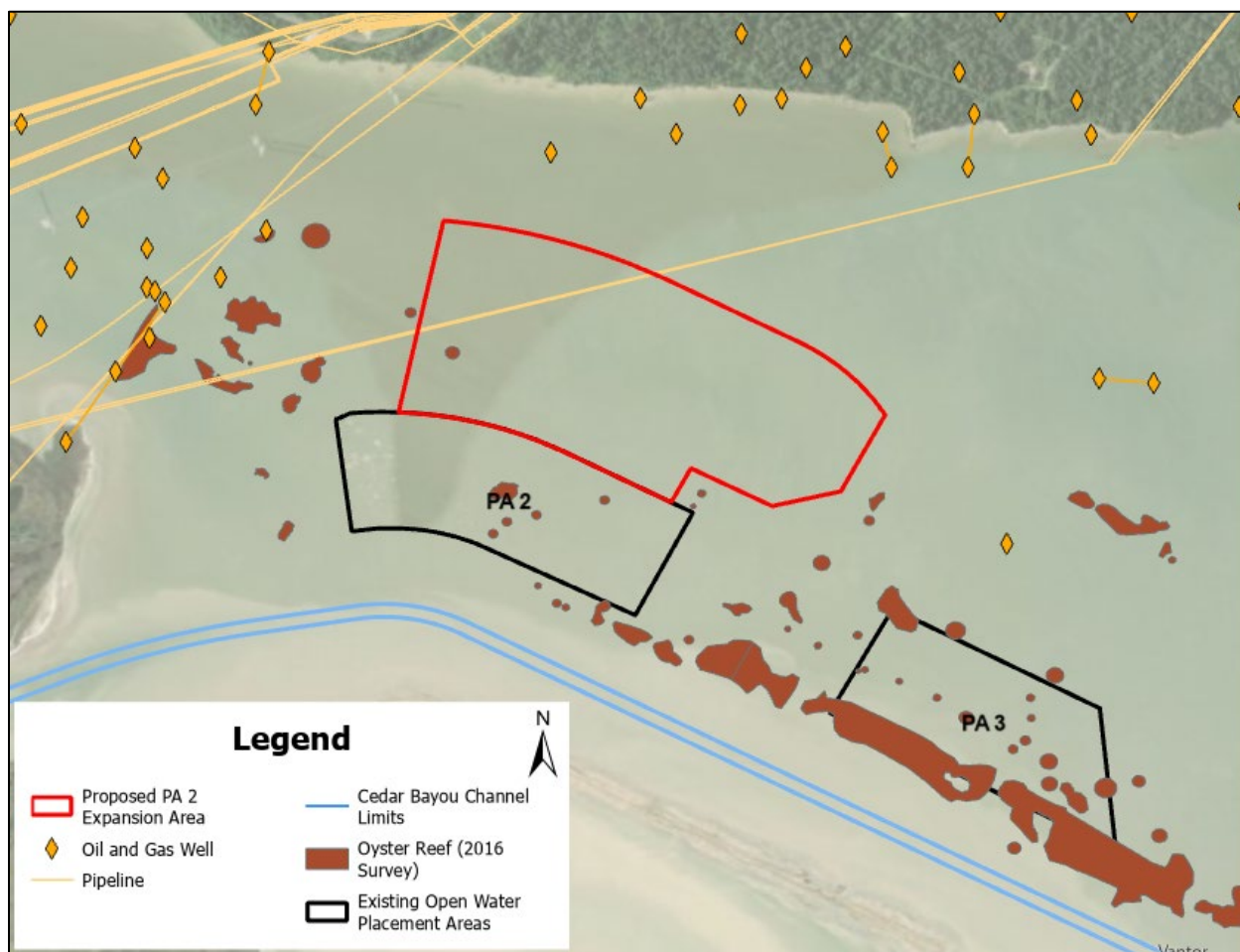


Figure 3-1. Alternative Actions Constraints Map

3.3.3 No-Action Alternative

The No-Action Alternative fails to meet the purpose and need for the project. It also falls short of meeting certain selection criteria in Subsection 3.2 and summarized in Table 3-1. Specifically, it does not meet the overall objective of allowing for up to 400,000 cy of placement volume per dredging event. This is due to a combination of limited area and limited water depth in existing PA 2. Although the No-Action Alternative is not considered a practicable alternative, it must still be fully considered during NEPA analysis, as required by the CEQ regulations at 40 CFR 1502.14(d). For most portions of the affected environment (Section 4), the No-Action Alternative does not depart notably from current conditions and in these cases the No-Action Alternative is synonymous with such conditions.

Table 3-1. Comparison of Selection Criteria Addressed by the Proposed Action Versus Alternative Designs and the No-Action Alternative

Selection Criteria	Proposed Action: Meets Criteria? (yes or no)	Alternative Action Eastward Expansion: Meets Criteria? (yes or no)	Alternative Action Westward Expansion: Meets Criteria? (yes or no)	Alternative Action Southward Expansion: Meets Criteria? (yes or no)	No-Action Alternative Meets Criteria? (yes or no)
(1) Capable of receiving ≥400,000 cy of dredged material per dredging event	Yes	Yes	Yes	Yes	No
(2) Avoid or minimize impacts to existing natural resources to the extent practicable	Yes	No	No	No	Yes
(3) Avoid impacts to other federal projects and navigation	Yes	Yes	Yes	No	Yes
(4) Avoid risk of interference with major active oil and gas related infrastructure	Yes	Yes	No	Yes	Yes
MEETS ALL SELECTION CRITERIA?	Yes	No	No	No	No

4 AFFECTED ENVIRONMENT & POTENTIAL IMPACTS

This section establishes and describes the affected environment and the potential environmental impacts of the proposed action. This EA was conducted in accordance with Public Law 91-190 NEPA of 1969. It also follows CEQ regulations 40 CFR parts 1500 through 1508. The level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. The scope of the affected environment considered for this EA for the proposed action consists of an area of submerged bay bottom in Galveston Bay, adjacent to the existing open-water PA 2 along the north side of the CBNC between mile 2.5 and mile 3. The overall acreage of the expanded, proposed, open-water PA includes approximately 100 acres of new area. The Galveston Bay complex is mostly contained within Chambers, Harris, and Galveston counties, Texas.

Resource areas addressed include historic and cultural resources, wetlands and special aquatic sites, water and sediment quality, wildlife and fish resources, federally protected species, freshwater inflows, sediment resources, recreation and land use, and socioeconomics. The affected environment discussions presented below describe the existing conditions of the environment and include existing effects to the environment by current and historic projects in the vicinity. Cumulative impacts will be evaluated in a subsequent section at the end of this document.

4.1 General Environmental Setting

The Galveston Bay complex includes Trinity Bay, Galveston Bay, East Bay, and West Bay. Galveston Bay receives 11 million acre-feet of freshwater inflow annually from the Trinity River and the San Jacinto River in addition to runoff from surrounding land (Texas Water Development Board 2023). The Galveston Bay complex has a total combined area of approximately 384,000 acres (155,400 hectares) (Galveston Bay Estuary Program [GBEP] 2025) and has an average water depth of -1.8 m (-5.9 feet) MLLW (Kim 2021). Galveston Bay is the largest estuary in Texas (GBEP 2025).

Galveston Bay is a shallow micro-tidal impoundment heavily influenced by wind and freshwater inflows from the Trinity and San Jacinto rivers and surrounding bayous. There are two tidal inlets to the bay. Bolivar Roads is Galveston Bay's primary connection with the Gulf. This, and San Luis Pass, provide tidal exchange with the Gulf (GBEP 2025). Galveston Bay is shallow with habitats including marshes, mud and sand flats, seagrass beds (submerged aquatic vegetation [SAV]), oyster reefs, and open-bay bottom (GBEP 2025). The majority of Galveston Bay is mud-bottomed; some small islands exist in the interior of the bay and some of these support bird rookeries and oyster reefs.

The western edge of Galveston Bay is densely packed with municipal, industrial, and urban development supported by the HSC and associated water-based infrastructure. The eastern edge of Galveston Bay is primarily agricultural and undeveloped lands. Approximately 5.4 million people live in Galveston, Harris, and Chambers counties, which together contain most of Galveston Bay (GBEP 2025).

The CBNC extends from station 03+00 of the HSC to mile 11 of the CBNC totaling approximately 12 miles in length. Beyond the extent of the maintained channel, the Cedar Bayou stream continues upstream extending north into Liberty County. The surrounding bay area where the CBNC and PA 2 are located is generally shallow, ranging in depth from -12 feet MLLW within the navigation channel to a generally flat area within the range of -2 to -4 feet MLLW. The area is

bounded to the west by Atkinson Island Wildlife Management Area (WMA), PA 1 (Hogg Island), residential developed shoreline to the east, and undeveloped shoreline to the north.

4.2 Existing Threats to Environment

Current threats to the environment of the project area include subsidence resulting from industrial activities, specifically oil and gas, and groundwater extraction. Other threats include sea level rise and severe tropical storms and hurricanes.

The Trinity and San Jacinto rivers historically contributed freshwater and sediment inflows into Galveston Bay, nourishing the bay's estuarine marshes and wetlands. Impoundments and diversions of these rivers to support development and freshwater supply have drastically altered the freshwater and sediment inflow regimes to Galveston Bay (GBEP 2025).

Sea level continues to rise along the Texas coast and the rate of change has increased in recent years. Sea level rise is a byproduct of the melting glaciers and ice sheets, and the expansion of ocean water as it warms with increasing temperatures. Add to this subsidence of coastal land around Galveston Bay due to soil compaction and withdrawal of groundwater (U.S. Environmental Protection Agency [EPA] and USACE 2016). Sea level rise along the mid-Texas coast has increased more than 0.2 inches per year from 1937 to 2020. The relative sea level trend for the project study area was measured as 0.21 ± 0.04 inches per year, with 95% confidence, based on mean sea level data from 1983 to 2020 according to data from National Oceanic and Atmospheric Administration (NOAA) tide station #775870. This is equivalent to a change of 1.78 feet (0.5 m) over the course of 100 years (NOAA 2021).

Galveston Bay complex, along the northern edge of the Gulf, is subject to occasional tropical storms and hurricanes. Hurricanes make landfall on any 50-mile portion of the Texas coast an average of once every six years (Roth 2010). Texas has been affected by several hurricanes and severe storms during the last century with the top five costliest for Texas having occurred since 2000 (NOAA 2021). Storm surge is a dangerous effect of tropical storms in the Gulf that threatens the coastal environment with each storm or hurricane. Storm surge is the abnormal rise of water level over and above the predicted astronomical tides resulting from winds of tropical storms and hurricanes. Storm surge can be seen to affect even inland waters such as tidal rivers and the Galveston Bay complex as it moves through bays. The coastal environment can be dramatically affected by surges from extreme hurricane events which can cause significant structural changes to barrier islands, destruction of low-lying lands, destruction of critical infrastructure, inundation of coastal shorelines with salt water, and severe damages to essential wildlife habitat (Needham and Keim 2012).

4.3 Resources Eliminated from Further Analysis

The proposed action area is submerged bay bottom surrounded by industrial and residential land. The nearest farmland is several miles away. The project would not affect prime or unique farmlands, as defined by the Farmland Protection Policy Act, or floodplains, a resource requiring consideration per Executive Order 1988 (Floodplain Management). Cumulative impacts are evaluated in Section 5.

4.4 Water & Sediment Quality

Water Profile & Water Quality

Water column profile—A literature search found no evidence of thermoclines, haloclines, or hypoxic zones in the project area. These attributes appear unlikely to occur in the project area because of its shallow depth (typically -2 to -4 feet [-0.6 to -1.2 m] MLLW Lloyd Engineering, Inc.

[LEI] [2025]) and its location within the bay. Although low dissolved oxygen zones have been documented in Galveston Bay, resulting in fish kills, such areas are generally associated with areas of poor water circulation such as dead-end canals (Thronson and Quigg 2008). Galveston Bay is subjected to water currents caused by tides, riverine input of freshwater, and wind-driven currents. The bay is estuarine with a varying salinity gradient that is influenced by tide, rain events, and river flow. River flow entering the bay averages 24,279,600 m³/day according to Engle et al. (2007). These authors also reported that salinity in summer averages 18 parts per thousand in the bay and the average annual water temperature is 29.5°C. The hurricane barrier constructed to protect Galveston Island and Texas City is thought to cause a reduction in salinity within the Galveston Bay estuary by retaining freshwater for longer periods than if the barrier had not been built (Stickney 1984).

Nutrient loading—The levels of nitrogen and phosphorus within Cedar Bayou were considered “Excellent” in 2023 (the most recent data available) according to the Galveston Bay Report Card (2025), although no numerical values or details were given as supporting evidence.

Water physicochemical parameters—The following parameters were measured 2 feet below the water’s surface within the existing Cedar Bayou PA 2 at station CB-23-PA 2B-W in October 2023 using a Horiba multiparameter meter. Dissolved oxygen was 9.41 mg/L, pH was 8.53, salinity measured 23.70 parts per thousand, specific conductivity was 37.50 mS/cm, turbidity was 15.00 Nephelometric Turbidity Units, and water temperature was 21.11°C.

The water and sediment parameters summarized below were taken in accordance with the requirements and procedures defined in Section 404 of the Clean Water Act.

Water sample CB-23-PA2-W was collected by pump at one-third to one-half of the 15.3-foot water depth within the existing Cedar Bayou PA 2 in October 2023 and was analyzed for water chemistry parameters. An elutriate sample was also generated by mixing the water sample with sediment collected by grab sampler from the same area, and the elutriate was analyzed for chemistry parameters. The following summary is taken from the LEI (2023) report.

Contaminant levels in water and elutriates—The water sample and elutriates generated from this water sample were analyzed for 15 metals, ammonia (as nitrogen), total cyanide, total petroleum hydrocarbons, 22 organochlorine pesticides, total polychlorinated biphenyls, 15 polynuclear aromatic hydrocarbons, and 41 semi volatile organic compounds (LEI 2023). Most of these contaminants were not detected above the method detection limit. None of these contaminants were in concentrations that exceeded the available criteria maximum concentration in EPA (2006, 2024), or Texas acute water quality standard values in Texas Commission on Environmental Quality (TCEQ) (2022).

Petroleum Spills in Galveston Bay

The Galveston Bay estuary is home to one of the world’s largest petroleum refining centers. Many of the local refineries utilize the HSC. Petroleum product pipelines are present in many areas of the bay (Final Integrated Feasibility Report—Environmental Impact Statement [FIFR-EIS] by USACE 2019). Galveston Bay has been subjected to repeated petroleum exposure. For instance, ship groundings and outright spillage in 1987 resulted in over 80,000 gallons of oil, hydrocarbons, and other hazardous materials entering the water (Gore 1992). Approximately 30% of the spilled oil occurred within the HSC alone. More recently, in 1989, another spill of an estimated 250,000 gallons of oil entered the HSC and Galveston Bay. In 1990, two oil barges collided with a Greek oil tanker, resulting in approximately 500,000 gallons of heavy crude entering the Galveston Bay estuary (Gore 1992). In 1991, the rupture of a pipeline transferring oil from onshore storage to a

barge ruptured and spilled 40,000 gallons of light crude oil into Galveston Bay. The slick from the pipeline rupture was determined to be over four miles long (Gore 1992). It is apparent that the Galveston Bay estuary must periodically contend with exposure to petroleum products.

Sediment Profile & Sediment Quality

Sediment profile—Sediment was collected by Ponar grab sampler in October 2023 from three stations within the existing Cedar Bayou PA 2. All three stations had the same sediment elevation of -3.91 feet MLLW (LEI 2023). The sediment from the three stations was composited (composite ID CB-23-PA2-S) and analyzed for physical and chemical parameters. The following is a summary of analysis results from the LEI (2023) sediment sampling and analysis report.

Grain size, total organic carbon (TOC) and total solids—The sediment composite was predominately silt (52.3%), with sand (34.5%), some clay (12.7%), and trace gravel (0.5%). TOC measured 0.39% and total solids measured 59.8%.

Contaminant levels in sediment—The sediment was analyzed for 15 metals, ammonia (as nitrogen), total cyanide, total petroleum hydrocarbons, 22 pesticides, total polychlorinated biphenyls, 15 polynuclear aromatic hydrocarbons, 41 semi volatile organic compounds, and 17 dioxins and furans. Most of these contaminants were not detected in concentrations above the method detection limit, and none of them exceeded the threshold effects level or the effects range low from Buchman (2008) or the human health protective concentration levels from the TCEQ (<https://www.tceq.texas.gov/remediation/trrp/trrppcls.html>).

Dredged Material Proposed for Open-water Placement

The dredged material that is proposed for open-water placement in the project area would be subjected to the sampling, analysis, and reporting requirements of the Inland Testing Manual by EPA and USACE (1998), Section 404 of the Clean Water Act, and the dredging regulations in 33 CFR 335–338. Such testing is generally conducted at regular intervals. This process ensures that dredged material does not have the potential for significant undesirable effects due to the presence of contaminants.

The most recent (2023) sampling and chemical analysis of O&M dredged material from the Cedar Bayou Federal Navigation Channel demonstrated that the material could be placed at Cedar Bayou PA 2 without restrictions (LEI 2023).

Hazardous, Toxic & Radioactive Waste

The proposed action would not be considered appropriate for hazardous, toxic, and radioactive waste (HTRW) screening. Engineer Regulation 1165-2-132 (HTRW Guidance for Civil Works Projects [USACE 1992]) instructs that dredged material placement sites are not considered HTRW sites unless such wastes are “located within project boundaries or may affect or be affected by Corps Civil Works projects”. Regulation 1165-2-132 further instructs that material proposed for dredging qualify as HTRW “only if they are within the boundaries of a site designated by the EPA or a state for a response action (either a removal action or a remedial action) under CERCLA (Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S. Code [U.S.C.] 9601 et seq), or if they are part of a National Priority List site under CERCLA”.

4.4.1 Consequences of the Proposed Action

The dredged material proposed for placement at the PA 2 expansion area would have undergone sediment, water, and elutriate testing and approval prior to placement at the site. The material itself would have originated from the nearby CBNC. The O&M material to be placed in the PA 2

expansion area would therefore most likely have physical, chemical, and toxicity properties comparable to what currently exists in and around the project area. No significant long-term changes are expected for water quality and sediment quality from the placement of material.

Turbidity at the project area would increase beyond ambient levels during, and immediately following, dredged material placement. Dissolved oxygen levels are likely to decrease during placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode. Estuarine organisms within the bay are generally evolutionarily prepared for such stressors and have mechanisms that allow them to survive such ephemeral perturbations successfully. Overall, impacts to water and sediment quality due to the expansion of PA 2 would be comparable with those associated with current placement activities at the existing PA 2 and would be temporary and minor.

4.5 Sediment Topography & Bathymetry, Shoreline Erosion & Accretion

Sediment Topography & Bay Depth

The bottom elevation within the project area typically ranges from -2 to -4 feet (-0.6 to -1.2 meters [m]) MLLW (LEI 2025).

Shoreline Erosion & Accretion

Tidal amplitudes are narrow in Galveston Bay, ranging from 0.76 to 1.81 feet (0.23–0.55 m), with a mean of approximately 1 foot (0.3 m). However, wind-driven tides can be as much as 3-to-4 feet (0.9–1.2 m) above or below normal tide amplitude in the bay (Lankford and Rogers 1969). Such wind-induced extreme tides can cause erosion or accretion along portions of the bay margin. Northerly winds from cold fronts may lead to water level differences as high as 3.3 feet (1.0 m) between eastern and western portions of Galveston Bay (Lester et al. 2002). Sediment transport from wind and tidal currents is further exacerbated by ship-wakes, shrimp trawling, and dredged material placement activities within the bay (Tate et al. 2014).

The cumulative effects of these actions create erosion and accretion. Shoreline erosion claimed an estimated 0.7% of the marshes annually from 1979 to 2002 according to White et al. (2004), which is higher than the 0.5% of wetlands lost annually nationwide in the period 1975–1985 (Dahl and Johnson 1991). From 2006 to 2011, a total of 5.1% of the wetlands within Galveston County have been eroded in terms of surface area (Entwistle et al. 2018). Most of the loss of marshes, and other wetlands, are due to a combination of subsidence, sea level rise, wave action, sediment deficit, dredging, and filling (Moulton et al. 1997, Ravens et al. 2009). Erosion has been photo-documented along the HSC-facing side of the Mid Bay PA (USACE 2022). A portion of the dredged material eroded from the bank probably remained in suspension within the water column long enough to travel into the HSC and adjacent area, eventually settling in lower-energy areas and contributing to shoaling within the navigation channel.

The Galveston Bay estuary complex has a history of rapid and dramatic changes in response to sea-level rise, and these changes historically regulated sediment supply to the estuary (Anderson et al. 2008). Nearly all wetlands along the western shore of the bay have been lost due to development (Anderson et al. 2008). The Trinity River and the San Jacinto River have been dammed, and this has caused a decrease in the sediment supply into the estuary (Phillips et al. 2004, White et al. 2002).

The Galveston Bay estuarine complex has experienced high rates of subsidence within the last century caused by extraction of groundwater and petroleum (Paine et al. 1986, Paine 1993,

Morton et al. 2006, Anderson et al. 2008). The impacts of increased subsidence include more flooding at rates that approach those that occurred during the prior flooding events summarized above. The current subsidence is believed to mainly impact the Trinity Bay area (east of the project area) and low-lying areas around this delta (Anderson et al. 2008). Subsidence and sea level rise were estimated at Galveston Pier 21 to have been 3.53 mm/year during 1909–1937, 6.08 mm/year during 1937–1983, and 3.51 mm/year since 1983 (Liu et al. 2020). As much as 85% of the 0.7-m relative sea level rise (RLR) since 1909 is attributed to subsidence from aquifer-system compaction and groundwater extraction. An additional 6.2 feet (1.9 m) of RLR (subsidence plus other forms of sea level rise) is projected for the Galveston Island area by 2100 according to Liu et al. (2020) (Figure 4-1).

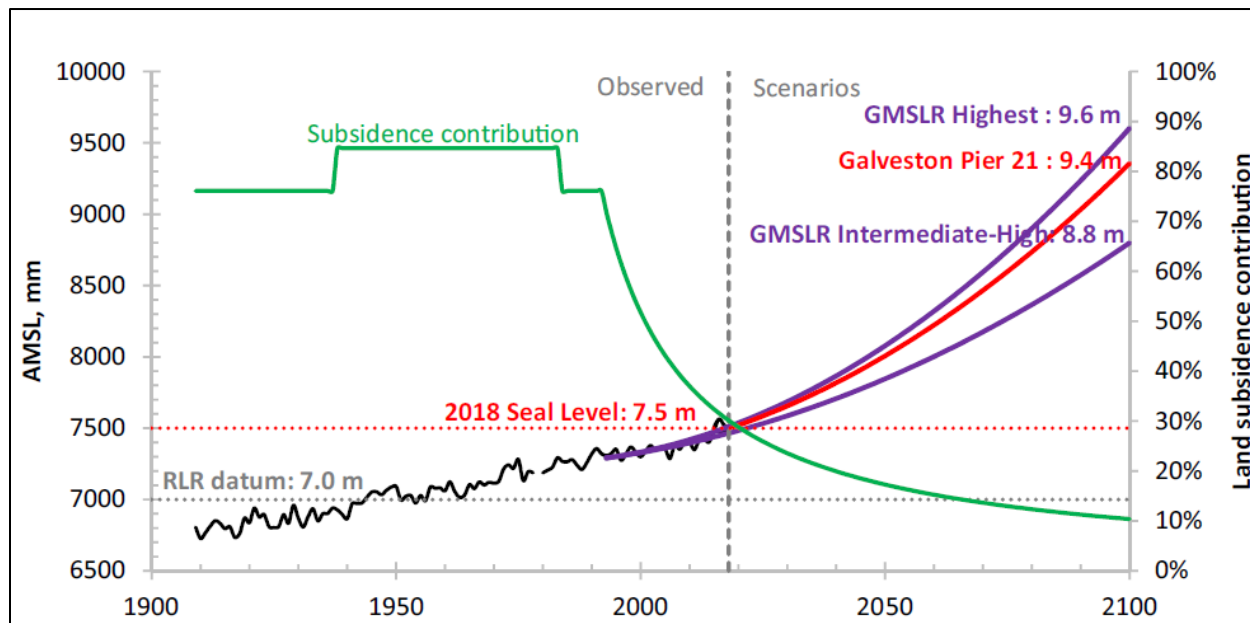


Figure 4-1. Projected Annual Mean Sea Level (AMSL) and Estimated Land Subsidence Contributions to Relative Sea Level Rise at Galveston Pier 21

Notes: GMSLR = global mean sea level rise, RLR = relative sea level rise.

Source: Modified from Figure 6 of Liu et al. (2020)

4.5.1 Consequences of the Proposed Action

The placement of dredged material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet MLLW to a maximum elevation of -0.5 feet MLLW. As the PA 2 expansion area is expected to be dispersive, it is anticipated that the change in bathymetry would be temporary and would return to subtidal bottom elevations over time. Additionally, severe tropical storms, hurricanes, or inland flooding events have the potential to disperse placed material from PA 2 to elsewhere within the bay, potentially resulting in a reduction in the elevation of the bay bottom at the expansion area. The addition of sediment into the bay system through the placement of material at PA 2 would not affect shoreline erosion and may potentially positively impact the shoreline through sediment accretion and combating general subsidence and sea level rise rates.

4.6 Wetlands & Special Aquatic Sites

Wetlands and special aquatic sites identified in 40 CFR 230 Subpart E consist of sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. The

sections below discuss each of these habitats as applicable to the project area. Refer to Appendix A for the Special Aquatic Resources Survey Report.

4.6.1 Wetlands

The project area is subtidal and has water depths typically of -2 to -4 feet MLLW. The depth, lack of intertidal habitats, and other characteristics of the project area prevent the establishment of wetland or SAV (including seagrass) habitats. Surveys of the project area in 2016 and July and August of 2025 further indicate a lack of wetland and SAV habitats within the project area (Appendix A).

4.6.2 Oyster Reef

Oyster reefs occur in subtidal and intertidal areas wherever there is a hard substrate and adequate currents to bring plankton and remove wastes. Oyster reefs provide ecologically important functions including maintaining or improving water quality and providing productive habitats for a wide variety of organisms, including species of commercial and recreational importance (Texas Parks and Wildlife Department [TPWD] 2019).

The eastern oyster (*Crassostrea virginica*) is present throughout the Texas coast although at substantially reduced numbers than historically recorded (Ybarra 2021). Oyster reefs and beds have historically been abundant in Galveston Bay but have been negatively affected by various modifications to the bay that have resulted in increased salinity levels beyond the tolerance range for the eastern oyster (Butler 1954).

In 2008, Hurricane Ike made landfall in Galveston and is thought to have destroyed a large percentage of the remaining oyster reefs in Galveston Bay. The severe sediment deposition caused by this hurricane smothered many of the oyster reefs across the bay and buried the hard substrate that is required for oyster development. Additionally, Hurricane Harvey made landfall in Texas and Louisiana in 2017 and generated a massive rainfall event, resulting in a large influx of freshwater into Galveston Bay. The reduced influence of the calcium carbonate-buffered saltwater from the Gulf allowed the low-salinity bay water to have increased acidity for about three weeks, bringing damage to the oyster shells in the estuary (Hicks and Shamberger 2023). These environmental factors and the history of extreme weather suggest minimal viable oyster habitat exists within the project area.

The entire Cedar Bayou PA 2 expansion project footprint including approximately 100 acres of new area with a 500-foot (152-m) buffer added to the proposed PA boundaries for a total of approximately 224 acres was assessed for oyster habitat and SAV (including seagrasses) using a survey conducted in 2016 and historical data. Surveys from 2016 indicate the presence of oysters in the area surrounding CBNC and PAs 3 and 4. Results of the 2016 survey indicated the potential presence of oyster reefs within and bordering the proposed PA 2 expansion area. An oyster habitat ground-truthing field effort took place in July and August of 2025 to clarify the prior survey findings. During these efforts a combined total of approximately 2.93 acres of oyster resources were identified within the survey area, consisting of 0.81 acres of viable oyster habitat, and 2.12 acres of buried shell (black habitat). No live oysters were found in the patent tong samples. The viable oyster habitat consisted mostly of juvenile-sized (25–50 mm) oyster shells and shell fragments with no live oysters found. LEI (2025) concluded through substrate-poling that the substrate found across the area was mostly soft silty clay. All this evidence combined suggests that the environmental conditions within the survey area are not conducive to the natural colonization and growth of healthy oyster reefs (see Appendix A). Refer to Figure 4-2 for a map of oyster resources identified in the project area.

Oyster reefs and viable oyster habitats were also considered regarding the Texas Department of State Health Services (2025) shellfish harvesting area maps of Galveston Bay. Such maps indicate that oysters and other shellfish harvests are restricted to the north of the CBNC in the project area and are prohibited northwest of this channel.

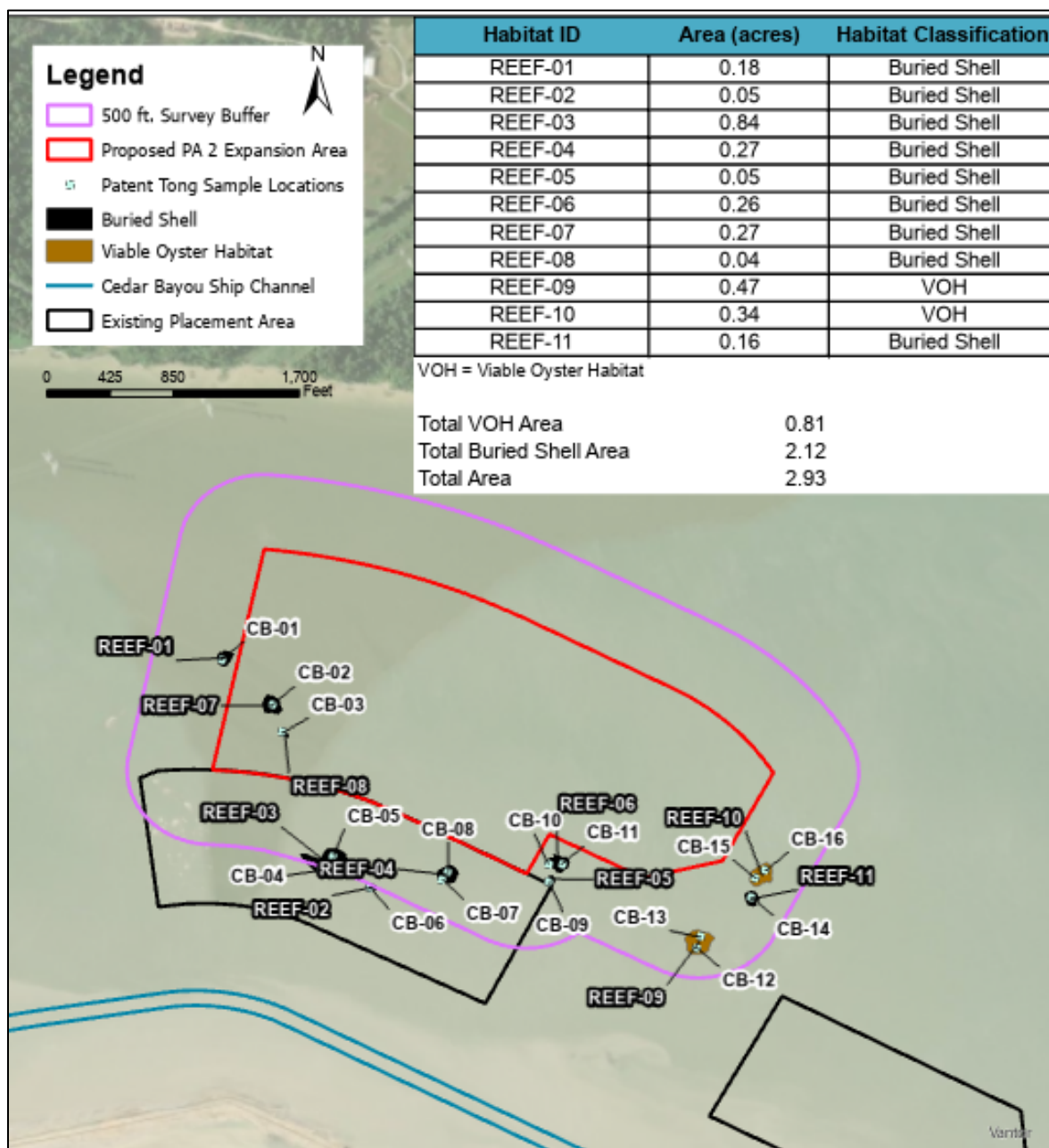


Figure 4-2. Oyster Habitats Delineated Within the 100-acre Project Area and 500-foot-wide Buffer Area

Source: Modified from Figure 2 of the oyster resources survey report by LEI (2025)

4.6.3 Consequences of the Proposed Action

No negative effects to wetlands or seagrasses (or other SAV) are expected as no evidence of such resources were found during the recent survey (Appendix A). The proposed action would not directly impact the natural colonization and growth of healthy oyster reefs. This is because

the project area is absent of living oysters or other exposed hard structure. The proposed PA 2 expansion would not directly impact viable oyster habitat through the placement of material. However, increased turbidity in the water column could indirectly affect oysters within the viable oyster habitat if it was colonized in the future. Therefore, placement of material may indirectly affect up to 0.81 acres of viable oyster habitat present in the 500-ft area buffer through the effects of temporary water quality impairment and sediment dispersion immediately following placement events. These effects would be temporary as water quality would return to baseline conditions following placement at PA 2. The preferred action was designed to avoid direct impacts to viable oyster habitat. Overall, all impacts to oyster reefs would be temporary and minor.

4.7 Fish & Wildlife

Relevant species other than those federally protected, and those having NOAA-designated EFH, are identified and discussed here. See Subsection 4.8 (Federally Protected Species) and 4.9 (Essential Fish Habitat) for these latter groups of species.

While most of the fish and wildlife discussed in this subsection are not state-listed in Texas by TPWD, such species and state protections are briefly discussed here. A query of the TPWD spatial database (<https://tpwd.texas.gov/gis/rtest/>) on 24 March 2025 revealed the following state-listed species in Harris County, Texas: 2 mollusks (both unionid mussels), 4 fishes (3 sharks, 1 freshwater bony fish), 1 amphibian (a toad), 7 reptiles (1 lizard, 6 turtles), 9 birds (migratory and non-migratory), and 19 mammals (marine/aquatic and bats). Texas categorizes the above species as either “state-threatened” or “state-endangered”. Protections afforded to these species by TPWD focus on direct impacts. State threatened and endangered animal species are protected from capture, trapping, taking, or killing, or attempting to do any of these actions (Title 31 of the Texas Administrative Code).

Atkinson Island wildlife—Atkinson Island, and its associated beneficial use PAs, is less than one mile southwest of the project area. This island supports wildlife such as rattlesnakes (presumably the western diamondback [*Crotalus atrox*] based on its range), shorebirds, wading birds, and raccoons (*Procyon lotor*) (USACE 2019). The northern portion of this island is a WMA managed by TPWD. TPWD (2025) notes that waterbirds, waterfowl, and rails utilize the Atkinson Island WMA. Migrating raptors and passerines stop at the WMA during spring and fall migrations. Hummingbirds visit the island in large numbers in September. Bird species reported to use this WMA include clapper rail (*Rallus crepitans*), horned lark (*Eremophila alpestris*), Nelson’s sparrow (*Ammospiza nelson*), white-tailed kite (*Elanus leucurus*), and gray catbird (*Dumetella carolinensis*) (TPWD 2025). Dominant vegetation of the WMA includes hackberry (*Celtis occidentalis*) and yaupon holly (*Ilex vomitoria*).

Shellfish and finfishes—Hundreds of species of shellfish and finfishes utilize Galveston Bay, and many of these likely utilize or pass through the project area at least occasionally. Some of the most common species of the bay include brown shrimp (*Penaeus aztecus*), white shrimp (*Penaeus setiferus*), blue crab (*Callinectes sapidus*), Gulf menhaden (*Brevoortia patronus*), Atlantic croaker (*Micropogonias undulatus*), spotted seatrout (*Cynoscion nebulosus*), gafftopsail catfish (*Bagre marinus*), gray snapper (*Lutjanus griseus*), and southern flounder (*Paralichthys lethostigma*) (GBEP 2025). The eastern oyster was once an abundant natural resource in the bay. Oysters are discussed under Subsection 4.6 (Wetlands and Special Aquatic Sites).

Amphibians & Reptiles—Southern leopard frogs (*Lithobates sphenoccephalus*) are known to utilize brackish waters in sloughs within Chambers and Harris counties for shelter and reproduction and utilize grassy meadows adjacent to Galveston Bay (USACE 2025). All life stages of leopard frogs are preyed upon by a host of fishes, reptiles, birds, and mammals.

Notable reptiles that utilize Galveston Bay include the Texas diamondback terrapin (*Malaclemys terrapin littoralis*) (Brennessel 2006) and the Gulf saltmarsh snake (*Nerodia clarkii clarkii*) (Tennant 1984). Historical records of terrapins in the Galveston Bay area suggest a formerly robust population. A once-active commercial fishery for terrapins in a bayou within this estuary was a matter of public record according to Brennessel (2006). An estimated 95% of the marshes that once supported terrapins and the Gulf saltmarsh snake in the Galveston Bay estuary have disappeared (Brennessel 2006). Gulf saltmarsh snake habitat in the bay area has decreased greatly since the early 1960s due to the draining of tidal wetlands in the area (Tennant 1984). Local populations of this snake are thought to have been impacted further by the presence of petrochemicals and sewage effluent from refineries, tankers, and commercial development (Tennant 1984). Terrapins and saltmarsh snakes have experienced declines in population in the Galveston Bay area (Tennant 1984, Brennessel 2006).

The reclusive and structure-oriented alligator snapping turtle (*Macrochelys temminckii*, state-threatened, with federal protection proposed) is unlikely to be found in Galveston Bay proper, such as in the project area, although it was documented in upstream areas by Gordon et al. (2023). Sea turtles may use the bay for foraging and are addressed in Subsection 4.8 (Federally Protected Species).

Birds—The northern portion of Galveston Bay is surrounded on most sides by hotspots for observing birds. The nearest bird-observation hotspot to the project area is Morgan's Point, about 1.5 miles west-by-southwest of the project area. Amateur naturalists have logged observations of 217 species of birds from this area according to searches of the Avian Knowledge Network (<https://avianknowledge.net/index.php/observations-map/>) and the eBird bird observation database (<https://ebird.org/explore>). A total of 21 bird species were reported to have been observed at Morgan's Point in high numbers (≥ 100 per observation event). These included common species like laughing gull (*Leucophaeus atricilla*) with an observation of 30,000 individuals on 19 December 2015, to species feeding in open water, such as black skimmer (*Rynchops niger*) with an estimated 500 individuals observed on 24 March 2007, and Forster's tern (*Sterna forsteri*) with an estimated 280 individuals observed on 02 January 2021.

Several bird species nest in or around Galveston Bay. Tree-nesting birds (egrets, herons, ibis, and the roseate spoonbill [*Platalea ajaja*]) appear to have local populations that are either stable or have moderately decreasing numbers (Galveston Bay Report Card 2025). Ground-nesting species of the bay, such as the black skimmer and the least tern (*Sternula antillarum*), generally show no major trend. The exception is the laughing gull which shows a moderately declining local population (Galveston Bay Report Card 2025).

4.7.1 Consequences of the Proposed Action

Larger more motile aquatic species currently utilizing this open-water habitat would be expected to actively relocate and avoid the area during construction, as there are no major physical barriers preventing such movements. The placement of dredged material in the project area would have adverse direct, short-term, and minor impacts on smaller, less motile demersal fishes and epifaunal and infaunal invertebrates within the project area. However, impacted species would be expected to recolonize living shoreline areas and adjacent open-water areas following construction. The direct, short-term loss of individuals within the spatially discrete project area ($>0.1\%$ of the 1,456-square-kilometers bay) is not expected to substantially impact the overall species richness or abundance in Galveston Bay as a whole.

Because the proposed action is not anticipated to result in the conversion of subtidal bay bottom habitat to any other type of habitat, there are no anticipated long-term effects to terrestrial, intertidal, or bird species. Birds have been observed to forage around dredged material placement operations in Galveston Bay if the material temporarily rises above surface water elevation before dispersing to subtidal elevations. Local bird populations may benefit from this short-term addition of foraging habitat.

4.8 Federally Protected Species

An assessment of federally protected species was conducted that fully addresses federally protected species of relevance to this EA, potential effects of the proposed action, and avoidance and minimization measures. The assessment includes a summary of the federal regulatory framework, discusses and addresses relevant federally protected species, includes results of a literature search and a query of available databases, summarizes potential impacts of the proposed action, and offers avoidance and minimization measures to reduce these impacts. Refer to Appendix B for the Federally Protected Species Assessment. A summary of findings is offered below.

Federally protected species that may potentially occur in or near the project area include the insects, birds, reptiles, fish and mammals listed in Table 4-1. Bird species protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703–712) and state-listed species may also occur in the project vicinity.

The project area is devoid of designated critical habitat. This subsection summarizes the federally protected species and potential effects of the proposed action to these species. See the Federally Protected Species Assessment in Appendix B for a thorough discussion and evaluation of possible effects of the proposed action compared to the no-action alternative.

Informal consultations with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) are summarized in Subsection 7.1 (Interagency Coordination and Consultations) for federally listed species under their jurisdiction that may be present within the project area. These consultations ensure compliance with the Endangered Species Act (ESA) of 1973. Appendix D contains the consultation correspondence.

Table 4-1. Summary of Federally Protected Species That May Potentially Occur In or Near the Project Area

Common Name (Scientific Name)	Federal Status	State (TPWD) Status
INSECTS		
Monarch butterfly (<i>Danaus plexippus</i>)	Proposed Threatened (USFWS) (88 FR 41560, 06/27/2023) Critical habitat is proposed (89 FR 100662, 12/12/2024)	(not listed)
FISHES		
Giant manta (<i>Mobula birostris</i>)	Threatened (NOAA Fisheries) (83 FR 2916, 01/22/2018) (no critical habitat designated)	(not listed)
Smalltooth sawfish (<i>Pristis pectinata</i>)	Endangered (NOAA Fisheries) (68 FR 15674, 04/01/2003) Critical habitat is designated (74 FR 45353, 09/02/2009)	Endangered
REPTILES		
Green sea turtle (<i>Chelonia mydas</i>) North Atlantic DPS	Threatened (co-managed) (43 FR 32800, 07/28/1978) Critical habitat is designated with more proposed (63 FR 46693, 09/02/1998 88 FR 46376, 07/19/2023)	Threatened
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	Endangered (co-managed) (35 FR 18319, 12/02/1970) Critical habitat is proposed (43 FR 45905, 11/29/1978)	Endangered
Loggerhead sea turtle (<i>Caretta caretta</i>)	Threatened (co-managed) (43 FR 32800, 07/28/1978) Critical habitat is designated (79 FR 39756, 07/10/2014)	Threatened
BIRDS		
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Protected under Bald and Golden Eagle Protection Act (USFWS) (no critical habitat designated)	(not listed)
Eastern black rail (<i>Laterallus jamaicensis jamaicensis</i>)	Threatened (USFWS) 85 FR 63764, 11/09/2020 (no critical habitat designated)	Threatened
Piping plover (<i>Charadrius melodus</i>)	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 (<i>Calidris canutus rufa</i>)	Threatened (USFWS) (79 FR 73705, 12/11/2014) Critical habitat is proposed (88 FR 22530, 04/13/2023)	Threatened

Common Name (Scientific Name)	Federal Status	State (TPWD) Status
Whooping crane (<i>Grus americana</i>)	Endangered (USFWS) (35 FR 8491, 06/02/1970) Critical habitat is designated (43 FR 20938, 05/15/1978)	Endangered
MAMMALS		
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Protected under the Marine Mammal Protection Act (NOAA Fisheries)	(not listed)
West Indian manatee (Florida manatee) (<i>Trichechus manatus</i> [<i>T. m. latirostris</i>])	Threatened (USFWS) (82 FR 16668, 04/05/2017) Critical habitat is designated with more proposed (42 FR 47840, 09/22/1977 89 FR 78134, 09/24/2024) Also protected by the Marine Mammal Protection Act (NOAA Fisheries)	Threatened

Sources: NMFS (2018), USFWS IPaC (<https://ipac.ecosphere.fws.gov/>) and ESA species (<https://www.fws.gov/species>) queries on 30 October 2025, TPWD Species of Greatest Conservation Need (<https://tpwd.texas.gov/wildlife-diversity/swap/sgcn/>) queries on 16 October 2025

4.8.1 Consequences of the Proposed Action

Based on all available data and the discussion and evaluation in the Federally Protected Species Assessment in Appendix B, the proposed action is predicted to have **no effect** or is **not likely to jeopardize the continued existence** of most (62%) of the federally protected species listed in Table 4-2. The proposed action **may affect, but is not likely to adversely affect** the giant manta (*Mobula birostris*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), and West Indian manatee (*Trichechus manatus*). See the Federally Protected Species Assessment in Appendix B for a thorough discussion of potential effects to federally protected species. Table 4-2 summarizes the habitat assessment and effects determination made for each species potentially in the project vicinity.

Table 4-2. Summary of Effects to Federally Protected Species from the Proposed Action

Common Name (Scientific Names)	Federal Protection Status	Proposed Action: ESA Section 7 Effects Determination	Summary of Effects
INSECTS			
Monarch butterfly (<i>Danaus plexippus</i>)	Proposed Threatened	Not likely to jeopardize	No suitable habitat in project area; minimization of lights will avoid/minimize any possible impacts.
FISHES			
Giant manta (<i>Mobula birostris</i>)	Threatened	May affect, but is not likely to adversely affect	Preferred habitat is pelagic open water; no evidence of this species entering Galveston Bay but cannot be ruled out completely.
Smalltooth sawfish (<i>Pristis pectinata</i>)	Endangered	No effect	Extremely rare in Texas waters; no known records from Galveston area since the 1960s.

Common Name (Scientific Names)	Federal Protection Status	Proposed Action: ESA Section 7 Effects Determination	Summary of Effects
REPTILES			
Green sea turtle (<i>Chelonia mydas</i>)	Threatened	May affect, but is not likely to adversely affect	No occurrences found near project area, but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	Endangered	May affect, but is not likely to adversely affect	No occurrences found near project area, but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
Loggerhead sea turtle (<i>Caretta caretta</i>)	Threatened	May affect, but is not likely to adversely affect	No occurrences found near project area, but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
BIRDS			
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Bald and Golden Eagle Protection Act	No effect	No effects to foraging or nesting habitats.
Eastern black rail (<i>Laterallus jamaicensis jamaicensis</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.
Piping plover (<i>Charadrius melodus</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.
Rufa red knot (<i>Calidris canutus rufa</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.
Whooping crane (<i>Grus americana</i>)	Endangered	No effect	No suitable habitat in or adjacent to project area.
MAMMALS			
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Marine Mammal Protection Act	No effect	Probably occurs in project area; individuals are highly motile and will avoid area during placement events.
West Indian manatee (Florida manatee) (<i>Trichechus manatus</i> [<i>T. m. latirostris</i>])	Threatened; Marine Mammal Protection Act	May affect, but is not likely to adversely affect	Rare in Texas waters; however, it is possible for this species to occur in warm months of year in project area; effects would be minimal as individuals are motile and will avoid placement activities.

Avoidance and Minimization Measures

The use of construction lighting at night shall be minimized, directed toward the work area, and shielded from view outside of the project area to the maximum extent practicable. This will help eliminate or reduce disorientation to migrating monarch butterflies and flying birds due to excessive lighting.

USACE will comply with applicable windows and protective measures for protection of sea turtles and manatees (and other marine mammals) as stated in the Gulf Regional Biological Opinion by NOAA Fisheries (2003) through Revision 2 of NMFS (2007) and the O&M-related Regional Biological Opinion by NMFS (2016). USACE will also comply with the construction conditions for protected species that are outlined in NOAA Fisheries (2021).

See Section 4 (Avoidance and Minimization Measures) of the Federally Protected Species Assessment in Appendix B for a full discussion of these measures.

Refer to Appendix D for records of agency consultations and concurrences.

4.9 Essential Fish Habitat

An EFH Assessment was prepared for the proposed PA 2 expansion project and is included in Appendix C. The EFH Assessment was written in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (MSA 16 U.S.C. 1855 (b)), including the Sustainable Fisheries Act (16 U.S.C. 1801) amendment of 1996, projects with potential impact to EFH must be analyzed. EFH is defined by NMFS (2004) and approved by the secretary of commerce acting through NMFS (50 CFR § 600.10) as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (MSA § 3[10]).

The EFH Assessment elucidates all EFH, including any Habitat Areas of Particular Concern of relevance to the proposed action, specifies and discusses potential impacts to EFH (broadly, turbidity and water quality and sedimentation), potential impacts, mitigation measures, and summarizes conclusions. The following is a summary of EFH of relevance to this EA. No Habitat Areas of Particular Concern were identified within Galveston Bay based on a literature search.

The project area contains estuarine EFH in the form of estuarine water column, estuarine mud substrate, and estuarine shell substrate. These habitats are designated as EFH for federally managed fisheries species because they provide nursery, foraging, and refuge habitats that support various economically important marine fishery species (Gulf of Mexico Fishery Management Council [GMFMC] 2004, 2005). These habitats also provide various essential estuarine support functions as discussed in (GMFMC 2004, 2005). Note that the Gulf of Mexico has been re-named the Gulf of America through Executive Order 14172, effective since 20 January 2025, and Secretary's Order 3423, effective since 07 February 2025.

The following species have EFH that are also applicable to the proposed action. This is based on descriptions from guidance documents including the South Atlantic Fishery Management Council (SAFMC) (1998a, b), GMFMC (1998, 2004, 2005), NOAA (2009), Mid-Atlantic Fishery Management Council (MAFMC) and NMFS (2011), and GMFMC and NMFS (2016). The NOAA Fisheries EFH Mapper (NOAA Fisheries 2025) online spatial database was used for supplemental information.

- Brown shrimp post-larval, juvenile, and subadult EFH
- Pink shrimp (*Penaeus duorarum*) juvenile and subadult EFH
- White shrimp post-larval, juvenile, subadult, adult, and spawning adult EFH
- Red drum (*Sciaenops ocellatus*) all life stages EFH
- Spanish mackerel (*Scomberomorus maculatus*) juvenile and adult EFH
- Gray snapper adult EFH
- Lane snapper (*Lutjanus synagris*) larvae, post-larvae, and juvenile EFH
- Red grouper (*Epinephelus morio*) early juvenile EFH

- Cobia (*Rachycentron canadum*) eggs and larvae EFH
- Blacktip shark (*Carcharhinus limbatus*) neonate and young-of-year EFH
- Bull shark (*C. leucas*) neonate, young-of-year, juvenile, and adult EFH
- Spinner shark (*C. brevipinna*) neonate and young-of-year EFH
- Bonnethead (*Sphyrna tiburo*) neonate and young-of-year EFH

Oyster reef habitat also fits the definition of EFH in MSA § 3(10) and is discussed and described as-such by Coen et al. (1999). However, a recent survey by LEI (2025) indicates an absence of live oysters (although oyster shells were observed). Oyster reef habitat is addressed as a component of EFH for federally managed species in Eco-region 4 (eastern Texas [including Galveston Bay] to western Louisiana) by the GMFMC (2004, 2005). Oysters and oyster reef habitat is discussed and addressed under Wetlands and Special Aquatic Sites in Subsection 4.6. Estuarine water column and estuarine mud substrate within the project area are described in Subsections 4.4 and 4.5; impacts of the proposed action are discussed there. Avoidance and minimization of those impacts are described and discussed in Section 6. See the EFH Assessment in Appendix C for a thorough discussion of EFH within the project area.

4.9.1 Consequences of the Proposed Action

In general, the designation and use of the Cedar Bayou PA 2 expansion area could potentially produce the following adverse environmental effects:

- Temporary water column perturbations (turbidity plumes, release of chemical contaminants, lowering dissolved oxygen concentrations)
- Mortality of benthic organisms
- Changing the bathymetry of the site
- Altering the sediment composition of the site

Potential Effects to Larval Invertebrates and Fishes—Short-term impacts to zooplankton, including planktonic larvae of federally managed invertebrates and fishes, resulting from dredged material placement may include mortality due to entrainment in the sediment plume and interference with filter-feeding caused by a temporary increase in suspended sediments. Pelagic eggs of fish can be smothered by re-suspended sediment (Suedel 2011). These impacts are expected to be short-term and localized and are not expected to significantly affect planktonic conditions in the region, especially considering that steps are taken in Tier II of the above-mentioned testing procedure to evaluate and prevent deleterious effects on zooplankton and other organisms of the water column before the dredged material is deemed suitable for open water placement.

Potential Effects to Pelagic Fishes—Placement activities at the site are expected to minimally affect pelagic fishes. Only a localized area will be affected by placement operations, and fish populations are not geographically limited to the PA 2 expansion area; therefore, the presence of such species within the affected area during placement operations is expected to be minimal. Pelagic fishes traveling through the immediate area may modify their route during discharge operations. Adult fishes within and immediately adjacent to the PA may experience a temporary reduction in the oxygen exchange capacity of their gills due to clogging and physical abrasion (Suedel 2011). A minor decrease in dissolved oxygen can occur due to increased biological oxygen demand associated with the dredged material. Additional stress in adult fishes can occur due to avoidance reactions (EPA 1995). Reproductive behavior of fishes has also been suggested to be impacted during placement activities (Suedel 2011). However, conditions that could impact pelagic fishes are expected to be short-term (measurable in hours) and localized (limited to the

PA), and the effects on adults and larger juveniles living within the water column are not expected to be significant given their ability to quickly avoid the localized area of placement activities.

Potential Impacts to Demersal Fishes and Shrimp— Placement of dredged material at the PA 2 expansion area may affect demersal fishes and other epifaunal populations in the short term. The immediate local effect of dredged material placement would be the burial of taxa such as penaeid shrimp, sea robins (*Prionotus* spp.), sand flounders (Paralichthyidae), and the blackcheek tonguefish (*Symphurus plagiusa*) as well as their epifaunal and infaunal prey. After dredged material is placed, much of the fine-grained sediment remains suspended near the bay bottom (Hirsch et al. 1978). This can cause stress in fishes in part due to the reduction of oxygen exchange capacity in the gills resulting from clogging and physical abrasion (EPA 1995, Suedel 2011). Larger juveniles and adults can avoid the suspended material by moving out of the area, but smaller juveniles are more vulnerable and susceptible to stress (Science Applications International Corp. 1986). Post-placement recovery of the local demersal fish populations may take 14 to 22 months, and recovery of the epibenthic invertebrate populations may take over two years, based on a dredge recolonization study in San Diego Bay conducted by Mooney (2010).

However, given the planned continuous or punctuated use of the PA 2 expansion area over a years-long period, local demersal fishes and epibenthic invertebrates may not fully recover between placement events. Over the long term, dredged material placement at the PA 2 expansion area may result in a localized decrease in demersal fish species diversity and abundance. These reductions could be caused, in part, by reduced food availability (EPA 1995).

Benthic infaunal and epifaunal populations, which are the main food sources for demersal fishes, decline when placement occurs frequently if these prey items are unable to re-establish themselves (Science Applications International Corp. 1986). Some recovery of the benthic community occurs within months, but complete recovery of the original benthic communities requires about 1 to 3 years according to studies by Germano and Rhoads (1984), Dillon (1984), and Scott et al. (1987), although recovery times vary widely between studies (Wilber and Clarke 2007). When placement occurs more often than yearly, the benthic community will likely experience reduced diversity and will support a more limited demersal fish community (EPA 1995).

4.10 Cultural Resources

There are no Texas Historical Places located within the PA 2 expansion area. The closest location of significance is a historical marker (No. 10613) for Bell Prairie approximately 0.9 miles northeast of the proposed PA 2 expansion boundary, on an upland residential site off Tri City Beach Road in Baytown, Harris County, Texas (Texas Historical Commission 2025). The site is the location of a plantation home and nearby wharf that were used for the importation of cattle from England. The home is no longer standing as it burned in 1915. There are no public records of any marine archaeological resources located within the project area. Archeological survey of the project area was completed in 2014 and did not find any significant remote sensing targets within the PA2 Expansion area. There are 2 magnetic anomalies identified outside of, but near, the project area, which have been previously recommended for avoidance (THC 2015).

4.10.1 Consequences of the Proposed Action

Review of previous survey areas provided by THC indicated that a 1.3-acre area of the proposed Cedar Bayou PA 2 Expansion Project area was not included in previous survey areas. The proposed Cedar Bayou PA 2 Expansion area was therefore modified during consultation with TSHPO to remove the area that was not covered by previous survey.

There are no known historical or cultural resources present in or near the proposed area of expansion for PA 2. No direct impacts to cultural resources are expected as no evidence of any such resources are known to occur in the action area. Additionally, the proposed action is the placement of dredged material with no excavation or dredging of the area proposed. Therefore, any unknown historic resources present in the area would not be impacted by the proposed project. Concurrence that the Project would not affect archaeological resources was received from the Texas State Historic Preservation Office at the Texas Historical Commission (See Appendix D).

4.11 Recreation, Aesthetics & Land Use

Current land use of the project area is limited to aquatic uses as the area is wholly or primarily comprised of submerged bay bottom. Recreational opportunities include fishing, although the only obvious fish-attracting structures seem to be a small number of small oyster reefs scattered near the project area. Aesthetics and recreation offered in the project area include views and photography of the horizon during sunrise and sunset, and of wildlife (e.g., bird watching, dolphin watching). Boating, kayaking, canoeing, and perhaps other water sports may be conducted in the project area on occasion. The project area is in the viewshed of the residential area Bay Oaks Harbor in the city of Baytown, Texas. There are also several residences in this area that have private boat ramps.

The Buddy McBride Public Boat Ramp is only about two miles northwest of the project area. Houston Yacht Club boat ramp is less than six miles southwest of the project area. There are several other public boat ramps within a 10-mile radius of the project area. There are several thousand registered water vessels within the Galveston Bay area (5,951 registered vessels in Chambers and Harris counties alone [BoatInfoWorld 2025]). Many citizens of bayside counties utilize Galveston Bay at least occasionally, for recreation.

There are no oil and gas wells in the PA 2 expansion area. There is one Highly Volatile Liquid Transmission pipeline, owned by Marathon Pipeline LLC, that bisects the project area (Railroad Commission of Texas 2025) (See Figure 3-1).

4.11.1 Consequences of the Proposed Action

The proposed project would not alter the use of the submerged land as the area would remain a submerged bay bottom. There will not be any project features that extend above the water line that would impede viewshed or recreational use of the area for boating or fishing. The use of the PA 2 is consistent with existing surrounding bay use. All placement activities would be consistent with the Texas Coastal Zone Management Program under the Coastal Zone Management Act (CZMA) of 1972.

4.12 Socioeconomics

The project area is within Galveston Bay and the nearest city to the project area is Baytown approximately 2 miles to the north. The community of Bay Oaks Harbor is along the closest shoreline, less than one mile northeast of the proposed PA 2 expansion area.

The population of Harris County (4,731,145) is about 100 times greater than that of nearby Chambers County (46,571) (U.S. Census Bureau 2025). The median ages for these areas are within 1 year of one another. Percent employment data was not available for Baytown but Chambers (61.7%) and Harris (63.8%) counties were similar to one another and were comparable to Texas (62.1%) (U.S. Census Bureau 2025). Chambers County had a much higher median household income (\$106,103) compared to Harris County (\$68,706). This is in contrast with the

relatively lower median education in Chambers County (only 22.8% with at least a bachelor degree) compared to Harris County (34.1%) (U.S. Census Bureau 2025). Population statistics for the city of Baytown and Chambers and Harris counties are compared to those of Texas in Table 4-3. Socioeconomic indicators are visually compared between these areas in Figure 4-3.

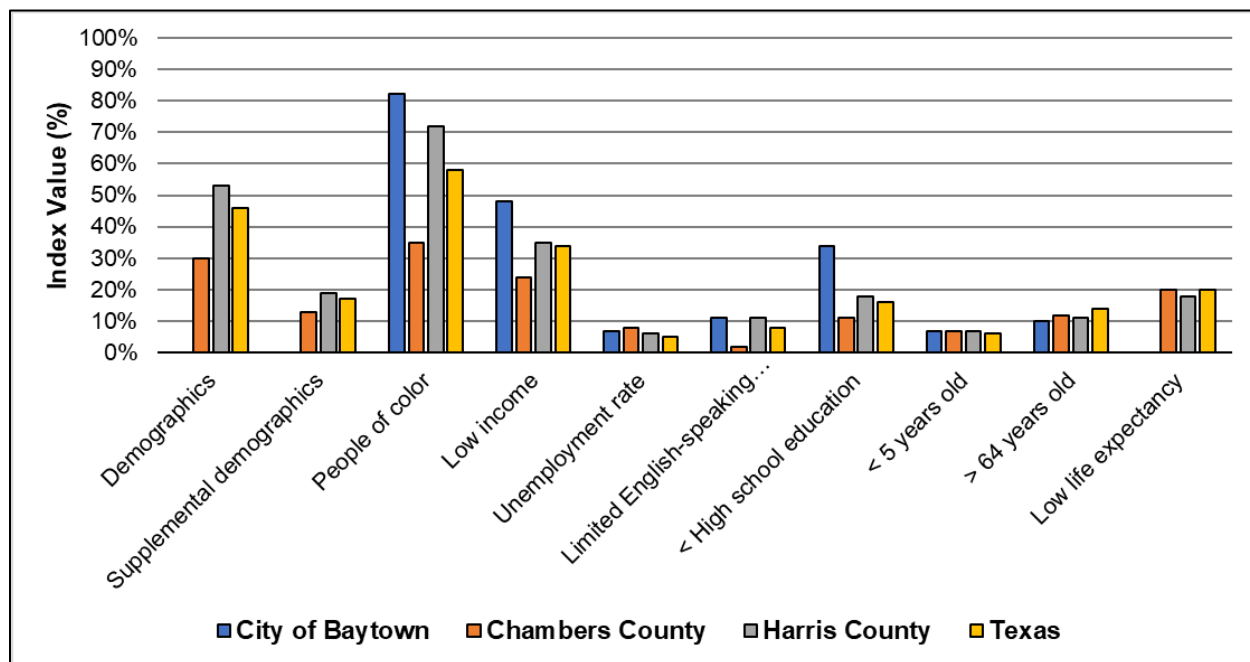


Figure 4-3. Socioeconomic Indicator Values for the City of Baytown, Chambers County, and Harris County Compared to the State of Texas

Sources: EPA Screen Community Report (<https://www.epa.gov/ejscreen>) accessed 23 Jan 2024 (not currently accessible as of 16 Oct 2025). Baytown data from <https://pedp-ejscreen.azurewebsites.net/>, searched online on 07 November 2025 (demographics indices not available for Baytown). Census year not stated.

Table 4-3. Population Statistics for the City of Baytown, Chambers County, and Harris County Compared to the State of Texas, 2021–2023

Population Statistic	City of Baytown	Chambers County	Harris County	Texas
Total population	12,746	46,571	4,731,145	29,145,505
Total households	4,299	16,558	1,842,683	11,449,769
Median age	—	35.4 ± 0.4	34.5 ± 0.1	35.6 ± 0.1
% employment	—	61.7%	63.82%	62.1%
Median household income	—	\$108,114	\$74,629	\$79,721
% education of ≥bachelor degree	—	23.0%	35.7%	35.2%
% without health care coverage	—	16.3%	20.48%	16.7%
Race and Ethnicity				
Native American	0%	<1% (337)	1.2% (55,011)	1.0% (278,948)
Asian	2%	1.4% (640)	7.4% (349,268)	5.4% (1,585,480)
African American	7%	6.9% (3,227)	19.2% (907,063)	12.2% (3,552,997)
Hispanic or Latino	73%	23.5% (10,952)	43.0% (2,034,709)	39.3% (11,441,717)
Hawaiian or other Pacific islander	0%	<1% (1)	<1% (4,141)	<1% (33,611)
White	18%	70.0% (32,614)	36.4% (1,720,356)	50.1% (14,609,365)
Other race	0%	9.3% (4,339)	18.9% (895,151)	13.6% (3,951,366)
Two or more races	1%	11.6% (5,413)	16.9% (800,155)	17.6% (5,133,738)
Language spoken at home				
% English	39%	79.4%	54.6%	64.9%
% Spanish	59%	19.1%	35.9%	28.3%
% other Indo-European languages	1%	0.4%	3.4%	2.6%
% Asian or Pacific islander	1%	1.0%	4.5%	3.1%
% other languages	0%	0.1%	1.5%	1.1%

Sources: U.S. Census Bureau (2025), searched online on 16 October 2025. Census data from 2021–2023. Baytown data from <https://pedp-ejscreen.azurewebsites.net/>, searched online on 07 November 2025 (some data not available).

4.12.1 Consequences of the Proposed Action

The project area for the proposed action is outside of any residential area and is physically removed from the nearest landform. The placement of O&M material in an open-water PA near the CBNC is comparable to ongoing placement activities at nearby open-water and upland confined disposal sites and will not directly affect the socioeconomics of the nearby community. However, the use of the PA 2 expansion area will support the continued safe and efficient operation of the CBNC. This, in turn, may have a positive indirect effect on local revenues and the socioeconomic conditions of surrounding communities influenced by industrial growth in the region.

4.13 Air Quality

The project area is within the Houston-Galveston-Brazoria non-attainment area. This area currently meets all EPA National Ambient Air Quality Standards except for ozone, which is designated as being in moderate non-attainment (USACE 2019). Air quality within the project vicinity is primarily influenced by emissions from industrial facilities, marine vessel traffic along the HSC and CBNC, and vehicular activity associated with nearby petrochemical and port operations. Localized background air quality data from the TCEQ monitoring stations in the cities of Baytown and Mont Belvieu indicate periodic exceedances of ozone during regional high-pressure events but generally compliant levels for other pollutants.

4.13.1 Consequences of the Proposed Action

No changes to air quality are expected resulting from the expansion of the Cedar Bayou PA 2 and the placement of dredged material into the PA beyond the expected future conditions or no-action alternative. No construction-related emissions would occur beyond ongoing routine maintenance activities, and therefore no change to existing air quality conditions would result. This is because the CBNC would need to undergo periodic O&M dredging and the dredged material would need to either be placed in a PA or disposed of at the Galveston ocean dredged material disposal site, regardless of if the proposed expansion is undertaken.

Temporary impacts to air quality would result from emissions from dredging vessels and would be comparable regardless of where the dredged material was placed. Air emissions would be generated over the short-term resulting from construction activities, but not to levels significantly higher than what presently occur under the No-Action Alternative, and air emissions would not be outside the normal range of emissions from other similar dredging and placement activities for Harris or Chambers counties.

4.14 Noise

Noise within the project area is largely generated by the following anthropogenic and natural sources:

- Commercial shipping traffic, including tugboats, associated with the CBNC, and the HSC about one mile west of the project area;
- Recreational boating traffic associated with the CBNC and HSC and elsewhere in Galveston Bay;
- Dredging equipment associated with regular O&M dredging of the CBNC;
- Dredged material placement activities at the nearby Atkinson Island beneficial use PAs and at existing PA 2 and PA 3; and
- Natural background sounds such as bird calls and sounds generated by wind and wave action.

Most of the noise within Galveston Bay is produced from anthropogenic sources associated with vessel traffic and dredged material activities (dredging and dredged material transport). Above-water noise emitted from motorboats typically range from 85 to 102 dB, ships of over 60,000 tons have been measured at 107.7 dB, noise from tugboats have been measured at 92.5 dB, and commercial fishing vessels were measured at 88–100 dB as reported by Berger et al. (2015).

4.14.1 Consequences of the Proposed Action

Noise would be generated during dredged material placement at the PA 2 expansion area. Such equipment as hydraulic dredges and lift pumps would be among the sources of noise associated with placement activities. These noises have been produced by placement activities at the

existing PA 2, along with other nearby PAs, and probably are difficult to detect any distance from the activities, due to the background sounds summarized above. Also, the shallow mud substrate is likely to dampen the sound to some extent. The activities associated with placement of O&M dredged material are of short duration and the types of noise generated are consistent with those already present within the vicinity of the project area. Overall, noise generated during placement activities at the PA 2 expansion area are not anticipated to greatly impact receptors in Galveston Bay, will be limited to short duration and negligible effects, and will be spatially limited to the project area.

5 CUMULATIVE IMPACTS

Cumulative impacts or effects are defined by the CEQ under 40 CFR § 1508.1 as the "...incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."

Past, present, and future actions considered here are those within about three miles of the area of the proposed action and are restricted to the aquatic area as this is the only area impacted by the project. This therefore includes projects within CBNC, portions of the HSC adjacent to the project area, Atkinson Island, PAs associated with Atkinson Island such as M12, and Cedar Bayou open-water PAs 2, 3, and 4. Projects beyond three miles in any direction from the project area have impact areas that are unlikely to spatially overlap with that of the proposed action and are therefore excluded from this cumulative impacts analysis.

Such actions include federal and non-federal (private) actions. The timeline of cumulative impacts is based on the duration of the impact. Impacted resources of consideration are those identified within Section 4 (Affected Environment & Potential Impacts). These environmental resources or parameters consist of:

- Water and Sediment Quality
- Sediment Topography and Bathymetry, Shoreline Erosion and Accretion
- Wetlands and Special Aquatic Sites
- Fish and Wildlife including Federally Protected Species and EFH
- Cultural Resources
- Recreation, Aesthetics and Land Use
- Socioeconomics
- Air Quality and Noise
- Oil and Gas Infrastructure

This section investigates the overall expected impact if the impacts from all past, present, and future actions were allowed to accumulate.

Most actions were identified primarily through a comprehensive review of the USACE regulatory permit database for permits within the study area of Galveston, Harris, and Chambers counties and located in waters of Galveston Bay or land adjacent to Galveston Bay. Individual project documents, such as public notices, draft and final EA and EISs, Records of Decision, newspaper articles, planning documents, and project websites or fact sheets, were also reviewed for impacts to the resource areas. No attempts were made to verify or update those documents, and no field data were collected to verify the impacts described in the above documents.

Note that detailed information regarding past, present, and reasonably foreseeable actions were limited, especially regarding cumulative impacts. In these cases, qualitative assessments were completed when possible. There is also a level of uncertainty involved in assessing impacts of projects that are either proposed or in progress. Most of the reasonably foreseeable projects are planned, but do not have definitive implementation schedules due to a variety of factors including

funding constraints and permitting. Furthermore, projects are often delayed or altered between the time they are announced and when they are completed or sometimes abandoned.

5.1 Projects Assessed for Cumulative Impacts

The projects assessed for cumulative impacts are listed below and illustrated in Figure 5-1. In most cases, the future impacts of these projects would be from dredging and dredged-material placement.

- **Ongoing Maintenance Dredging of CBNC**
 - Dredging events at this channel have the potential to create cumulative effects with the placement of material. There is not a pre-determined schedule for future maintenance dredging events; however, it is considered a reasonably foreseeable future action as maintenance dredging of the channel is an integral part of the operation of the ship channel and the key motivation for the purpose and need of the proposed project.
- **Vertex Energy Cedar Marine Terminals**
 - This is an approved USACE permit for the maintenance dredging of the Vertex Energy dock on Cedar Bayou. The permit authorizes the maintenance dredging of the dock and placement of the material at the upland PA 6 location. Future maintenance dredging or modification of the area could contribute to cumulative effects of the project due to proximity to the PA 2 site.
- **Atkinson Island Marsh and M12**
 - The Atkinson Island Marsh Beneficial Use Site and PA M12, are federally designated Dredged Material PAs located in the upper Galveston Bay estuary, south of CBNC. It is managed by the USACE as part of the HSC dredged material management system. The site has been used extensively for beneficial use of dredged material, including creation of intertidal marshes, bird habitat islands, and containment cells for HSC maintenance dredging. Expansion and use of these areas will continue for the foreseeable future and the sites proximity to the project location could contribute to cumulative effects with the proposed project.
- **Cedar Port Navigation District Channel Deepening Project**
 - USACE intends to prepare an EIS for the Cedar Port Navigation and Improvement District Channel Deepening Project, accompanied by a feasibility report prepared by Cedar Port Navigation and Improvement District under the authority granted by Section 203 of WRDA 1986. The study will identify and evaluate the feasibility of providing a deep-water connection between the HSC and a planned future deepwater terminal facility at Cedar Port Industrial Park while enhancing efficient, safe, and reliable navigation in the CBNC and HSC to existing stakeholder terminals.
- **Ongoing beneficial-use, wetland mitigation and habitat restoration projects**
 - There are various projects sponsored by the GLO, TCEQ, Port of Houston, Galveston Bay Foundation, and others for the benefit and restoration of the Galveston Bay system. The GLO funds a wide range of coastal restoration projects that are commonly used as beneficial-use recipients for dredged material (e.g., marsh nourishment using dredged sediments). Port Houston has undertaken/partnered on numerous habitat restoration projects in Galveston Bay, including development of thousands of acres of intertidal marsh, construction/restoration of bird habitat islands (e.g., Redfish Island partial restoration, Goat Island restoration), underwater berms for fish habitat, and marsh

creation using dredged material. USACE conducts beneficial-use placement of material at submerged areas and marsh areas for restoration of intertidal and oyster habitats. These projects could overlap in space and time with placement at PA 2 if located in the vicinity of the project expansion area and during a maintenance placement event.

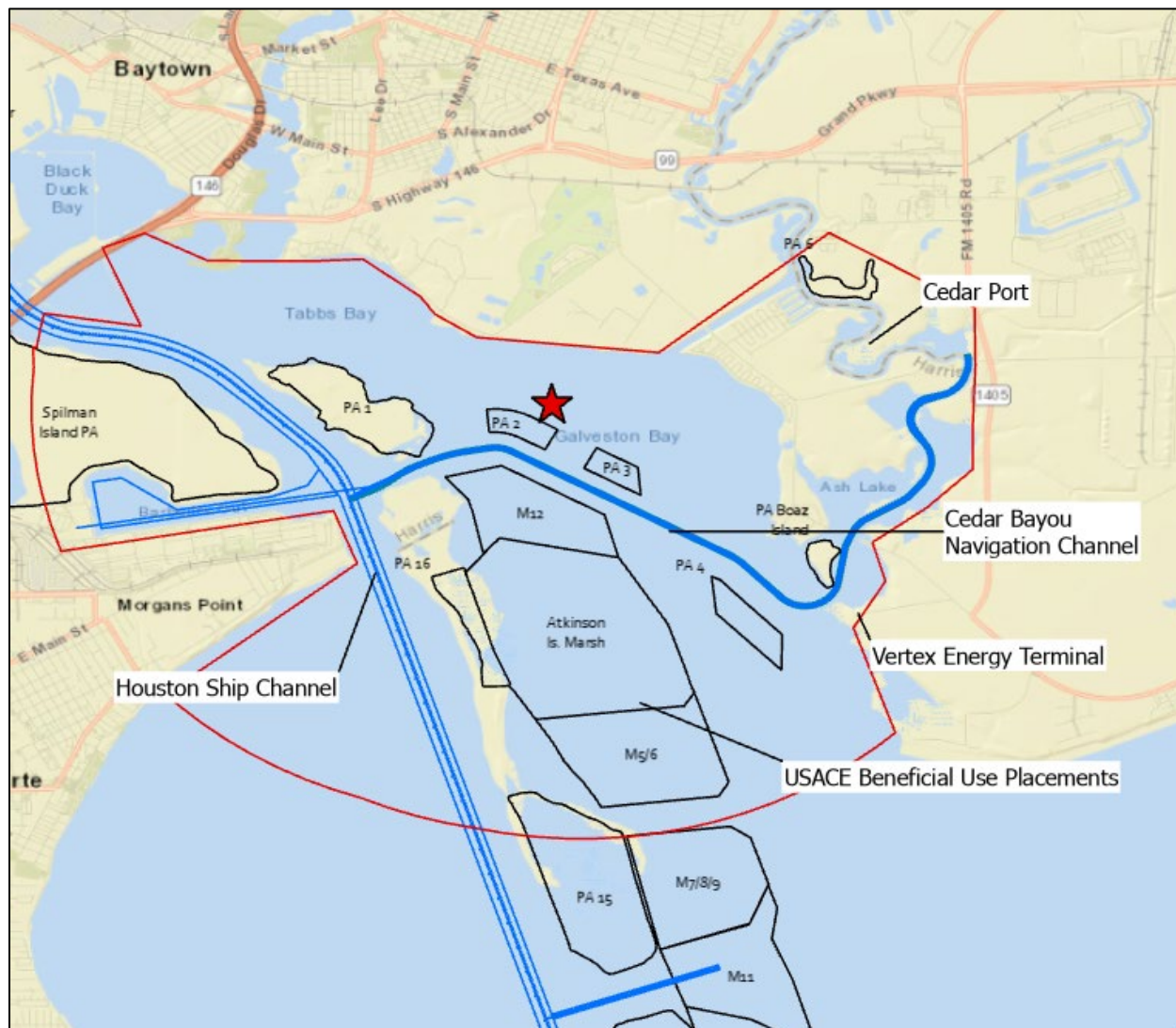


Figure 5-1. Map of Projects Within a 3-mile Radius Considered for Cumulative Impacts

5.2 Cumulative Effects Assessment

Based on information in Section 4.0 (Affected Environment & Potential Impacts), key resources are evaluated for cumulative effects as discussed above. The PA 2 expansion project is anticipated to have minor and temporary effects to water quality turbidity and bathymetry; and indirect and temporary effects to oyster reef resources. All other resources or effects were determined to be non-existent or considered negligible. Therefore, the cumulative effects assessment evaluates projects that could contribute to effects of the project to water quality or oyster resources. The following subsections discuss each of these key resources.

5.2.1 Water & Sediment Quality

Turbidity at the project area would increase beyond ambient levels during and immediately following dredged material placement. Dissolved oxygen levels are likely to decrease during construction and placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode.

Estuarine organisms within the bay are generally evolutionarily prepared for such stressors and would have physiological and (or) behavioral adaptations allowing them to survive such ephemeral perturbations successfully. Overall, the cumulative effects of this proposed action, combined with the predicted effects of other foreseeable actions would have temporary minor negative impacts. Future combined actions of beneficial use are expected to provide beneficial effects to water and sediment quality due to the functioning of marsh and oyster reef habitats within this region of the bay.

5.2.2 Sediment Topography & Bathymetry, Shoreline Erosion & Accretion

Dredged material placement would cause temporary changes in bathymetry at the PA 2 expansion area and could increase sediment transport through the dispersive actions of the open-water PA adjacent to the project area. These effects would be most pronounced during storm events and following heavy rain events. Similar processes may be associated with the expansion of PAs M12 and Atkinson Island Marsh.

The effects of dredging of the nearby HSC and CBNC reaches, and associated terminals, are not expected to add greatly to sediment transport or bathymetric changes in the bay apart from the use of open-water PAs such as at PA 2. The cumulative effects would be mainly short term, associated with the placement activities of the proposed action. Long-term effects are expected to be minor as all open-water PAs are intended to disperse over time.

5.2.3 Wetlands & Special Aquatic Sites

The project area is currently devoid of wetlands, SAV, and most other special aquatic sites as it is composed entirely of relatively flat subtidal bay bottom. The exception is that the project area was found to have a total of 0.81 acres of viable oyster habitat, most of which is located outside of the 100-acre project area but within the 500-foot buffer surrounding the project area. Placement of material at the PA 2 expansion area, in combination with other foreseeable projects, could create minor and temporary negative effects on viable oyster habitat in the vicinity of the project if that habitat was to be colonized. Water quality is expected to return to ambient conditions following placement activities and therefore, no permanent effects to oyster resources are anticipated that would cumulatively contribute to loss of oyster habitat in Galveston Bay.

6 AVOIDANCE & MINIMIZATION MEASURES

The project was intentionally designed to avoid and minimize impacts to natural resources, including oyster resources. As such, the project avoids the direct impact to any viable oyster habitat. In total, 0.81 acres of viable oyster habitat was identified during survey within the 500-foot survey buffer surrounding the proposed extension of PA 2. As discussed above, temporary impacts to this habitat may occur as a result increased turbidity caused by dredge material placement. With BMPs in practice, no permanent negative effects to oyster resources are anticipated.

This assessment of the potential environmental impacts to important resources finds that the proposed action would have negligible and insignificant adverse impacts to open-water habitat and fisheries resources. Additional impacts would be related to loss of slow moving or sessile benthic organisms due to the placement of dredged material. The abundance of similar habitat available elsewhere in the bay is expected to minimize the loss by providing refuge for displaced organisms. Therefore, no impacts have been identified that would require compensatory mitigation.

6.1 Construction Best Management Practices

BMPs would be adhered to during PA 2 dredged-material placement activities to minimize adverse effects. When considering impacts, it was assumed that, at a minimum, BMPs identified throughout this section would apply during placement activities. These BMPs are based primarily on widely accepted federal, state, and industry standards for relevant construction activities. The discussion below sets the minimum protective conditions for the proposed action. Environmental effects from the proposed action would be minimized to the extent practicable through implementation of the following BMPs:

- Refueling and maintenance of vehicles and equipment in designated areas to prevent accidental spills and potential contamination of water sources and the surrounding soils.
- Limiting idling of vehicles and equipment to reduce emissions.
- Limiting ground disturbance necessary for staging areas, access routes, pipeline routes, etc. to the smallest area necessary to safely operate during construction and restoring staging area and access routes to result in no permanent loss.
- Minimizing project equipment and vehicles transiting between the staging area and restoration site to the greatest extent practicable, including but not limited to using designated routes, confining vehicle access to the immediate needs of the project, and coordinating and sequencing work to minimize the frequency and density of vehicular traffic.
- Utilizing specialized project vehicles and mats when feasible to further minimize temporary disturbance to aquatic areas within the transportation.
- Minimizing use of construction lighting at night and when in use, directing lighting toward the construction activity area and shielding from view outside of the project area to the maximum extent practicable.

Water & Sediment Quality

- Placement of dredged material will adhere to the standards of the TCEQ's Water Quality Certification.

Fish & Wildlife Resources Including Protected Species & Essential Fish Habitat

- 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.
- All recommendations and requirements for avoidance of protected species from USFWS and (or) NOAA Fisheries will be incorporated where feasible for applicable species located in the project area.

6.2 Conclusions

The proposed project and other past, present, and reasonably foreseeable actions are expected to have overall minor cumulative impacts for the area as most projects include an aspect of BMPs and avoidance practices. Development projects that have adverse impacts to the resources discussed above are localized within the HSC and Galveston Bay complex and provide mitigation for adverse impacts. The adverse impacts of the proposed action, in combination with other potential projects, include temporary and minor impacts to water quality due to turbidity increases during placement and sediment transport of placed material. Therefore, the proposed action's negative contribution to cumulative impacts is anticipated to be minimal or insignificant.

7 COMPLIANCE WITH ENVIRONMENTAL LAWS & REGULATIONS

7.1 Interagency Coordination & Consultations

Scoping is an early and open process for developing the breadth of issues to be addressed in the EA and for identifying any significant concerns related to a proposed action. Federal, state, and local agencies with jurisdiction that could be affected by the proposed action were notified during the development of this EA. This notification is a requirement of the Intergovernmental Cooperation Act of 1968 (42 U.S.C. 4231[a]) and Executive Order 12372. Scoping with agency representatives began with letters sent to federal and state agencies on November 25, 2025, seeking comments and input on the project design and potential effects. Response to the scoping letter was received from NMFS requesting that the project initiate EFH consultation and conduct informal consultation under Section 7 of the ESA. A response was also received from THC, which identified a former archaeological survey conducted for the project area.

USACE initiated informal consultations with NMFS and USFWS under Section 7 of the ESA for affected federally protected species and with NMFS for EFH concurrently with the publication of the Draft EA. USFWS and NMFS have issued concurrence with the USACE's determinations regarding the project's effects. Correspondence regarding these concurrences is in Appendix D.

A request for concurrence was submitted to the Texas State Historic Preservation Office at the Texas Historical Commission. This request indicated a finding that the proposed action is unlikely to adversely affect historic properties listed, or eligible for listing, in the National Register of Historic Places. THC concurred with the finding. Correspondence regarding this concurrence is in Appendix D.

State Water Quality Certification has been received from the TCEQ. Determination that the project is consistent with the CZMA and CMP from the Texas General Land Office was received.

Correspondence regarding all agency coordination and all received determinations or concurrences, as well as conservation measures, are in Appendix D.

7.2 Government to Government Consultations

National Historic Preservation Act § 106 (54 U.S.C. 306101), and implementing regulations at 36 CFR Part 800, direct federal agencies to coordinate and consult with federally recognized Native American tribes historically affiliated with the land underlying a project area. Consistent with these regulations, Department of Defense (DoD) Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, and DAFI 90-2002, *Interactions with Federally Recognized Tribes*, federally recognized tribes that are historically affiliated with the Galveston Bay area are invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations.

The *Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships*, dated 26 Jan 2021, emphasizes the recognition of tribal sovereignty and self-governance and the commitment to fulfilling federal trust and treaty responsibilities to tribal nations. This memorandum prioritizes the regular, meaningful, and robust consultation with tribal

nations and honors the promises made between the U.S. Government and tribal nations for more than two centuries.

Relevant Native American tribal representatives were contacted via email to notify them of the posted public notice and invite them to comment. The following Native American tribes were consulted and were given 30 days to review and comment on the proposed action:

- Coushatta Tribe of Louisiana
- Alabama-Coushatta Tribe of Texas
- Kiowa Indian Tribe of Oklahoma
- The Comanche Nation
- Mescalero Apache Tribe
- Tonkawa Tribe of Oklahoma

No comments were received from Native American tribes.

7.3 Public Review of the Environmental Assessment

A notice of availability of Draft EA and request for public review and comment was published in the USACE Galveston District: Planning and Environmental Documents for Public Review. There were no comments received by the USACE.

8 REFERENCES

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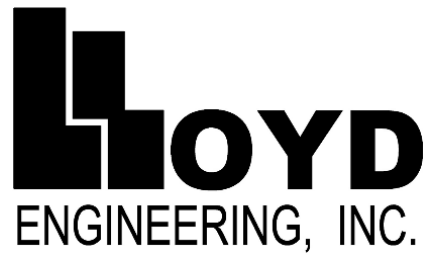
APPENDIX A
SPECIAL AQUATIC RESOURCES REPORT

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



**US Army Corps
of Engineers®**



SPECIAL AQUATIC RESOURCES SURVEY REPORT
CEDAR BAYOU PLACEMENT AREA 2 (PA 2)
EXPANSION PROJECT
GALVESTON BAY, TEXAS

Prepared for:

U.S. Army Corps of Engineers, Galveston District
2000 Fort Point Road
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Prepared by:

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August 2025

Table of Contents

	Page
Acronyms and Abbreviations	iii
1.0 INTRODUCTION.....	1-1
2.0 METHODS	2-2
3.0 RESULTS	3-1
3.1 PHASE 1	3-1
3.2 PHASE 2	3-1
4.0 CONCLUSIONS	4-2
5.0 REFERENCES.....	5-3

Appendices

Appendix A	Project Figures
Appendix B	Oyster Habitat Tables
Appendix C	Photo Log
Appendix D	Field Data Sheets

Acronyms, Abbreviations and Initialisms

CBC	Cedar Bayou Channel
C°	degrees Celsius
DGPS	Differential Global Positioning System
EA	Environmental Assessment
Etrac	Etrac, Inc.
GIS	Geographic Information System
GNSS	global navigation satellite system
HSC	Houston Ship Channel
LEI	Lloyd Engineering, Inc.
NAVD88	North American Vertical Datum 1988
PA	Placement Area
Project	Cedar Bayou Placement Area #2 Expansion Project
SBP	Sub-Bottom Profiler
SSS	side-scan sonar
su	standard unit
TPWD	Texas Parks and Wildlife Department
USACE	U.S. Army Corps of Engineers

1.0 Introduction

The U.S. Army Corps of Engineers (USACE) is proposing to expand the boundaries of the Cedar Bayou Channel (CBC) open-water placement area (PA) #2 as part of the Cedar Bayou Placement Area #2 Expansion Project (Project). The material proposed to be placed within the proposed expanded PA as part of the Project will be maintenance dredge material from the CBC, which spans approximately 12 miles within both Harris and Chambers counties from Cedar Bayou to channel station 03+00 of the Houston Ship Channel (HSC). The USACE contracted Lloyd Engineering, Inc. (LEI) to conduct a special aquatic resources survey within the newly proposed open-water placement area to support the preparation of an Environmental Assessment (EA) for the project. The proposed open-water placement site would be located in Galveston Bay, adjacent to the existing open-water PA 2 along the north side of the CBC between mile 2.5 and mile 3. The overall acreage of the expanded proposed open-water placement area includes approximately 101 acres of new area. However, a 500 ft buffer was added to the proposed placement area boundaries where appropriate (per Texas Parks and Wildlife [TPWD] protocols), which increased the total survey area for the Project to approximately 224 acres. See Figure 1 in Attachment A for a map depicting the precise location and outline of the survey area for the proposed open-water disposal site.

The purpose of the Project is to ensure continued navigational efficiency and safety within the CBC by providing dredge material disposal capacity for future maintenance dredging events. The purpose of this study is to identify areas within the proposed open-water placement area that could potentially be utilized as additional open-water placement areas for dredge material that will be excavated as part of normal maintenance operations. These areas would ideally be free of any viable seagrass or oyster resources that would be negatively impacted as a result of the placement of dredged material within open water placement areas due to siltation and increased water turbidity.

Eastern Oyster (*Crassostrea virginica*)

The eastern oyster (*Crassostrea virginica*) is a sessile bivalve mollusk that occurs throughout the Gulf of Mexico in shallow bays, mud flats, and offshore sandy bars (Stanley and Sellers, 1986). Oysters grow well on a variety of substrates, ranging from rocky bottoms to some types of mud. The presence and growth of oysters are closely correlated with salinity and other abiotic variables.

Oysters spawn from March through November in the northern Gulf of Mexico (Bulter, 1954), and the peak of spawning season in Texas is between May and early June (Stanley and Sellers, 1986). Spawning is triggered mostly by temperature when it rises above 20 degrees Celsius (C°) for normal spawn and above 25°C for mass spawning (Pattillo, et al., 1997).

Eggs hatch six hours after fertilization, and oyster larvae remain in the water column as meroplankton for two to three weeks after hatching (Patillo, et al., 1997). As a reference, settling or attachment to substrate was first observed in Galveston Bay about two months after spawning when the larvae were approximately 0.2 millimeter in length (Hopkins, 1931).

Upon settling or attachment, the sessile juveniles are referred to as spat. Spat-fall on the Gulf Coast typically occurs from March to mid-November (Gunter, 1955; Hopkins, 1931). Juveniles begin to develop once larvae attach. In the Gulf, sexual maturity of oysters may occur as soon as four weeks after attachment (Menzel, 1955), but generally maturation occurs at 18 to 24 months of age (Quast, et al., 1988).

Growth rates of adult oysters can vary greatly depending on conditions. Some adult oysters have been documented to grow at a rate of 50 millimeters per year (Bulter, 1954). Gunter (1951) provides growth rates of 60 millimeters in the first year, 90 millimeters in the second year, and 115 millimeters in the third year. Based on these growth rates, it is possible for an oyster to reach harvestable size of 76.2 millimeters (3 inches) within two years.

Oysters play a critical ecological role within the marine and estuarine ecosystems of the Texas coast. They provide many environmental services such as acting as filters by removing detritus and other particulates from the water column, providing habitat for a wide range of fish and other marine organisms, and acting as a sediment-stabilizing agent to help prevent the erosion of shorelines.

Seagrass

There are five species of seagrass which occur along the Texas coast, shoal grass (*Halodule wrightii*), turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), star grass (*Halophila engelmannii*), and widgeon grass (*Ruppia maritima*). Each of these species anchor themselves to the sediment with rhizomes, which are root structures that extend horizontally several centimeters below the sediment surface. Since the maximum height of seagrasses above the sediment surface is typically around 50 centimeters (cm), the water depth and clarity must be such that sunlight can penetrate to the sediment surface in order for the seagrass to thrive. Additionally, the sediment must be stable enough to allow seagrasses to establish their rhizomes. Therefore, seagrass thrives in areas with low wave action and predominantly sandy sediment.

Seagrasses play a critical ecological role within the estuarine ecosystems of the Texas coast. They provide sediment stabilization, therefore providing a natural erosion control measure. They also provide food and habitat for a wide range of fish and other marine organisms including some threatened and endangered species such as sea turtles and manatees.

2.0 Methods

The special aquatic resources survey methodology was completed in two phases. Phase 1 involved the study and confirmation of historical data previously collected by LEI in 2016 for the purpose of moving oysters from within the boundaries of the existing open-water PA 2 to open-water PA 4. This survey found a total of 1.613 acres of Oyster Resources within the boundaries of PA 2 that were moved to PA 4. Additionally, this survey also found 11 areas totaling 2.93 acres of potential oyster resource habitat within the proposed Project area. These areas were the focus of this special aquatic resources survey. On July 1, 2025, LEI scientists conducted a probing survey in order to confirm the presence of the hard-bottom areas identified in the 2016 survey, as well as to confirm the absence of hard bottom areas in the buffer area located along the northern edge of the proposed Project area. The areas identified in the 2016 survey were probed using an aluminum sounding pole equipped with a density gauging point on one end and a 3-inch sounding disk on the other. The sounding pole was deployed approximately every 10 feet across each anomaly to ensure appropriate sampling point density.

Phase 2 of the survey consisted of collecting verification and quantification samples of the hard bottom areas that were confirmed in Phase 1. On August 7, 2025, LEI ecologists conducted an oyster resources verification within the designated survey area. This survey was conducted according to the guidelines provided by the TPWD for the survey of oysters (TPWD, 2019). LEI ecologists conducted the oyster

resources survey under TPWD scientific research permit (SPR-0421-049), as required for sampling oysters within Texas state waters.

To comprehensively characterize the identified anomalies, hydraulic patent tongs were deployed at least once within each hard bottom habitat. These tongs, which sampled a 0.25 m² area, were designed to capture shell, shell hash, and associated reef species. Sample locations were recorded using a Trimble Geo 7X GNSS unit, and the retrieved contents at each location were photo-documented, described, measured, and classified. A map showing the patent tong sample locations can be found in Figure 3 in Attachment A.

When oysters were collected in the patent tongs, they were enumerated and categorized by size: shell pieces (partial shells <25 mm), spat (<25 mm), juvenile (26–50 mm), sub-adult (51–75 mm), or adult (>75 mm). The percentages of live and dead oysters were calculated by separating live oysters from the dead and determining a live-to-dead ratio. Live oysters were fully intact and tightly closed, while dead oysters were fully intact with connected valves but slightly to completely open. Whole single-valve or broken shells were not counted as dead oysters but classified as oyster shells. Any shell or man-made substrate larger than 1.5 by 2.5 inches was considered potential oyster resources (per Jan Culberson, TPWD). This data was then used to classify each anomaly into one of the following categories: mud; scattered shell on mud (brown habitat); buried shell (black habitat); and viable oyster habitat.

The substrate and oyster resources verification survey confirmed the composition of anomalies identified by the SSS data and verified the absence of hard-bottom habitat in areas lacking hard-bottom SSS signatures. This information helped characterize the bay floor's composition within the project survey area, assessed potential impacts, and aided in minimizing and avoiding those impacts where possible.

3.0 Results

The following sections describe the results and findings from Phase 1 and Phase 2 of the special aquatic resources survey conducted within the project area.

3.1 Phase 1

Results of the Phase 1 data acquisition confirmed the presence of 11 hard-bottom substrate anomaly signatures characteristic of scattered live oysters and/or consolidated oyster reefs totaling up to approximately 2.93 acres of potential oyster resources. The Phase 1 survey also indicated that substrate within the survey boundaries consist mostly of soft silty clay substrates. See Figure 2 in Attachment A for a map showing the confirmed hard bottom areas within the survey area.

Table 1 in Attachment C summarizes all of the anomaly signatures that were verified during Phase 1, and their characterization following the completion of Phase 2. Figure 2 in Attachment A shows the boundaries of each potential oyster resource area verified during Phase 1.

The survey crews did not observe any signs of seagrass habitat throughout the survey. It was noted that the high level of disturbance and lack of water clarity throughout the majority of the survey area was not conducive to the establishment and growth of seagrass due to the lack of sunlight reaching the sediment surface. Since there were no signs of seagrass habitat observed across the entire survey area in Phase 1, it was determined that no further investigations were necessary as part of Phase 2 of the survey.

3.2 Phase 2

Results of the Phase 2 habitat verification survey revealed that out of the 11 potential habitat areas identified during Phase 1, only 2 areas covering approximately 0.81 acres were confirmed to be viable oyster habitat. However, these areas consisted of mostly exposed juvenile-sized (25-50 mm) oyster shells and shell pieces. There were no live oysters, oysters observed in any of the patent tong samples taken throughout the survey area. Most associated reef organisms observed during the surveys were competitors or obligate species, however Crabs and polychaete worms were the most observed reef-associated species, with very few live hooked mussels or barnacles observed on the shells that were sampled. Field ecologists also observed very few oyster predators (e.g. boring sponges) in the samples that were taken, and no oyster drills were observed. However, several shells were observed with holes bored through them, indicating that there could have been predators present historically.

The remaining nine areas covering approximately 2.12 acres were classified as black habitat consisting of mostly buried juvenile, spat-sized shell pieces, and shell hash. The shells observed in these samples were brittle and stained black, indicating that they had been buried for a significant period of time. See Table 1 in Attachment B for the acreages and classification of each individual habitat. See Figure 3 in Attachment A for a map depicting all areas classified as viable oyster habitat, or black habitat.

Refer to Figure 3 in Appendix A for figures depicting the precise location of each patent tong sample location, the locations and boundaries of each habitat area investigated during Phase 2, as well as the areas verified as viable oyster habitat. Refer to Appendix C for a photo log showing the contents of each patent tong sample. Refer to Appendix D for the field data sheets containing field descriptions of each patent tong sample, along with the shell counts for each patent tong sample.

4.0 Conclusions

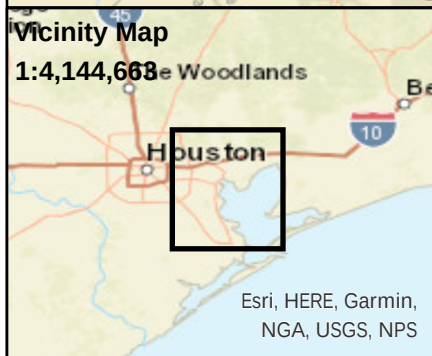
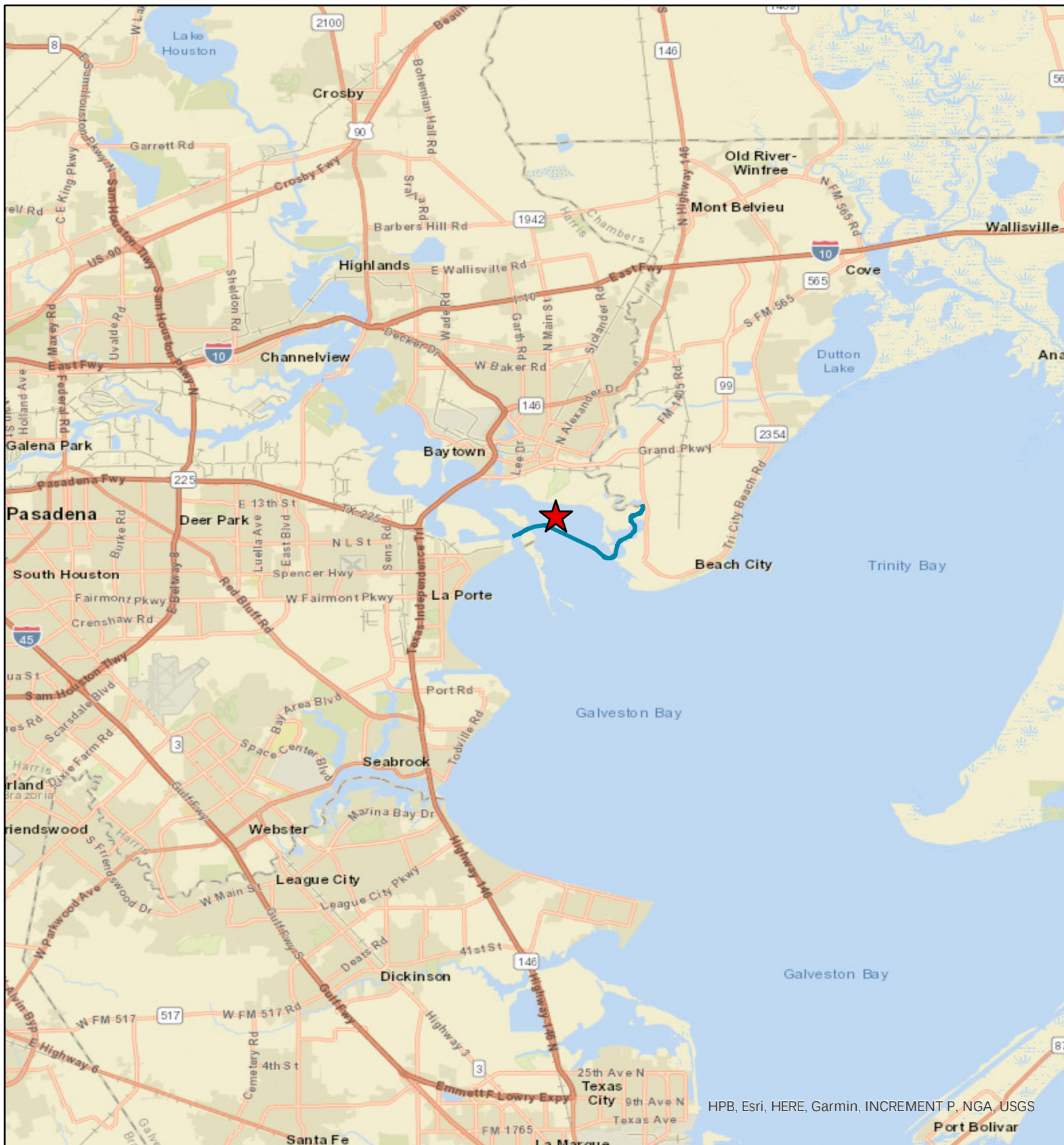
LEI was contracted by USACE to conduct an special aquatic resources survey to determine the presence or absence of seagrass and/or oyster resources and the potential for direct or indirect impacts as a result of the placement of new work dredge material within newly proposed open-water placement areas located in Matagorda Bay. The survey found a combined total of approximately 2.93 acres of oyster resources were identified within the survey area, consisting of 0.81 acres of viable oyster habitat, and 2.12 acres of black habitat (buried shell). There were no areas of scattered shell on top of mud found within the survey area. No live oysters were found, and the majority of oyster shells observed during the survey were juvenile-sized oyster shells and shell pieces. There were no seagrasses identified in the survey area. The bathymetry survey found that the sediment elevations across the majority of the site ranged from -2 to -4 ft MLLW, but was highly disturbed due to recent dredge material discharge operations within the existing PA 2 area. The substrate found across the area was mostly soft silty clay. All of this evidence combined suggests that the environmental conditions within the survey area are not conducive to the natural colonization and growth of healthy oyster reefs.

5.0 References

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Appendix A

Project Figures



Legend

-  Cedar Bayou Ship Channel
-  USACE Cedar Bayou PA2 Expansion Project

0 5,000 10,000 20,000 Feet



Figure 1: Project Vicinity Map

Cedar Bayou Channel
Placement Area 2 Expansion Project
U.S. Army Corps of Engineers
Harris County, Texas

Date: Aug 13, 2025

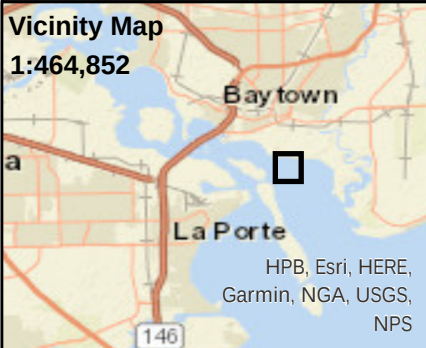
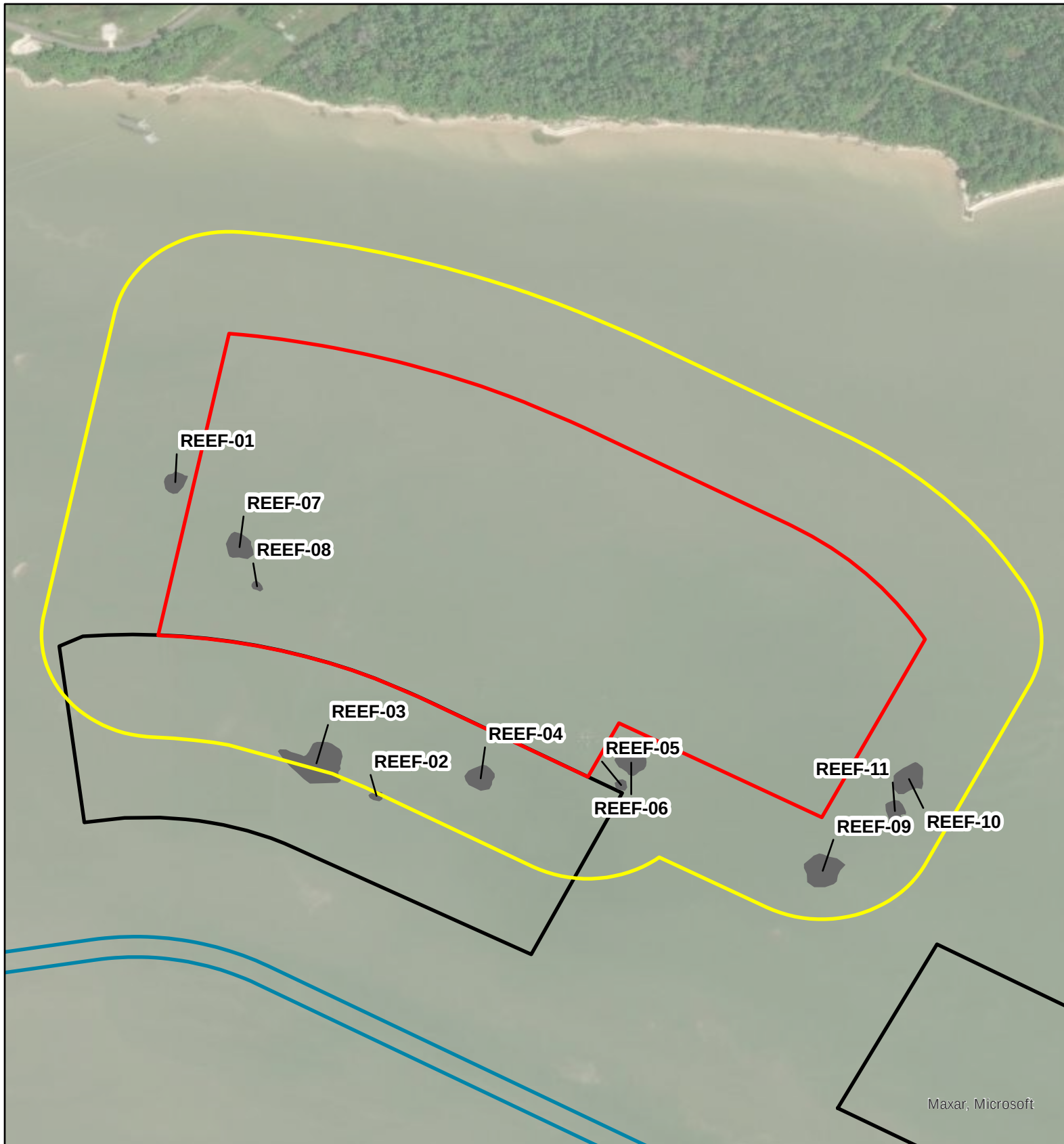
Prepared By: LEI

Prepared For: USACE

Project: PA2 Expansion



**US Army Corps
of Engineers®**



Legend

- 500 ft. Survey Buffer
- Proposed PA2 Expansion Area
- Confirmed Hard Bottom Habitats (Delineated in 2016)
- Cedar Bayou Ship Channel
- Existing Placement Area

0 162.5 325 650 Feet



Figure 2: Phase 1 Survey Results

Cedar Bayou Channel
Placement Area 2 Expansion Project
U.S. Army Corps of Engineers
Harris County, Texas

Date: Sep 03, 2025

Prepared By: LEI

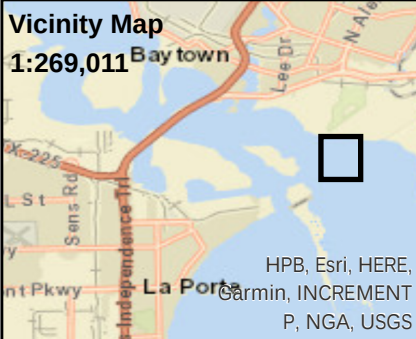
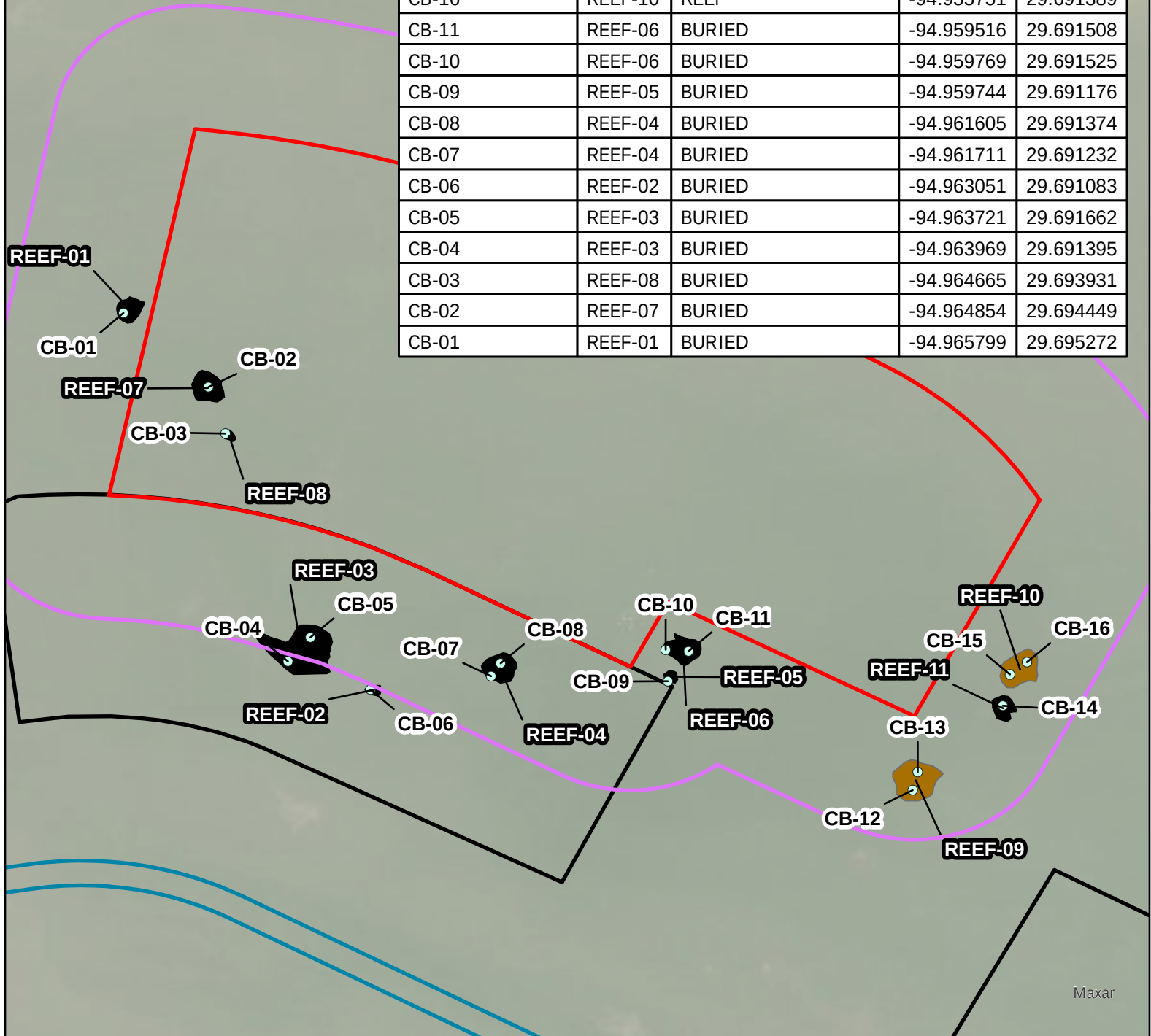
Prepared For: USACE

Project: CB PA2 Expansion



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Sample Point ID	Reef ID	Habitat Classification	Longitude	Latitude
CB-12	REEF-09	REEF	-94.957022	29.689964
CB-13	REEF-09	BURIED	-94.956966	29.690165
CB-14	REEF-11	BURIED	-94.95602	29.690904
CB-15	REEF-10	REEF	-94.95594	29.69125
CB-16	REEF-10	REEF	-94.955751	29.691389
CB-11	REEF-06	BURIED	-94.959516	29.691508
CB-10	REEF-06	BURIED	-94.959769	29.691525
CB-09	REEF-05	BURIED	-94.959744	29.691176
CB-08	REEF-04	BURIED	-94.961605	29.691374
CB-07	REEF-04	BURIED	-94.961711	29.691232
CB-06	REEF-02	BURIED	-94.963051	29.691083
CB-05	REEF-03	BURIED	-94.963721	29.691662
CB-04	REEF-03	BURIED	-94.963969	29.691395
CB-03	REEF-08	BURIED	-94.964665	29.693931
CB-02	REEF-07	BURIED	-94.964854	29.694449
CB-01	REEF-01	BURIED	-94.965799	29.695272



Legend

- 500 ft. Survey Buffer
- Proposed PA2 Expansion Area
- Patent Tong Sample Locations
- Buried Shell
- Viable Oyster Habitat
- Cedar Bayou Ship Channel
- Existing Placement Area

0 140 280 560 Feet



Figure 3: Phase 2 Survey Results

Cedar Bayou Channel
Placement Area 2 Expansion Project
U.S. Army Corps of Engineers
Harris County, Texas

Date: Sep 03, 2025

Prepared By: LEI

Prepared For: USACE

Project: CB 2 Expansion



**US Army Corps
of Engineers®**

Appendix B

Habitat Result Tables

Table 1
Phase 1 Habitat Summary Table

Habitat ID	Area (acres)	Habitat Classification
REEF-01	0.18	Buried Shell
REEF-02	0.05	Buried Shell
REEF-03	0.84	Buried Shell
REEF-04	0.27	Buried Shell
REEF-05	0.05	Buried Shell
REEF-06	0.26	Buried Shell
REEF-07	0.27	Buried Shell
REEF-08	0.04	Buried Shell
REEF-09	0.47	VOH
REEF-10	0.34	VOH
REEF-11	0.16	Buried Shell

VOH = Viable Oyster Habitat

Total VOH Area	0.81
Total Buried Shell Area	2.12
Total Area	2.93

Appendix C

Photo Log

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 1: Patent tong contents from sample location CB-12



Photo 2: Patent tong contents from sample location CB-13

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 3: Patent tong contents from sample location CB-14



Photo 4: Patent tong contents from sample location CB-15

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 5: Patent tong contents from sample location CB-16



Photo 6: Patent tong contents from sample location CB-11

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 7: Patent tong contents from sample location CB-10



Photo 8: Patent tong contents from sample location CB-09

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 9: Patent tong contents from sample location CB-07



Photo 10: Patent tong contents from sample location CB-05

Oyster Resources Survey
Cedar Bayou Placement Area 2 Expansion Project
Site Photographs



Photo 11: Patent tong contents from sample location CB-04



Photo 12: Patent tong contents from sample location CB-01

Appendix D

Oyster Data Sheets



OYSTER SURVEY DATA FORM

Project: USACE CBA Expansion Project

Location:

Names: BS TR

Date: 08/07/25

Weather Conditions: Sunny, hot
Water Conditions: calm
Tide Conditions:

Station ID	Water Depth (ft)	Dredge, Probe or Grab	Time of Dredge (sec)	Length of Dredge (ft)	Substrate Composition	% Live	% Dead	Oyster Composition					Total Live Oysters	Total Dead Oysters	Picture #
								Number of Live Oysters by Size							
								Spat (<25mm) (<0.98")	Juvenile (26-50mm) (0.99-1.06")	Sub-Adult (51-75mm) (1.07-2.95")	Adult (>76mm) (>2.96")				
CB-12	3.0	Grab	-	-	Silty clay	0	100	8	20	11	20	59	0	0701	
CB-13	3.2	Grab	-	-	Silty clay	0	100	-	32	28	24		0	0702	
CB-14	3.0	Grab	-	-	Silty clay	0	100	0	5	3	3	11	0	0703	
CB-15	4.2	Grab	-	-	Silty clay	0	100	15	20	12	16	53	0	0704	
CB-16	3.4	Grab	-	-	Silty clay	0	100	20	12	3	6	41	0	0705	
CB-11	4.1	Grab	-	-	Silty clay			13	15	13	24	59	1	0706	
CB-10	4.2	Grab	-	-	Silty clay	0	100	8	0	1	0	9	0	0707	
CB-09	4.2	Grab	-	-	Silty clay	0	100	0	0	1	2	3	0	0708	
CB-08	3.0	Grab	-	-	Silty clay	0	100	30	12	7	4	123	0	0709 -	
CB-07	3.9	Grab	-	-	Silty clay	0	100	0	9	9	1	1	0	0709A	
CB-06	3.0	Grab	-	-	Silty clay	0	100	0	0	1	0	1	0	0710 -	
CB-05	3.0	Grab	-	-	Silty clay	0	100	0	0	2	0	2	0	0710B	
CB-04	2.95	Grab	-	-	Silty clay	0	100	8	20	12	4	1	0	0711 0711	
CB-03	4.0	Grab	-	-	Silty clay	0	100	9	9	4	4	0	0	0712	
CB-02	2.7	Grab	-	-	Silty clay	0	100	2	4	8	4	918	0	0713	
CB-01	3.6	Grab	-	-	Silty clay	0	100	0	12	6	16	34	0	0714	
OVERALL TOTALS															
						% Live	% Dead	Total Spat	Total Juvenile	Total Sub-Adult	Total Adult	Total Dead Oysters	Total Live Oysters		

APPENDIX B
FEDERALLY PROTECTED SPECIES ASSESSMENT

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



**FEDERALLY PROTECTED SPECIES ASSESSMENT
FOR THE
CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
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February 2026

TABLE OF CONTENTS

1	INTRODUCTION	4
1.1	Background.....	4
1.2	Proposed Action & Project Area.....	5
1.3	Regulatory Framework.....	7
1.3.1	National Environmental Policy Act of 1969.....	7
1.3.2	Endangered Species Act of 1973.....	7
1.3.3	Bald & Golden Eagle Protection Act of 1940	7
1.3.4	Migratory Bird Treaty Act of 1918.....	8
1.3.5	Marine Mammal Protection Act of 1972.....	8
2	FEDERALLY PROTECTED SPECIES OF INTEREST.....	9
2.1	Searches of Available Literature & Databases	10
2.2	Occurrence of Species & Their Critical Habitat.....	11
3	EFFECTS ANALYSIS OF PROPOSED ACTION	27
3.1	Effects to Monarch Butterfly	27
3.2	Effects to the Giant Manta & Smalltooth Sawfish	27
3.4	Effects to Sea Turtles & Their Critical Habitat.....	27
3.5	Effects to Birds & Their Critical Habitat	29
3.6	Effects to Aquatic & Avian Mammals.....	29
4	AVOIDANCE & MINIMIZATION MEASURES	31
4.1	Monarch Butterfly	31
4.2	Giant Manta	31
4.3	Sea Turtles	31
4.4	Birds	31
4.5	Manatees & Dolphins	32
5	SUMMARY OF EFFECTS	33
6	REFERENCES	35

LIST OF TABLES

Table 2-1.	Summary of Federally Protected Species That May Occur In or Near the Project Area	9
Table 2-2.	Summary of Smalltooth Sawfish Records from Chambers, Galveston, and Harris Counties, Texas, Based on a Literature Search.....	13
Table 5-1.	Summary of Effects to Federally Protected Species from the Proposed Action.....	33

LIST OF FIGURES

Figure 1-1.	Cedar Bayou Federal Navigation Channel and Surrounding Placement Areas in Upper Galveston Bay, Texas	5
Figure 1-2.	Conceptual Design of the Proposed Action: Cedar Bayou Placement Area 2 Expansion Area in Galveston Bay, Texas	6
Figure 2-1.	Encounters with Smalltooth Sawfish (<i>Pristis pectinata</i>) Recorded from In and Around Galveston Bay Based on an International Sawfish Encounter Database Query.....	14
Figure 2-3.	Green Sea Turtle (<i>Chelonia mydas</i>) Proposed Critical Habitat in Texas Includes Galveston Bay	16
Figure 2-4.	Loggerhead Sea Turtle (<i>Caretta caretta</i>) Critical Habitat ‘LOGG-S-02’ off the Texas Coast, from 10-m Contour to the U.S. Exclusive Economic Zone	17
Figure 2-5.	Eastern Black Rail (<i>Laterallus jamaicensis jamaicensis</i>) Distribution within Texas.....	19
Figure 2-6.	Eastern Black Rail (<i>Laterallus jamaicensis jamaicensis</i>) Breeding Status per County During 2011–2016	20
Figure 2-7.	Examples of Habitats Typically Used by the Eastern Black Rail (<i>Laterallus jamaicensis jamaicensis</i>).....	21
Figure 2-8.	Critical Habitat for the Piping Plover (<i>Charadrius melodus</i>) Includes Bolivar Beach (TX-36) and Two Other Areas (TX-35 and TX-37) Adjacent to the Project Area	22
Figure 2-9.	Proposed Critical Habitat for the <i>Rufa</i> Red Knot (<i>Calidris canutus rufa</i>) Includes the Gulf Side of the Bolivar Peninsula (TX-1) Adjacent to the Project Area	24
Figure 2-10.	Proposed Critical Habitat for the <i>Rufa</i> Red Knot (<i>Calidris canutus rufa</i>) Includes the Gulf Side of Galveston Island (TX-2) Adjacent to the Project Area.....	25

ACRONYMS, ABBREVIATIONS & INITIALISMS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973
GCBR	Global Core Biodata Resource
iDigBio	integrated digitized biocollections
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
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, regulations for implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500–1508, and USACE NEPA implementing regulation ER 200-2-2 in USACE (1988). The EA evaluates potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2). The EA evaluates practicable alternatives for the proposed action, assesses anticipated effects, recommends best management practices, and measures to avoid and minimize adverse effects resulting from the proposed action.

1.1 Background

The Cedar Bayou Navigation Channel (CBNC) was established by congress in 1930 from the natural stream course of Cedar Bayou (Rivers and Harbors Act of 1930, Public Law 520). Since establishment, this channel has been maintained by the USACE. The maintenance of the CBNC has been reauthorized by the Water Resources Development Act (WRDA) in 2000, 2007, and most recently in 2022, for improvements to the channel. The Cedar Bayou channel spans approximately 12 miles within Harris and Chambers counties from channel mile 11 to station 03+00 of the Houston Ship Channel (HSC). However, the USACE currently maintains the Bay Reach of the CBNC from the Houston Ship Channel at Mile -2.7 (station 03+00 of the HSC) to the Bayou Reach of the CBNC at Mile 3, totaling a 5.7 mile portion of the channel that is federally maintained. For this EA, the CBNC refers to this federally maintained 5.7-mile portion.

Originally six placement areas (named PA 1 through PA 6) were designated for use for placement of material dredged from the CBNC. Three of these (PA 2, PA 3, and PA 4) were for open-water placement. PA 6 is an upland-confined placement area which remains in use but has limited capacity for future use. PA 3 and PA 4 also have limited availability and operational restrictions. PA 1 (also called Hogg Island) and PA 5 (also called Boaz Island) are no longer available for material placement due to capacity limitations and the need to avoid encroaching on neighboring federal projects. Therefore, PA 2 is currently the preferred placement area for maintenance material originating from the CBNC due to its availability, proximity to the channel, and cost efficiency. Refer to Figure 1-1 below for a vicinity map of the project location and existing channels and placement areas.



Figure 1-1. Cedar Bayou Federal Navigation Channel and Surrounding Placement Areas in Upper Galveston Bay, Texas

1.2 Proposed Action & Project Area

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the CBNC. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

The project area is in upper Galveston Bay, north of Atkinson Island and the CBNC. The project area is submerged land granted from the State of Texas, Texas General Land Office, to Port Houston Authority via a land grant with Navigation Servitude Easement granted to the USACE. The water depth within the project area is shallow and subtidal, with water depths in the area are typically within the range of 3 to 6 feet with tidal variations. Bottom elevations were from -2 to -4 feet [-0.6 to -1.2 m] mean lower low water (MLLW) based on survey conducted via sounding pole in August 2025 following a recent placement action. Existing PA 3 is approximately 47 acres and is located approximately 1,500 feet east of PA 2. Figure 2-1 below shows the proposed expansion area for PA 2 and its location in relation to the CBNC, PA 3, and PA 4.

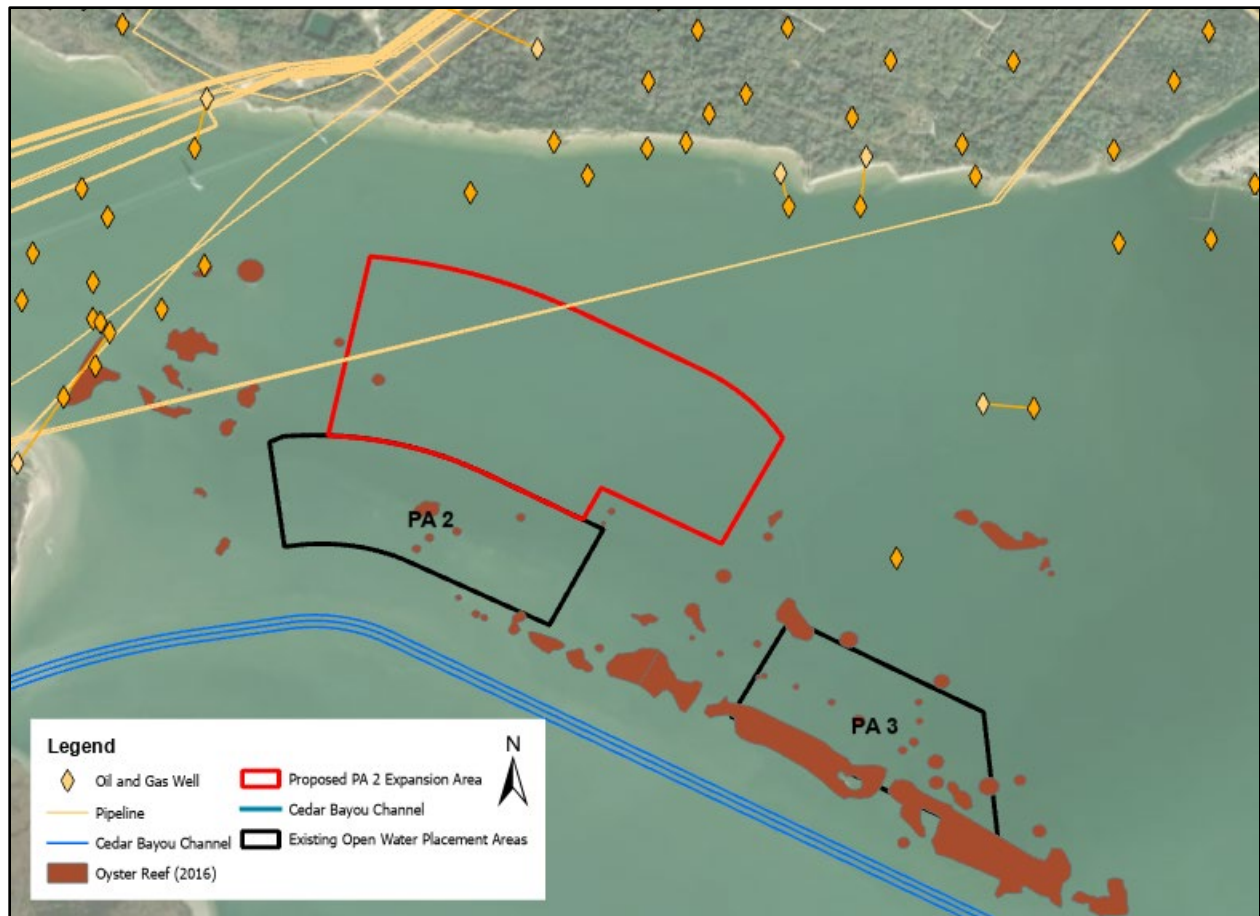


Figure 1-2. Conceptual Design of the Proposed Action: Cedar Bayou Placement Area 2 Expansion Area in Galveston Bay, Texas

1.3 Regulatory Framework

1.3.1 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 Environmental Impact Statement (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.

1.3.2 Endangered Species Act of 1973

The Endangered Species Act (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 proposed PA 2 expansion project area are incorporated into the ESA § 7 consultation as part of this assessment.

1.3.3 Bald & Golden Eagle Protection Act of 1940

The Bald and Golden Eagle Protection Act (16 U.S. Code [U.S.C.] 668-668d) has been amended several times since its 1940 enactment (U.S. Fish and Wildlife Service [USFWS] 2025a). 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 2025a).

1.3.4 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>.

1.3.5 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 (National Oceanic and Atmospheric Administration [NOAA] Fisheries 2024). This act is facilitated by NOAA Fisheries for cetaceans (whales, dolphins, and porpoises) 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 in or near the project area include the insects, fishes, reptiles, birds, and mammals listed in Table 2-1 below. This section lists and discusses these federally protected species as they relate to the proposed action. Federally protected species that lead strictly pelagic open-water lifestyles, and terrestrial plant species, are omitted from consideration of possible effects of this estuarine-based proposed action area. Likewise, Galveston Bay 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 the Project Area

Common Name (Scientific Name)	Status	
	Federal	State (TPWD)
INSECTS		
Monarch butterfly (<i>Danaus plexippus</i>)	Proposed threatened (USFWS) (89 FR 100662, 12/12/2024) (critical habitat proposed but not yet designated)	(not listed)
FISHES		
Giant manta (<i>Mobula birostris</i>)	Threatened (NOAA Fisheries) (83 FR 2916, 01/22/2018) (no critical habitat designated)	(not listed)
Smalltooth sawfish (<i>Pristis pectinata</i>)	Endangered (NOAA Fisheries) (68 FR 15674, 04/01/2003) Critical habitat is designated (74 FR 45363, 09/02/2009)	Endangered
REPTILES		
Green sea turtle (<i>Chelonia mydas</i>)	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
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	Endangered (co-managed) (35 FR 18319, 12/02/1970) Critical habitat is proposed (43 FR 45905, 11/29/1978)	Endangered
Loggerhead sea turtle (<i>Caretta caretta</i>)	Threatened (co-managed) (43 FR 32800, 07/28/1978) Critical habitat is designated (79 FR 39856, 07/10/2014)	Endangered
BIRDS		
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Protected under Bald and Golden Eagle Protection Act (USFWS)	(not listed)
Eastern black rail (<i>Laterallus jamaicensis jamaicensis</i>)	Threatened (USFWS) (85 FR 63764, 10/08/2020) (no critical habitat designated)	Threatened

Common Name (Scientific Name)	Status	
	Federal	State (TPWD)
Piping plover (<i>Charadrius melodus</i>)	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 (<i>Calidris canutus rufa</i>)	Threatened (USFWS) (79 FR 73705, 12/11/2014) Critical habitat is proposed (88 FR 22530, 04/13/2023)	Threatened
Whooping crane (<i>Grus americana</i>)	Endangered (USFWS) (35 FR 8491, 06/02/1970) Critical habitat is designated (43 FR 36588, 08/17/1978)	Endangered
MAMMALS		
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Protected under the Marine Mammal Protection Act (NOAA Fisheries)	(not listed)
West Indian manatee (Florida manatee) (<i>Trichechus manatus</i> [<i>T. m. latirostris</i>])	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

Sources: National Marine Fisheries Service ([NMFS] 2018), Seitz and Waters (2018, 2020), USFWS IPaC (<https://ipac.ecosphere.fws.gov/>) and ESA species (<https://www.fws.gov/species>) queries on 30 October 2025, Texas Parks and Wildlife Department (TPWD) Species of Greatest Conservation Need (<https://tpwd.texas.gov/landwater/land/tcap/sqcn.phtml>) queries on 16 October 2025.

2.1 Searches of Available Literature & Databases

Searches were conducted of the available literature, and in online databases, on 16 and 30 October 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)
- Avian Knowledge Network, a partnership of federal and state agencies and non-governmental organizations (<https://avianknowledge.net/>)
- 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 has been proposed to be protected as a Threatened species under the ESA since 12 December 2024, and critical habitat was proposed to be designated by USFWS (2024, 2025b). However, ESA protection has not yet been enacted, nor has critical habitat been designated at the time of writing. The proposed critical habitat consists of seven units, including five subunits, along coastal areas of California (USFWS 2024).

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 only two records of monarch butterflies in the GCBR for the Galveston Bay area (both records are from 2025). A search of iNaturalist produced 2,845 research-grade observations of this species in Harris County, Texas, from 2020 to present. Observations were primarily associated with the cities of Houston and Clear Lake, probably due to the relatively high numbers of people in these areas rather than a true reflection of relative density of Monarch butterflies. The two closest research-grade observations were from Morgan's Point (10 May 2025) and Baytown (09 October 2025). 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 (Walls 1975, Hoese and Moore 1977, Shipp 1986, McEachran and Fechhelm 1998) although recent work suggests the presence of a newly described cryptic species, *Mobula yarae* in the western Atlantic including the Gulf (Bucair et al. 2025). NMFS (2020) reported anecdotal records of manta (reported as *M. birostris*) captures during relocation-trawling efforts in the Gulf but gave no further spatial or temporal information. In the northern Gulf, one or more species of manta (*Mobula birostris* and [or] *M. yarae*) are most often observed over the Flower Garden Banks National Marine Sanctuary (McEachran and Fechhelm 1998, Childs 2001, Stewart et al. 2018) which is approximately 100 nmi (120 mi, 190 km) south of Galveston. The individuals observed at the Flower Garden Banks are mostly juveniles according to Stewart et al. (2018) and these researchers reported a mean estimated disc width of 2.25 m and median disc width of 2.12 m out of 104 mantas observed there. However, note that a thesis by Childs (2001) reported mantas (as *M. birostris*) up to 5 m disc width from the Flower Garden Banks based on 134 observations of this species in that area.

There is at least one record of an individual manta captured in Corpus Christi Bay (Hoese and Moore 1977). Mantas have historically been reported (as *M. birostris*) entering shallow inlets along the South Carolina coast at high tide and returning to the sea at ebb tide (Bigelow and Schroeder

1953). These authors considered this species to be common near the mouth of the Mississippi River, stating that ‘schools of them have been reported along the borders of muddy water where the Mississippi flows in the Gulf’ (page 510 of Bigelow and Schroeder 1953). Nevertheless, mantas do not appear to commonly enter bays in recent times, although they may have in the past. 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.

Nursery habitat for *M. birostris* has not been reported with certainty. No critical habitat has been designated for this species (NMFS 2019). A study by Pate and Marshall (2020) suggested that a nursery for juvenile mantas (*M. birostris* and [or] *M. yarae*) may occur off the Atlantic coast of Florida, from St. Lucie Island southward through Boynton Beach Inlet. These authors conducted 175 boat-based surveys from June 2016 through December 2019 during which they documented 150 encounters with mantas. Water depths where these animals were observed averaged 2.7 m (range 0.8–9.8 m) and all but one of the mantas observed had estimated disc widths of ≤ 3 m. These sightings suggest immature individuals frequent this area, as they were below the known disc widths for mature males (375–400 cm) or females (410–470 cm) summarized by White and Last (2016). The Pate and Marshall (2020) study documented a high degree of site fidelity of the juvenile mantas in their study area, including across years, and appears to meet the definition of a elasmobranch nursery as defined by Heupel et al. (2007).

Smalltooth Sawfish (*Pristis pectinata*)

The smalltooth sawfish occurs in Texas coastal waters, but it is currently considered to be very rare in this state. The range of this species is generally contained within tropical and subtropical latitudes. The current center of distribution for this species in U.S. waters is southern Florida (Waters et al. 2014). Critical habitat has been designated for this species but it 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.

The largetooth sawfish (*Pristis pristis*) is a morphologically similar species to the smalltooth sawfish, is federally endangered, and once inhabited Texas waters in low numbers. However, this species has not been recorded from Texas waters since the 1960s and is believed to have been extirpated from the United States as a whole (Seitz and Waters 2018, 2020).

A search of smalltooth sawfish records from Chambers, Galveston, and Harris counties was conducted with 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]) on 30 October 2025 revealed 20 encounters with smalltooth sawfish (Table 2-2). All the encounters were attributed to Galveston County. No encounters from Harris and Chambers counties could be found for this species. The records found spanned from the late 1930s through 1967. Most of these encounters were recorded near or in the lower bay, especially along the Gulf coast or associated with inlets. The closest recorded location for a sawfish encounter is over 15 miles south of the project area. Figure 2-1 shows plotted localities of smalltooth sawfish encounters in Galveston Bay.

An additional 74 sawfish encounters were also recorded in the Sawfish Recovery Database, were only identified to the genus *Pristis*, and were encountered within Galveston County from 1874 to 1979. These records are not included in the table or figure below.

Table 2-2. Summary of Smalltooth Sawfish Records from Chambers, Galveston, and Harris Counties, Texas, Based on a Literature Search

Date of Encounter	County	Total Length (cm)	Source(s), Notes
31-Aug-1967	Galveston	427	NSED-04469; capture in surf near San Luis Pass, Galveston; held at Sea-Arama on Galveston Island
1967	Galveston	122	Hewlett (1977); NSED-05126; capture "near Galveston"; held captive in Sea-Arama, later moved to Dallas World Aquarium
11-May-1961	Galveston	77	NSED-05905; capture in Trinity Bay or San Luis Pass, Galveston Bay
1953	Galveston	100 ($n = 6$)	NSED-01780; captures in Galveston
Early 1950s	Galveston	320	NSED-05929; capture in Galveston, Intercoastal Waterway by Greens Lake Cut
1947	Galveston	140	NSED-01769; Galveston
< xx-Apr-1940	Galveston	610	NSED-04287; capture in Gulf waters near Galveston
1938	Galveston	457	NSED-04341; capture in Galveston
Late 1930s	Galveston	Not recorded	NSED-05910; capture in San Luis Pass, Galveston
Not recorded	Galveston	Not recorded, $n = 6$	NSED-02111 through 02116; M. McDavitt database; coll. B.L. Baughman (see Baughman 1943)

NSED = National Sawfish Encounter Database (predecessor of the International Sawfish Encounter Database, now known as the Sawfish Recovery Database)

Sources: International Sawfish Encounter Database (ISED) query results provided by Adam Brame, NOAA Fisheries Southeast Regional Office, St. Petersburg, FL; and sources cited above.

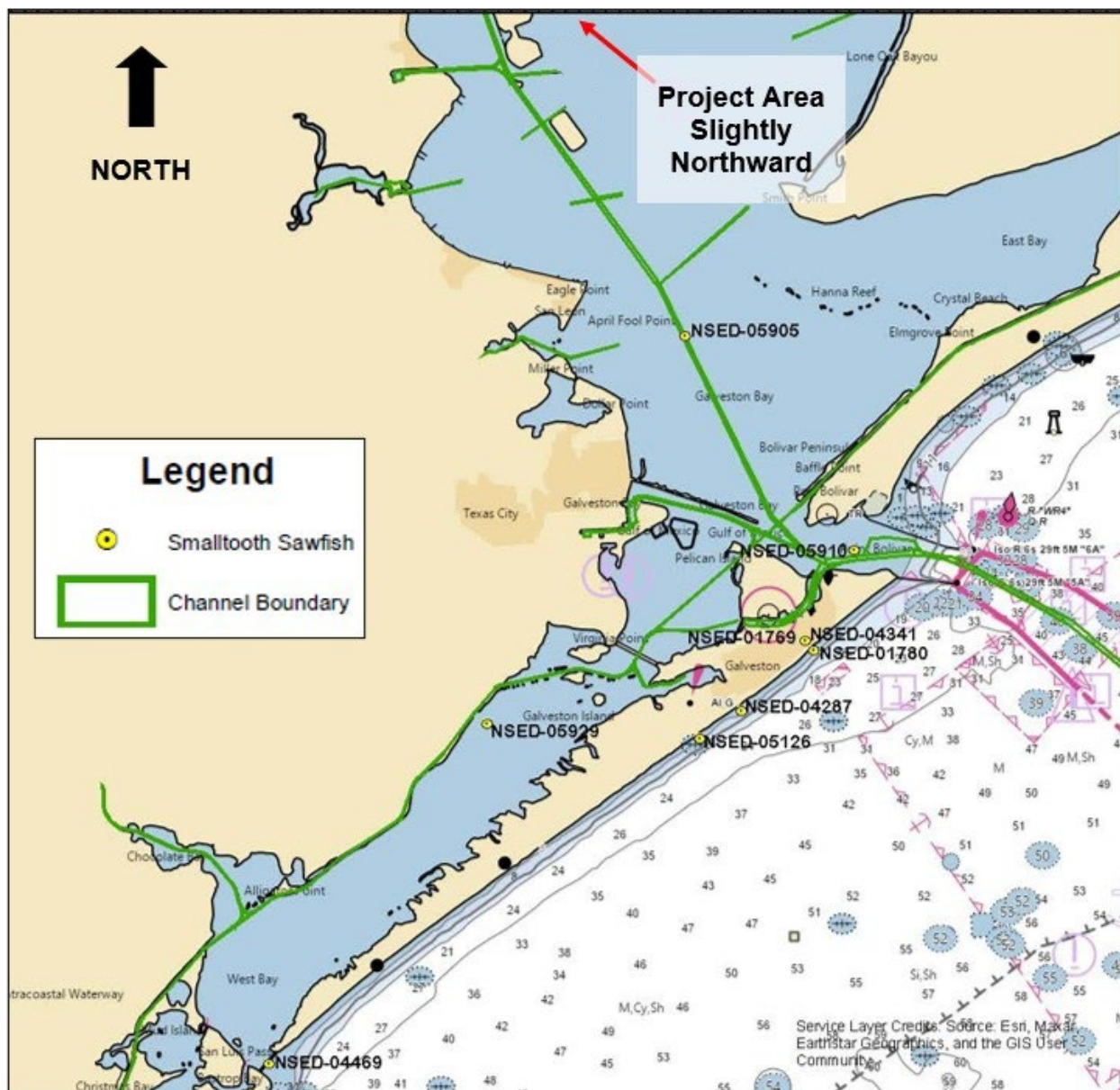


Figure 2-2. Encounters with Smalltooth Sawfish (*Pristis pectinata*) Recorded from In and Around Galveston Bay Based on an International Sawfish Encounter Database Query

Notes: Yellow dots represent an encounter with a smalltooth sawfish; NSED = National Sawfish Encounter Database (predecessor of the ISED); see Table 2-2 for details on each sawfish encounter.

Source: ISED query results provided by Adam Brame, NOAA Fisheries Southeast Regional Office, St. Petersburg, FL; and sources cited above.

Sea Turtles (Cheloniidae & Dermochelyidae)

Five species of federally threatened or endangered sea turtles occur in coastal Texas waters (Girondot 2015, Witherington and Witherington 2015). Of these, only three species—green (*Chelonia mydas*), loggerhead (*Caretta caretta*), and Kemp’s ridley (*Lepidochelys kempii*) sea turtles are known to utilize Galveston Bay waters. NMFS (2023a) stated that Galveston Bay supports a resident population of green turtles. NMFS went on to state 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 no research grade records for loggerheads, green turtles, or Kemp's ridley turtles in Harris County for the period 2020 through present. There were also no research grade records for any of these species in Chambers County for this period. Several records were found for all three of these species in Galveston County for this time period, but this county is over 10 miles south of the project area, and most of these records were in nearshore Gulf waters or associated with inlets. 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). This area is over 30 miles south of the project area.

No records were found for hawksbill sea turtle (*Eretmochelys imbricata*) or leatherback (*Dermochelys coriacea*) within Galveston Bay or nearby waters.

Critical habitat has been designated for all five species but there is no designated critical habitat in Galveston Bay for these species (USFWS IPaC <https://ipac.ecosphere.fws.gov/>). However, critical habitat has been proposed in July 2023 for the North Atlantic distinct population segment of green sea turtle for portions of the Texas coastline by NMFS (2023b). Proposed critical habitat unit 'TX01' includes the project area and includes much of Galveston Bay and out to Gulf waters along the continental slope (NMFS 2023a, b) (Figure 2-3). This critical habitat has not been finalized as of this writing.

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 2-4). 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 are dependent on the presence of floating pelagic macroalgae, *Sargassum fluitans* and *S. natans*, commonly referred to simply as sargassum. Such habitat does not exist in the Galveston Bay project area but does occur elsewhere, in portions of the Gulf (Gower and King 2008).

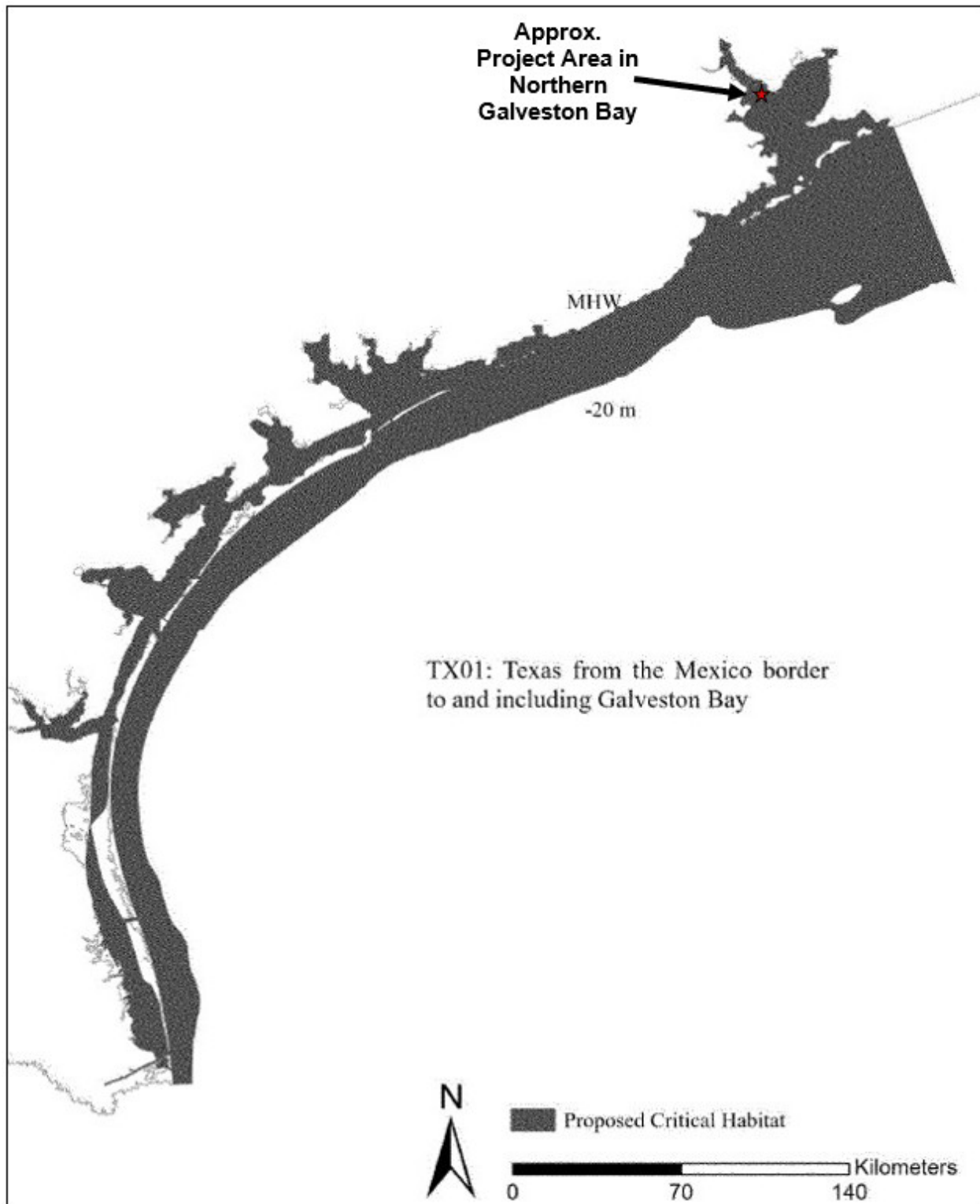


Figure 2-3. Green Sea Turtle (*Chelonia mydas*) Proposed Critical Habitat in Texas Includes Galveston Bay

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)

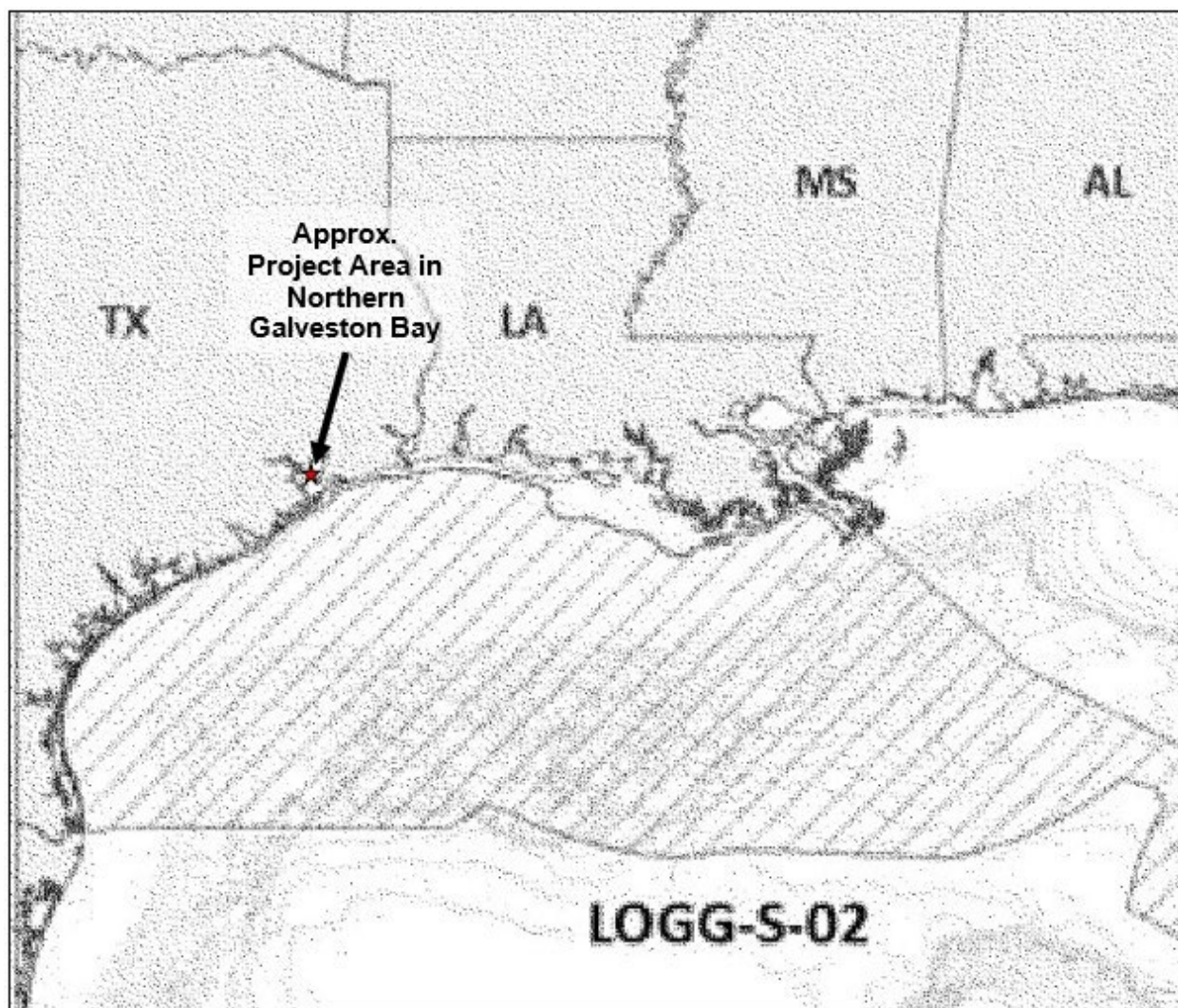


Figure 2-4. Loggerhead Sea Turtle (*Caretta caretta*) Critical Habitat 'LOGG-S-02' off the Texas Coast, from 10-m Contour to the U.S. Exclusive Economic Zone

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). In addition, research grade observations of bald eagle were found in searching iNaturalist for the period 2020 through present. These records consisted of 431 observations in Harris County, with an additional 43 for Chambers County, and 20 for Galveston County.

Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)

Coastal habitats of Texas are used year-round by the federally threatened eastern black rail (Figure 2-5) and the species is thought to breed in the state (Oberholser 1974, USFWS 2019) (Figure 2-6). Evidence of breeding in Texas includes nests and (or) pairs of adults observed in May and June in Galveston County (Oberholser 1974) but not Harris County. 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 2-7) (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 abundance data in eBird from the Galveston Bay area indicate that this species occurs in the area primarily during June through July. Black rails were recorded from the Galveston Bay area during the breeding season (late May through July) and pre-breeding season (March through mid-May), based on hundreds of records of this species, including audio files. A search of iNaturalist resulted in one recent research grade record of a black rail in Harris County (July 2025). Searches of iNaturalist for the period 2020 through present resulted in no records for Chambers County but 17 research grade observations for Galveston County.

No records were found for black rail in the Avian Knowledge Network database or UF Ornithology Collection database for Harris, Chambers, or Galveston counties. The project area lacks prairie or marsh habitat, or any other terrestrial habitat that could be used by this species.

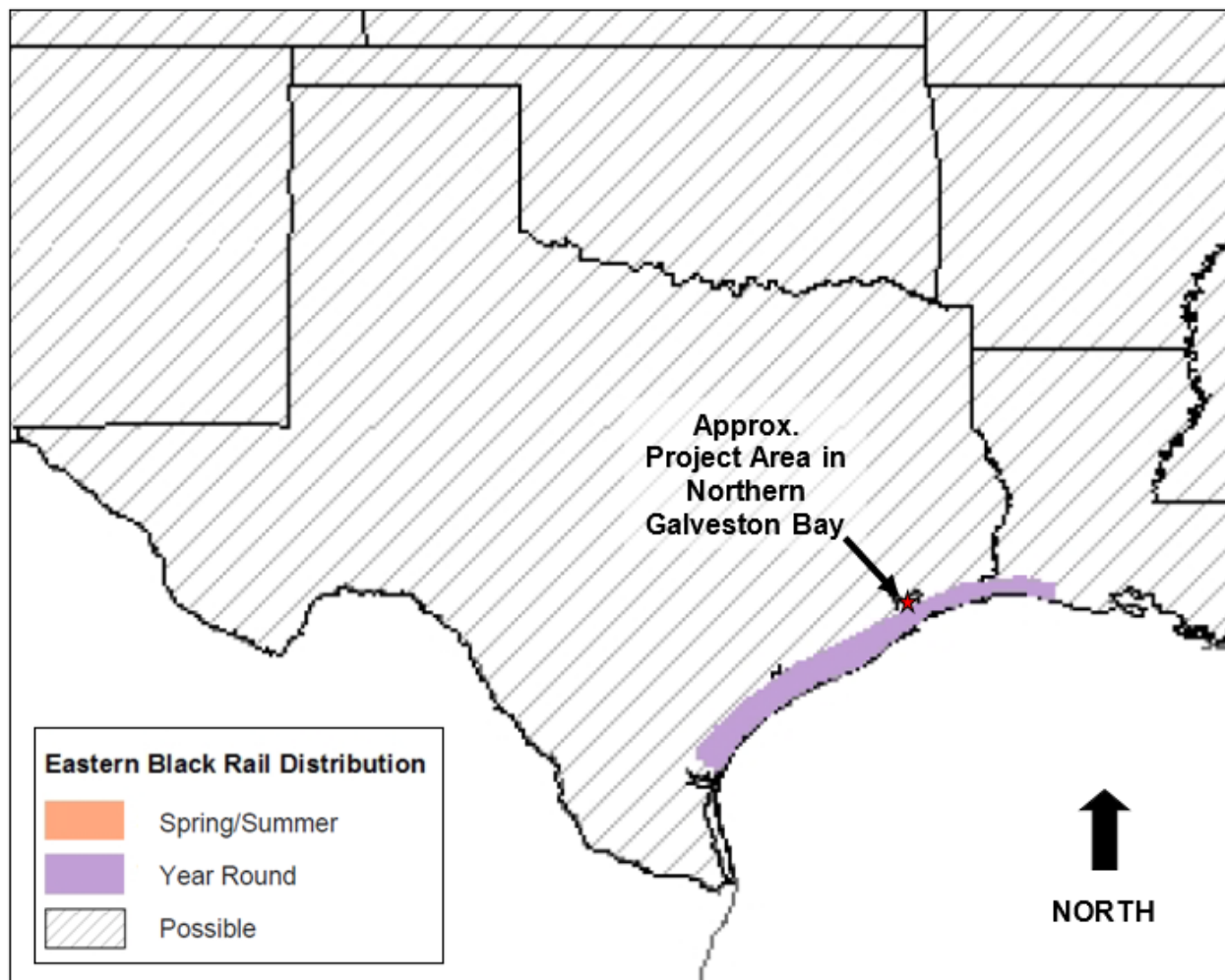


Figure 2-5. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Distribution within Texas

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)

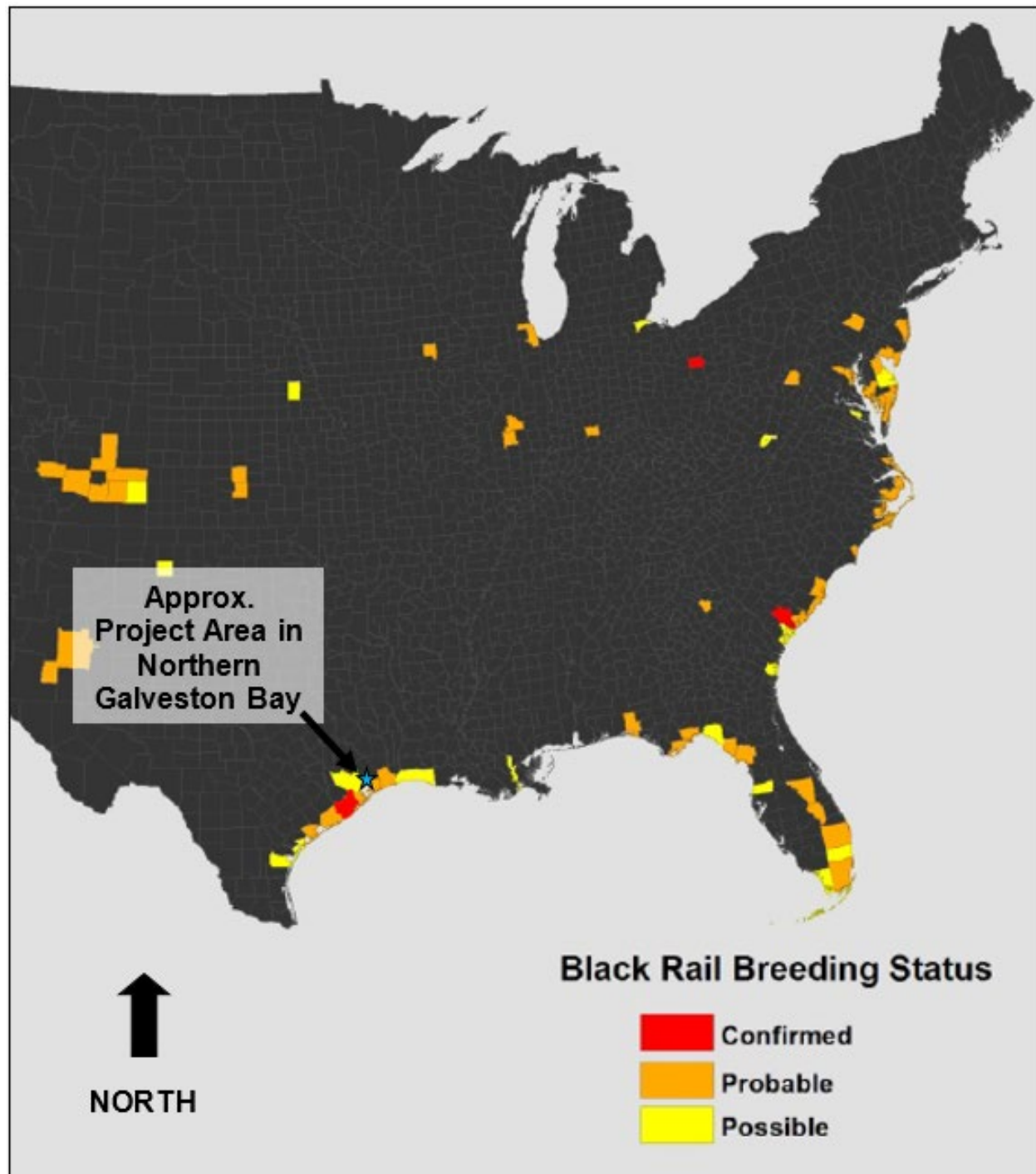


Figure 2-6. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Breeding Status per County During 2011–2016

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 2-7. 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 2-8 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 include 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.

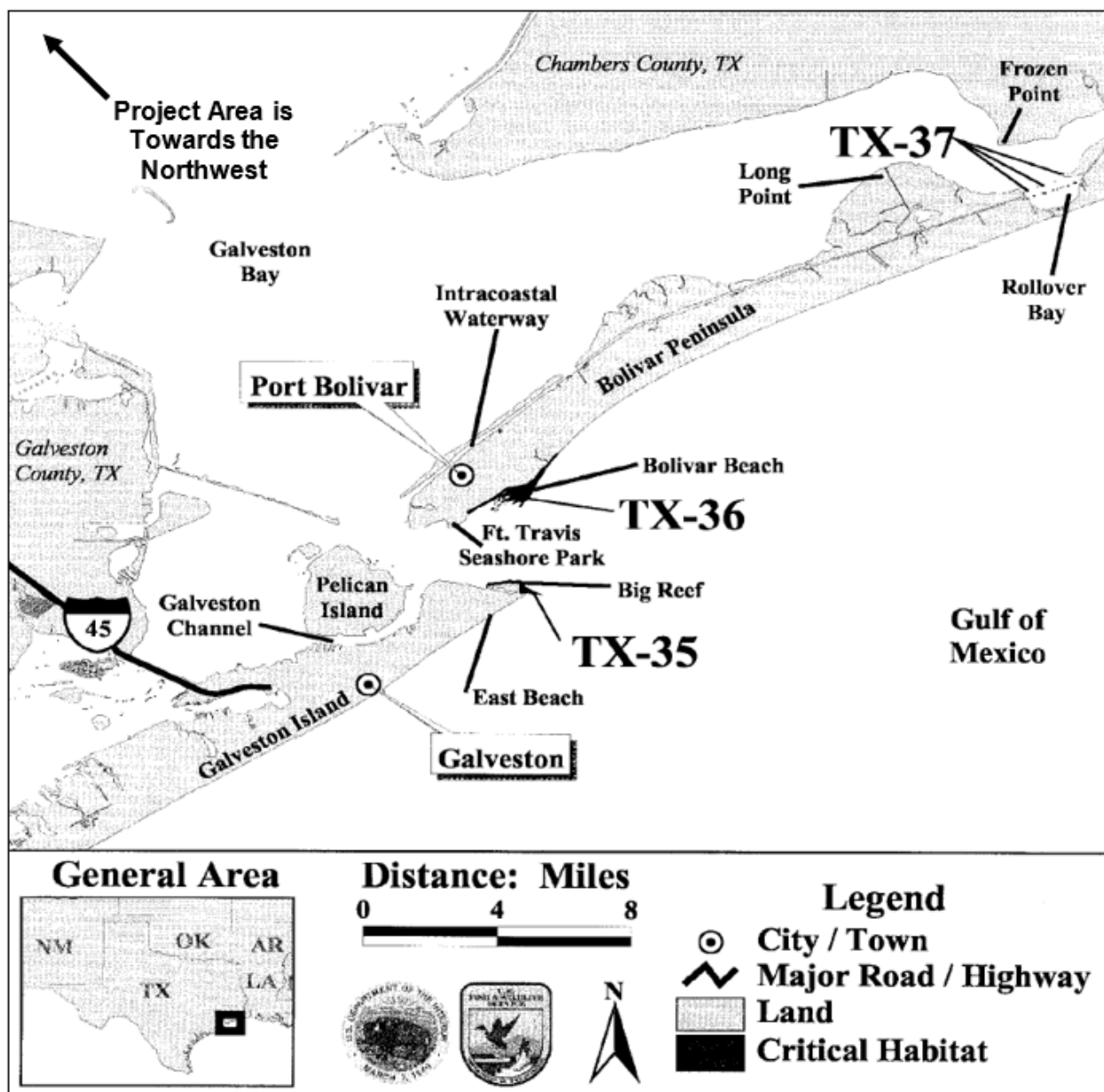


Figure 2-8. Critical Habitat for the Piping Plover (*Charadrius melodus*) Includes Bolivar Beach (TX-36) and Two Other Areas (TX-35 and TX-37) Adjacent to the Project Area

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 critical habitat TX-1 for the *rufa* red knot (Figure 2-9)

(USFWS 2021a). The western portion of this proposed 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). Oberholser (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 critical habitat TX-2 for this species (Figure 2-10). 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 for the period 2020 through present. Searches of the UF Ornithology Collection database and other databases held no additional records for this area.

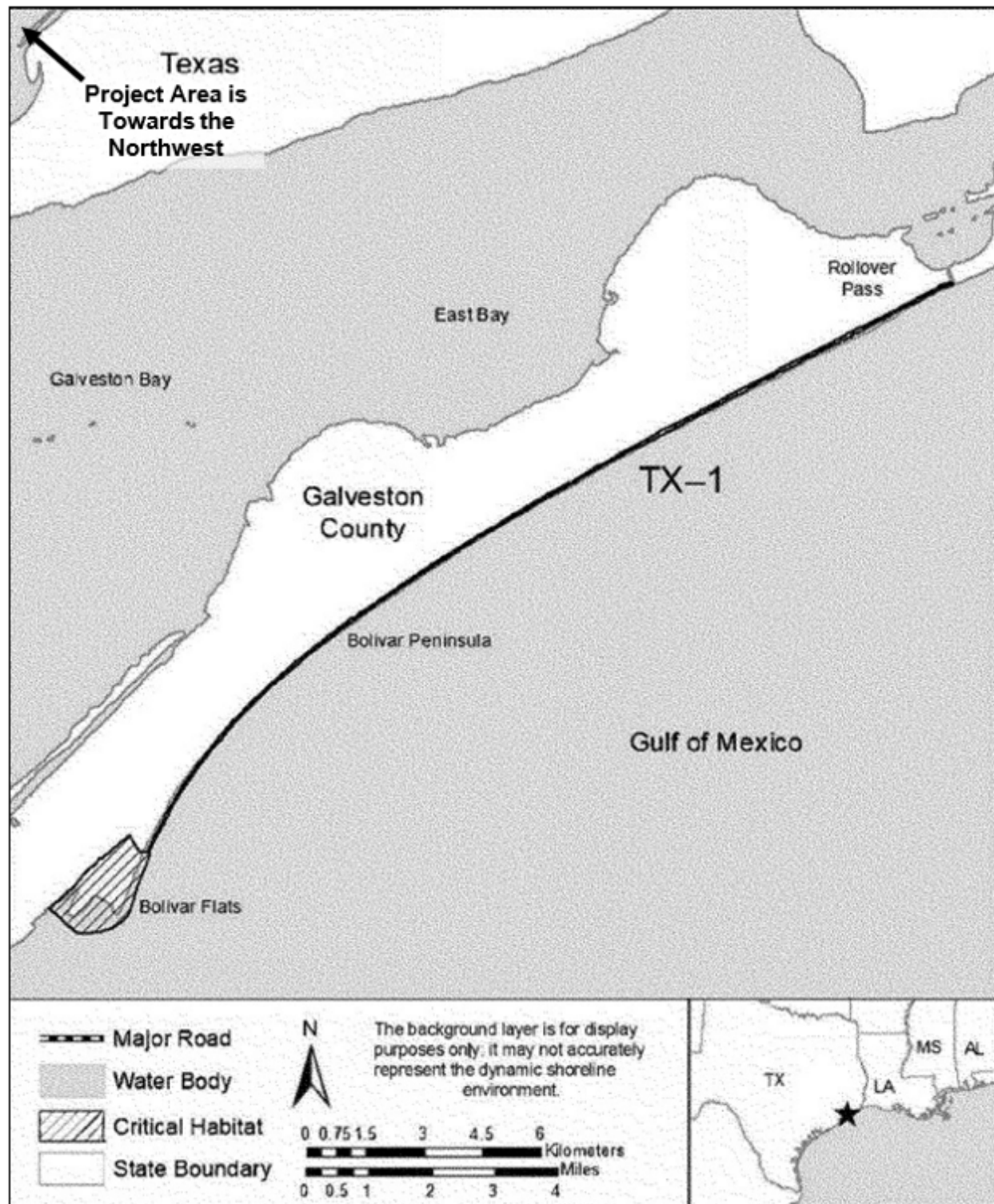


Figure 2-9. Proposed Critical Habitat for the *Rufa* Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of the Bolivar Peninsula (TX-1) Adjacent to the Project Area

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

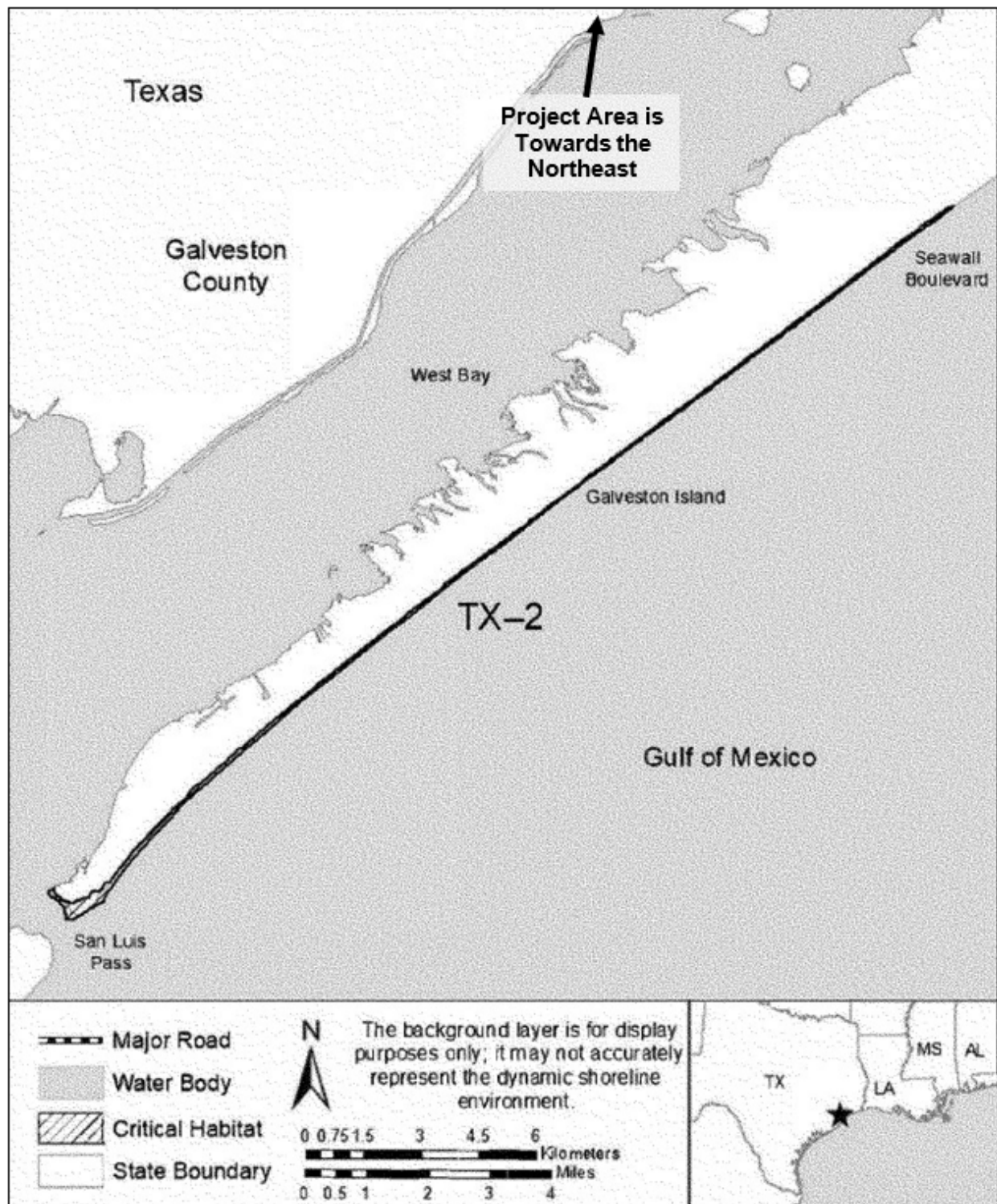


Figure 2-10. Proposed Critical Habitat for the *Rufa* Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of Galveston Island (TX-2) Adjacent to the Project Area

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

Whooping Crane (*Grus americana*)

The federally endangered whooping crane includes Texas as a wintering area along its historic migratory route (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. Nesting occurs at this 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.

Bottlenose Dolphin (*Tursiops truncatus*)

Bottlenose dolphin are protected under the Marine Mammal Protection Act. This species ranges throughout coastal areas of the northern Gulf 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. Coastal populations and offshore populations rarely intermix (Davis and Schmidly 1994). The population within Galveston Bay and surrounding bays is considered a distinct 'stock' from other populations in surrounding areas according to Vollmer and Rosel (2013). A search of iNaturalist found three research grade observations of this species, including photographs, in Harris County for the period 2020 through present. The nearest such observation was near Ash Lake, near the project area, in September 2022. There were also six observations in Chambers County, and 221 observations in Galveston County, for this same period.

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

The West Indian manatee has been afforded federal protection as a threatened species under the ESA since 1967 (USFWS 1967) as 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 Jose 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 anywhere in the Galveston Bay complex.

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 2,800 research grade observations of this species within Harris County were found in online databases for the period 2020 to present. Individuals of this species likely fly across Galveston Bay while migrating to and from overwintering sites in Mexico, although this species uses multiple flyways 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 the Giant Manta & Smalltooth Sawfish

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 but their possible occurrence there cannot be fully ruled out. 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 is primarily a warm water species, inhabiting waters of Florida and closer to the equator. Although it has been recorded Texas waters in the past, it was never commonly found in the state.

Smalltooth sawfish have been documented by Seitz and Poulakis (2006) and Yakich et al. (2024) to be susceptible to impacts from a wide variety of anthropogenic activities. Injuries or mortality to this species have been associated with habitat modification, directed and non-directed fisheries, pollution, debris entanglement, impoundments, and oil spills according to these authors. However, no dredging-related or placement-related injuries or mortalities were reported by these authors.

Manta and sawfish are large and highly motile, and it is reasonable to assume they would be able to easily avoid any impacts from dredged material placement at the PA 2 expansion area. 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. Although the smalltooth sawfish is well documented to enter estuaries in subtropical areas such as southern Florida, no evidence was found for this species having been observed in Galveston Bay in recent decades. For these reasons, the proposed action **may affect, but is not likely to adversely affect** the giant manta. **No effect** is expected on the smalltooth sawfish due to its extreme rarity in Texas waters.

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. However, no records were found for these species in Harris or Chambers counties since 2020. These species apparently rarely venture into the upper bay area from Galveston County. Although proposed critical habitat for the green turtle includes the project area and throughout Galveston Bay, it is unclear how often the upper bay is inhabited by 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). Loggerheads appear to only rarely be found northward of Galveston County waters. Nevertheless, the possible occurrence of this species in the project area cannot be completely ruled out.

According to USFWS and NMFS (1991), green sea turtles inhabit three main marine habitats: 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). Although the project area is shallow, no seagrass is present in the project area (Lloyd Engineering 2025), and no evidence was found of any recent occurrence of this species within Harris County waters. However, the occurrence of this species within the project area cannot be completely ruled out.

Kemp's ridley adults in their post-pelagic stages are commonly found foraging over shallow coastal and bay substrates. Juveniles are frequently found feeding in bays, coastal lagoons, and river mouths and could be located in inland waters of Galveston Bay (TPWD 2017). However, no recent occurrence of this species was found in Harris or Chambers counties in recent years. The species seems to only rarely venture northward from Galveston County waters into the upper bay.

Pre-placement briefs will be given to contractors 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 placement activities. These methods of minimizing impacts will be adhered to during placement activities to ensure avoidance of impacts to sea turtles.

Placement will be by hydraulic pipeline. The absence of scows or other large vessels during placement will eliminate the chance of collisions with vessels as this is a well-documented source of injury and mortality for sea turtles. These animals spend an average of 3% of their time at the surface, breathing or basking (e.g., Witherington and Witherington 2015). The use of hydraulic pipes to move the dredged material, instead of scows, will eliminate this source of mortality (Hazel and Gyuris 2006, Hazel et al. 2021). Other avoidance and minimization measures are discussed in Subsection 4.3.

Placement activities at the PA 2 expansion area can potentially reduce food availability by burying and (or) altering the benthic food sources (such as seagrasses) and creating temporary increases in turbidity. Also, siltation is often associated with placement activities. However, no seagrasses or other macroalgae were observed during a survey of the project area by Lloyd Engineering (2025), so no effects to seagrasses are expected.

The effect of increased turbidity on sea turtles, and their food sources, is expected to be minimal due to the rarity of occurrence of sea turtles in the project area and the short duration of the reduced water clarity. The effects of burial on benthic infauna could be persistent within the boundaries of the PA 2 expansion area since placement operations may 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 PA 2 expansion project area (ca. 100 acres) represents very small portion of this type of benthic habitat available in the Galveston Bay complex, so impacts to the availability of benthic fauna in the area is expected to be minor.

Kemp's ridley sea turtles feed on crustaceans and mollusks along with a wide variety of other prey. 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 all the information above, any effect on the availability of prey is 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 utilized the project area at least occasionally, albeit in low numbers. The low numbers of any one species of bird minimize the chances of disturbance to foraging or roosting birds during placement activities at the PA 2 expansion area. Also, no critical habitat occurs in or near the project area for any bird species, with the nearest critical habitat being tens of miles southward, at the Bolivar Peninsula and in other areas of Galveston County. Measures designed to minimize and avoid disturbance to bird species are summarized in Subsection 4.4.

Piping plover and *rufa* red knots are known to utilize intertidal beaches, flats, dune systems, and upland flats. The project area lacks any of these features, therefore this area is not expected to attract these bird species. Due to a 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 whooping crane is expected. The proposed action area is currently devoid of suitable habitat (critical or otherwise) for 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.

No effect is expected for the bald eagle. The proposed action area is suitable for foraging but the area is only a tiny fraction of the Galveston Bay complex as a whole.

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 motile swimmers and therefore are likely to be able to easily avoid the project area during placement activities.

Vollmer and Rosel (2013) conducted a thorough literature review that included potential threats to populations in the Gulf. 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. These compilations of anthropogenic threats identified by Davis and Schmidly (1994) and Vollmer and Rosel (2013) did not note dredged material placement activities or hydraulic pipeline 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.

West Indian Manatee

The West Indian manatee is very rare in Texas waters due mainly to the cooler winter water temperatures there compared to the more favorable warmer waters of Florida and southeastern Georgia. No recent records were found for Galveston Bay 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 4.5 for specified measures). For these reasons, and accounting for 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

The following avoidance and minimization measures will be implemented, to the extent practicable, by workers involved in placement of dredged material within the PA 2 expansion project area to protect federally protected species as discussed below.

4.1 Monarch Butterfly

Use of construction lighting at night shall be minimized, directed toward the work area, and shielded from view outside of the project area to the maximum extent practicable. This will help eliminate or reduce disorientation to migrating monarch butterflies 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 Giant Manta

In the very unlikely case that a manta is observed within the project area during placement operations, crews will take steps to avoid interacting or impacting the animal(s). USACE will also comply with the construction conditions for protected species that are outlined in NOAA Fisheries (2021).

4.3 Sea Turtles

USACE will comply with applicable windows and protective measures for protection of sea turtles as stated in the Gulf Regional Biological Opinion by NOAA Fisheries (2003) through revision 2 of NMFS (2007) and the O&M-related Regional Biological Opinion by NMFS (2016a). USACE will also comply with the construction conditions for protected species that are outlined in NOAA Fisheries (2021).

4.4 Birds

There is a risk that birds may be attracted to the PA 2 expansion area during dredged material placement activities. This is because such activities may make prey, such as small fish more available or easier to capture due to being temporarily disoriented by the temporary increase in turbidity or other factors. The following measures are planned with the intent to avoid or otherwise minimize impacts to birds to the extent practicable:

- Use of construction lighting at night shall be minimized, directed toward the work area, and shielded from view outside of the project area to the maximum extent practicable. This will help reduce the potential for disorientation to night-flying or crepuscular birds.
- Eastern black rail habitat (coastal prairie habitats) appears to be absent from the vicinity of the project area. However, if an eastern black rail nest is documented in nearby vegetated areas of PA 1 or Atkinson Island, the following conservation measures would be considered for use in avoidance and minimization of potential effects to eastern black rail:
 - A biological monitor may be provided with the authority to stop work immediately upon discovery of any eastern black rail (alive, injured, or dead) within the project area. The Texas Coastal Ecological Services Field Office will be contacted immediately at 361-533-6765 upon discovery of a black rail within the project area.
- The following conservation measures would be implemented to minimize the potential for adverse effects to the whooping crane:

- Workers should be educated, with approved USFWS materials, to recognize whooping cranes, their habitat, and their federally endangered status.
- Report any sightings of whooping cranes to the Texas Coastal Ecological Services Field Office in Corpus Christi at 361-533-6765.

4.5 Manatees & Dolphins

To minimize project impacts on the manatee, and other aquatic mammals, related to dredged material placement at the PA 2 expansion area and of the use of hydraulic pipelines, USACE will comply with the terms and conditions of the Gulf Regional Biological Opinion by NOAA Fisheries (2003) through revision 2 of NMFS (2007) (or more recent revision) and the O&M-related Regional Biological Opinion by NMFS (2016a). As with sea turtle avoidance measures, 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 (91 m) 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 placement activities at the PA 2 expansion project area, 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).

5 SUMMARY OF EFFECTS

Table 5-1 below presents the summary of effects determined for the proposed PA 2 expansion project for all species with potential occurrence in or around Galveston Bay.

Table 5-1. Summary of Effects to Federally Protected Species from the Proposed Action

Common Name (Scientific Names)	Federal Protection Status	Proposed Action: ESA Section 7 Effects Determination	Summary of Effects
INSECTS			
Monarch butterfly (<i>Danaus plexippus</i>)	Proposed Threatened	No effect	No suitable habitat in project area; minimization of lights will avoid/minimize any possible impacts.
FISHES			
Giant manta (<i>Mobula birostris</i>)	Threatened	May affect, but is not likely to adversely affect	Preferred habitat is pelagic open water; no evidence of this species entering Galveston Bay but cannot be ruled out completely.
Smalltooth sawfish (<i>Pristis pectinata</i>)	Endangered	No effect	Extremely rare in Texas waters; no known records from Galveston area since the 1960s.
REPTILES			
Green sea turtle (<i>Chelonia mydas</i>)	Threatened	May affect, but is not likely to adversely affect	No occurrences found near project area but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	Endangered	May affect, but is not likely to adversely affect	No occurrences found near project area but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
Loggerhead sea turtle (<i>Caretta caretta</i>)	Threatened	May affect, but is not likely to adversely affect	No occurrences found near project area but occurrence cannot be ruled out; most life stages highly motile and can actively avoid placement activities; no effect to nesting habitat.
BIRDS			
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Bald and Golden Eagle Protection Act	No effect	No effects to foraging or nesting habitats.
Eastern black rail (<i>Laterallus jamaicensis jamaicensis</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.
Piping plover (<i>Charadrius melodus</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.
Rufa red knot (<i>Calidris canutus rufa</i>)	Threatened	No effect	No suitable habitat in or adjacent to project area.

*Federally Protected Species Assessment for the
Cedar Bayou Placement Area 2 Expansion*

Common Name (Scientific Names)	Federal Protection Status	Proposed Action: ESA Section 7 Effects Determination	Summary of Effects
Whooping crane (<i>Grus americana</i>)	Endangered	No effect	No suitable habitat in or adjacent to project area.
MAMMALS			
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Marine Mammal Protection Act	No effect	Probably occurs in project area; individuals are highly motile and will avoid area during placement events.
West Indian manatee (Florida manatee) (<i>Trichechus manatus</i> [<i>T. m. latirostris</i>])	Threatened; Marine Mammal Protection Act	May affect, but is not likely to adversely affect	Rare in Texas waters; however, it is possible for this species to occur in warm months of year in project area; effects would be minimal as individuals are motile and will avoid placement activities.

6 REFERENCES

Note that although several references below include the name 'Gulf of Mexico', this water body has since been re-named the 'Gulf of America' through Executive Order 14172, effective since 20 January 2025, and Secretary's Order 3423, effective since 07 February 2025.

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APPENDIX C
ESSENTIAL FISH HABITAT ASSESSMENT

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



ESSENTIAL FISH HABITAT ASSESSMENT FOR THE CEDAR BAYOU PLACEMENT AREA 2 EXPANSION HSC-M-7 GALVESTON BAY, TEXAS

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Proposed Action & Project Area	2
2	ESSENTIAL FISH HABITAT	4
2.1	Existing Estuarine Habitat Types	4
2.1.1	Estuarine Water Column	4
2.1.2	Estuarine Mud Substrate	5
2.1.3	Oyster Reef and Estuarine Shell Substrate	6
2.1.4	Other Estuarine Habitats	9
2.2	Federally Managed Fish and Invertebrate Species	9
2.2.1	Brown, Pink and White Shrimp	10
2.2.2	Red Drum	12
2.2.3	Spanish Mackerel	13
2.2.4	Gray and Lane Snapper	14
2.2.5	Red Grouper	16
2.2.6	Cobia	17
2.2.7	Blacktip Shark	18
2.2.8	Bull Shark	20
2.2.9	Spinner Shark	22
2.2.10	Bonnethead	23
2.3	Recreational and Commercial Fisheries	24
2.3.1	Life Histories of Selected Species	24
3	ASSESSMENT OF IMPACTS TO ESSENTIAL FISH HABITAT	26
3.1	Turbidity and Water Quality	26
3.1.1	Minimization of Water Quality Impacts Through Statutory and Regulatory Screening	26
3.1.2	Potential Impacts to Larval Invertebrates and Fishes	27
3.1.3	Potential Impacts to Pelagic Fishes	27
3.2	Sedimentation	28
3.2.2	Potential Impacts to Demersal Fishes and Shrimp	28
3.3	Proposed Mitigative Measures and Guidelines for Essential Fish Habitat Protection	31
3.3.1	Mitigation of Sedimentation	31
3.3.2	Guidelines for Essential Fish Habitat Protection	31
4	CONCLUSIONS	32
5	REFERENCES	33

LIST OF FIGURES

Figure 1-1.	Cedar Bayou Federal Navigation Channel and Surrounding Placement Areas in Upper Galveston Bay, Texas	2
Figure 1-2.	Conceptual Design of the Proposed Action: Cedar Bayou Placement Area 2 Expansion Area in Galveston Bay, Texas	3
Figure 2-1.	Sediment Composite CB-23-PA2-S Collected by Grab Sampler in October 2023 from Three Locations within Existing Cedar Bayou PA 2, Adjacent to the Project Area	6
Figure 2-2.	Results of a Special Aquatic Resources Survey, Including Oyster Resources, of the Approximately 100-acre Project Area of the Proposed Action and 500-foot-wide Buffer Zone	8
Figure 2-3.	EFH for Several Life Stages of Brown, Pink, and White Shrimp in Galveston Bay, Texas	12
Figure 2-4.	EFH for Several Life Stages of Red Drum in Galveston Bay, Texas.....	13
Figure 2-5.	EFH for All Life Stages of Spanish Mackerel in Galveston Bay, Texas.....	14
Figure 2-6.	EFH for All Life Stages of Gray and Lane Snapper in Galveston Bay, Texas.....	15
Figure 2-7.	EFH for All Life Stages of Red Grouper in Galveston Bay, Texas	17
Figure 2-8.	EFH for All Life Stages of Cobia in Galveston Bay, Texas	18
Figure 2-9.	EFH for Neonate and young-of-year Blacktip Sharks in Texas Coastal Waters, including Galveston Bay	19
Figure 2-10.	EFH for Neonate and Young-of-year (a) and Juvenile and Adult Bull Sharks (b) in Texas Coastal Waters, including Galveston Bay	21
Figure 2-11.	EFH for Neonate and Young-of-year Spinner Sharks in Texas Coastal Waters, including Galveston Bay	22
Figure 2-12.	EFH for Neonate and Young-of-year Bonnetheads in the Northern Gulf Coast, including Galveston Bay, Texas.....	23

LIST OF TABLES

Table 3-1.	Estimated Recovery Times of Infaunal Communities Following Dredged Material Placement Compiled from Previous Studies Worldwide	30
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ACRONYMS, ABBREVIATIONS & INITIALISMS

BMP	best management practice
BU	beneficial use
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	Environmental Assessment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
GMFMC	Gulf of Mexico Fishery Management Council *
HAPC	Habitat Areas of Particular Concern
MAFMC	Mid-Atlantic Fishery Management Council
MLLW	mean lower low water
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
O&M	operations and maintenance
ppm	parts per million
SAFMC	South Atlantic Fishery Management Council
TL	total length
TPWD	Texas Parks & Wildlife Department
USACE	U.S. Army Corps of Engineers

* Note that the 'Gulf of Mexico' has been re-named the 'Gulf of America' through Executive Order 14172, effective since 20 January 2025, and Secretary's Order 3423, effective since 07 February 2025.

1 INTRODUCTION

The U.S. Army Corps of Engineers, Galveston District (USACE) has prepared a Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), Public Law 91–190, regulations for implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CFR) 1500–1508, and USACE NEPA implementing regulation ER 200-2-2 in USACE (1988). The EA evaluates potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2). The EA evaluates practicable alternatives for the proposed action, assesses anticipated effects and recommends best management practices, and measures to avoid and minimize adverse effects resulting from the proposed action.

1.1 Background

The Cedar Bayou Navigation Channel (CBNC) was established by congress in 1930 from the natural stream course of Cedar Bayou (Rivers and Harbors Act of 1930, Public Law 520). Since establishment, this channel has been maintained by the USACE. The maintenance of the CBNC has been reauthorized by the Water Resources Development Act (WRDA) in 2000, 2007, and most recently in 2022, for improvements to the channel. The Cedar Bayou channel spans approximately 12 miles within Harris and Chambers counties from channel mile 11 to station 03+00 of the Houston Ship Channel (HSC). However, the USACE currently maintains the Bay Reach of the CBNC from the Houston Ship Channel at Mile -2.7 (station 03+00 of the HSC) to the Bayou Reach of the CBNC at Mile 3, totaling a 5.7 mile portion of the channel that is federally maintained. For this EA, the CBNC refers to this federally maintained 5.7-mile portion.

Originally six placement areas (named PA 1 through PA 6) were designated for use for placement of material dredged from the CBNC. Three of these (PA 2, PA 3, and PA 4) were for open-water placement. PA 6 is an upland-confined placement area which remains in use but has limited capacity for future use. PA 3 and PA 4 also have limited availability and operational restrictions. PA 1 (also called Hogg Island) and PA 5 (also called Boaz Island) are no longer available for material placement due to capacity limitations and the need to avoid encroaching on neighboring federal projects. Therefore, PA 2 is currently the preferred placement area for maintenance material originating from the CBNC due to its availability, proximity to the channel, and cost efficiency. Refer to Figure 1-1 below for a vicinity map of the project location and existing channels and placement areas.

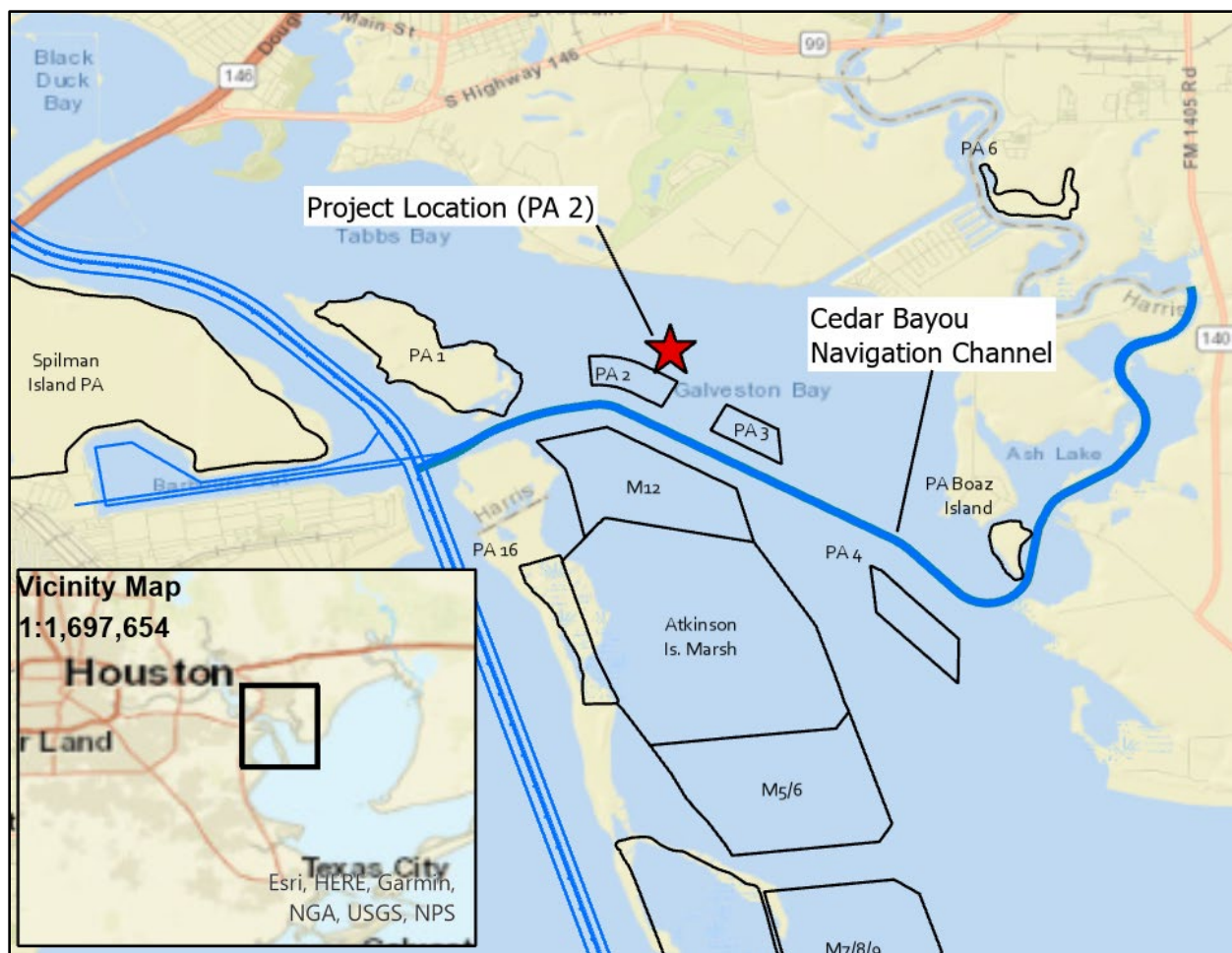


Figure 1-1. Cedar Bayou Federal Navigation Channel and Surrounding Placement Areas in Upper Galveston Bay, Texas

1.2 Proposed Action & Project Area

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the CBNC. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

The project area is in upper Galveston Bay, north of Atkinson Island and the CBNC. The project area is submerged land granted from the State of Texas, Texas General Land Office, to Port Houston Authority via a land grant with Navigation Servitude Easement granted to the USACE. The water depth within the project area is shallow and subtidal, with water depths in the area are typically within the range of 3 to 6 feet with tidal variations. Bottom elevations were from -2 to -4 feet [-0.6 to -1.2 m] mean lower low water (MLLW) based on survey conducted via sounding pole in August 2025 following a recent placement action. Existing PA 3 is approximately 47 acres and is located approximately 1,500 feet east of PA 2. Figure 2-1 below shows the proposed expansion area for PA 2 and its location in relation to the CBNC, PA 3, and PA 4.

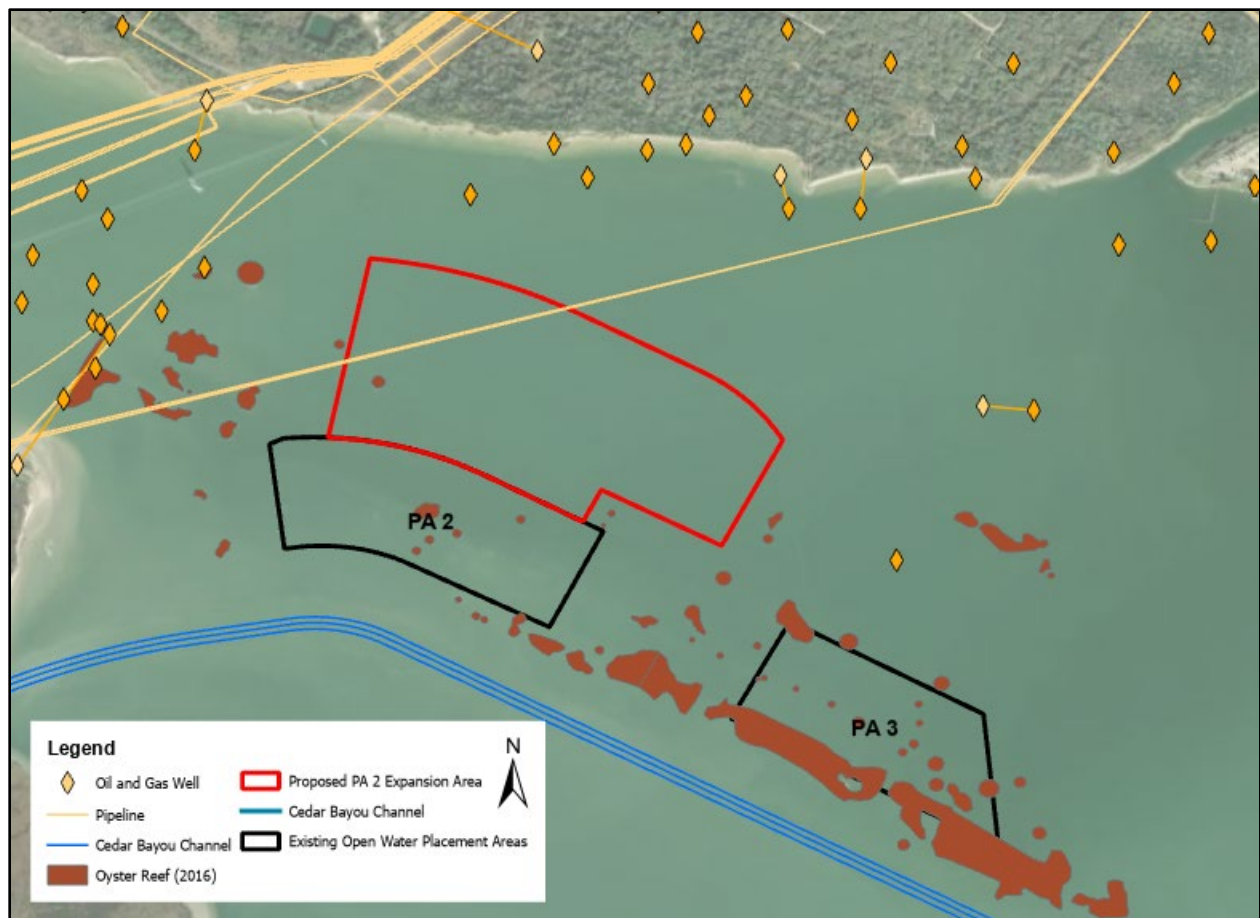


Figure 1-2. Conceptual Design of the Proposed Action: Cedar Bayou Placement Area 2 Expansion Area in Galveston Bay, Texas

2 ESSENTIAL FISH HABITAT

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act ([MSA] 16 U. S. Code 1855 (b)), including the Sustainable Fisheries Act (16 U.S. Code 1801) amendment of 1996, projects with potential impact to essential fish habitat (EFH) must be analyzed. EFH is defined by the National Marine Fisheries Service (NMFS) (2004) and approved by the secretary of commerce acting through NMFS (50 CFR § 600.10) as ‘...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity...’ (MSA § 3[10]).

The Gulf Fishery Management Council (GMFMC) implements regulations through NMFS for species in its management region. This council is responsible for managing and conserving various fish and invertebrates between state waters and the eastern extent of the exclusive economic zone (200 nautical miles offshore) off the Gulf coast of Texas and neighboring states (GMFMC 2017). The NMFS Office of Sustainable Fisheries provides oversight and support for the GMFMC through the development of national policies, guidance, and regulations. The Highly Migratory Species Management Division of NMFS manages an additional four major groups of pelagic fishes. These include several species of sharks, tunas, billfishes, and swordfish (National Oceanic and Atmospheric Administration [NOAA] 2009). The South Atlantic Fishery Management Council (SAFMC) and Mid-Atlantic Fishery Management Council (MAFMC) do not have jurisdiction along Texas coastal and inshore waters. However, some species managed by these councils have EFH identified along the Texas coast (NMFS 2008) as these councils can designate EFH outside their respective regions of jurisdiction (Geo-Marine 2008).

2.1 Existing Estuarine Habitat Types

The proposed project area is located within Eco-region 4 (eastern Texas [including Galveston Bay] to western Louisiana) as identified by the GMFMC (2004, 2005). The categories of EFH in the project area include estuarine water column, estuarine mud substrate, and estuarine shell substrate. These habitats are designated as EFH for federally managed fisheries species because they provide nursery, foraging, and refuge habitats that support various economically important marine fishery species such as spotted seatrout (*Cynoscion nebulosus*), flounder (*Paralichthys* spp.), Atlantic croaker (*Micropogonias undulatus*), black drum (*Pogonias cromis*), gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*), and blue crab (*Callinectes sapidus*). Such estuarine-dependent organisms are targeted in fisheries and serve as prey for other fisheries managed by the GMFMC (e.g., red drum, mackerels, snappers, and groupers) and highly migratory species managed by NOAA Fisheries, such as billfishes and sharks. These habitats also provide other essential estuarine support functions, including: (1) providing a physically recognizable structure and substrate for refuge and attachment above and below the sediment surface; (2) binding sediments; (3) preventing erosion; (4) collecting organic and inorganic material by slowing currents; and (5) providing nutrients and detrital matter to the Galveston Bay estuary (USACE 2019).

2.1.1 Estuarine Water Column

Existing conditions—The water column within the project area is shallow and subtidal, with depths typically within the range of -2 to -4 feet [-0.6 to -1.2 m] (MLLW) according to Lloyd Engineering (2025). A literature search found no evidence of thermoclines, haloclines, or hypoxic zones in the project area. The project area, like most of the Galveston Bay complex, is subjected to water currents caused by tides, riverine input of freshwater, and wind-driven currents. The bay is estuarine with a varying salinity gradient that is influenced by tide, rain events, and river flow. River flow entering the bay averages 24,279,600 m³/day according to Engle et al. (2007). These authors also reported that salinity in summer averages 18 parts per thousand in the bay and the average annual water temperature is 29.5°C. The hurricane barrier constructed to protect

Galveston Island and Texas City is thought to cause a reduction in salinity within the Galveston Bay estuary by retaining freshwater for longer periods than if the barrier had not been built (Stickney 1984).

The most recent water parameters available from the project area were measured by Lloyd Engineering in October 2023 at about 2 feet below the water's surface within the existing Cedar Bayou PA 2 at station CB-23-PA 2B-W. The measuring device was not stated. Dissolved oxygen was 9.41 mg/L, pH was 8.53, salinity measured 23.70 parts per thousand, specific conductivity was 37.50 mS/cm, turbidity was 15.00 Nephelometric Turbidity Units, and water temperature was 21.11°C (Lloyd Engineering 2023).

Predicted impacts—Turbidity within the estuarine water column at the project area would increase beyond ambient levels during, and immediately following, dredged material placement. Dissolved oxygen levels are likely to decrease during placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode. Estuarine organisms within the bay are generally evolutionarily prepared for such stressors and have mechanisms that allow them to survive such ephemeral perturbations successfully. Overall, impacts to the estuarine water column due to the project are anticipated to be temporary and minor.

2.1.2 Estuarine Mud Substrate

Existing conditions—The project area, like much of Galveston Bay, is dominated by soft mud substrate (Galveston Bay Estuary Program 2025). The bay bottom within the project area is composed mostly of soft silty clay based on a field survey conducted in July and August 2025 by Lloyd Engineering (2025).

Sediment was collected by Ponar grab sampler in October 2023 from three stations within the existing Cedar Bayou PA 2. All three stations apparently had the same water depth of -3.9 feet MLLW (Lloyd Engineering 2023). These three stations sampled and analyzed were the closest areas to the project area where such data is available. The sediment from the three stations was composited (composite ID CB-23-PA2-S [Figure 2-1]) and analyzed for physical and chemical parameters. The sediment composite was predominately silt (52.3%), with 34.5% sand, some clay (12.7%), and trace gravel (0.5%). Total organic carbon measured 0.39% and total solids measured 59.8% (Lloyd Engineering 2023).

The sediment was analyzed for 15 metals, ammonia (as nitrogen), total cyanide, total petroleum hydrocarbons, 22 pesticides, total polychlorinated biphenyls, 15 polynuclear aromatic hydrocarbons, and 41 semivolatile organic compounds. Most of these contaminants were not detected in concentrations above the method detection limit, and none of them exceeded the threshold effects level or the effects range low from Buchman (2008) or the human health protective concentration levels from the Texas Commission on Environmental Quality (<https://www.tceq.texas.gov/remediation/trrp/trrppcls.html>) (Lloyd Engineering 2023).

Predicted impacts—The substrate of the placed O&M dredged material would be comparable to the estuarine mud substrate already found within the project area as they would be created with native sediment dredged from the nearby Cedar Bayou Navigation Channel. The placement of dredged material within the project area would decrease the water depth of the project area from what is generally -2 to -4 feet MLLW but would avoid the emergence of the sediment above the water line. This is the minimum water depth that USACE has set for placement areas associated with maintenance-dredging of the channel.

The project area is mostly subtidal mud substrate that will eventually become shallower but would not become permanently emergent. The expansion area would be maintained by USACE so as not to be shallower than -5 feet MLLW. The shoaling of this area, resulting from dredged material placement over time, is expected to continue to provide foraging and sheltering opportunities to benthic fauna (mainly invertebrates) and epibenthic species (primarily invertebrates and fishes). The future elevation of the mud substrate may allow foraging by wading birds and (or) shorebirds, during periods of low tide.

Overall, impacts to estuarine mud substrate would be minor and permanent. It would continue to provide shelter and foraging opportunities to estuarine species, although the species composition within the assemblage is expected to change, to some degree, to include those adapted to shallower water.



Figure 2-1. Sediment Composite CB-23-PA2-S Collected by Grab Sampler in October 2023 from Three Locations within Existing Cedar Bayou PA 2, Adjacent to the Project Area

Source: Photo 9 of Attachment D in Lloyd Engineering (2023)

2.1.3 Estuarine Shell Substrate

Existing conditions—As stated in the main body of the EA, the entire PA 2 expansion area, plus a 500-foot buffer around the entire project area, was field-surveyed on 01 July and 07 August 2025 by Lloyd Engineering (2025) for eastern oyster (*Crassostrea virginica*) habitat and submerged aquatic vegetation (including seagrasses). Survey methods followed guidance in

Texas Parks & Wildlife Department ([TPWD] 2019) and the field work was permitted under scientific research permit SPR-0421-049 of the TPWD.

Prior to the 2025 field effort, data collected in a 2016 oyster resources survey of the area in and around the existing PA 2 was reviewed for occurrences of oyster resources. Some of this 2016 survey area included a portion of what is now the project area for the proposed PA 2 expansion (Lloyd Engineering 2025).

The July 2025 survey phase involved probing, with an aluminum sounding pole with a density gauge point, the 11 areas of potential oyster habitat that were identified in the 2016 oyster resources survey by Lloyd Engineering in and around the existing PA 2. The sounding pole was inserted into the sediment every 10 feet along a straight line across each potential oyster habitat area.

The August 2025 survey involved the use of hydraulically operated patent tongs to sample one or more 0.25-square-meter areas within each potential oyster habitat area. Any oysters or oyster shell obtained with the tongs were counted and categorized by size (partial shell <25 mm across, spat <25 mm, juvenile oyster 26–50 mm across, subadult oyster 51–75 mm, or adult oyster >75 mm) (Lloyd Engineering 2025). Other data categorized and quantified included live versus dead oysters, and any hard substrate larger than 1.5 by 2.5 inches across (such substrate was categorized as potential oyster resources). The potential oyster habitat areas were each categorized as either mud, scattered shell on mud (brown habitat), buried shell (black habitat), or viable oyster habitat (Lloyd Engineering 2025). These efforts elucidated the occurrence, distribution, and types of shell substrate within the project area.

The above-described survey effort resulted in a combined total of 2.93 acres of oyster resources within the survey area. This consisted of 0.81 acres of viable oyster habitat and 2.12 acres of buried shell (black habitat). The viable oyster habitat was found mostly in the buffer area, outside of the area proposed for the PA 2 expansion (Figure 2-2). The viable oyster habitat consisted mostly of exposed juvenile-sized (25–50 mm) oyster shells and shell fragments (Lloyd Engineering 2025). No live oysters were observed within the survey area. These workers concluded with ‘All of this evidence [from their survey results] combined suggests that the environmental conditions within the survey area are not conducive to the natural colonization and growth of healthy oyster reefs’ (Section 4 of Lloyd Engineering 2025). See the survey report in Appendix A of the EA.

The proposed action would not directly impact the natural colonization and growth of healthy oyster reefs. This is because the project area is absent of living oysters or other exposed hard structure. The proposed PA 2 expansion would not directly impact viable oyster habitat through the placement of material. However, increased turbidity in the water column could indirectly affect oysters within the viable oyster habitat if it was colonized in the future. Therefore, placement of material may indirectly affect up to 0.81 acres of viable oyster habitat present in the 500-ft area buffer through the effects of temporary water quality impairment and sediment dispersion immediately following placement events. These effects would be temporary as water quality would return to baseline conditions following placement at PA 2. The preferred action was designed to avoid direct impacts to viable oyster habitat. Overall, all impacts to oyster reefs would be temporary and minor.

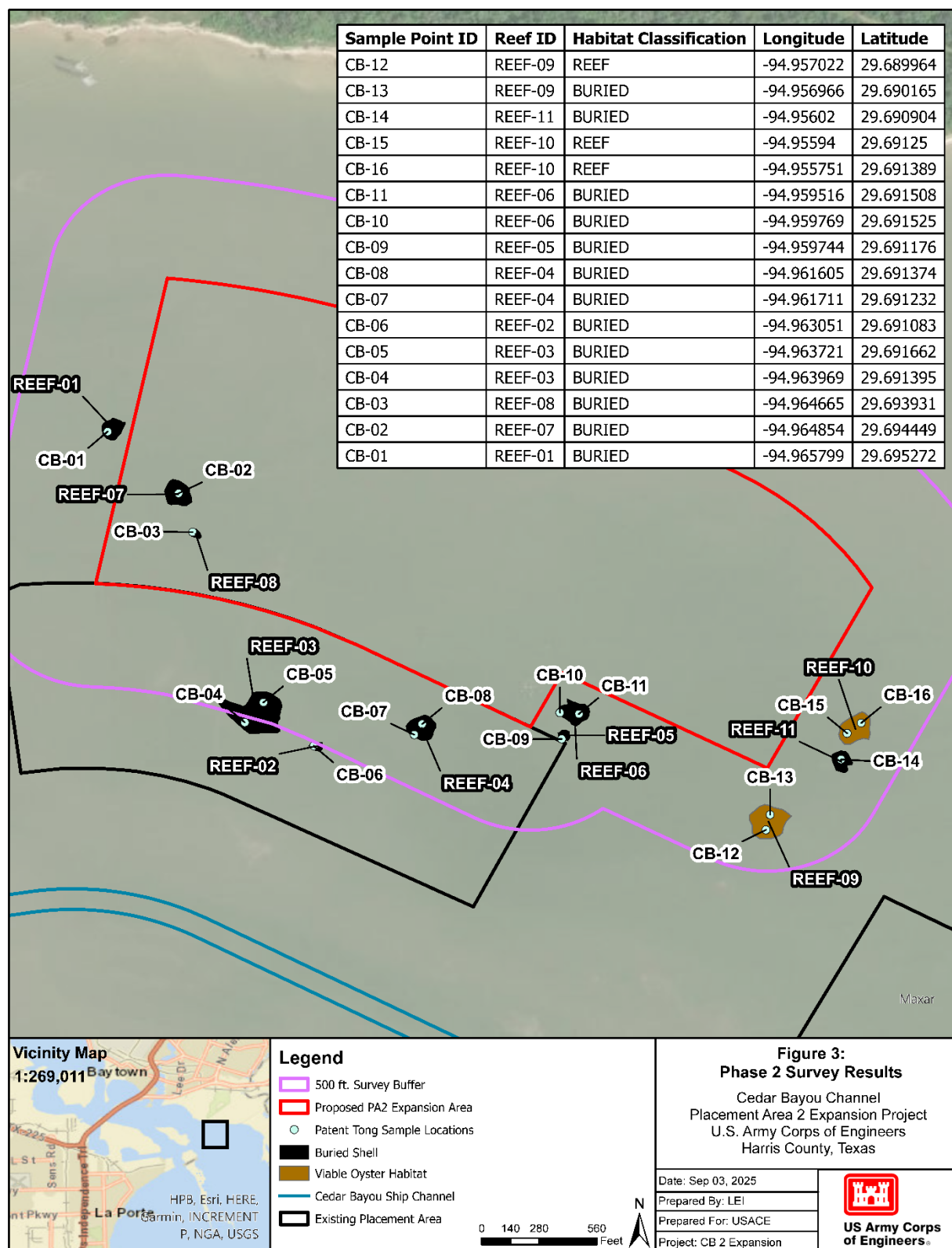


Figure 2-2. Results of a Special Aquatic Resources Survey, Including Oyster Resources, of the Approximately 100-acre Project Area of the Proposed Action and 500-foot-wide Buffer Zone

Source: Modified from Figure 3 of the Special Aquatic Resources Survey report by Lloyd Engineering (2025)

2.1.4 Other Estuarine Habitats

The survey effort by Lloyd Engineering (2025) did not find evidence of seagrasses, and other aquatic macrophytes, within the project area or along with the 500-foot-wide buffer around this area. The project area is subtidal and the bottom is primarily mud. The water depth and other features of the area do not appear capable of supporting emergent estuarine marsh habitat or other emergent or terrestrial habitats. No such habitat was observed during the Lloyd Engineering (2025) survey effort.

2.2 Federally Managed Invertebrate & Fish Species

This subsection identifies EFH and Habitat Areas of Particular Concern (HAPC) based on descriptions from several guidance documents by NOAA and fishery management councils. These documents include SAFMC (1998a, b), GMFMC (1998, 2004, 2005), NOAA (2009), MAFMC and NMFS (2011), and GMFMC and NMFS (2016). The NOAA Fisheries Essential Fish Habitat Mapper (NOAA Fisheries 2025 [<https://www.habitat.noaa.gov/apps/efhmapper/>]) online spatial database was used for supplemental information. No HAPC were identified within Galveston Bay based on a literature search.

EFH within Galveston Bay address the following groups of fishery-managed taxa:

- Shrimp EFH (GMFMC 2004, GMFMC and NMFS 2016, NOAA Fisheries 2025)
 - Brown shrimp (*Penaeus aztecus*) EFH for post-larval, juvenile, and subadult life stages
 - Pink shrimp (*Penaeus duorarum*) EFH for late post-larval, juvenile, subadult, and adult life stages
 - White shrimp (*Penaeus setiferus*) EFH for late post-larval, juvenile, subadult, and adult life stages
- Red Drum EFH (GMFMC and NMFS 2016, NOAA Fisheries 2025)
 - Red drum (*Sciaenops ocellatus*) all life stages EFH
- Reef Fish EFH (GMFMC and NMFS 2016, NOAA Fisheries 2025)
 - 31 species in 6 families of 4 orders
 - Perciformes: Lutjanidae (11 species), Serranidae (11 species), Malacanthidae (3 species), Carangiformes: Carangidae (4 species), Tetraodontiformes: Balistidae (1 species), and Labriformes: Labridae (1 species)
 - All life stages EFH
- Coastal Migratory Pelagics EFH (GMFMC and NMFS 2016, NOAA Fisheries 2025)
 - King mackerel (*Scomberomorus cavalla*) all life stages EFH
 - Spanish mackerel (*Scomberomorus maculatus*) all life stages EFH
 - Cobia (*Rachycentron canadum*) all life stages EFH
- Atlantic Highly Migratory Species (species-specific EFH) (NMFS 2017, NOAA Fisheries 2025)
 - Blacktip shark (*Carcharhinus limbatus*) neonate and young-of-year EFH
 - Bull shark (*C. leucas*) neonate, young-of-year, juvenile, and adult EFH
 - Spinner shark (*C. brevipinna*) neonate and young-of-year EFH
 - Bonnethead (*Sphyrna tiburo*) neonate and young-of-year EFH

Of the above groups of fishery-managed taxa having EFH in the region, the following species have EFH that are applicable to the project area based on a list of species-specific information provided in the NOAA Fisheries Inland EFH Mapper (<https://efhtools.github.io/InlandEFH/Mapper.html>):

- Brown shrimp post-larval, juvenile, and subadult EFH
- Pink shrimp juvenile and subadult EFH
- White shrimp post-larval, juvenile, subadult, adult, and spawning adult EFH
- Red drum eggs, larvae, post-larvae, juvenile, and adult EFH
- Spanish mackerel juvenile and adult EFH
- Gray snapper (*Lutjanus griseus*) adult EFH
- Lane snapper (*Lutjanus synagris*) larvae, post-larvae, and juvenile EFH
- Red grouper (*Epinephelus morio*) early juvenile EFH
- Cobia eggs and larvae EFH

To the above list can be added the blacktip shark, bull shark, spinner shark, and bonnethead.

Each of these species are addressed below, including summaries of their life history parameters.

Oyster reef habitat also fits the definition of EFH in MSA § 3(10) and is discussed and described as-such by Coen et al. (1999). However, a recent survey by Lloyd Engineering (2025) found no evidence of live oysters (although oyster shells were observed). Oyster reef habitat is addressed as a component of EFH for federally managed species in Eco-region 4 (eastern Texas [including Galveston Bay] to western Louisiana) by the GMFMC (2004, 2005). This habitat is addressed in this EFH assessment as Estuarine Shell Substrate in Subsection 2.1.3. It is also addresses and discussed within the EA, under Subsection 4.6, Wetlands and Special Aquatic Sites.

2.2.1 Brown, Pink & White Shrimp

EFH for brown, pink, and white shrimp includes estuarine nursery areas, offshore habitats, and connecting waterways for spawning and growth to maturity (SAFMC 1998a). Nursery areas included as EFH consist of tidal freshwater, coastal wetlands (e.g., intertidal marshes, tidal forests, mangroves), estuaries, nearshore flats, and submerged aquatic vegetation. HAPC do not include Galveston Bay, but include other coastal inlets, all state-identified nursery habitats of importance to this group, and state-identified overwintering areas (SAFMC 1998a). Tidal creeks and salt marshes serving as nurseries are perhaps the most important habitats for penaeid shrimp (SAFMC 1998a and b).

EFH for brown, pink, and white shrimp is identified by GMFMC (2004, 2005), GMFMC and NMFS (2016), and NOAA Fisheries (2025) and addresses post-larval, juvenile, subadult, adult, and (or) spawning adults. Galveston Bay, including the project area, is part of this EFH (Figure 2-3). No HAPC were identified in Galveston Bay by these authors.

These three penaeid shrimp species include Galveston Bay within their respective ranges and occur from inshore waters to about 110 m depth (Tavares 2002). Preferred substrates include mud, sand, peat, and shell bottom. These species can occur within estuaries at least during their early life history stages (Tavares 2002). The white shrimp is most abundant in brackish water estuaries over soft mud and clay bottom. Post-larvae and juveniles live and grow within estuaries (Tavares 2002). Adults of brown and pink shrimp are nocturnal (white shrimp are more diurnal) (Tavares 2002), although even nocturnal species may be active by day during highly turbid conditions.

The abundance of these and other penaeid shrimp may correspond with the availability of favored substrates (SAFMC 1998b). For instance, pink shrimp appear to show a positive correlation with coarse grain and calcareous substrate (SAFMC 1998b). White and brown shrimp appear to favor soft (muddy or peaty) sediment near to shore and occur in dense concentrations there (SAFMC 1998b and 2009).

Spawning takes place over several months, from about March through September (Carson 1944). Hatching occurs approximately 14 hours after the eggs are laid (Carson 1944). Larvae can occur in marine or estuarine waters, where they live within the water column and consume zooplankton (SAFMC 1998b). Post-larvae are generally benthic. In northern areas, some post-larvae may overwinter buried within the substrate. In this region, post-larvae may use inshore emergent vegetation such as smooth cordgrass (*Spartina alterniflora*) and rush (*Juncus* spp.), where they are able to obtain enough food for rapid growth (SAFMC 1998b). These emergent vegetated habitats are thus critically important. Within these habitats, sediment mixtures of mud appear to be favored by juveniles. A brackish low-salinity regime is also favored by juveniles, although various studies have contradicted one another on the degree of importance of low salinity (SAFMC 1998b). As juveniles approach adult size, they migrate towards waters having higher salinities. The largest juveniles and adults are generally found in the highest salinity regimes, including open marine waters (SAFMC 1998b). Some studies indicate that temperature range and food availability have greater impact on growth than does salinity. Juveniles appeared to grow little or not at all in 16°C, but growth rates increased rapidly above 20°C in one study (SAFMC 1998b). Excessively cold winters have been known to cause mortality in all life stages and are thought to contribute to reduced landings following such events.



Figure 2-3. EFH for Several Life Stages of Brown, Pink, and White Shrimp in Galveston Bay, Texas

Note: The shrimp EFH is shown as green fill with a blue outline in the image above and refers to all three species of shrimp and multiple life stages according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.2 Red Drum

Red drum eggs, larvae, post-larvae, juvenile, and adult EFH include Galveston Bay, including the project area, according to GMFMC and NMFS (2016) and NOAA Fisheries (2025) (Figure 2-4).

Red drum are found over sand and silty sand bottoms in coastal waters of the northern and northeastern Gulf and much of the Atlantic coast of the U.S. (Chao 2002, McEachran and Fechhelm 2005). Juveniles are most often found in estuaries. The species is abundant in intertidal zones of the southeastern U.S., including Texas (Chao 2002). Red drum appear to undergo seasonal migrations, wandering as far north as Long Island during the warmer months of the year. In Texas' waters adult red drum migrate from estuaries to offshore waters in summer, and they spawn offshore in fall, favoring waters just outside of barrier islands (Shipp 1986). This species

feeds heavily on crustaceans along with mollusks and fishes (Chao 2002, McEachran and Fechhelm 2005).



Figure 2-4. EFH for Several Life Stages of Red Drum in Galveston Bay, Texas

Note: The red drum EFH is shown as green fill with a blue outline in the image above and refers to all life stages of red drum, except for spawning adults, according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.3 Spanish Mackerel

Galveston Bay, including the project area, includes EFH for all life stages of Spanish mackerel according to GMFMC and NMFS (2016) and NOAA Fisheries (2025) (Figure 2-5).

The Spanish mackerel is found in coastal and estuarine waters of the southeastern U.S., including Texas (Collette 2002b, Adams et al. 2003). Terres Ceron et al. (2023) found a negative correlation between the trend of increasing average temperatures during spring and fall in Galveston Bay over the period 1982–2019 and abundance of Spanish mackerel in the bay. These authors attributed the increasing average temperatures over this period to climate change. The range of the Spanish mackerel, and other cool water species such as southern flounder (*Paralichthys*

lethostigma), appears to be retracting northward along the U.S. east coast according to Terres Ceron et al. (2023).

Spawning takes place from spring through summer (Powell 1975, Adams et al. 2003), and the species is thought to spawn repeatedly in a season (Powell 1975). Larvae are found throughout the summer (Powell 1975, Collette 2002b). Texas nearshore and estuarine waters are used as juvenile nursery areas (Collette 2002b), including areas along unprotected beaches.



Figure 2-5. EFH for All Life Stages of Spanish Mackerel in Galveston Bay, Texas

Note: The Spanish mackerel EFH is shown as green fill with a blue outline in the image above and refers to all life stages according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.4 Gray & Lane Snapper

Galveston Bay, including the project area, includes EFH for all life stages of gray and lane snapper according to GMFMC and NMFS (2016) and NOAA Fisheries (2025) (Figure 2-6).

Gray and lane snapper are generally benthic during later life stages, often inhabiting structured benthic habitats as adults (SAFMC 1998b, 2009). Some of the more obvious structures are coral

reefs, artificial reefs, hardbottom, ledges, cavities, and sloping softbottom surfaces. Juveniles of both species inhabit inshore and estuarine habitats such as seagrass beds, mangroves, lagoons, and bays (SAFMC 1998b, 2009).

A search of the Texas Parks & Wildlife Department's Texas Artificial Reefs interactive mapping application (<https://tpwd.texas.gov/gis/ris/artificialreefs/>) resulted in no artificial reefs having been permitted, created, and managed in Galveston Bay. However, non-permitted artificial reefs are likely to occur within the bay. Non-permitted structures may consist of piles of hard materials placed by anglers and these structured habitats potentially harbor gray and lane snapper as well as other snapper species.

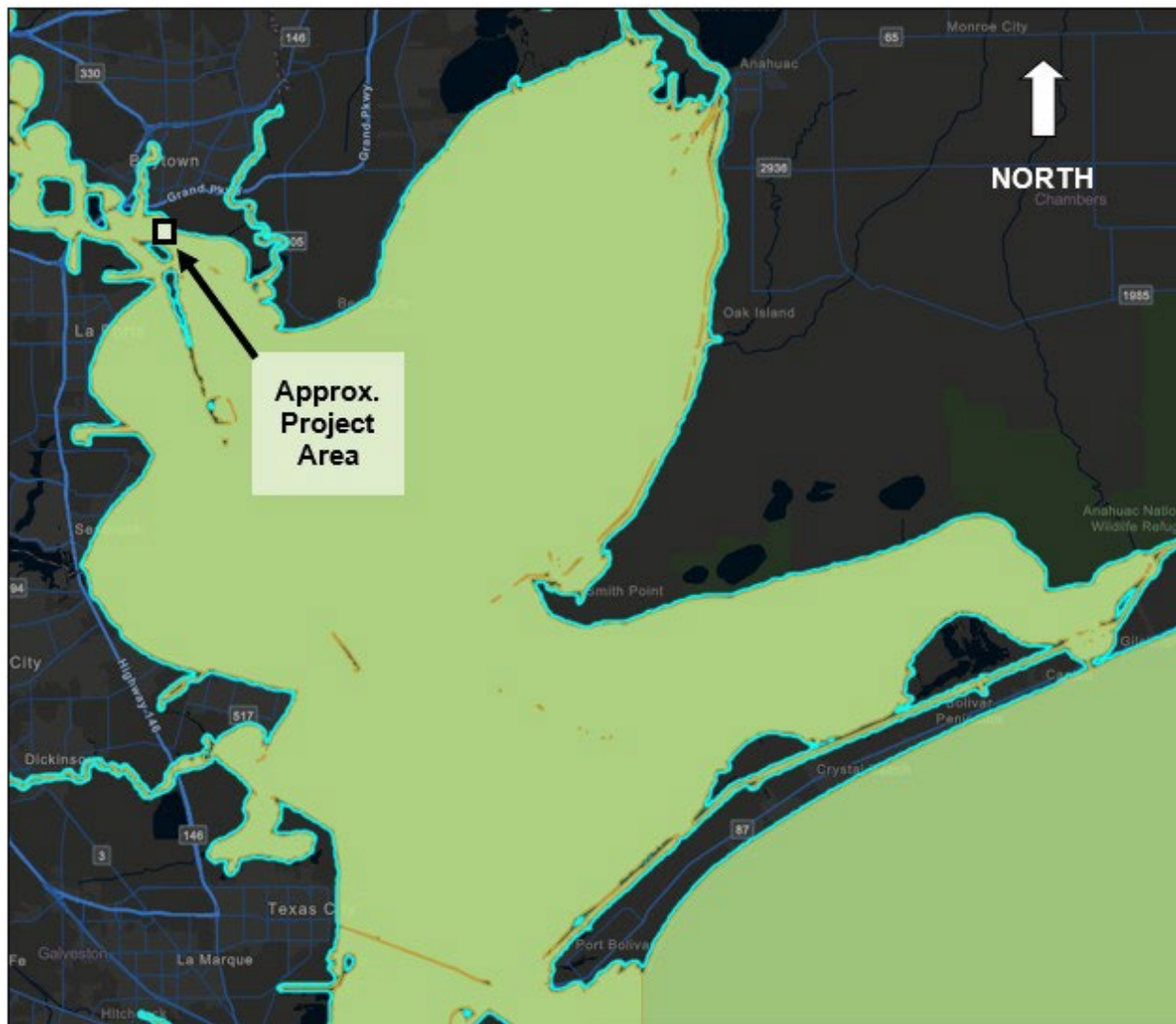


Figure 2-6. EFH for All Life Stages of Gray and Lane Snapper in Galveston Bay, Texas

Note: The gray and lane snapper EFH is shown as green fill with a blue outline in the image above and refers to all life stages according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.5 Red Grouper

Galveston Bay, including the project area, includes EFH for all life stages of red grouper according to GMFMC and NMFS (2016) and NOAA Fisheries (2025) (Figure 2-7).

Red grouper, and other serranids, are predatory, are generally demersal, and are found at varying depths (inshore to approaching 200 m) (Heemstra et al. 2002). Red grouper are typically associated with structured habitat such as rocky substrates, but juvenile life stages are instead associated with seagrass beds (Heemstra et al. 2002, McEachran and Fechhelm 2005). This species often exhibits site specificity (Heemstra et al. 2002). Prey consists of a combination of invertebrates (especially cephalopods and crustaceans) and fishes (Heemstra et al. 2002).

Reproduction is poorly known for serranids. Members of the group are hermaphrodites, some of which are protogynous, while others are synchronous hermaphrodites (Heemstra et al. 2002). Certain grouper species spawn in large aggregations at specific sites, making them susceptible to overfishing (Heemstra et al. 2002). Many serranids grow rather slowly, and this K-selected life history trait limits their ability to recover from the effects of overfishing (Heemstra et al. 2002).

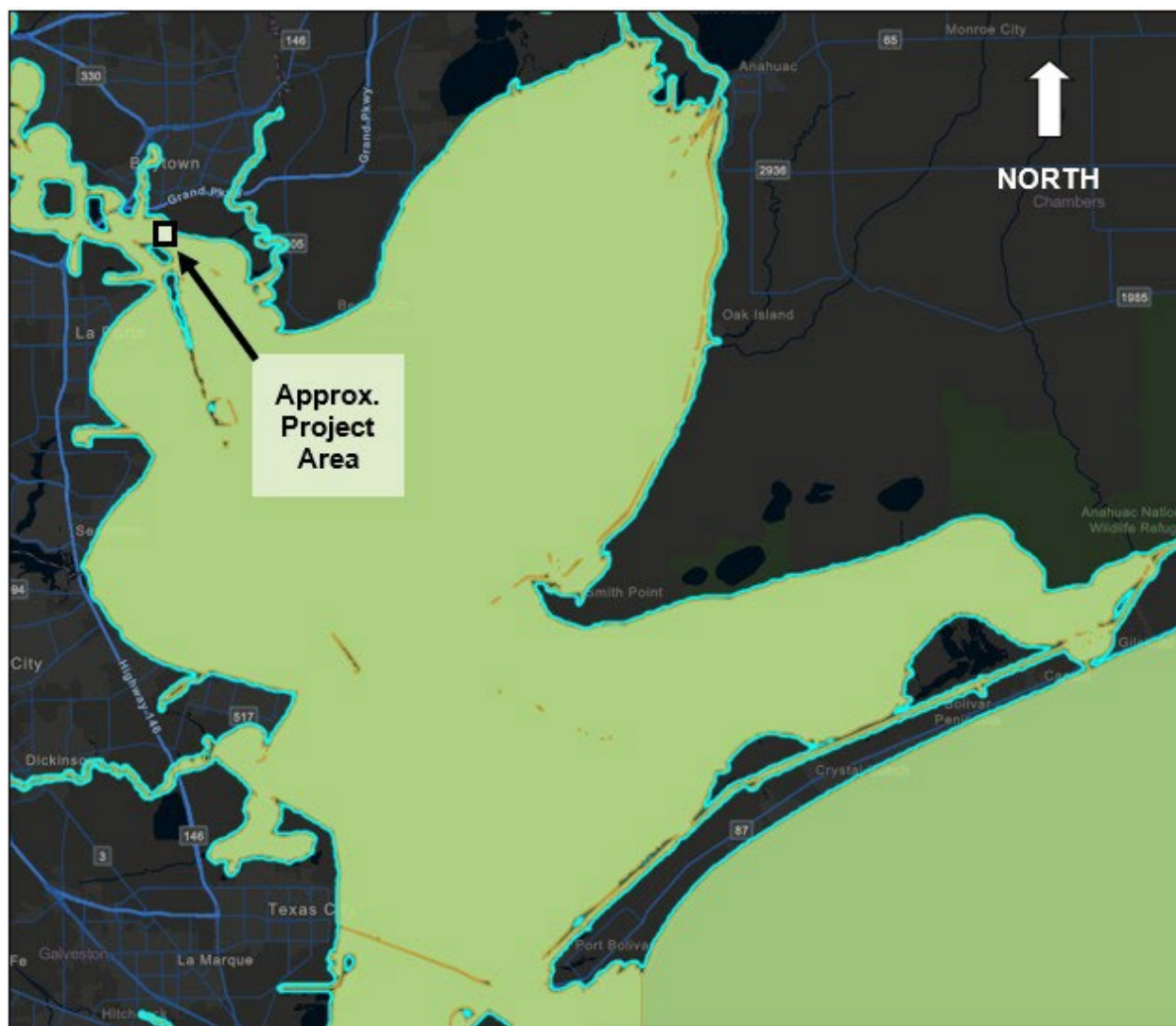


Figure 2-7. EFH for All Life Stages of Red Grouper in Galveston Bay, Texas

Note: The red grouper EFH is shown as green fill with a blue outline in the image above and refers to all life stages according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.6 Cobia

Galveston Bay, including the project area, includes EFH for all life stages of cobia according to GMFMC and NMFS (2016) and NOAA Fisheries (2025) (Figure 2-8).

Cobia are distributed along the U.S. Gulf and Atlantic coasts (Adams et al. 2003). Cobia migrate southward and into deeper water during fall and winter and return to nearshore waters in spring and summer. Off the southeastern U.S., the species spawns from April to September (Adams et al. 2003). Cobia grow fast considering their large size and females reach maturity around age 2. As cobia increase in size, their choice of focal prey switches from portunid crabs to predominantly forage fishes (Adams et al. 2003). Cobia are found above structured habitat such as reefs and rocky substrates in open continental shelf waters (Kells and Carpenter 2011) up to 1,200 m deep (Collette 2002a). This species is less often found in estuaries (Collette 2002a).



Figure 2-8. EFH for All Life Stages of Cobia in Galveston Bay, Texas

Note: The cobia EFH is shown as green fill with a blue outline in the image above and refers to all life stages according to the NOAA Fisheries (2025) EFH Mapper.

Source: Figure taken from NOAA Fisheries (2025) EFH Mapper

2.2.7 Blacktip Shark

Galveston Bay, including the project area, includes EFH for neonate blacktip sharks according to NMFS (2017) and NOAA Fisheries (2025) (Figure 2-9).

Blacktip sharks were the second-most abundant species of shark caught in Texas bays during a study of shark nurseries of Texas by Jones and Grace (2002). These authors captured adult blacktip sharks in Galveston Bay, along with several other Texas bay systems. Blacktip sharks are abundant along the Gulf coast of the U.S. (Castro 1983, 2011; Castro et al. 1999). Brood size ranges from one to eight young, each measuring 55 to 60 cm total length (TL), born in late May to early June in shallow mud-bottomed coastal nurseries in the southeastern U.S. and Gulf Coast (Castro et al. 1999, Castro 2011). Reproduction is biannual (Castro et al. 1999). Neonates use water depths of from 2.1 to 6.0 m according to a study by Carlson (2002). Jones and Grace (2002) reported that young-of-year blacktip sharks were most abundant in the Galveston Bay system (including West Bay and Trinity Bay), and Corpus Christi Bay system, compared to other Texas

bays that they studied. Juveniles use both nearshore and estuarine waters (NOAA 2009). Juveniles and adult blacktip sharks migrate north and south along the eastern seaboard, and migrations are temperature-driven (NOAA 2009).

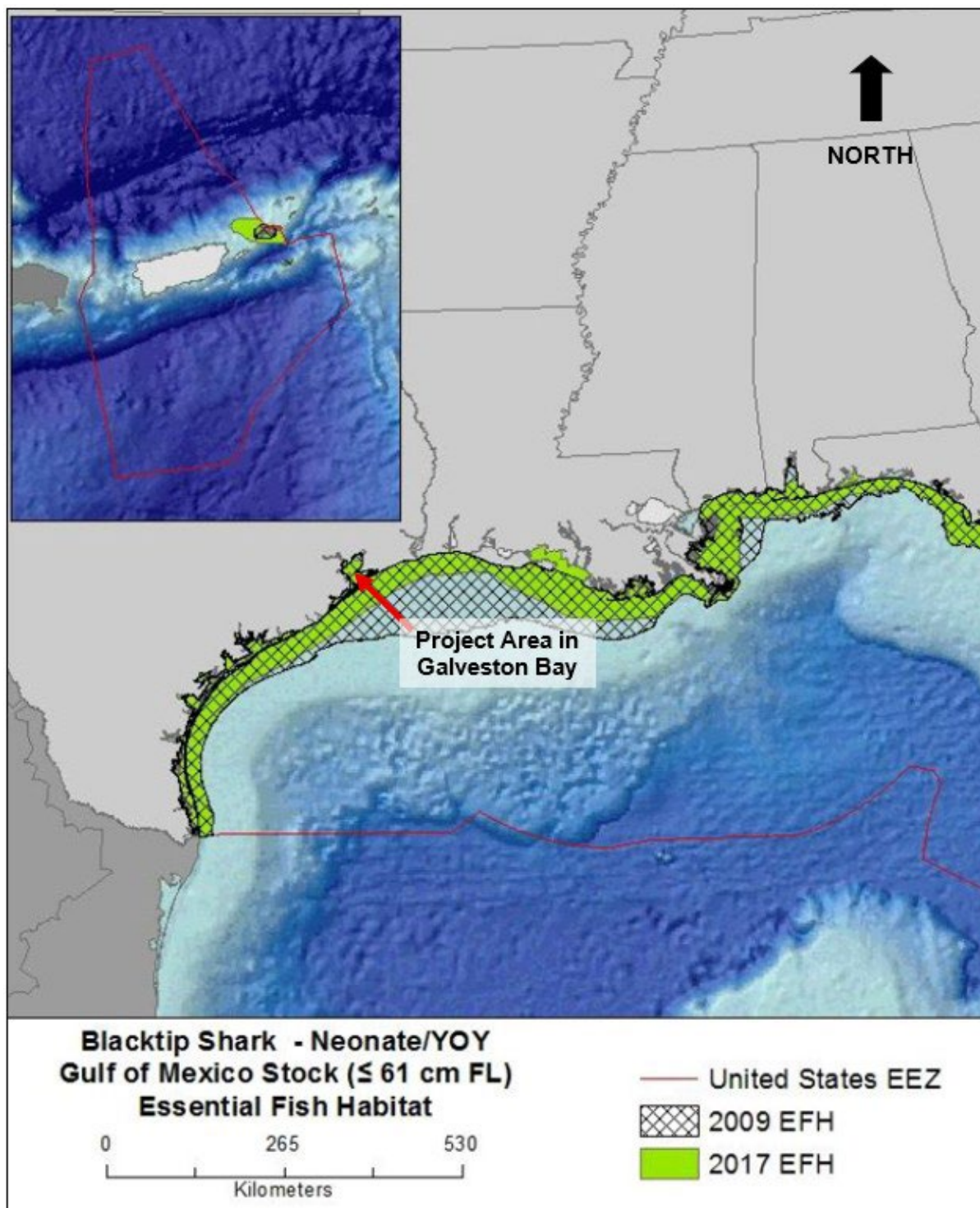


Figure 2-9. EFH for Neonate and young-of-year Blacktip Sharks in Texas Coastal Waters, including Galveston Bay

Note: The neonate blacktip EFH is shown as green fill as currently delineated according to NMFS (2017).

Source: Modified from Figure G 30 of NMFS (2017)

2.2.8 Bull Shark

Galveston Bay, including the project area, includes EFH for neonate and young-of-year, juvenile, and adult life stages of bull sharks according to NMFS (2017) and NOAA Fisheries (2025) (Figure 2-10).

The bull shark was the most abundant species of shark caught in Texas bays during a study of shark nurseries of Texas by Jones and Grace (2002). Terres Ceron et al. (2023) found a positive correlation between the trend of increasing average temperatures during spring and fall in Galveston Bay over the period 1982–2019 and increasing abundance of bull sharks in the bay. These authors attributed the increasing average temperatures over this period to climate change.

Bull sharks are thought to breed biannually (Castro et al. 1999, Castro 2011). Gestation is estimated at 10 to 11 months (Castro et al. 1999). Brood size is one to 10 young, each measuring approximately 75 cm TL (Castro et al. 1999). Gulf estuaries provide nursery areas for this species (Castro et al. 1999), as do coastal lagoons (Snelson et al. 1984). Estuarine habitats used by young bull sharks often have very low salinity (Castro 1999). Young bull sharks in inshore nurseries are susceptible to mortality during cold winters (Dodrill 1977). Jones and Grace (2002) reported capturing young-of-year bull sharks, ranging from 833 to 975 mm TL, in Texas bays starting each May and captures of this year class continued through summer and into fall.

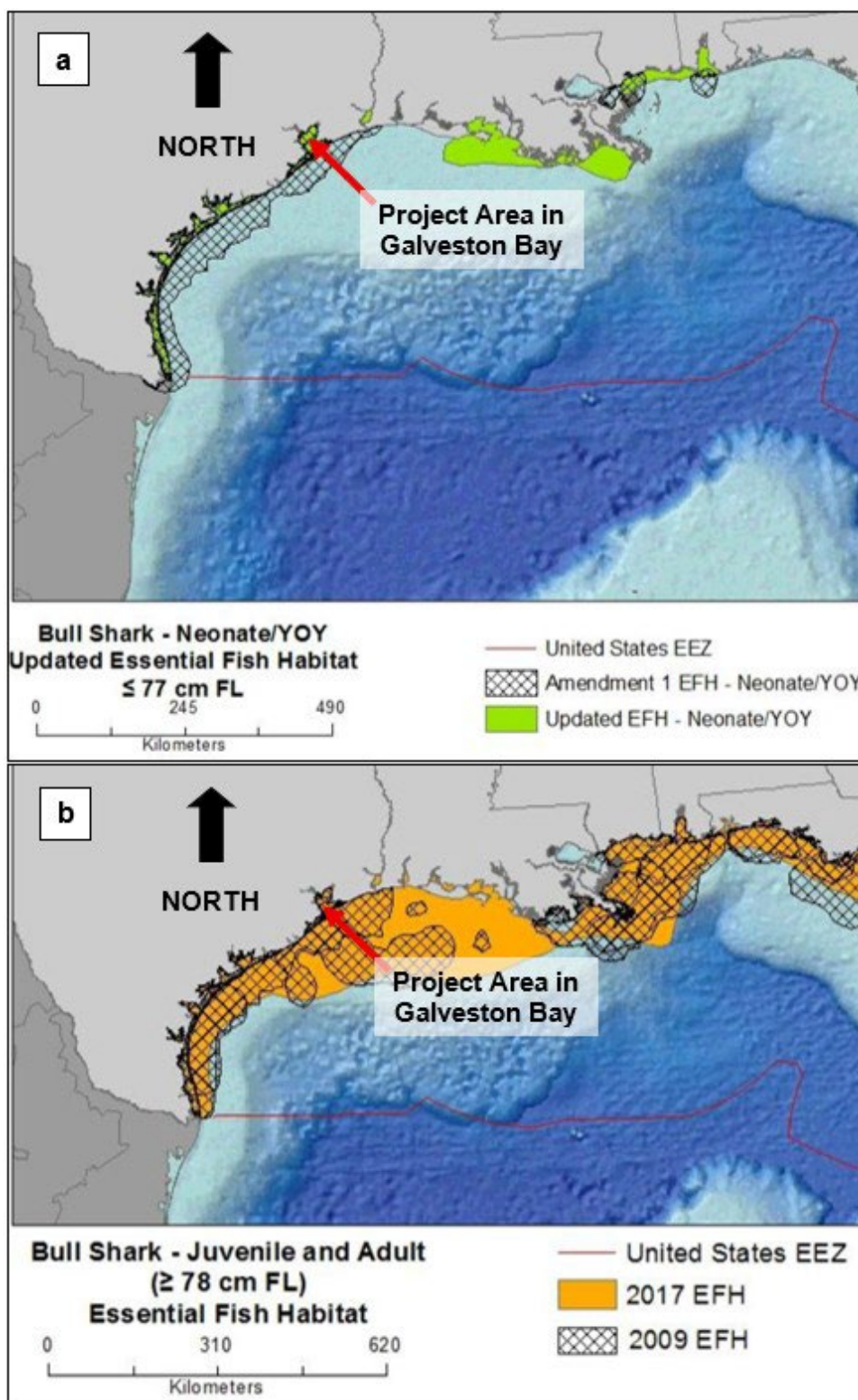


Figure 2-10. EFH for Neonate and Young-of-year (a) and Juvenile and Adult Bull Sharks (b) in Texas Coastal Waters, including Galveston Bay

Note: The neonate bull shark EFH is shown in green fill in the top image while juvenile and adult bull shark EFH are shown as orange fill in the bottom image. The green and orange fill shown represent currently delineated EFH according to NMFS (2017).

Source: Modified from Figures G 32 and G 33 of NMFS (2017)

2.2.9 Spinner Shark

Galveston Bay, including the project area, includes EFH for neonate and young-of-year spinner sharks according to NMFS (2017) and NOAA Fisheries (2025) (Figure 2-11).

Spinner sharks were caught in Galveston Bay, along with several other Texas bays, during a study of shark nurseries of Texas by Jones and Grace (2002). However, these authors reported that this species occurred in relatively low abundance in these bays. The spinner shark has a biannual reproductive cycle (Castro et al. 1999). Neonates measure 58 to 65 cm TL and are born in late May to early June (Castro 2011). Brood size is six to eight young (Castro 2011). Nursery areas are shallow coastal waters (Castro et al. 1999, Castro 2011). Life stages of spinner sharks caught in Galveston Bay included young-of-year and juveniles of age 1+ years old (Jones and Grace 2002).

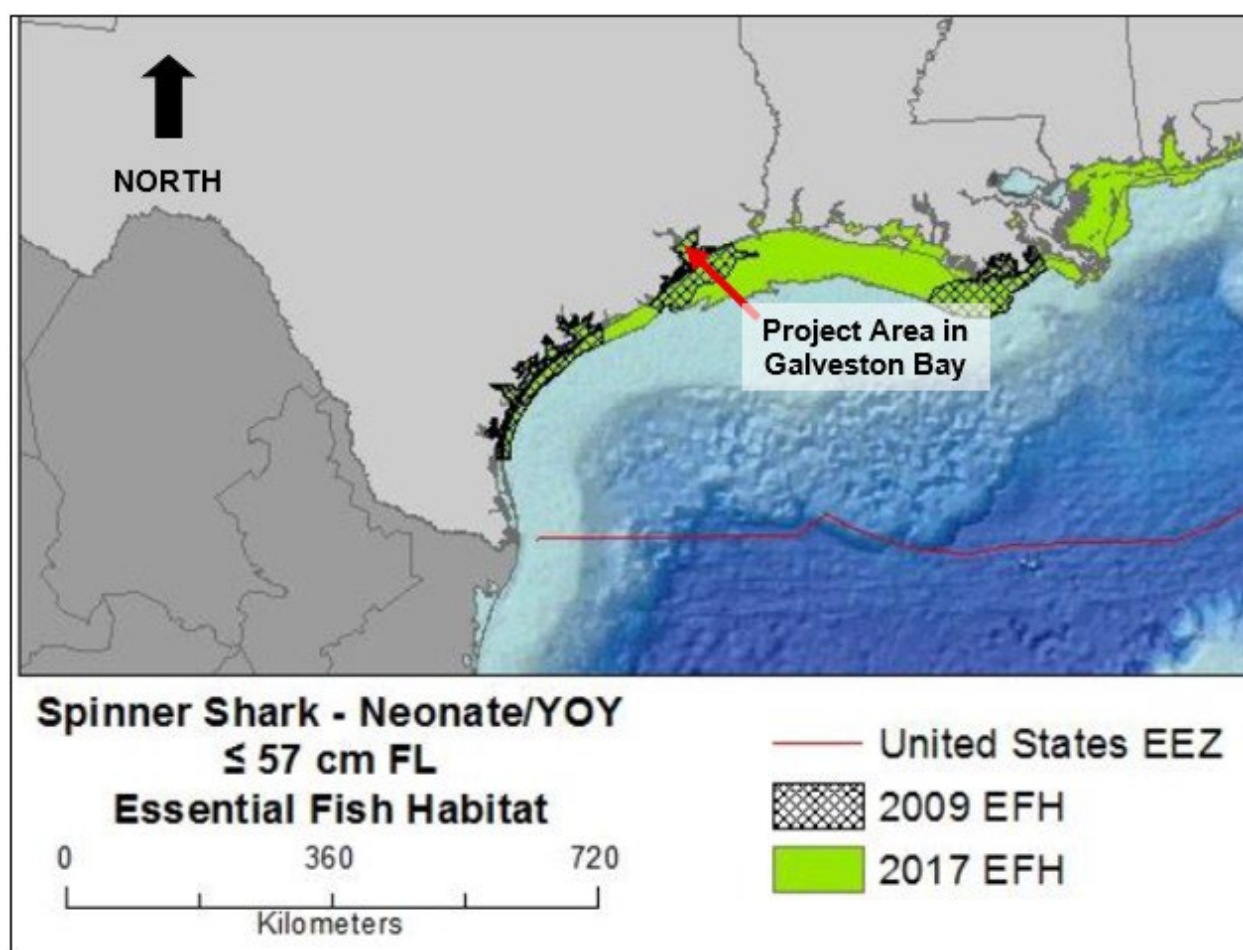


Figure 2-11. EFH for Neonate and Young-of-year Spinner Sharks in Texas Coastal Waters, including Galveston Bay

Note: The neonate spinner shark EFH is shown as green fill as currently delineated according to NMFS (2017).

Source: Modified from Figure G 45 of NMFS (2017)

2.2.10 Bonnethead

Galveston Bay, including the project area, includes EFH for neonate and young-of-year bonnetheads according to NMFS (2017) and NOAA Fisheries (2025) (Figure 2-12).

Bonnetheads of all ages were caught in all major bay systems of Texas during a study of shark nurseries of Texas by Jones and Grace (2002). The species prefers water temperatures above 21°C and depths of 10 to 80 m (Castro 2011). Bonnetheads have a short (4.5 to 5 months) gestation period and an annual reproductive cycle (Castro et al. 1999). Brood size is 8 to 12 young (Castro et al. 1999). Neonates measure 27 to 35 cm TL (Castro et al. 1999). Jones and Grace (2002) reported that young-of-year bonnetheads were most abundant in April in Texas bays. These authors found that insufficient numbers of captures of neonate-sized bonnetheads prevented the identification of probable nursery areas in Texas bays. However, parturition has been reported to occur in fall in other parts of this species' range (Parsons 1993).

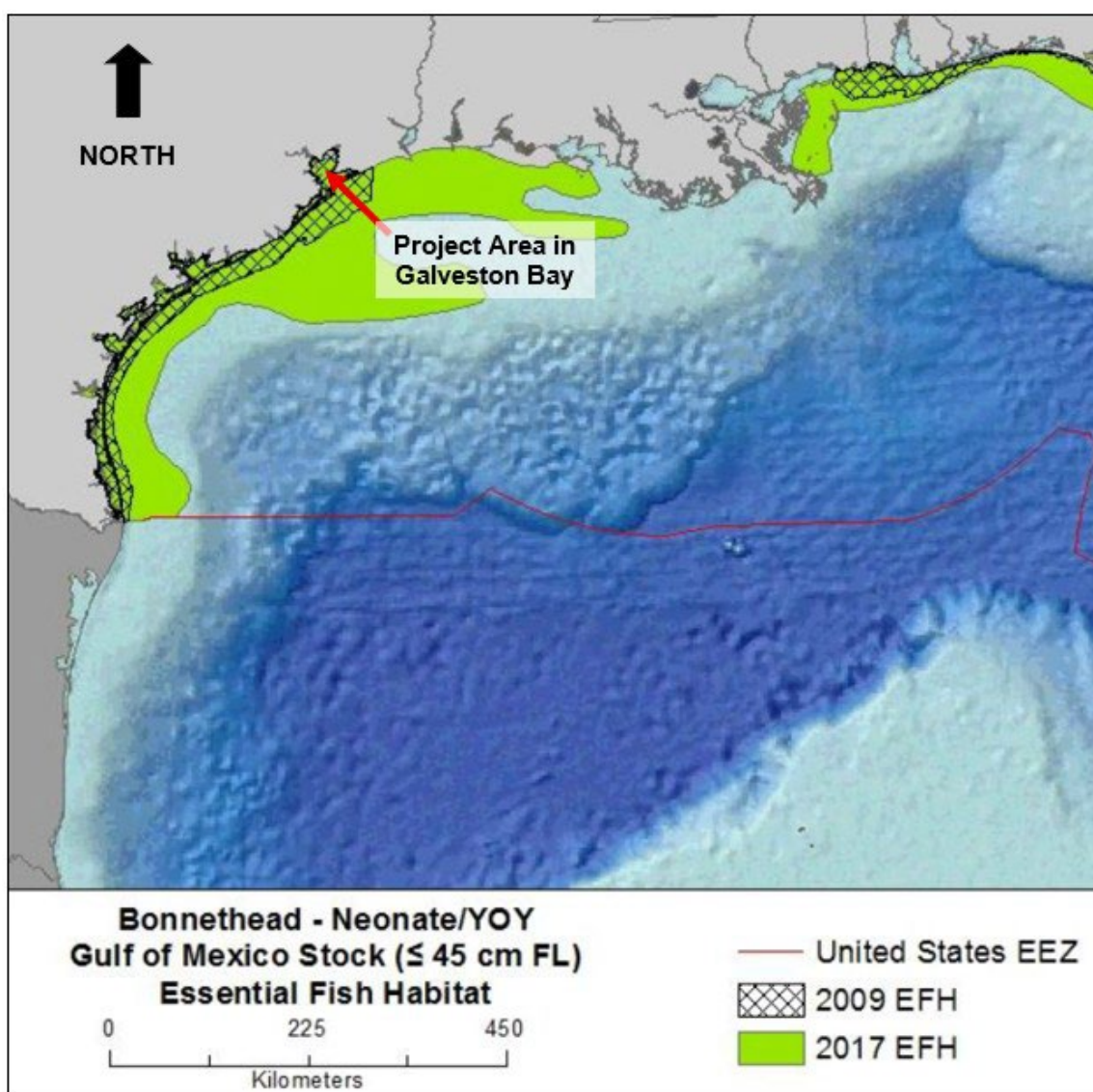


Figure 2-12. EFH for Neonate and Young-of-year Bonnetheads in the Northern Gulf Coast, including Galveston Bay, Texas

Note: The neonate bonnethead EFH is shown as green fill as currently delineated according to NMFS (2017).

Source: Modified from Figure G 52 of NMFS (2017)

2.3 Recreational & Commercial Fisheries

As discussed and described in Subsection 4.7 of the EA, there are hundreds of species of shellfish and finfishes that utilize Galveston Bay and are of recreational and (or) commercial importance. Many of such species likely utilize or pass through the project area at least occasionally. Fishery resources within the bay are the most lucrative of any bay within Texas. These resources annually generate approximately 33% of the total commercial fishing revenue and 50% of the total recreational fishing revenue for Texas (Lester and Gonzales 2010). Most of the recreational revenue is generated via the pursuit of finfishes, while most of the commercial revenue is attributed to the shrimp fishery (Lester and Gonzales 2010). Some of the most common species of the bay include brown shrimp, white shrimp, blue crab, Gulf menhaden, Atlantic croaker, spotted seatrout, gray snapper, and southern flounder (Galveston Bay Estuary Program 2025).

2.3.1 Life Histories of Selected Species

Penaeid shrimp—Spawning takes place over several months, from about March through September (Carson 1944). Hatching takes place in approximately 14 hours (Carson 1944). Larvae can occur in marine waters, where they live within the water column and consume zooplankton (SAFMC 1998b). Post-larvae are generally benthic. In northern areas, some post-larvae may overwinter buried within the substrate (SAFMC 1998b). In the northern Gulf, post-larvae may use inshore emergent vegetation such as smooth cordgrass (*Spartina alterniflora*) and rush (*Juncus spp.*), where they are able to obtain enough food for rapid growth (SAFMC 1998b). These emergent vegetated habitats are thus critically important (SAFMC 1998b). Within these habitats, sediment mixtures of mud appear to be favored by juveniles, as is a brackish salinity regime (SAFMC 1998b). However, various studies have contradicted one another on the degree of importance of low salinities (SAFMC 1998b). As juveniles approach adult size, they migrate towards waters having higher salinities (SAFMC 1998b). The largest juveniles and adults are generally found in the highest salinity regimes, including open marine waters (SAFMC 1998b). Some studies indicate that temperature range and food availability have greater impact on growth than does salinity (SAFMC 1998b). Juveniles appeared to grow little or not at all in 16°C, but growth rates increased rapidly above 20°C in one study (SAFMC 1998b). Excessively cold winters have been known to cause mortality in all life and are thought to contribute to reduced landings following such events (SAFMC 1998b).

Blue crab—Post-larval blue crab can be found in Galveston Bay. Early larval stages are found in the lower estuary and adjacent marine waters. Late larval stage blue crab occur mainly in the open Gulf, entering the estuary just prior to adopting an epibenthic adult life stage (Perry and McIlwain 1986). The species spawns in the northern Gulf in coastal and estuarine waters in the spring, summer, and fall (Perry and McIlwain 1986). Juvenile blue crab are found on soft mud (Perry and McIlwain 1986). Adult males often wander into low salinity waters and even freshwater habitats. Mature females prefer the higher salinities of the lower estuary and adjacent marine waters (Perry and McIlwain 1986). Blue crab are opportunistic epibenthic feeders feeding on a wide variety of food items. The species tends to feed on whatever is most abundant at a given area, including but not limited to other crustaceans (including other blue crab), mollusks, fishes, and detritus (Perry and McIlwain 1986). The species is in-turn important prey to fishes, sea turtles, and birds.

Atlantic croaker—Eggs and larvae of this species occur in open Gulf waters and are pelagic, normally occurring during the late fall to early winter (McEachran and Fechhelm 2005). Larval and juvenile croaker move closer to shore and begin to enter Galveston Bay and other Texas estuaries. Estuarine habitats used by this species include seagrass, saltmarsh, and tidal creek habitats, including both mud and sand substrates (McEachran and Fechhelm 2005). In early fall and through the winter months, adult croaker migrate out of the bay and other estuaries to

nearshore and offshore waters to spawn. Spawning peaks during October through November. Fish older than one year are less abundant in the bay but low numbers can be found around oyster reefs, bridges, piers, and other high-relief structures over deeper water (McEachran and Fechhelm 2005). Mature croaker are found offshore and inhabit muddy or sandy bottoms. Adults tolerate a wide range of salinities but are most often associated with salinities ranging from 6 to 20 ppm. Temperatures of from 27° to 31°C are associated with optimal growth in this species (McEachran and Fechhelm 2005). Atlantic croaker feed primarily on polychaete worms, crustaceans, and mollusks (Springer and Woodburn 1960).

Gray snapper—This and other species of snappers are typically epibenthic and nocturnal predators inhabiting inshore waters to depths of approximately 550 m (Anderson 2002, McEachran and Fechhelm 2005). Adult gray snapper typically inhabit reef structure or rocky areas (Anderson 2002). This species preys on crustaceans and fishes (Anderson 2002). Spawning occurs in summer for continental populations, including those of Texas (Anderson 2002). Spawning occurs at night and sometimes coincides with spring tides (Anderson 2002). Females spawn multiple times during a given season (Anderson 2002). Eggs are fertilized near-surface after an ascending courtship ritual (Anderson 2002). Eggs and larvae are pelagic (Anderson 2002). Larvae are photo-sensitive, avoiding the surface during the day but distributing themselves more evenly after dark (Anderson 2002). This and other snappers exhibit K-selected life history traits, including slow growth and late maturation (Anderson 2002).

Southern flounder—This species is the dominant species of large paralichthyid flounder in the northern Gulf (Munroe 2002). Southern flounder occurs over soft sediments (mud, clay, silt) in estuaries and coastal areas out to 40 m depth. A wide range of temperature and salinity ranges are suitable (Munroe 2002). Summers are generally spent in brackish water estuaries but the species moves offshore to deeper marine waters in fall and winter, for spawning. Sexual maturity is reached at about two years of age. Spawning in the Gulf occurs at depths of 20 to 60 m and during September through April (peaking during November through January) (Munroe 2002). Juveniles begin to migrate into Texas bays when water temperatures are as low as 14°C, but migration peaks when temperatures average 16°C. Post-spawned adults re-enter Texas bays as early as February to April (Munroe 2002). Southern flounder are voracious predators. Adult feed mostly on fishes but also take crabs and shrimp. Juveniles feed mainly on small benthic invertebrates (Munroe 2002).

3 ASSESSMENT OF IMPACTS TO ESSENTIAL FISH HABITAT

In general, the designation and use of the Cedar Bayou PA 2 expansion area could potentially produce the following adverse environmental effects:

- Temporary water column perturbations (turbidity plumes, release of chemical contaminants, lowering dissolved oxygen concentrations)
- Mortality of benthic organisms
- Changing the bathymetry of the site
- Altering the sediment composition of the site

The following sections discuss the potential effects of dredged material placement at the proposed Cedar Bayou PA 2 expansion site. Turbidity and sedimentation are thought to be primary causes of impacts to EFH.

O&M dredged material to be placed into the expansion area of the PA 2 is anticipated to originate from the Cedar Bayou Navigation Channel, less than one mile south of the project area. Because the Cedar Bayou Channel and the PA 2 expansion area are close to one another and within the same estuary, the composition of dredged sediment originating from the Cedar Bayou Channel is expected to be comparable to the substrate currently found at the area proposed for the PA 2 expansion.

3.1 Turbidity & Water Quality

The behavior of dredged material during placement can be separated into three main phases as follows:

Convective descent (the primary phase) occurs when the sediment cloud falls under the influence of gravity and its initial momentum is imparted by gravity.

Dynamic collapse (the secondary phase) occurs when the descending cloud either impacts the bottom or arrives at a level of neutral buoyancy, at which time descent is retarded and horizontal spreading dominates.

Passive transport-dispersion (the tertiary phase) commences when material transport and spreading are determined mostly by ambient currents and turbulence rather than by the dynamics of the placement operation.

3.1.1 Minimization of Water Quality Impacts Through Statutory & Regulatory Screening

Although short-term water quality (primarily turbidity) impacts during placement and construction operations are unavoidable, testing of sediment, elutriates, and water prior to placement of dredged material is conducted to minimize these impacts. In accordance with the statutory and regulatory framework of Section 404 of the Clean Water Act (CWA) and using guidance from the Inland Testing Manual by the U.S. Environmental Protection Agency (EPA) and USACE (1998), the dredged material undergoes testing for contaminants prior to dredging and placement. Sediment, elutriates, and water originating from the Cedar Bayou Navigation Channel are analyzed for various metals, ammonia (as nitrogen), cyanide, total petroleum hydrocarbons, organochlorine pesticides, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, and semivolatile organic compounds. Sediment from the navigation channel is also typically analyzed for dioxins and furans. The concentrations of any detected contaminants are compared to

screening levels. In the case of contaminants detected in water and elutriates, the detected concentrations are compared to available criteria maximum concentration in EPA (2006, 2024) and Texas acute water quality standard values in Texas Commission on Environmental Quality (2022). In the case of contaminants detected in sediment, the concentrations are compared to the threshold effects level and the effects range low from Buchman (2008) as well as the human health

protective concentration levels from the Texas Commission on Environmental Quality (<https://www.tceq.texas.gov/remediation/trrp/trrppcls.html>). If the results of contaminant analyses indicate that detected levels of contaminants exceed the range determined acceptable for open-water placement, then the material is deemed unacceptable for placement at PA 2 and an alternative method of disposal is identified.

Thus, contaminant-related impacts are avoided or minimized by identifying the levels of contaminants in the dredged material and determining whether the material is acceptable for open-water placement under the CWA and EPA and USACE (1998) guidance before it can be placed at the PA 2 expansion area (or other open-water placement area).

3.1.2 Potential Impacts to Larval Invertebrates & Fishes

Impacts to zooplankton, including planktonic larvae of federally managed invertebrates and fishes, resulting from dredged material placement may include mortality due to entrainment in the sediment plume and interference with filter-feeding caused by a temporary increase in suspended sediments. Pelagic eggs of fish can be smothered by re-suspended sediment (Suedel 2011). These impacts are expected to be short-term and localized and are not expected to significantly affect planktonic conditions in the region, especially considering that steps are taken in Tier II of the above-mentioned testing procedure to evaluate and prevent deleterious effects on zooplankton and other organisms of the water column before the dredged material is deemed suitable for open water placement.

3.1.3 Potential Impacts to Pelagic Fishes

Though information is limited, most studies on the effects of dredging and dredged material disposal/placement on fish communities have focused on larvae and eggs in estuarine environments (e.g., Auld and Schubel 1978, Johnston and Wildish 1981). Results from these studies suggest that if the placement of dredged material does not significantly affect these sensitive life stages, fishes and commercial fisheries will be similarly unaffected by placement events (EPA 1993).

Pelagic fishes and other actively swimming organisms are generally not adversely affected by dredged material placement due to their high mobility (EPA 1983). During a placement event, the greatest impacts to pelagic fishes may be from increased turbidity within the sediment plume, which may temporarily limit the feeding efficiency of visually oriented predators and reduce the oxygen exchange capacity of their gills via the clogging of opercular cavities and gill filaments (Doudoroff 1957, EPA 1993) and the physical abrasion of filtering and respiratory organs (Suedel 2011). Younger juveniles may be more susceptible to the effects of released dredged material (EPA 1995). The reduction in oxygen exchange capacity in the gills of young juveniles and the effects of decreased dissolved oxygen associated with a turbidity plume can be more pronounced compared to effects on adults and older juveniles. However, highly mobile fishes are likely to avoid the sediment plume. It is possible that dredged material deposition at a nearshore placement area provides attractive foraging opportunities for actively predacious species by temporary displacement of epibenthic forage species. There are no artificial reefs in or near the proposed expansion area for PA 2. No impacts are expected to such habitat.

Turbidity tests done by Wallen (1951) using montmorillonite clay (a 2:1 smectite clay) particles and 16 warm-water fish species showed no behavioral changes in fish until the turbidity levels were very high (nearing 20,000 ppm of silicone dioxide). Further, the Wallen (1951) study showed that most fish withstood concentrations above 50,000 ppm before mortality took place, and many of the fish were able to endure concentrations of more than 100,000 ppm for a week or longer before succumbing when turbidity reached between 175,000 and 225,000 ppm. In highly turbid conditions, harmful dissolved substances (whether natural or man-made) can impair the gas exchange capacity of the gills at least as much as can particulate matter (Doudoroff 1957). The impairment of gill function in advanced life stages of fish ascribable to chemically inert suspended particles can apparently only occur when turbidity is exceedingly high (Doudoroff 1957), and so it is thought to only minimally affect fish gill functions during placement activities.

Placement activities at the expansion area for PA 2 are expected to minimally affect pelagic fishes. Only a localized area will be affected by placement operations, and fish populations are not geographically limited to the placement area; therefore, the presence of such species within the affected area during placement operations is expected to be minimal. Pelagic fishes traveling through the immediate area may modify their route during discharge operations. Adult fishes within and immediately adjacent to the PA may experience a temporary reduction in the oxygen exchange capacity of their gills due to clogging and physical abrasion (Suedel 2011). A minor decrease in dissolved oxygen can occur due to an increase in the biological oxygen demand associated with the dredged material. Additional stress in adult fishes can occur due to avoidance reactions (EPA 1995). Reproductive behavior of fishes has also been suggested to be impacted during placement activities (Suedel 2011). However, conditions that could impact pelagic fishes are expected to be short-term (measurable in hours) and localized (limited to the placement area), and the effects on adults and larger juveniles living within the water column are not expected to be significant given their ability to quickly avoid the localized area of placement activities.

3.2 Sedimentation

Dredged material placement at the proposed PA 2 expansion area will result in the accumulation of dredged material over the bay bottom and a reduction in water depth across the project area, although the sediment composition will likely be comparable to the existing composition. A monitoring program could detect a potential concern and aid in the prevention of any adverse effects.

As explained in Subsection 3.1.1, dredged material proposed for placement at the PA 2 expansion area will first undergo stringent chemical testing designed to minimize water column impacts and benthic toxicity effects. Placement of dredged material that is determined to be suitable for open water placement is not expected to produce significant long-term environmental effects related to sediment and water chemistry and contaminants of concern. The sediment grain size composition within the project area is not expected to change from the native sediment considering that the Cedar Bayou Navigation Channel has similar grain size composition as the project area (Lloyd Engineering 2023). Overall, based on previous testing done on sediment and water obtained from the nearby channel, and from the existing PA 2, permanent or long-term adverse impacts to benthic infauna are not expected.

3.2.2 Potential Impacts to Demersal Fishes & Shrimp

Placement of dredged material at the PA 2 expansion area is expected to create an immediate local effect on demersal fishes and epibenthic invertebrates. The immediate local effect of dredged material placement would be the burial of taxa such as penaeid shrimp, searobins (*Prionotus* spp.), sand flounders (*Paralichthyidae*), and the blackcheek tonguefish (*Symphurus plagiusa*) as well as some of their epifaunal and infaunal prey. After dredged material is placed,

much of the fine-grained sediment remains suspended near the bay bottom (Hirsch et al. 1978). This can cause stress in fishes in part due to the reduction of oxygen exchange capacity in the gills due to clogging and physical abrasion (EPA 1995, Suedel 2011). Larger juveniles and adults can avoid the suspended material by moving out of the area, but smaller juveniles are more vulnerable and susceptible to stress (Science Applications International Corp. 1986). Post-placement recovery of the local demersal fish populations may take 14 to 22 months, and recovery of the epibenthic invertebrate populations may take over two years, based on a dredge recolonization study in San Diego Bay conducted by Mooney (2010).

Benthic infaunal and epifaunal populations, which are the main food sources for demersal fishes, decline when placement occurs frequently because these food sources are unable to re-establish themselves (Science Applications International Corp. 1986). Some recovery of the benthic community occurs within months, but complete recovery of the original benthic communities requires about 1 to 3 years according to studies by Germano and Rhoads (1984), Dillon (1984), and Scott et al. (1987). However, the duration between disturbance by dredged material placement and evidence of recovery of the benthic infaunal community varies widely between sites. As shown in Table 3-1 below, a review of the available literature shows a benthic infaunal mean recovery time of 9.8 months but with a very wide range (1 month to over 30 months) (Wilber and Clarke 2007 and sources in Table 3-1). When placement occurs more often than yearly, the benthic community will likely experience reduced diversity and will support a more limited demersal fish community (EPA 1995).

Table 3-1. Estimated Recovery Times of Infaunal Communities Following Dredged Material Placement Compiled from Previous Studies Worldwide

Site	Regional Climate	Water Depth (m)	Predominant Sediment Type	Changes to Sediment Type? (yes, no)	Mechanism of Recovery ¹	Recovery Time (months)	Reference(s) ²
Columbia River, OR/WA	Cold	Shallow	Fine sand, clay	No	All life stages	>10	Richardson et al. (1977)
Quebec, Canada	Cold	55	Fine sand	Yes	All life stages	>24	Harvey et al. (1998)
Port Valdez, AK	Cold	15–23	Mud	No	Larval	>30	Blanchard and Feder (2003)
Puget Sound, WA	Cold	60	Silt, clay, sand	No	Adult recruitment	9	Bingham (1978)
Western Baltic Sea	Cold	19	Fine sand	No	Adult recruitment	<24	Powilleit et al. (2006)
Weser Estuary, Germany	Cold	16	Silt, sand	Yes	Undetermined	>8	Witt et al. (2004)
New S. Wales, Australia	Temperate	6	Fine sand	No	Adult recruitment	3	Smith and Rule (2001)
Gulfport, MS	Temperate	3	Silt, clay	Yes	Adult recruitment	12	Wilber et al. (2007)
Corpus Christi, TX	Temperate	3	Silt, clay	No	All life stages	<12	Ray and Clarke (1999)
Coastal Louisiana	Temperate	3	Silt, clay	No	Undetermined	5	Flemer et al. (1997)
Sewee Bay, SC	Temperate	3	Silt, clay	Yes	Adult recruitment	6	Van Dolah et al. (1979)
Dawho River, SC	Temperate	<5	Silt, clay	Yes	Adult recruitment	3	Van Dolah et al. (1984)
Delaware Bay	Temperate	Shallow	Silt, clay	No	Undetermined	>5	Leathern et al. (1973)
New S. Wales, Australia	Temperate	Shallow	Silt, clay, sand	No	Adult recruitment	1	Jones (1986)
Mobile Bay, AL	Temperate	3	Mud	No	Adult recruitment	3	Clarke and Miller-Way (1992)
Coos Bay, OR	Temperate	8	Silt, clay	No	Adult recruitment	1	McCauley et al. (1977)
James River, VA	Temperate	3	Fluid mud	No	All life stages	3	Diaz and Boesch (1977), Diaz (1994)
Southern Brazil	Temperate	19	Silt, clay, fine	Yes	Adult recruitment	<9	Angonesi et al. (2006)
Queensland, Australia	Subtropical	11	Silt, clay	Yes	Adult recruitment	3	Cruz-Motta and Collins (2004)
Mirs Bay, Hong Kong	Subtropical	19	Sand, gravel	Yes	Undetermined	<24	Valente et al. (1999)
					MEAN (± SD)	9.8 ± 8.8	
					RANGE	1 – >30	

¹ Mechanism of recovery is usually speculated but refers to the primary type of recruitment thought to have contributed to recovery at a given disposal/placement area.

² References can be found in Table 1 of Wilber and Clarke (2007): <https://westerndredging.org/index.php/woda-conference-presentations/category/60-session-3d-environmental-aspects-of-dredging>.

Source: Modified from Table 1 of Wilber and Clarke (2007)

3.3 Proposed Mitigative Measures & Guidelines for Essential Fish Habitat Protection

3.3.1 Mitigation of Sedimentation

Short-term and long-term impacts related to changes in bathymetry resulting from dredged material placement at the PA 2 expansion area are unavoidable. To minimize the significance and monitor impacts of placement activities on the site, several measures should be included in the future management plans for PA 2:

- Periodic monitoring of the site and surrounding area to determine changes in bathymetry, sediment composition, short-term and long-term fate of materials, and benthic community structure.
- Placement of material should be confined to only the placement area. Release zones may be further defined within the placement area to better contain and minimize effects of dredged material placement within a specified time.

To reduce the effects of suspended sediments on epifauna, very-fine-grained sediments should be deposited in the smallest area possible so that the least amount of benthic habitat is affected per dredging and placement cycle (Hirsch et al. 1978). However, any sandy sediment should be dispersed over a larger area. A thin layer of sandy sediment would allow epifaunal invertebrates and demersal fishes the best chance of surviving burial (Hirsch et al. 1978).

3.3.2 Guidelines for Essential Fish Habitat Protection

GMFMC has developed guidelines that should be incorporated into project plans to minimize impacts to fishing and related activities. Listed below are the guidelines developed for navigation channel-related activities, including the placement of dredged material (GMFMC 2005). These guidelines will be considered for inclusion during the designation of the PA 2 expansion area.

- **Project Implementation:** Environmentally critical habitats have been avoided as much as possible.
- Pipes used in the hydraulic dredging process will be placed and adjusted in a way that avoids impacts to any sensitive habitats. **Project Implementation:** Pontoon floats are typically used with hydraulic pipelines for dredging projects in Galveston Bay and would be used as conditions allow. These floats avoid dragging the pipelines along the bay bottom.
- Excavated materials will be beneficially used to the extent practicable. Placement of the dredged material within the bay allows the organic material to continue to be productive within the coastal cell, to the benefit of local fauna. **Project Implementation:** Dredged material placement during the O&M dredging have been accounted for in the proposed action. Expansion of PA 2 will convert unvegetated homogenous subtidal bay bottom to intertidal habitat that is comparable to the productivity of the current subtidal bay bottom. The proposed new expansion area is expected to be approximately 100 acres.

4 CONCLUSIONS

The proposed expansion of PA 2 would not impact oyster reefs as no living oysters were observed in the project area despite survey efforts by Lloyd Engineering (2025). Similarly, the expansion of this placement area is not expected to interfere with or prevent environmental parameters conducive to the natural colonization and growth of any future oyster reefs in this area.

Prior to placement of dredged material at the PA 2 expansion area, rigorous testing of sediment, water, and elutriates will be undertaken to assess the impacts of the proposed open-water placement before the dredged material can be determined suitable for such placement under the statutory and regulatory requirements of Section 404 of the CWA. Such testing is designed to ensure that effects to benthic resources are minimized.

EFH exists in and around the study area for several species and species-groups. Effects to the water column, such as increased turbidity, are expected to be temporary. Direct effects of sedimentation are not expected to be substantial due to the mobility of most federally managed species that may occur within the PA 2 expansion project area and the lack of geographic constraints within the project area within the larger Galveston Bay complex. Benthic infaunal organisms and sessile organisms that serve as prey or provide microhabitats to managed species are expected to be affected by construction and dredged material placement activities. Species and species groups preferring soft sediment (e.g., penaeid shrimp) may find the placement of fine sediment attractive and may even benefit from placement activities. Overall, the effects on EFH in the area are expected to be minimal.

Populations of federally managed sport and commercial fish species within the Galveston Bay complex help support important regional fisheries. EFH occurs in and around the PA 2 expansion project area for several fish species and three species of penaeid shrimp. Federally managed species populations are not likely to experience a negative effect considering that:

- O&M dredged material from the Cedar Bayou Navigation Channel is typically soft sediment suitable for some of these species; and
- The PA 2 expansion project area is a tiny fraction of the total area designated as EFH within Galveston Bay by NOAA.

EFH for several federally managed species occurs within Galveston Bay. No significant effects are expected to occur for the large, highly mobile species. No evidence was found for the presence of corals or other live hardbottom resources at the PA 2 expansion project area. Limited effects to larval fishes may occur during active placement activities, however. For these reasons, only minimal effects are expected for reef fish.

5 REFERENCES

Note that although several references below include the name 'Gulf of Mexico', this water body has since been re-named the 'Gulf of America' through Executive Order 14172, effective since 20 January 2025, and Secretary's Order 3423, effective since 07 February 2025.

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APPENDIX D
INTERAGENCY COORDINATION

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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





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

REPLY TO
ATTENTION OF

Navigation Branch

February 24, 2026

JOINT PUBLIC NOTICE
U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
AND
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PUBLIC NOTICE NO. HSC-M-7

DRAFT ENVIRONMENTAL ASSESSMENT
CEDAR BAYOU PLACEMENT AREA 2 EXPANSION
GALVESTON BAY: HARRIS COUNTY, TEXAS

PURPOSE

This public notice is to inform interested parties that the U.S. Army Corps of Engineers, Galveston District (USACE) has prepared a draft 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 1500-1508 for the evaluation of potential impacts potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2) for placement of O&M dredged material from the Cedar Bayou Navigation Channel.

The USACE has prepared the Draft EA to identify, evaluate, and disclose all impacts from work associated with this project that were not previously evaluated or disclosed in the Houston Ship Channel Expansion Channel Improvement Project 11- Final Integrated Feasibility Report and Environmental Impact Statement.

This notice is being distributed to interested State, Federal, and local agencies, private organizations, and individuals in order to assist in collecting facts and recommendations concerning the proposed project.

PROPOSED PROJECT

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the Cedar Bayou Navigation Channel. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed

expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

NEED FOR WORK

The purpose and need of the proposed action is to provide additional open-water disposal capacity at PA 2 for future operations and maintenance (O&M) dredging events to ensure continued navigational efficiency and safe transit within the CBNC. The objective of this project can be achieved through the identification of a suitable submerged area adjacent to PA 2 for the expansion of the PA 2 limits that can be used for placing O&M dredged material from the CBNC.

COMPLIANCE WITH LAWS AND REGULATIONS

This proposed project has been coordinated with Federal, State, and local agencies. The following is a list of Federal, State, and local agencies with which these activities are being coordinated:

Federal:

U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Environmental Protection Agency

State:

Texas Parks and Wildlife Department
Texas General Land Office, Coastal Coordination Council
Texas Historical Commission
Texas Commission on Environmental Quality

Local:

Port of Houston Authority

Consultation procedures have been initiated with the USFWS and NOAA Fisheries (National Marine Fisheries Service, NMFS) in compliance with the Endangered Species Act, as amended. Our initial determination is that the proposed action may affect, but is not likely to adversely affect the West Indian Manatee (T), loggerhead sea turtle (*Caretta caretta*) (T), Kemp's ridley sea turtle (*Lepidochelys kempii*) (E), and green sea turtle (*Chelonia mydas*) (T).

The proposed project has been coordinated with the Texas GLOs Coastal Coordination Council. The proposed project would impact waters within the Texas Coastal Management Program, and therefore a Coastal Management Program Consistency Determination has been requested.

The proposed activity has been coordinated with the State Historic Preservation Officer. Our initial determination is that the proposed action will not have any adverse impacts on historic or cultural resources.

STATE WATER QUALITY CERTIFICATION

The proposed project will be evaluated with regard to the requirements of Section 404(b)(1) of the Clean Water Act. The Texas Commission on Environmental Quality (TCEQ) is reviewing the proposed project under Section 401 of the Clean Water Act and in accordance with Title 30, Texas Administrative Code Section 279.1-13, to determine if the work would comply with State water quality standards. By virtue of an agreement between the U.S. Army Corps of Engineers and the TCEQ, this public notice is also issued for the purpose of advising all known interested persons that there is pending before the TCEQ a decision on water quality certification under such act. Any comments concerning this work may be submitted to the Texas Commission on Environmental Quality, Attention: 401 Coordinator, (MC-150), P.O. Box 13087, Austin, Texas, 78711-3087. The public comment period extends 30 days from the date of publication of this notice. A copy of the public notice with a description of the project is made available for review in the TCEQ's Austin office.

The TCEQ may conduct a public meeting to consider all comments concerning water quality if requested in writing. A request for a public meeting must contain the following information: the name, mailing address, and telephone number of the person making the request; a brief description of the interest of the requester or of persons represented by the requester; and a brief description of how the project would adversely affect such interest.

EVALUATION FACTORS

The decision whether to proceed with the proposed action will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources, as well as public and environmental safety and economic concerns.

ENVIRONMENTAL DOCUMENTATION

A preliminary review of this proposed project indicates that an Environmental Impact Statement (EIS) is not required. This preliminary determination of EIS requirement will be changed if information brought forth in the coordination process is of a significant nature. An Environmental Assessment and the appropriate NEPA compliance documents have been prepared, and made available to interested Federal, State, local agencies, and known interested persons.

As documented in the EA, the project would avoid and/or minimize significant impacts to the human and natural environment.

PUBLIC COMMENT

Persons desiring to provide comments on the project are requested to submit their comments in writing within 30 days of the date of this notice to:

U.S. Army Corps of Engineers, Galveston District
Attention: Ms. Lisa M. Finn

P.O. Box 1229
Galveston, TX 77553

or by email: Lisa.M.Finn@usace.army.mil The comments should make specific reference to Public Notice No. HSC-M-6

Any person who has an interest that may be affected by this action may request a public hearing. The request must be submitted in writing within 30 days of the date of this notice and must clearly set forth the interest that may be affected and the manner in which the interest may be affected by this activity.

Any questions concerning the proposed action may be directed to Ms. Lisa M. Finn, at (409) 766-3949.

Belynda Kinman
Chief, Operations Division
Galveston District

Attachment: Exhibit A

**D-1:
USFWS Section 7**

**CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

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



**US Army Corps
of Engineers®**



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

REPLY TO
ATTENTION OF

MARCH 3, 2026

Operations Division-Navigation Section

David Hoth
Texas Coastal and Central Plains Ecological Services Field Office
U.S. Fish & Wildlife Service
17629 El Camino Real, Ste 211
Houston, TX 77058

SUBJECT: Notice of Availability: Cedar Bayou PA 2 Expansion Project Draft Environmental Assessment

The U.S. Army Corps of Engineers (USACE), Galveston District (CESWG), has prepared a Draft Environmental Assessment (EA) to evaluate potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2) for placement of O&M dredged material from the Cedar Bayou Navigation Channel. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

A public notice has been issued for this project to inform interested parties that the USACE has prepared the draft 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 1500-1508.

Refer to the public notice of the project under the CESWG Project page at <https://www.swg.usace.army.mil/Projects/Cedar-Bayou-Placement-Area-2-Expansion/>

This letter request is to initiate informal consultation under Section 7(a)(2) of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531 et seq.), for the proposed environmental effects to listed species for Cedar Bayou PA 2 Expansion Project. USACE also requests your comments for the project pursuant to the Fish and Wildlife Coordination Act.

USACE has determined that the project ***may affect, but is not likely to adversely affect*** the West Indian Manatee (*Trichechus manatus*). No other protected species or critical habitat under USFWS jurisdiction are known to potentially be effected by the project. The Corps has made this determination with the agreement to implement species-specific conservation measures and monitoring protocols to reduce all effects to these species and their habitat to insignificant and/or discountable levels. Please refer to Attachment 1 of this document for the prepared Federally Protected Species Assessment.

USACE Galveston District is requesting that the U.S. Fish and Wildlife Service provide concurrence to the ***may affect, but is not likely to adversely affect*** determination for the manatee pursuant to Section 7 of the Endangered Species Act.

We appreciate your cooperation in coordinating the proposed project and request that you provide your comments by June 2, 2026. Should you need additional information or have any questions, please call me at (409) 766-3949.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lisa Finn', with a stylized flourish at the end.

Lisa Finn
Environmental Project Manager, Navigation



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Texas Coastal and Central Plains Ecological Services Office
Houston Sub-Office
17629 El Camino Real, Suite 211
Houston, Texas 77058
PHONE: 281/286-8282
FAX: 281/488-5882



In Reply Refer To:
2026-0059304

March 12, 2026

Colonel David W. Dake
District Commander, United States Army Corps of Engineers
Galveston District
2000 Fort Point Road
Galveston, Texas 77550

Subject: Section 7 Concurrence on the Cedar Bayou Placement Area (PA) 2 Expansion Project in
Galveston Bay, Texas

Dear Colonel Dake:

Thank you for contacting the U.S. Fish and Wildlife Service (Service) requesting review of the Cedar Bayou PA 2 Expansion Project, dated February 2026. The purpose of the project is to expand placement area 2 in Cedar Bayou for placement of O&M dredged material from the Cedar Bayou Navigation Channel. This project is regulated by the U.S. Army Corps of Engineers (USACE). Our response is provided in accordance with the Endangered Species Act of 1973 (Act) (16 U.S.C. 1531 et seq.).

The proposed action would expand the existing PA (48 acres) by approximately 1,500 by 3,200 feet (4,800,000 square feet/ 110.19 acres) to the north/northwest. The project area is in upper Galveston Bay (Galveston County, Texas), north of Atkinson Island and the Cedar Bayou Navigation Channel. The water depth within the project area is shallow and subtidal, with water depths ranging from 3-6 feet.

The following endangered, threatened, and proposed species are known to occur in Galveston County, Texas:

Piping plover (*Charadrius melodus*) – threatened
Red knot (*Calidris canutus rufa*) – threatened
Whooping crane (*Grus americana*) – endangered
West Indian manatee (*Trichechus manatus*) - endangered
Monarch butterfly (*Danaus plexippus*) – proposed threatened

The USACE determined the project would have “no effect” on piping plover, red knot, eastern black rail, and whooping crane due to lack of suitable habitat in the proposed project area. Under Section 7(a)(2) of the Act, consultation is not required for proposed actions that are determined to have no effect on listed species.

The USACE determined that the proposed project “is not likely to jeopardize” the monarch butterfly. While consultations are required only when the proposed action may affect listed species, a conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. Therefore, conferencing under Section 7 of the Act is not required for this project.

The USACE determine the proposed project “may affect, but is not likely to adversely affect” the West Indian manatee due to potential suitable habitat in the proposed project area. The proposed action area is within Galveston Bay, Texas where West Indian manatees have occasionally been observed. The USACE has proposed the following avoidance and minimization measures to be implemented to minimize potential impact to West Indian manatee:

Avoidance and Minimization Measures

West Indian manatee

- Any biological monitors and all construction personnel will review training which includes but is not limited to manatee training materials and videos found at <https://www.youtube.com/watch?v=Xs7zLRtZVOQ> and Manatee and Other Marine Animal Watch Information | FWC(<https://myfwc.com/wildlifehabitats/wildlife/manatee/>)
- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone of its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings work may resume.
- If a manatee(s) is sighted within 100-feet of the project area, all vessels associated with the project should operate at “no wake/idle” speed within the construction area and at all times while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
- The permittee understands and agrees that all in-water lines (rope, chain, and cable, including the lines to secure turbidity curtains) must be stiff, taut, and non-looping. Examples of such lines are heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. In all instances, no excess line is allowed in the water. Where appropriate, in-water wires and cables should be fitted with PVC sleeve from the surface to the bottom to prevent any potential scraping of the passing manatees.
- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. A temporary sign measuring 12 " X 15"

should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: “CAUTION: EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION”.

- Collisions with, injury to, or sightings of manatees should be immediately reported to the Texas Marine Mammal Standing Network ([1-800-9MAMMAL] [1-800-962-6625]) and the Service’s Texas Coastal and Central Plains Ecological Services Office (361-533-6765). Provide the reason for the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

Contingent upon the implementation of these avoidance and minimization measures and that the proposed project impacts are temporary, the Service concurs with the “may affect, not likely to adversely affect” determination for West Indian manatee.

No further endangered species consultation will be required unless: 1) the proposed action is subsequently modified in a manner that causes an effect on a listed species or designated critical habitat; 2) new information reveals the proposed action may affect federally listed species or designated critical habitat in a manner or to an extent not previously considered; or 3) if a new species is listed or a critical habitat is designated under the Act that may be affected by the proposed action.

If you have any questions or comments, please contact Courtney Dvorsky at courtney_dvorsky@fws.gov or by phone at (832) 205-3926. Please use the Service’s consultation code 2026-0059304 in any future correspondence. Thank you for your cooperation on this project.

Sincerely,

DAVID
HOTH

 Digitally signed by DAVID
HOTH
Date: 2026.03.12
09:00:52 -05'00'

Catherine Yeargan
Field Supervisor

**D-2:
NMFS SECTION 7**

**CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

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





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

REPLY TO
ATTENTION OF

Operations Division-Navigation Section

April 29, 2026

**Request to NOAA Fisheries Southeast Regional Office
for Initiation of Expedited Informal Consultation**

Mr. Dennis Klemm
Acting Assistant Regional Administrator for Protected Resources
National Marine Fisheries Service
Southeast Regional Office
St. Petersburg, Florida

Re: Request for Initiation of Expedited Informal Consultation under section 7(a)(2) of the Endangered Species Act for the Cedar Bayou Placement Area 2 Expansion Project, HSC-M-7

Dear Mr. Klemm:

The U.S. Army Corps of Engineers (USACE) proposes the proposed project as described below. We request initiation of informal consultation under section 7(a)(2) of the Endangered Species Act (ESA) for the Cedar Bayou Placement Area 2 Expansion Project. We have determined that the proposed activity may affect, but is not likely to adversely affect, the ESA-listed species and critical habitat included in the table(s) below. Our supporting analysis is provided below. We request your written concurrence with our determinations.

Pursuant to our request for expedited informal consultation, we are providing, enclosing, or otherwise identifying the following information:

- A description of the action to be considered;
- A description of the action area;
- A description of any listed species or critical habitat that may be affected by the action; and
- An analysis of the potential routes of effect on any listed species or critical habitat.

Proposed Action

The purpose and need of the proposed action is to provide additional open-water disposal capacity at PA 2 for future operations and maintenance (O&M) dredging events to ensure continued navigational efficiency and safe transit within the CBNC. The objective of this project can be achieved through the identification of a suitable submerged area adjacent to PA 2 for the expansion of the PA 2 limits that can be used for placing O&M dredged material from the CBNC.

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the CBNC. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the CBNC, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast, for a total area of approximately 148 acres. The center location for the proposed expansion area is 29.693953, -94.96117. Placement of O&M material from the Cedar Bayou Channel occurs approximately every 3 years and lasts approximately 3 months per dredging event. The proposed expansion area is proposed to remain in operation for the foreseeable future as an open water placement area.

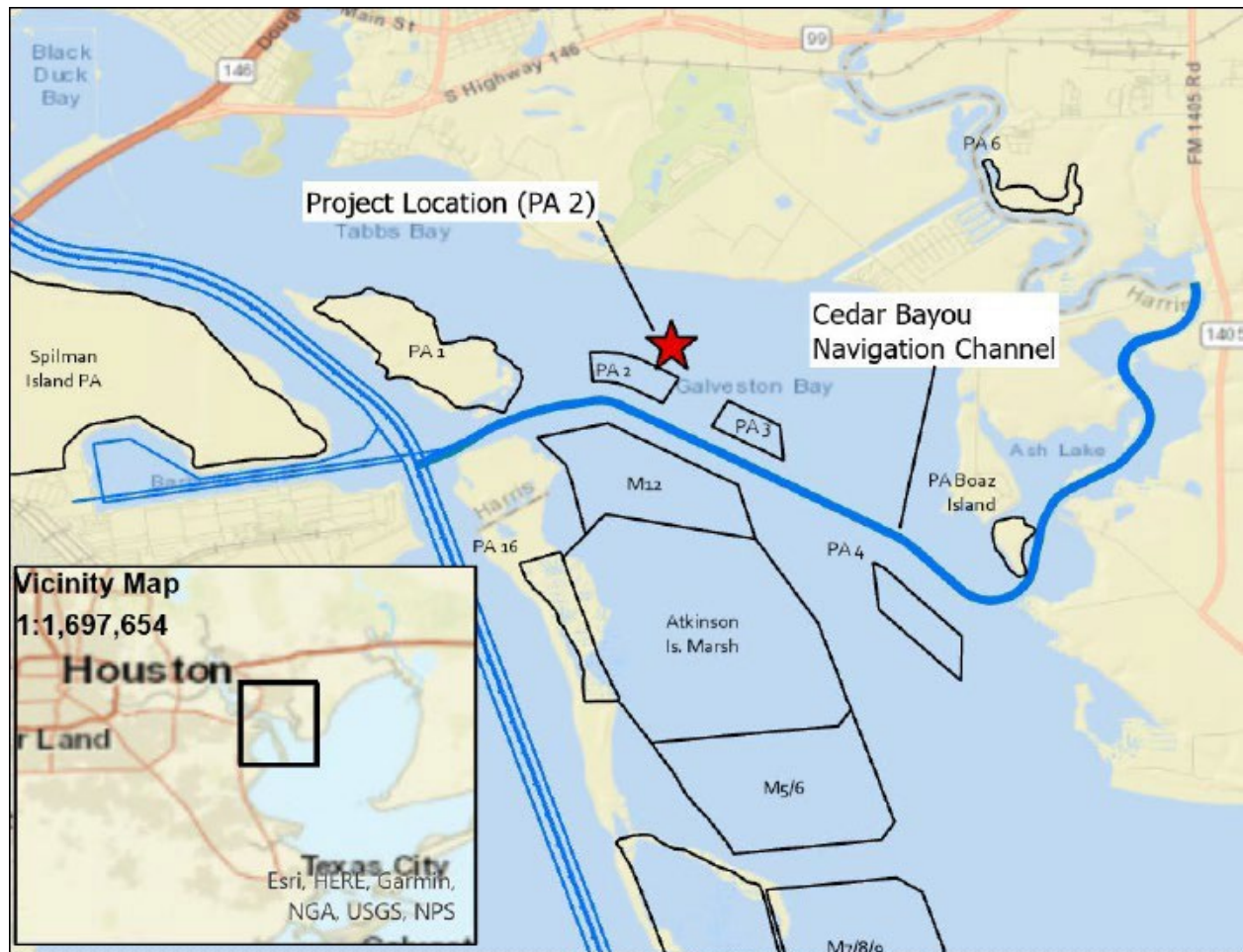


Figure 1-1. Cedar Bayou Federal Navigation Channel and Surrounding Placement Areas in Upper Galveston Bay, Texas

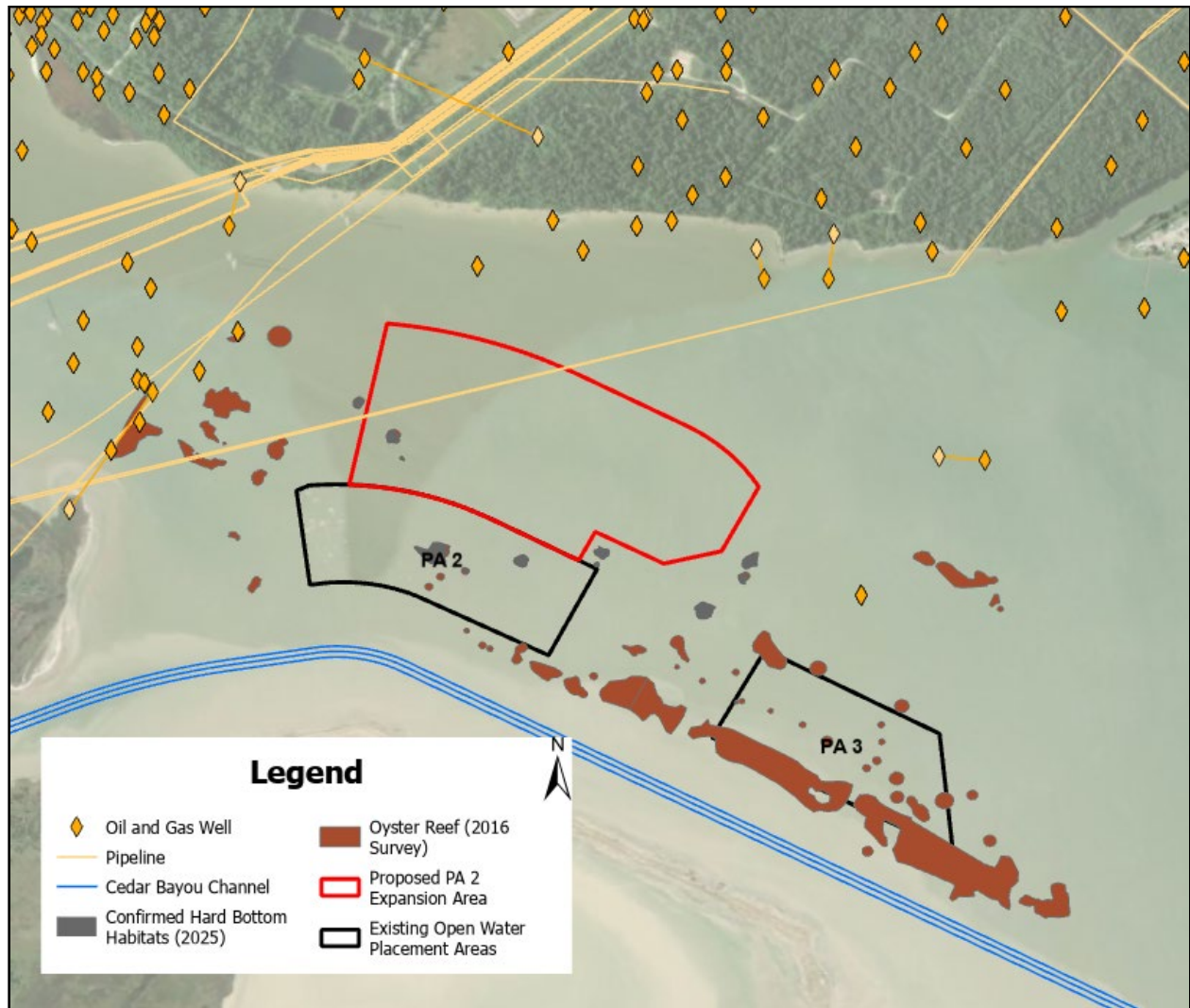


Figure 1-2. Proposed PA 2 Expansion Area (100 acres)

- No Dredging
- No Pile Driving
- Work Vessels:
 - Approximate size and type of vessel (i.e., deep draft, cargo, barge etc.)
 - Dredge boat: examples of two sizes below
 - Length: 270 ft / 82.3 m
Suction Diameter: 30 in / .76 m
Discharge Diameter: 30 in / .76 m
 - Length: 74 ft / 22.5 m
Beam: 26 ft / 7.9 m
Suction Diameter: 20 in / .5 m
Discharge Diameter: 18 in / .4 m

- Available information on speed: Speeds will vary and are dependent on contractor selection and type of vessel being used based on construction plan. Vessel speeds will be reduced while maintaining sufficient maneuverability and navigation. Dredge will be stationary while in operation within a localized area. Spuds are used to stabilize the dredge vessel within the authorized channel boundary as needed. The dredge vessel spuds up and down to move along the channel and progress the cutterhead.
- Travel routes will be restricted to the immediate project area during dredging and placement of O&M material during operation of the site will be via temporary hydraulic dredge pipe. Active dredging and placement of the channel occurs for 3 months at a time, approximately once per 3 years.
- Number of trips: temporary pipeline will be used according to federal navigation channel maintenance dredging standard operations. The temporary floating pipeline will be placed within the designated placement area and held in place with temporary anchor buoy at the end of the pipe. The remainder of the floating pipe is typically not anchored and is left to float at the surface with flotation buoys. If anchoring is needed due to strong winds or currents, anchors with a single line attached to the flotation buoy are temporarily placed in soft sediment away from oyster reefs and removed following the placement event. The pipeline will be extended to reach the location of the dredge vessel for a maximum length of 13,000 feet when the dredge is at the farthest reach of the Cedar Bayou Channel. When the dredge vessel is at the closest reach, the pipe may be as few as 2000 feet long.
- Placement activity will occur 24 hours a day for the duration of the event (up to 3 months). Lights are used to illuminate the discharge pipe with a spudded work barge, and placed along the flotation buoys as needed for navigation safety/hazard identification at night. The end of the placement pipe is mounted and moved with via pipe barge throughout the designated placement area to direct discharge through a diffuser, target placement location, and prevent sediment from building up above the water surface or flowing out of the boundary of the PA.
- Presence of lookout: All construction personnel will be responsible for observing water-related activities to detect the presence of Threatened and/or Endangered Species.

There are no land-based activities.

Conservation Measures and BMPs

- The project will adhere to and follow all Protected Species Construction Conditions (as described in https://media.fisheries.noaa.gov/2021-06/Protected_Species_Construction_Conditions_1.pdf) and Vessel Strike Avoidance Measures (as described in https://media.fisheries.noaa.gov/2021-06/Vessel_Strike_Avoidance_Measures.pdf).

Description of the Action Area

The *action area* is all areas to be affected by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). *Effects of the action* are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. The action area is distinct from and can be larger than the project footprint because some elements of the project may affect listed species or critical habitat some distance from the project footprint. The action area, therefore, extends out to a point where no effects from the project are expected to occur.

For this project, the action area includes the PA 2 area and surrounding waters of Galveston Bay and the CBNC.

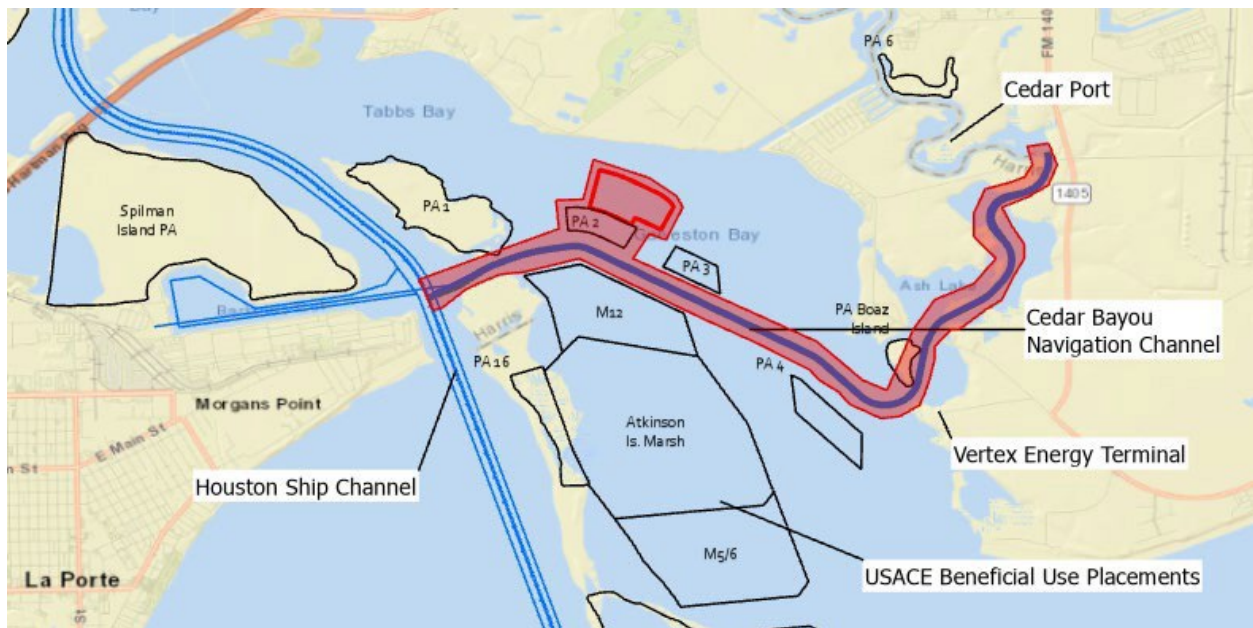


Figure 1-3 Project Action Area

The project area is in upper Galveston Bay, north of Atkinson Island and the CBNC. The water depth within the project area is shallow and subtidal, with depths typically within the range of -2 to -4 feet [-0.6 to -1.2 m] mean lower low water (MLLW) according to Lloyd Engineering (2025) – refer to Attachment 1 for the Special Aquatic Resources Survey Report. Existing PA 3 is approximately 47 acres and is located approximately 1,500 feet east of PA 2. Figure 1-2 above shows the proposed expansion area for PA 2 and its location in relation to the CBNC, PA 3, and PA 4.

A Special Aquatic Resources Survey (Attachment 1) was conducted within the project area. The survey found a combined total of approximately 2.93 acres of oyster resources were identified within the survey area, consisting of 0.81 acres of viable oyster habitat, and 2.12 acres of black habitat (buried shell). There were no areas of scattered shell on top of mud found within the survey area. No live oysters were found, and the majority of oyster shells observed during the survey were juvenile-sized oyster shells and shell pieces. There were no seagrasses identified in the survey area. The substrate found across the area was mostly soft silty clay.

Potentially Affected NMFS ESA-Listed Species and Critical Habitat

We have assessed the listed species that may be present in the action area and our determination of the project's potential effects to them as shown in Table 1 below.

Please note abbreviations used in *Table 2*: E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect; N/A = not applicable

Table 1. ESA-listed Species in the Action Area and Effect Determination(s)

Species	ESA Listing Status	Listing Rule/Date	Most Recent Recovery Plan/Outline Date	Effect Determination (Species)
Sea Turtles				
Green (North Atlantic [NA] distinct population segment [DPS])	T	81 FR 20057/ April 6, 2016	October 1991	<u>NLAA</u>
Kemp's ridley	E	35 FR 18319/ December 2, 1970	September 2011	<u>NLAA</u>
Loggerhead (Northwest Atlantic [NWA] DPS)	T	76 FR 58868/ September 22, 2011	December 2008	<u>NLAA</u>
Fish				
Giant manta ray	T	83 FR 2916/ January 22, 2018	2019	<u>NLAA</u>

Critical Habitat

We have assessed the critical habitats that overlap with the action area and our determination of the project's potential effects to them as shown in Table 3 below.

Please note abbreviations used in Table 3: NLAA = may affect, not likely to adversely affect; NE = no effect

Table 1. Critical Habitat(s) in the Action Area and Effect Determination(s)

No Critical Habitats in the AA.

Effects of the Action

Sea Turtles

These species include the Green sea turtle (*Chelonia mydas*, Kemp's ridley sea turtle (*Lepidochelys kempii*), and the Loggerhead sea turtle (*Caretta caretta*).

Green Sea Turtle

Along the coast of Texas, green sea turtles are known to nest on barrier islands on the middle coast and lower coast, especially at PINS (USFWS 2019b). Hatchling green sea turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae. The species is generally found in reefs, bays, inlets and estuaries, especially dominated by sea grasses (submerged aquatic vegetation) and algae. The green sea turtle migrates in deeper marine waters; open beaches with gradual slopes and minimal disturbance are required for nesting (USFWS 2019b). This species is common to inshore waters of Texas foraging on seagrass and algae (Dixon 2014).

Kemp's ridley Sea Turtle

The Kemp's ridley is one of the rarest sea turtles in the world. In Texas, known nesting areas include the Padre Island National Seashore (PINS), as well as the Gulf-side of San Jose and Mustang Islands (Landry n.d.; Peterson 2014; USFWS 2019c). Outside of nesting, turtles are usually found in the nearshore and inshore waters of the northern GOM. Adults and sub-adults primarily occupy nearshore habitats that contain muddy or sandy bottoms where prey can be found. Hatchlings and small juveniles enter the water and quickly swim offshore to open ocean developmental habitat where they associate with floating Sargassum (*Sargassum sp.*) seaweed. They passively drift within the Sargassum, feeding on a wide variety of floating items. Some of these juvenile turtles remain within the GOM while others are swept out of the Gulf and into the Atlantic Ocean by the Gulf Stream (USFWS 2019c). This developmental period is estimated to last for a few years, at which time these sub-adult turtles return to shallow-water zones of the northern GOM or northwestern Atlantic Ocean where they feed and continue growing until they reach adulthood.

Loggerhead Sea Turtle

The loggerhead is widely distributed within its range. It may be found hundreds of miles out to sea. Coral reefs, rocky places, and shipwrecks are often used as feeding areas. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and it is often in association with other species of sea turtles. Most loggerhead hatchlings originating from United States'

beaches are believed to lead a pelagic existence in the North Atlantic gyre for an extended period of time, perhaps as long as 7 to 12 years, and are best known from the eastern Atlantic near the Azores and Madeira (USFWS 2019d). Post-hatchlings have been found floating at sea in association with *Sargassum* rafts. Critical habitat for the Northwest Atlantic Ocean DPS was designated in 2014 to protect both marine and terrestrial habitats. Terrestrial critical habitat is restricted to the Florida coast and critical marine habitat includes *Sargassum* habitats, for the protection of post-hatchlings and juveniles. As *Sargassum* forms floating mats and travels with the Loop Current in the GOM, critical habitat was established to account for the edge of the Loop Current (NOAA 2014).

Routes of Effect

The Green sea turtle, Kemp's ridley sea turtle, and loggerhead sea turtle could potentially be located in the Action Area and inshore ship channel areas looking for foraging or resting area, although unlikely and scarce due to the lack of shallow water areas and submerged vegetation. The leatherback sea turtle and the hawksbill sea turtle are pelagic species in this part of the GOM and would not be expected to occur within the vicinity of inshore Action Area.

No impacts to nesting activities or habitat is anticipated as a result of the proposed Project as no sandy beaches or dune systems are located within the vicinity of the proposed construction activities. Impacts on sea turtles from collision with barges or other construction and operation vessels associated with the project could result in sea turtle injury or mortality. However, we believe this is extremely unlikely to occur since sea turtles are known to have excellent eyesight and hearing and are normally able to avoid oncoming boats and barges by diving and/or swimming away (Hazel et al. 2007; DeRuiter and Doukara 2012). Sea turtles on or near the water surface are known to dive in response to perceived threats, including air guns (DeRuiter and Doukara 2012) as well as approaching boats (Hazel et al. 2007). Green sea turtles are capable of avoiding boats in both deep and shallow water up to a speed of 2.5 miles per hour (Hazel et al. 2007). In addition, the implementation of NMFS's *Protected Species Construction Conditions* (NMFS 2021) and *Vessel Strike Avoidance Measures* (NMFS 2021) will require all construction workers to observe in-water activities for the presence of these species. Operation of any mechanical construction equipment shall cease immediately if a sea turtle is seen within 150 feet of operations. Activities may not resume until the protected species has departed the project area of its own volition. Dredging and placement will occur on a 24-hour schedule and may occur during overnight hours. Sufficient surface lighting will be utilized at the dredge pipe effluent end to add visibility to the immediate project area where workers can observe for sea turtle presence. Lights will not be placed along the dredge pipe length except for the minimum required for navigational safety/hazard avoidance. Therefore, as long as the turtles are able to see and hear, they will be able to detect and avoid the relatively slow-moving vessels and barges in the inshore Action Area.

Foraging or resting individuals (juvenile or adult) may be exposed to increased turbidity in the Action Area due to placement of dredge material. As highly mobile species' they have the ability to relocate to adjacent areas where turbidity is at ambient conditions. Sea turtles might be adversely affected by their inability to access the project area for foraging and refuge due to their avoidance of construction activities, related noise, and avoidance of the pipeline. We have

determined these effects will be insignificant. The size of the area from which animals will be excluded is relatively small in comparison to the available similar habitat nearby. In addition, any disturbances to listed species would be temporary, limited to 3 months of in-water construction, after which the site conditions are expected to return to background levels and animals will be able to return. Direct effect pathways would include O&M material vessel traffic. These direct effect pathways are dependent upon the actual presence of an individual of those species at the location during the activity, which is unlikely due to near continuous presence of vessel activity in the CBNC and during construction and lack of aquatic vegetation. The conservative approach with respect to these species is to assume their potential presence within suitable habitat for foraging, resting, or traveling, although it recognized that their presence would be unlikely and they would be transient in the area and would avoid areas of activity. Based on the analysis conducted, the proposed construction activities **may affect, but is not likely to adversely affect** green sea turtles, Kemp's Ridley sea turtles, and loggerhead sea turtles.

Giant Manta Ray

This migratory pelagic species prefers sparse, highly fragmented habitats within tropical, subtropical, and temperate marine waters. Populations within the Gulf of Mexico (GOM) are small and sparsely distributed; however, a population of this species occurs within the Flower Garden Banks National Marine Sanctuary. These filter feeders are known near the Yucatan Peninsula as well as other areas of the GOM (NOAA 2025.) World-wide, this species has been known to utilize estuarine habitats including natural bays and inlets for foraging, especially by juveniles. Galveston Bay is included in the potential habitat area of the Giant Manta Ray (GMR), although there are no recorded observations of individuals of this species within the bay. There has been one individual observed in offshore waters of Galveston Island, however it was outside the Galveston jetty entrance to the HSC (Farmer et al. 2022). In the Gulf, the highest nearshore occurrence was predicted around the Mississippi River delta (Farmer et al. 2022).

Routes of Effect

Based on the giant manta ray's preferred habitat, the most likely occurrence associated with Project related activities would be during O&M material placement operations within Galveston Bay by increased turbidity of the water column during material placement. However, manta rays are highly mobile and expected to temporarily avoid areas of active dredge material placement. The exclusion of giant manta ray from the project area will be temporary, limited to 3 months of in-water construction, after which the site conditions are expected to return to background levels and animals will be able to return. We have determined these effects will be insignificant. The GMR could be impacted by vessel strikes, and turbidity during aquatic construction phases of the proposed Project. Giant manta rays can be injured or killed by boat strikes as they travel through maritime shipping lanes and can also become entangled in anchor lines or pipe cables, and other underwater obstructions associated with dredge placement in marine waters. Some anchoring may be utilized for the temporary dredge pipe. The potential for Project related impacts is dependent upon the actual presence of an individual of this species within the Action Area.

The identified potential Project related impacts are dependent upon the actual presence of an

individual of this species inshore during material disposal within the PA 2 area, which is extremely unlikely because the habitat found within Galveston Bay does not provide preferred habitat of the manta ray. Individuals present in the Action Area would likely be juveniles or adults that have strayed from their typical habitat at Flower Garden Banks National Marine Sanctuary which is over 100 miles southeast of the Action Area or strayed inshore from the offshore environment through the HSC entrance located 29 miles from the project area.

However, their potential presence in the waters of Galveston Bay cannot completely be discounted. In addition, the implementation of NMFS's *Protected Species Construction Conditions* (NMFS 2021) and *Vessel Strike Avoidance Measures* (NMFS 2021) will require all construction workers to observe in-water activities for the presence of these species. Operation of any mechanical construction equipment shall cease immediately if a giant manta ray is seen within 150 feet of operations. Activities may not resume until the protected species has departed the project area of its own volition. Therefore, it has been determined that the proposed Project **may affect, but is not likely to adversely** affect the Giant Manta Ray.

Conclusion

The USACE has reviewed the proposed project for its effects to ESA-listed species and their critical habitat. Based on the analysis above, we have determined that the Cedar Bayou Placement Area 2 Expansion Project is not likely to adversely affect any listed species under NMFS's jurisdiction. We have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

Sincerely,



DATE: 04/29/2026

Lisa Finn

Environmental Program Manager,
Operations Division-Navigation Section

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- . 2019b. Green Sea Turtle (*Chelonia mydas*). Available at: <https://www.fws.gov/northflorida/seaturtles/turtle%20factsheets/green-sea-turtle.htm>. Accessed March 2023.

———. 2019c. Kemp's Ridley Sea Turtle (*Lepidochelys kempii*). Available at: <https://www.fws.gov/northflorida/seaturtles/turtle%20factsheets/kemps-ridley-sea-turtle.htm>. Accessed March 2023.

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Witherington, B. E., R. Herren, and M. Bresette. 2006b. *Caretta caretta*—loggerhead sea turtle. In *Biology and Conservation of Florida Turtles*, edited by Meylan, P.A., pp. 74–89. Chelonian Research Monographs No. 3. Lunenburg, MA: Chelonian Research Foundation.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
<https://www.fisheries.noaa.gov/region/southeast>

05/29/2026

F/SER31:SC
SERO-2026-00354

Lisa Finn
Environmental Program Manager, Operations Division – Navigation Section
Galveston District Corps of Engineers
Department of the Army
2000 Fort Point Road
Galveston, Texas 77550

Ref.: HSC-M-7, Cedar Bayou Navigation District, Placement Area 2 Expansion Project,
Baytown, Harris County, Texas – EXPEDITED TRACK

Dear Lisa Finn,

This letter responds to your April 29, 2026, request pursuant to Section 7 of the Endangered Species Act (ESA) for consultation with the National Marine Fisheries Service (NMFS) on the subject action.

We reviewed the action agency's consultation request document and related materials. Based on our knowledge, expertise, and the action agency's materials, we concur with the action agency's conclusions that the proposed action is not likely to adversely affect the NMFS ESA-listed species and/or designated critical habitat.

We would like to offer the following clarification to complement your incoming request for Consultation. Please include this information as applicable in future consultation requests.

Protected species may be entangled by in-water lines and other in-water equipment. However, we believe this is extremely unlikely to occur because the implementation of NMFS' *Protected Species Construction Conditions* (NMFS 2021) requires that all in-water equipment shall be properly secured with materials that reduce the risk of protected species entanglement and entrapment. All in-water lines and other in-water equipment must be properly secured with materials that reduce the risk of entanglement of marine species. Project materials must be designed to reduce the risk of entanglement of marine species. In-water lines (rope, chain, and cable) must be stiff, taut, and non-looping. Examples of such lines are heavy metal chains or heavy cables that do not readily loop and tangle. Flexible in-water lines, such as nylon rope or any lines that could loop or tangle, must be enclosed in a plastic or rubber sleeve/tube to add rigidity and prevent the line from looping and tangling. In all instances, no excess line is allowed in the water. In-water lines and other in-water equipment must be placed in a manner that does not entrap species within the project area or block access for them to navigate around the project area.

This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA and implementing regulations at 50 CFR 402. On March 30, 2026, in *Center for Biological Diversity v. Burgum*, No. 24-cv-04651 (N.D. Cal.), the U.S. District Court for the Northern District of



California vacated aspects of four provisions from the 50 CFR part 402 regulations governing interagency consultation under section 7 of the Endangered Species Act and reinstated the provisions that were previously in effect. Consistent with the Court’s ruling, these are the governing provisions for this consultation:

- “Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.” (50 CFR 402.02 (2018)). This definition includes the second sentence of the definition of “effects of the action.” That sentence provided the definition of “environmental baseline” in effect as of 2018. In the 2019 rule amending the 50 CFR part 402 regulations, the Services established “environmental baseline” as a standalone definition. 84 Fed. Reg. 44976, 45016 (August 27, 2019). In the 2024 rule, the Services made minor revisions to the “environmental baseline” definition. 89 Fed. Reg. 24268, 24298 (April 5, 2024). The Court’s ruling did not touch upon that definition of “environmental baseline,” and it therefore remains valid. The definition is also fully consistent with the definition of “effects of the action” from 2018.
- 50 CFR 402.16(a): “(a) Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and” (50 CFR 402.16(a) (2023)).

This concludes your consultation responsibilities under the ESA for species and/or designated critical habitat under NMFS’s purview. Reinitiation of consultation is required and shall be requested by the action agency or by NMFS where discretionary Federal action agency involvement or control over the action has been retained or is authorized by law and: (a) take occurs; (b) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this consultation; (c) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered in this consultation; or (d) if a new species is listed or critical habitat designated that may be affected by the action.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Shelby Casali, Consultation Biologist, by email at Shelby.Casali@noaa.gov.

Sincerely,

for Dennis Klemm
Acting Assistant Regional Administrator
for Protected Resources

File: 1514-22.f.8

**D-3:
NMFS EFH**

**CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

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





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

REPLY TO
ATTENTION OF

Operations Division-Navigation Section

MARCH 3, 2026

Ms. Charrish Stevens
Habitat Conservation Division
NOAA National Marine Fisheries Service
4700 Ave U
Galveston, TX 77551

SUBJECT: Cedar Bayou PA 2 Expansion Project Draft Environmental Assessment & EFH
Coordination

Ms. Stevens,

The U.S. Army Corps of Engineers (USACE), Galveston District (CESWG), has prepared a Draft Environmental Assessment (EA) to evaluate potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2).

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the Cedar Bayou Navigation Channel. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

A public notice has been issued for this project to inform interested parties that the USACE has prepared the draft 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 1500-1508.

Refer to the public notice of the project under the CESWG Project page at <https://www.swg.usace.army.mil/Projects/Cedar-Bayou-Placement-Area-2-Expansion/>

USACE Galveston District is requesting that the National Marine Fisheries Service provide coordination regarding the proposed project pursuant to the Magnuson-Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act.

Our determination is that the proposed action would not have a substantial adverse impact on Essential Fish Habitat or federally managed fisheries in Galveston Bay or the Gulf of Mexico. We request your concurrence with this determination upon review of the Draft EA and EFH Assessment.

Agencies or persons or desiring to provide comments on the project are requested to submit their comments in writing within 30 days of the date of the notice to:

U.S. Army Corps of Engineers, Galveston District
Attention: Ms. Lisa M. Finn
P.O. Box 1229
Galveston, TX 77553

or by email: Lisa.M.Finn@usace.army.mil The comments should make specific reference to Cedar Bayou PA 2, Public Notice No. HSC-M-7.

We appreciate your cooperation in coordinating the proposed project and request that you provide your comments by June 2, 2026. Should you need additional information or have any questions, please call me at (409) 766-3949.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Finn", with a stylized flourish at the end.

Lisa Finn
Environmental Program Manager, Navigation

From: [charrish.stevens - NOAA Federal](#)
To: [Finn, Lisa M CIV USARMY CESWG \(US\)](#); [Courtney Gerken](#)
Cc: [David Dale - NOAA Federal](#); [Brian Rosegger - NOAA Affiliate](#)
Subject: NOAA NMFS Review of Public Notice No. HSC-M-6 for Cedar Bayou PA2 Expansion Project
Date: Tuesday, March 24, 2026 7:43:22 AM

Dear Ms. Lisa Finn,

NOAA's National Marine Fisheries Service (NMFS) Habitat Conservation Division received correspondence from the U.S. Army Corps of Engineers Galveston District on March 3, 2026, regarding the request to review the Draft Environmental Assessment and its associated appendices, including the Essential Fish Habitat (EFH) Assessment, for the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2) (Public Notice No. HSC-M-7). The PA2 is located in Galveston Bay in Harris and Chambers Counties, Texas. The following comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Based on our review of the draft EA and its associated appendices and the EFH assessment, we concur with the Galveston District's determination that the proposed actions will not substantially adversely impact EFH or federally managed fisheries in Galveston Bay or the Gulf of Mexico. Therefore, NMFS has no EFH conservation recommendations to provide and no objection to issuing the project permit. Assuming the project is not further revised, this satisfies the consultation procedures outlined in 50 CFR Section 600.920, the regulation implementing the EFH provisions of the Magnuson-Stevens Act.

We appreciate your coordination with our office on this project. If you have any additional questions or require more information, please feel free to contact me via email.

Thank you for your coordination,

Charrish Stevens
Fishery Biologist
Habitat Conservation Division
NOAA National Marine Fisheries Service
4700 Ave U, Galveston, TX 77551

Office Ph: (409) 766-3697
Fax: (409) 766-3575
Email: charrish.stevens@noaa.gov

D-4:
TEXAS HISTORICAL COMMISSION

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



From: noreply@thc.state.tx.us
To: [Courtney Gerken](mailto:Courtney.Gerken@thc.state.tx.us); reviews@thc.state.tx.us; Jerry.L.Androy@usace.army.mil; Jerry.L.Androy@usace.army.mil
Subject: Proposed Cedar Bayou PA 2 Expansion Project
Date: Wednesday, April 29, 2026 2:12:51 PM



Re: Project Review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas

THC Tracking #202609416

Date: 04/29/2026

Proposed Cedar Bayou PA 2 Expansion Project
Cedar Bayou Navigation Channel

Description: Section 106 compliance for the Cedar Bayou PA 2 Expansion Project (HSC-M-7).

Dear Courtney Gerken:

Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Amy Borgens, has completed its review and has made the following determinations based on the information submitted for review:

Archeological Resources

- No identified underwater archeological sites, historic shipwrecks, and/or significant remote-sensing targets present or affected. However, if buried cultural materials are encountered during project activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided for the underwater project area.

Consultation with the Texas State Historic Preservation Officer does not constitute consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public, nor does it conclude the Federal Section 106 consultation process. If you have not already done so, please contact the U.S. Army Corps of Engineers as the responsible Federal agency regarding their Section 106 compliance. We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following

Section 106 compliance. We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: amy.borgens@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit <http://thc.texas.gov/etrac-system>.

Sincerely,



for Joseph Bell, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

cc: Jerry.L.Androy@usace.army.mil



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

REPLY TO
ATTENTION OF

Operations Division-Navigation Section

APRIL 16, 2026

Amy Borgens
State Marine Archeologist
Texas Historical Commission
PO Box 12276
Austin, TX 78711

RE: Cedar Bayou PA 2 Expansion Project (HSC-M-7)

Ms. Borgens,

The U.S. Army Corps of Engineers (USACE), Galveston District (CESWG), has prepared a Draft Environmental Assessment (EA) to evaluate potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2).

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the Cedar Bayou Navigation Channel. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

In response to a scoping letter sent by USACE, THC provided comments on December 23, 2025 and December 29, 2025. The THC provided the following information:

“The archeological survey that overlaps the proposed expansion is from 2014 by Survey and Mapping, LLC (Texas Antiquities Permit 7060) and not the 2020 RECON Offshore survey (TAP 9613)—that survey area (M12) is just to the south of PA 2. There were no significant remote sensing targets detected in the expanded PA for PA 2...Anomaly 2 from the TAP 7060 survey is in [PA2] and was recommended for avoidance by 50 m. The avoidance margin for Anomaly 3 also overlaps PA 2. The Texas Historical Commission concurred with these required recommendations on 23 February 2015 (tracking no. 201505675).”

Review of the digital shapefiles provided by THC indicated that a 1.3 acre area of the proposed Cedar Bayou PA 2 Expansion Project area was not included in previously survey areas. The proposed Cedar Bayou PA 2 Expansion area has therefore been modified to remove the area that was not covered. The revised boundary is reflected in the figure attached as Attachment 1.

USACE Galveston District requests the SHPO's concurrence with our determination of No Adverse Effect to anomalies 2 and 3 and that the proposed expansion is in compliance with Section 106 of the National Historic Preservation Act (Public Law 89-665; 16 U.S.C. 470).

For additional project details, please refer to the public notice of the project under the CESWG Project page at <https://www.swg.usace.army.mil/Projects/Cedar-Bayou-Placement-Area-2-Expansion/>

We appreciate your cooperation in reviewing the proposed project and request that you provide your comments by April 24, 2026. Should you need additional information or have any questions, please call me at (409) 766-3949.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lisa Finn', with a stylized flourish at the end.

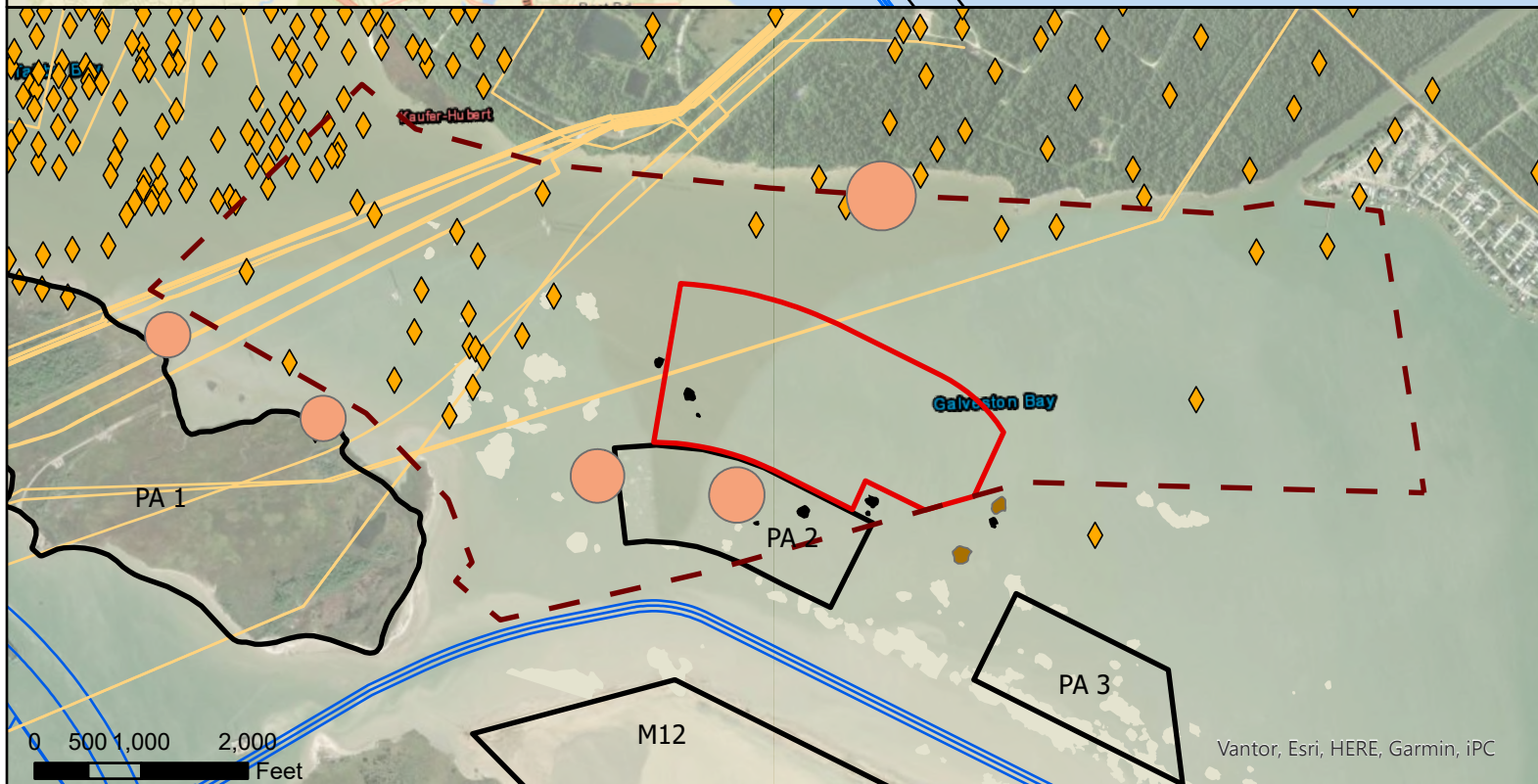
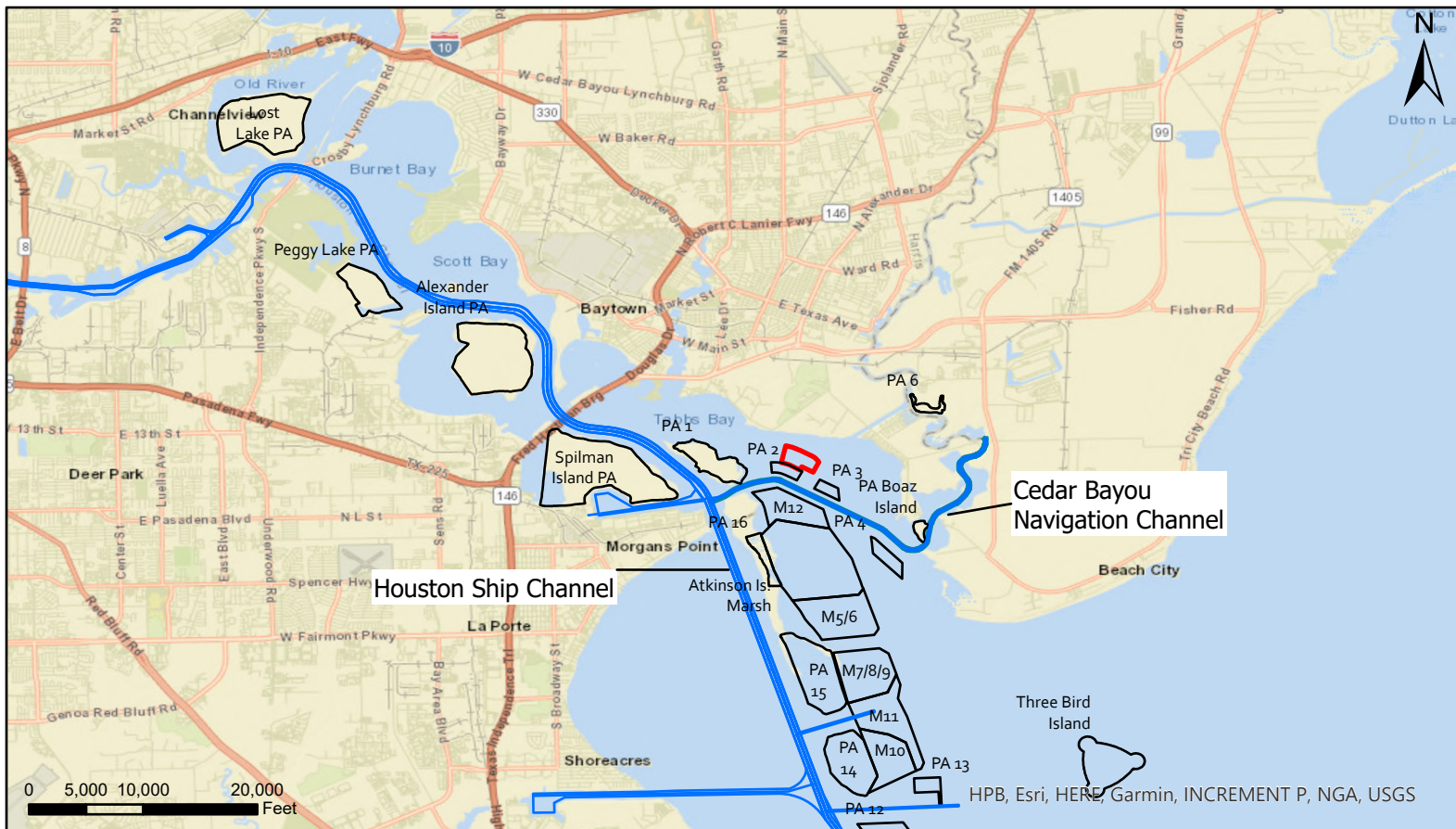
Lisa Finn
Environmental Program Manager, Navigation

CC: Jerry.L.Androy@usace.army.mil

Enclosure:

Attachment 1 – Project Figure (revised PA2 Expansion Boundary)

Attachment 2 – Email correspondence



Legend

- Avoidance Areas (TAP 7060)
- Previous Survey Area (TAP 7060)
- Proposed PA 2 Expansion (100 ac)
- Existing Placement Area
- Oil and Gas Well
- Pipeline
- Confirmed Hard Bottom Habitats (Delineated in 2016)
- Buried Shell
- Viable Oyster Habitat
- Previously Delineated Oyster Resource (2016)
- Navigation/Ship Channel

Figure 1: Project Area Map

Cedar Bayou Channel
Placement Area 2 Expansion Project
U.S. Army Corps of Engineers
Harris County, Texas

Date: Apr 16, 2026

Prepared By: LEI

Prepared For: USACE

Project: PA2 Expansion



**US Army Corps
of Engineers**

From: [Amy Borgens](#)
To: [Courtney Gerken](#)
Cc: [Project Reviews](#); Jerry.L.Androy@usace.army.mil; [Finn, Lisa M CIV USARMY CESWG \(USA\)](#); [Marisa Weber](#)
Subject: Re: Proposed Cedar Bayou PA 2 Expansion Project
Date: Tuesday, April 7, 2026 6:44:41 PM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)
[rp26_email_signature_3ed926eb-f645-4ef4-9479-c1f50fe8be7e.png](#)

Hello Courtney,

The SHPO comments for 202602675 mentioned that a small portion of the project area had not been surveyed and in the email of 23 December a shapefile for the project rea was requested. In that 23 December email it was mentioned that modifying the project area would be considered. The shapefile was forwarded on 29 December 2025. In the 202602675 SHPO letter I made a mistake in referencing the investigation under permit 9613 (what you are calling the M12 survey)—but the comments about the overlapping projects were still correct and addressed in subsequent emails. For example:

SPHO 23 December 2025 comments: “A revised figure forwarded to the THC on 17 December 2025 suggests that a small portion of the expansion area may lie outside the area subject to archaeological investigation. Can the expansion area be modified so it is fully within the area previously cleared by archeological investigations?”

29 December 2025 Lloyd email response: “We can consider modification to the expansion area based on the M12 survey- is it possible to get the boundary of the previously cleared area so that I can perform an overlay with our files?”

29 December 2025 THC email: “The archeological survey that overlaps the proposed expansion is from 2014 by Survey and Mapping, LLC (Texas Antiquities Permit 7060) and not the 2020 RECON Offshore survey (TAP 9613)... I have attached the shapefile of the survey area for TAP 7060.”

With the new coordination forwarded in the 6 March 2026 email, I had anticipated there might be a modified project area to avoid the need for additional archeological survey. I have attached an image illustrating the 7060 project area and the PA2 Expansion Area. Since this issue has not been addressed, I cannot currently concur with the No Adverse Effect determination as the project area has not been fully subject to archeological investigation. That section of the PA2 Expansion that has not been subject to survey is in State Tract (ST) 361 which has a high probability to contain submerged cultural resources (code MK). Therefore, there is still the potential for undetected submerged cultural resources to be present in the area that has not been surveyed.

I look forward to continued discussion on this issue.

Regards,

Amy

Amy Borgens

From: Courtney Gerken <courtney@lloydeng.com>
Sent: Monday, April 6, 2026 1:26 PM
To: Amy Borgens <Amy.Borgens@thc.texas.gov>
Cc: Project Reviews <reviews@thc.texas.gov>; Jerry.L.Androy@usace.army.mil
<Jerry.L.Androy@usace.army.mil>; Finn, Lisa M CIV USARMY CESWG (USA) <lisa.m.finn@usace.army.mil>;
Marisa Weber <marisa@lloydeng.com>
Subject: RE: Proposed Cedar Bayou PA 2 Expansion Project

CAUTION: External Email – This email originated from outside the THC email system. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Amy,

The area of PA2 Expansion was not modified because I understood that your follow up email clarified that the area was covered by previous 2014 survey by Survey and Mapping, LLC (Texas Antiquities Permit 7060) and that there were no anomalies located in the area. I have attached a figure and kmz of the PA2 Expansion area. I do not have a shapefile of what the M12 survey covered.

Thanks,

Courtney Gerken

Office: 832.426.4656 x1029

Mobile: 713.413.7342

Email: courtney@lloydeng.com

From: Amy Borgens <Amy.Borgens@thc.texas.gov>
Sent: Wednesday, April 1, 2026 1:09 PM
To: Courtney Gerken <courtney@lloydeng.com>
Cc: Project Reviews <reviews@thc.texas.gov>; Jerry.L.Androy@usace.army.mil; Finn, Lisa M CIV USARMY CESWG (USA) <lisa.m.finn@usace.army.mil>; Marisa Weber <marisa@lloydeng.com>
Subject: Re: Proposed Cedar Bayou PA 2 Expansion Project

Hello Courtney,

In an earlier email you mentioned the PA2 expansion area might be modified as part of it was in an area not previously cleared by underwater archeological surveys. Was it modified? Can you provide an image (and KMZ file) that shows the current planned PA footprint?

Amy

Amy Borgens

From: Courtney Gerken <courtney@lloydeng.com>
Sent: Friday, March 6, 2026 1:46 PM
To: Amy Borgens <Amy.Borgens@thc.texas.gov>
Cc: Project Reviews <reviews@thc.texas.gov>; Jerry.L.Androy@usace.army.mil
<Jerry.L.Androy@usace.army.mil>; Finn, Lisa M CIV USARMY CESWG (USA) <lisa.m.finn@usace.army.mil>;
Marisa Weber <marisa@lloydeng.com>
Subject: RE: Proposed Cedar Bayou PA 2 Expansion Project

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Amy,

Please see the attached letter for the Request for Concurrence to our findings in compliance with Section 106 for the Cedar Bayou PA 2 Expansion Project (HSC-M-7).

As a separate topic, we would like to continue the discussion regarding the existing PA 2 area and the anomalies referenced in your scoping response separate from the PA 2 Expansion concurrence letter. The establishment and use of PA 2 predate the 2014 survey and 2015 concurrence letter you reference. We will send a separate email to discuss that.

Thank you,

Courtney Gerken

Office: 832.426.4656 x1029

Mobile: 713.413.7342

Email: courtney@lloydeng.com

From: Amy Borgens <Amy.Borgens@thc.texas.gov>
Sent: Monday, December 29, 2025 12:28 PM
To: Courtney Gerken <courtney@lloydeng.com>
Cc: Project Reviews <reviews@thc.texas.gov>; Jerry.L.Androy@usace.army.mil; Finn, Lisa M CIV USARMY CESWG (USA) <lisa.m.finn@usace.army.mil>; Marisa Weber <marisa@lloydeng.com>
Subject: Re: Proposed Cedar Bayou PA 2 Expansion Project

Hello Courtney,

I made an error with the review for the expanded placement area (PA). The archeological survey that overlaps the proposed expansion is from 2014 by Survey and Mapping, LLC (Texas Antiquities Permit 7060) and not the 2020 RECON Offshore survey (TAP 9613)—that survey area (M12) is just to the south of PA 2. There were no significant remote sensing targets detected in the expanded PA for PA 2. I have attached the shapefile of the survey area for TAP 7060.

Do you know when PA 2 was recreated? Anomaly 2 from the TAP 7060 survey is in A2 and was recommended for avoidance by 50 m. The avoidance margin for Anomaly 3 also overlaps PA 2. The Texas Historical Commission concurred with these required recommendations on 23 February 2015 (tracking no. 201505675). If this PA was created after the 2015 review, can you provide assurance that Anomalies 2 and 3 were avoided as required? I have attached the avoidance margins for the two anomalies.

Regards,

Amy



Amy Borgens

State Marine Archeologist
Archeology Division
P.O. Box 12276, Austin, Texas 78711-2276
Phone: +1 737 329 5898
Fax: +1 512 463 8927

thc.texas.gov



From: Courtney Gerken <courtney@lloydeng.com>

Sent: Tuesday, December 23, 2025 1:51 PM

To: Amy Borgens <Amy.Borgens@thc.texas.gov>

Cc: Project Reviews <reviews@thc.texas.gov>; Jerry.L.Androy@usace.army.mil <Jerry.L.Androy@usace.army.mil>; Finn, Lisa M CIV USARMY CESWG (USA) <lisa.m.finn@usace.army.mil>; Marisa Weber <marisa@lloydeng.com>

Subject: RE: Proposed Cedar Bayou PA 2 Expansion Project

CAUTION: External Email – This email originated from outside the THC email system. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Amy,

Thank you for your review and response. We can consider modification to the expansion area based on the M12 survey- is it possible to get the boundary of the previously cleared area so that I can perform an overlay with our files?

Also can you clarify that arche survey would still be warranted in any new proposed area even if the project does not permanent fill, excavation, or dredging?

Thank you,

Courtney Gerken

Office: 832.426.4656 x1029

Mobile: 713.413.7342

Email: courtney@lloydeng.com

From: noreply@thc.state.tx.us <noreply@thc.state.tx.us>

Sent: Tuesday, December 23, 2025 11:22 AM

To: Courtney Gerken <courtney@lloydeng.com>; reviews@thc.state.tx.us; lerry.L.Androy@usace.army.mil

Subject: Proposed Cedar Bayou PA 2 Expansion Project



IRONSCALES couldn't recognize this email as this is the first time you received an email from this sender noreply@thc.state.tx.us



Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

THC Tracking #202602675

Date: 12/23/2025

Proposed Cedar Bayou PA 2 Expansion Project

Harris County

Description: lease see the attached letter for request of scoping comments for the USACE-SWG-Navigation proposed project.

Dear Courtney Gerken:

Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Amy Borgens, has completed its review and has made the following determinations based on the information submitted for review:

Archeology Comments

- THC/SHPO unable to complete review for the underwater project area at this time based on insufficient documentation. A supplemental review must be submitted, and the 30-day review period will begin upon receipt of adequate documentation.

We have the following comments: An underwater archeological remote-sensing survey was conducted of a portion of the proposed A2 expansion area in 2020 by RECON Offshore for the Houston Ship Channel Expansion Channel Improvement Project, under Texas Antiquities Permit No. 9613. Targets M90 and M99 were recommended for avoidance, though these are not located within survey area M12, which overlaps a portion of the Proposed A2 Expansion Area. Underwater archeological survey is not warranted for the portion of the project in area M12, but may be required for the expansion area that has not already been subject to archeological investigation. A revised figure forwarded to the THC on 17 December 2025 suggests that a small portion of the expansion area may lie outside the area subject to archaeological investigation. Can the expansion area be modified so it is fully within the area previously cleared by archeological investigations?

Consultation with the Texas State Historic Preservation Officer does not constitute consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public, nor does it conclude the Federal Section 106 consultation process. If you have not already done so, please contact the U.S. Army Corps of Engineers as the responsible Federal agency regarding their

reviewers: amy.borgens@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit <http://thc.texas.gov/etrac-system>.

Sincerely,



for Joseph Bell, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

cc: Jerry.L.Androy@usace.army.mil, Jerry.L.Androy@usace.army.mil

**D-5:
TX GLO CZMP**

**CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

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





TEXAS GENERAL LAND OFFICE
COMMISSIONER DAWN BUCKINGHAM, M.D.

April 21, 2026

Department of the Army
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229
POC: Lisa Finn

Re: Cedar Bayou Placement Area (PA) 2 Expansion Draft Environmental Assessment
Add ~ 100 acres to PA 2, extend ~ 1,500 by 3,200 ft
Galveston Bay, Texas
CMP#: 26-1083-F2

Dear Ms. Finn:

The project referenced above has been reviewed for consistency with the Texas Coastal Management Program (CMP) pursuant to 31 Texas Administrative Code §30.20. It has been determined that the project, as proposed, is consistent with the CMP goals and enforceable policies.

Please note that this letter does not authorize the use of Coastal Public Land. No work may be conducted or structures placed on State-owned land until you have obtained all necessary authorizations, including any required by the General Land Office and the U.S. Army Corps of Engineers.

If you have any questions or concerns, please contact me at (512) 463-7497 or at federal.consistency@glo.texas.gov.

Sincerely,

Leslie Koza
Federal Consistency Coordinator
Texas General Land Office

CONSISTENCY WITH THE TEXAS COASTAL MANAGEMENT PROGRAM

THE APPLICANT SHOULD SIGN THIS STATEMENT AND
RETURN WITH APPLICATION PACKET TO:

TEXAS GENERAL LAND OFFICE
COASTAL RESOURCES-FEDERAL CONSISTENCY
1700 NORTH CONGRESS AVENUE, ROOM 330
AUSTIN, TEXAS 78701-1495
federal.consistency@glo.texas.gov

FOR USACE USE ONLY:

PERMIT #: _____

PROJECT MGR: _____

APPLICANT'S NAME AND ADDRESS (PLEASE PRINT):

Title First Last Suffix

Mailing Address Home

City State Zip Code Work

Country Email Mobile

Fax

The Texas Coastal Management Program (CMP) coordinates state, local, and federal programs for the management of Texas coastal resources. Activities within the CMP boundary must comply with the enforceable policies of the Texas Coastal Management Program and be conducted in a manner consistent with those policies. The boundary definition is contained in the CMP rules (31 TAC §503.1).

- To determine whether your proposed activity lies within the CMP boundary, please contact GLO Federal Consistency Staff at federal.consistency@glo.texas.gov

PROJECT DESCRIPTION:

Is the proposed activity at a waterfront site or within coastal, tidal, or navigable waters? ☒ Yes ☐ No

If Yes, name affected coastal, tidal, or navigable waters:

Is the proposed activity water dependent? ☒ Yes ☐ No (31 TAC §501.3(a)(14))

<http://tinyurl.com/CMPdefinitions>

Please briefly describe the project and all possible effects on coastal resources:

The proposed Cedar Bayou Placement Area 2 (PA 2) Expansion Project is to provide additional open-water disposal at the existing PA 2 for future operations and maintenance dredging events to ensure continued navigational efficiency and safe transit within the Cedar Bayou Channel (CBC). The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast. The project will effect 100 acres of submerged bay bottom with temporary placement of dredged material. The placement of dredged material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet MLLW to a maximum elevation of -0.5 feet MLLW. As the PA 2 expansion area is expected to be dispersive, it is anticipated that the change in bathymetry would be temporary and would return to subtidal bottom elevations over time. Turbidity at the project area would increase beyond ambient levels during, and immediately following, dredged material placement. Dissolved oxygen levels are likely to decrease during placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode.

Indicate area of impact: ☒ acres or ☐ square feet

ADDITIONAL PERMITS/ AUTHORIZATIONS REQUIRED:

- ☐ Coastal Easement - Date application submitted: _____
- ☐ Coastal Lease - Date application submitted: _____
- ☐ Stormwater Permit- Date application submitted: _____
- ☒ Water Quality Certification - Date application submitted:
- ☐ Other state/federal/local permits/authorizations required: _____

The proposed activity must not adversely affect coastal natural resource areas (CNRAs).

PLEASE CHECK ALL COASTAL NATURAL RESOURCE AREAS THAT MAY BE AFFECTED:

- | | | |
|---|--|--|
| ☐ Coastal Barriers | ☐ Critical Erosion Areas | ☒ Submerged Lands |
| ☐ Coastal Historic Areas | ☐ Gulf Beaches | ☐ Submerged Aquatic Vegetation |
| ☐ Coastal Preserves | ☐ Hard Substrate Reefs | ☐ Tidal Sand or Mud Flats |
| ☐ Coastal Shore Areas | ☒ Oyster Reefs | ☐ Waters of Gulf of Mexico |
| ☐ Coastal Wetlands | ☐ Special Hazard Areas | ☒ Waters Under Tidal Influence |
| ☐ Critical Dune Areas | | |

The applicant affirms that the proposed activity, its associated facilities, and their probable effects comply with the relevant enforceable policies of the CMP, and that the proposed activity will be conducted in a manner consistent with such policies.

PLEASE CHECK ALL APPLICABLE ENFORCEABLE POLICIES:

<http://tinyurl.com/CMPpolicies>

☒	§501.15 Policy for Major Actions
☐	§501.16 Policies for Construction of Electric Generating and Transmission Facilities
☐	§501.17 Policies for Construction, Operation, and Maintenance of Oil and Gas Exploration and Production Facilities
☐	§501.18 Policies for Discharges of Wastewater and Disposal of Waste from Oil and Gas Exploration and Production Activities
☐	§501.19 Policies for Construction and Operation of Solid Waste Treatment, Storage, and Disposal Facilities
☐	§501.20 Policies for Prevention, Response and Remediation of Oil Spills
☐	§501.21 Policies for Discharge of Municipal and Industrial Wastewater to Coastal Waters
☐	§501.22 Policies for Nonpoint Source (NPS) Water Pollution
☐	§501.23 Policies for Development in Critical Areas
☐	§501.24 Policies for Construction of Waterfront Facilities and Other Structures on Submerged Lands
☒	§501.25 Policies for Dredging and Dredged Material Disposal and Placement
☐	§501.26 Policies for Construction in the Beach/Dune System
☐	§501.27 Policies for Development in Coastal Hazard Areas
☐	§501.28 Policies for Development Within Coastal Barrier Resource System Units and Otherwise Protected Areas on Coastal Barriers
☐	§501.29 Policies for Development in State Parks, Wildlife Management Areas or Preserves
☐	§501.30 Policies for Alteration of Coastal Historic Areas
☐	§501.31 Policies for Transportation Projects
☐	§501.32 Policies for Emission of Air Pollutants
☐	§501.33 Policies for Appropriations of Water
☐	§501.34 Policies for Levee and Flood Control Projects

Please explain how the proposed project is consistent with the applicable enforceable policies identified above. Please use additional sheets if necessary. *For example: If you are constructing a pier with a covered boathouse, then the applicable enforceable policy is: §501.24 Policies for Construction of Waterfront Facilities and Other Structures on Submerged Lands. The project is consistent because it will not interfere with navigation, natural coastal processes, and avoids/minimizes shading.*

The project is consistent with §501.15 Policy for Major Actions. The policy states that "(b) Prior to taking a major action, the agencies and subdivisions having jurisdiction over the activity shall meet and coordinate their major actions relating to the activity. The agencies and subdivisions shall, to the greatest extent practicable, consider the cumulative and secondary adverse effects, as described in the federal environmental impact assessment process, of each major action relating to the activity. and

(c) No agency or subdivision shall take a major action that is inconsistent with the goals and policies of this chapter. In addition, an agency or subdivision shall avoid and otherwise minimize the cumulative adverse effects to coastal natural resource areas of each of its major actions relating to the activity."

The project has coordinated the action with agencies and considered the cumulative and secondary adverse effects of the action as documented in the Environmental Analysis made available to GLO through inter agency joint public notice.

The project is consistent with 501.25 Policies for Dredging and Dredged Material Disposal and Placement because it will a) not lead to adverse effects to coastal waters, submerged lands, critical areas, or shore or beach areas and under paragraph (3) Except as provided in paragraph (4) of this subsection, dredging and the disposal and placement of dredged material shall not be authorized if:

(A) there is a practicable alternative that would have fewer adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches, so long as that alternative does not have other significant adverse effects;

(B) all appropriate and practicable steps have not been taken to minimize adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches; or

(C) significant degradation of critical areas under § 26.23(a)(7)(E) of this title would result.

(4) A dredging or dredged material disposal or placement project that would be prohibited solely by application of paragraph (3) of this subsection may be allowed if it is determined to be of overriding importance to the public and national interest in light of economic impacts on navigation and maintenance of commercially navigable waterways.

As described in the Environmental Analysis for the proposed project, the placement of dredged material in the established open water PA 2, and proposed expansion of PA 2, is the most practicable alternative that minimizes adverse effects on coastal resources by avoiding Viable Oyster Habitat and further development of confined placement areas in the sensitive coastal area surrounding Cedar Bayou Navigation Channel. All appropriate and practicable steps have been taken to minimize adverse effects on coastal waters and submerged lands through the analysis of alternatives and intentional siting of the open water placement area expansion.

BY SIGNING THIS STATEMENT, THE APPLICANT IS STATING THAT THE PROPOSED ACTIVITY COMPLIES WITH THE TEXAS COASTAL MANAGEMENT PROGRAM AND WILL BE CONDUCTED IN A MANNER CONSISTENT WITH SUCH PROGRAM

FINN.LISA.MARIE.

1300636043

Digitally signed by
FINN.LISA.MARIE.1300636043
Date: 2026.02.05 14:25:06 -06'00'

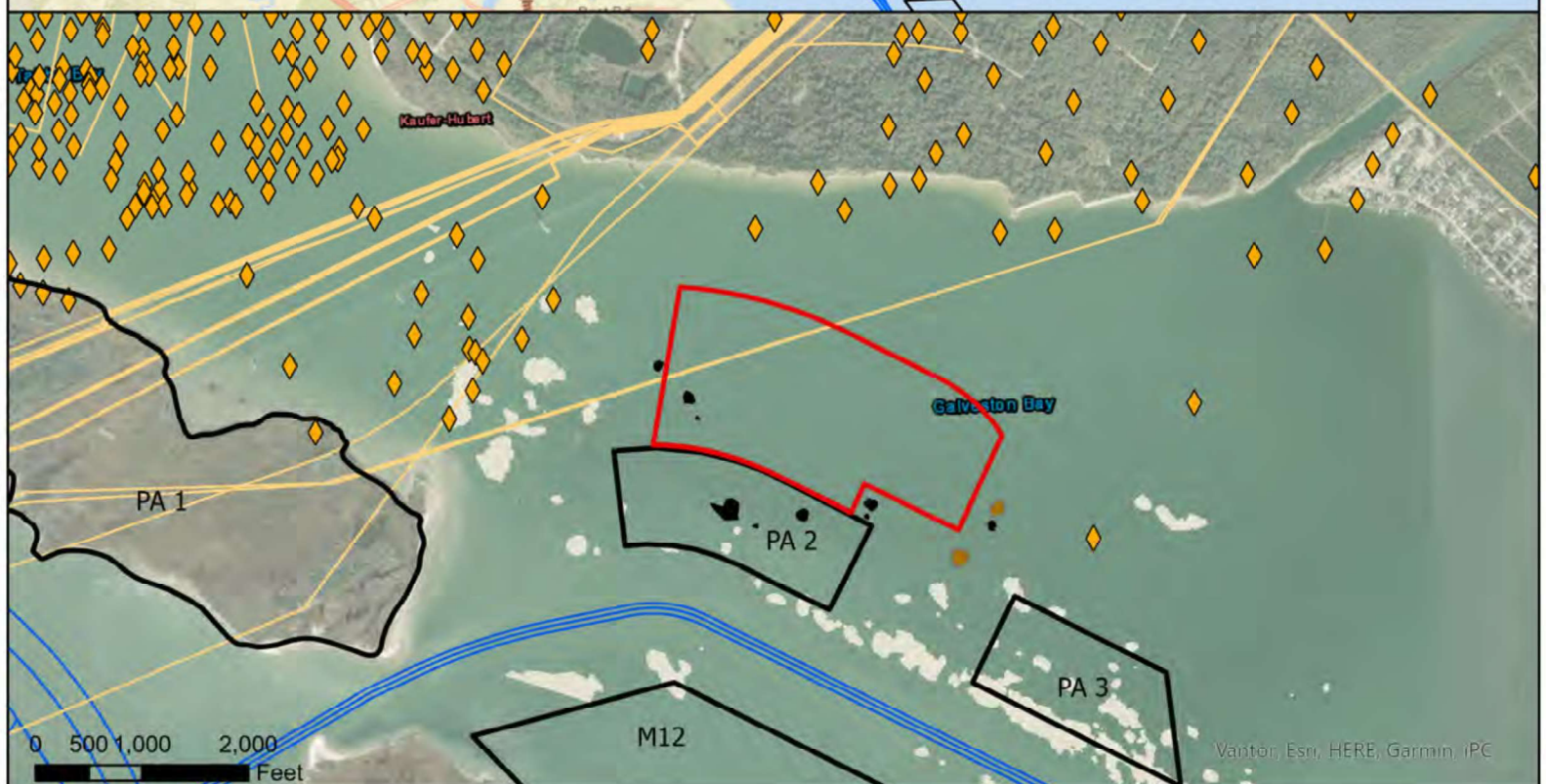
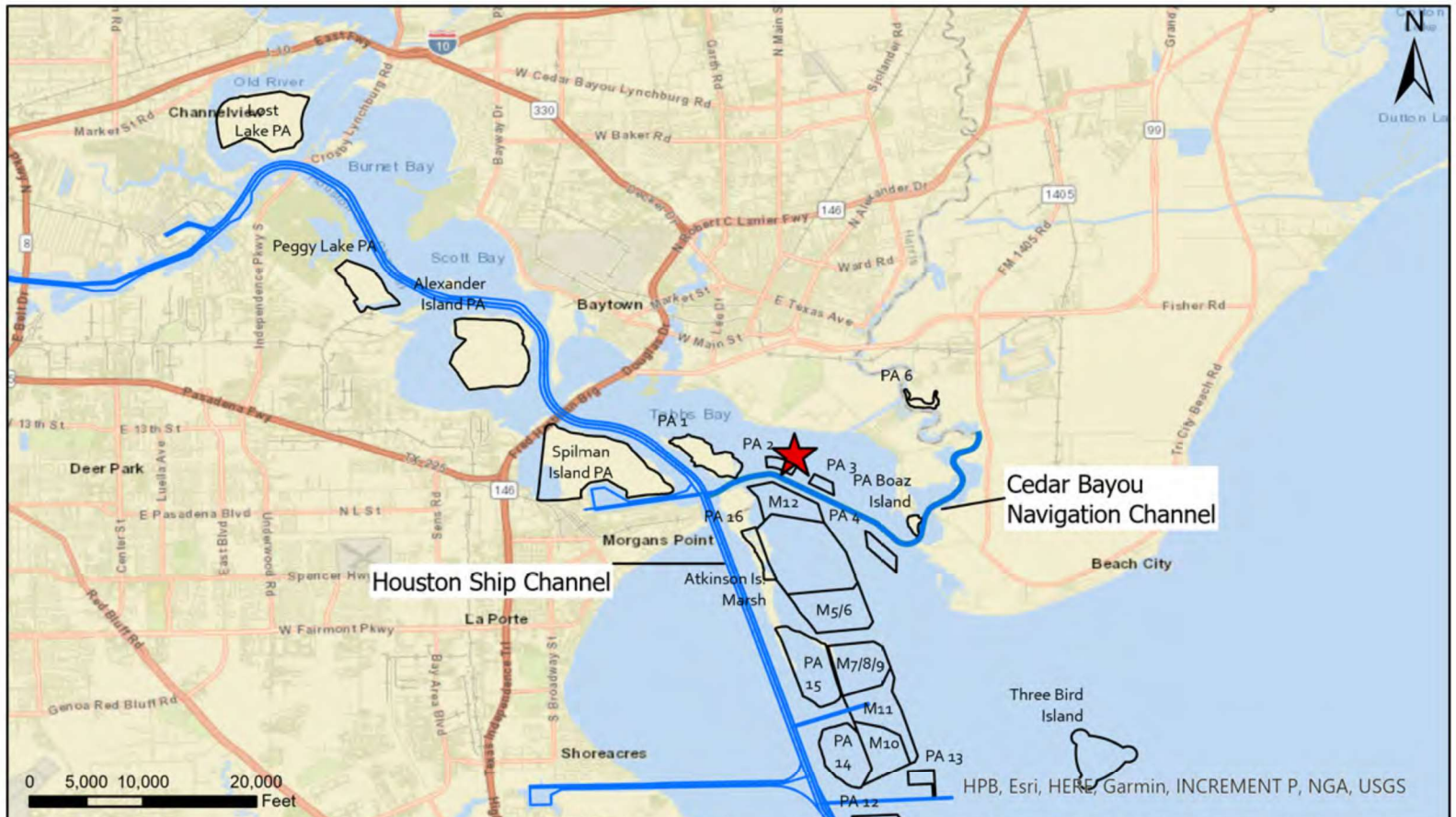
Signature of Applicant/Agent

Date

Any questions regarding the Texas Coastal Management Program should be referred to:

Texas General Land Office
Coastal Resources Division
1700 North Congress Avenue, Room 330
Austin, Texas 78701-1495
Phone: (512) 475-0773
Toll Free: 1-800-998-4GLO
federal.consistency@glo.texas.gov

Print Form



- Legend**
- Proposed PA 2 Expansion (100 ac)
 - Existing Placement Area
 - ◆ Oil and Gas Well
 - Pipeline
 - Confirmed Hard Bottom Habitats (Delineated in 2016)
 - Habitat Classification
 - Buried Shell
 - Viable Oyster Habitat
 - Previously Delineated Oyster Resource (2016)
 - Navigation/Ship Channel

Figure 1:
Project Area Map
 Cedar Bayou Channel
 Placement Area 2 Expansion Project
 U.S. Army Corps of Engineers
 Harris County, Texas

Date: Jan 29, 2026	US Army Corps of Engineers
Prepared By: LEI	
Prepared For: USACE	
Project: PA2 Expansion	

D-6:
TCEQ WQC

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



Brooke T. Paup, *Chairwoman*
Catarina R. Gonzales, *Commissioner*
Tonya R. Miller, *Commissioner*
Kelly Keel, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 14, 2026

Lisa M. Finn
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553

Re: HSC-M-7 Cedar Bayou PA 2 Expansion EA

Dear Ms. Finn:

This letter is in response to the 401 Certification Request dated March 4, 2026, the Joint Public Notice dated February 24, 2026, and the Cedar Bayou Placement Area 2 Expansion HSC-M-7 Draft Environmental Assessment (EA) dated February 2026 regarding the U.S. Army Corps of Engineers (USACE) proposed Cedar Bayou Placement Area 2 (PA 2) Expansion Project. The project is located in Galveston and Tabbs Bays, Chambers County, Texas.

The Texas Commission on Environmental Quality (TCEQ) has reviewed the Public Notice, EA, and related application information along with the 401 Certification Request. On behalf of the Executive Director and based on our evaluation of the information contained in these documents, TCEQ certifies that there is reasonable assurance that the project will be conducted in a way that will not violate water quality standards.

The proposed Cedar Bayou PA 2 Expansion Project is intended to provide additional open water disposal at the existing PA 2 for future operations and maintenance dredging events to ensure continued navigational efficiency and safe transit within the Cedar Bayou Channel. The proposed expansion would add approximately 100 acres to the existing PA 2, extending the placement area approximately 1,500 by 3,200 feet to the north/northeast. The project will affect 100 acres of submerged bay bottom due to placement of dredged material. The placement of dredged material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet mean lower low water (MLLW) to a maximum elevation of -0.5 feet MLLW.

The EA states that the project area is currently devoid of wetlands, submerged aquatic vegetation, and most other special aquatic sites as it is composed entirely of relatively flat subtidal bay bottom. The exception is that the project area was found to have a total of 0.81 acres of viable oyster habitat, most of which is located outside of the 100-acre project

Ms. Finn
U.S. Army Corps of Engineers
USACE Permit Application No. HSC-M-7 Cedar Bayou PA 2 Expansion EA
Page 2

area but within the 500-foot buffer surrounding the project area. No permanent effects to oyster resources are anticipated that would cumulatively contribute to loss of oyster habitat in Galveston Bay.

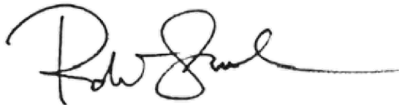
The EA states that dredged material proposed for open-water placement in PA 2 will be subject to the sampling, analysis, and reporting requirements of the Inland Testing Manual (EPA and USACE 1988), Section 404 of the Clean Water Act, and the dredging regulations in 33 CFR 335-338.

The applicant has stated that compensatory mitigation will not be required as the project is impacting unvegetated submerged bottom and will not impact any other resource areas. The area will remain unvegetated bay bottom after the placement is complete.

No review of property rights, location of property lines, nor the distinction between public and private ownership has been made, and this certification may not be used in any way with regard to questions of ownership.

If you require additional information or further assistance, please contact Mr. Peter Schaefer, Water Quality Assessment Section, Water Quality Division (MC-150), at (512) 239-4372 or by email at peter.schaefer@tceq.texas.gov

Sincerely,

A handwritten signature in black ink, appearing to read "Rob Sadler", with a long horizontal flourish extending to the right.

Robert Sadler, Deputy Director
Water Quality Division
Texas Commission on Environmental Quality

RS/PS

cc: Lisa M. Finn, U.S. Army Corps of Engineers via e-mail at lisa.m.finn@usace.army.mil

**Texas Commission on Environmental Quality
401 State Certification Request Form**

1) Applicant's contact information:

Project Applicant

Name: Lisa M. Finn

Organization: US Army Corps of Engineers Galveston District

Phone no.: 409-766-3949

Email: Lisa.M.Finn@usace.army.mil

Consultant

Name: Courtney Gerken

Organization: Lloyd Engineering, Inc.

Phone no.:

Email: courtney@lloydeng.com

2) Description of the proposed project:

The proposed Cedar Bayou Placement Area 2 (PA 2) Expansion Project is to provide additional open-water disposal at the existing PA 2 for future operations and maintenance dredging events to ensure continued navigational efficiency and safe transit within the Cedar Bayou Channel (CBC). The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast. The project will effect 100 acres of submerged bay bottom with temporary placement of dredged material. The placement of dredged material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet MLLW to a maximum elevation of -0.5 feet MLLW.

3) Identify the applicable federal license or permit for which 401 certification is being request and include the Corps permit project number and Corps project manager:

Permit No. HSC-M-7
by USACE-SWG- Navigation

Section 404(b)(1) of the Clean Water Act.

The project is being evaluated under NEPA.
Public Notice has been issued <https://www.swg.usace.army.mil/Projects/Cedar-Bayou-Placement-Area-2-Expansion/>

4) Identify the location and nature of any potential discharge (i.e., fill, dredged material placement area return water) that may result from the proposed project and the location of the receiving waters:

The project will effect 100 acres of submerged bay bottom within Galveston/Tabbs Bay with temporary placement of dredged material. The placement of dredged material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet MLLW to a maximum temporary elevation of -0.5 feet MLLW.

**Texas Commission on Environmental Quality
401 State Certification Request Form**

5) Describe any proposed methods and means to monitor the discharge and the equipment or measures planned to treat, control, or manage the discharge, (i.e., best management practices)

Best Management Practices (BMPs) to be implemented:

Placement will adhere to TCEQ Water Quality Certification.

Dredging best management practices will be utilized to minimize temporary turbidity impacts to water quality.

During construction, temporary water quality impacts are anticipated due to increased turbidity from the placement of excavated material or dredged material. Standard BMPs will be utilized during placement to minimize turbidity over ambient conditions. Placement of maintenance material during the operation of the project will occur within expansion area therefore turbidity impacts are anticipated to be limited to the immediate project area and settling will occur within the boundaries of the placement area.

6) Include a list of all other federal, interstate, tribal, state, territorial, or local agency authorizations required for the proposed project, including all approvals or denials already received.

This proposed project has been coordinated with the USFWS and other Federal, State, and local agencies. Consultation procedures have been initiated with the USFWS in compliance with the ESA, as amended. The NMFS has been consulted to concur with the determination that the project would have no effect on listed species under their jurisdiction and that the project is in compliance with the ESA.

The project is consistent with the Texas Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972. All conditions of the consistency determination shall be implemented to minimize adverse impacts on the coastal zone.

7) Include documentation that a prefilng meeting request was submitted to the certifying authority (TCEQ) at least 30 days prior to submitting this certification request.

Attached.

8) "The project proponent hereby certifies that all information contained herein is true, accurate, and complete, to best of my knowledge and belief. The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time."

Signature:  Date: 03.04.2026

Important Note:

Texas Commission on Environmental Quality 401 State Certification Request Form

Please fill out and return this form to 401CERTS@tceq.texas.gov and cc the Corps project manager.

If this is a Tier 1 project, please attach the [Tier I Checklist](#).

If this is a Tier 2 project, please attach:

- 1) a copy of the Corps 404 permit application,
- 2) [Tier II 401 Questionnaire and Alternatives Analysis Checklist](#). - attached

Tier 1 projects are those that impact less than 3 acres of wetlands or 1,500 linear feet of stream or shoreline, or any combination of the two, where 500 linear feet of stream or shoreline is equivalent to one acre of wetland. Tier II projects are those with impacts that exceed Tier impact thresholds.

Texas Commission on Environmental Quality 401 State Certification Prefiling Meeting Request Form

Why is this Pre-Filing Meeting Request Required? The U.S. Environmental Protection Agency published its Clean Water Act Section 401 Certification Rule in the Federal Register on July 13, 2020.¹ It took effect on September 11, 2020. The federal rule requires all project applicants to submit a Pre-filing Meeting Request to the state certifying authority, the Texas Commission on Environmental Quality (TCEQ), at least 30 days prior to submitting a Section 401 Water Quality Certification Request (Certification Request). The TCEQ has prepared this pre-filing meeting request form to help project applicants comply with the new 401 Certification Rule requirements.

Next Steps: The TCEQ will review your request for a pre-filing meeting to determine whether it is necessary or appropriate for a specific project. Completing this form will help with the TCEQ's determination. Thank you for using this form.

1. Please submit this request form and, a project location map to 401Certs@tceq.texas.gov.
2. If a pre-filing meeting is determined to be necessary by either the applicant or the TCEQ, the meeting will be scheduled to discuss the project.
3. If you do not receive a response to your request for a pre-filing meeting and after at least 30 days, you may submit the certification request to the TCEQ if a Section 401 certification is required for your project. Projects that require state certification are 1) all individual permit U.S. Army Corps of Engineer 404 permit applications and, 2) individual conditional certifications for the return water of Nationwide Permit 16.

For more information: EPA's 401 rule: <https://www.epa.gov/cwa-401/final-rule-clean-water-act-section-401-certification-rule>

Project Information

Project Name: South Texas Gateway Terminal Maintenance Dredging		
Project Applicant		
Name: Lisa Finn	Organization: US Army Corps Engineers	
Phone #: 409-766-3949	Email: lisa.m.finn@usace.army.mil	
Consultant		
Name: Courtney Gerken	Organization: Lloyd Engineering, Inc.	
Phone #: 713-413-7342	Email: courtney@lloydeng.com	
Project Location (Note: Please attach a project location map when submitting this form)		
Address:	City:	County: Harris
Lat: 29.6807357°N		Long: 94.9629615°W
Brief Project Description and Scope:		
The proposed Cedar Bayou Placement Area 2 (PA 2) Expansion Project is to provide additional open-water disposal at the existing PA 2 for future operations and maintenance dredging events to ensure continued navigational efficiency and safe transit within the Cedar Bayou Channel (CBC). The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast. The project will effect 100 acres of submerged bay bottom with temporary placement of dredged material. The placement of dredged		

material within the PA 2 expansion area would change the bathymetry of the area from a bottom elevation typically of -2 to -4 feet MLLW to a maximum elevation of -0.5 feet MLLW.

Please provide the type of federal permit for which the applicant is seeking state 401 certification. Please include a federal permit number if available.

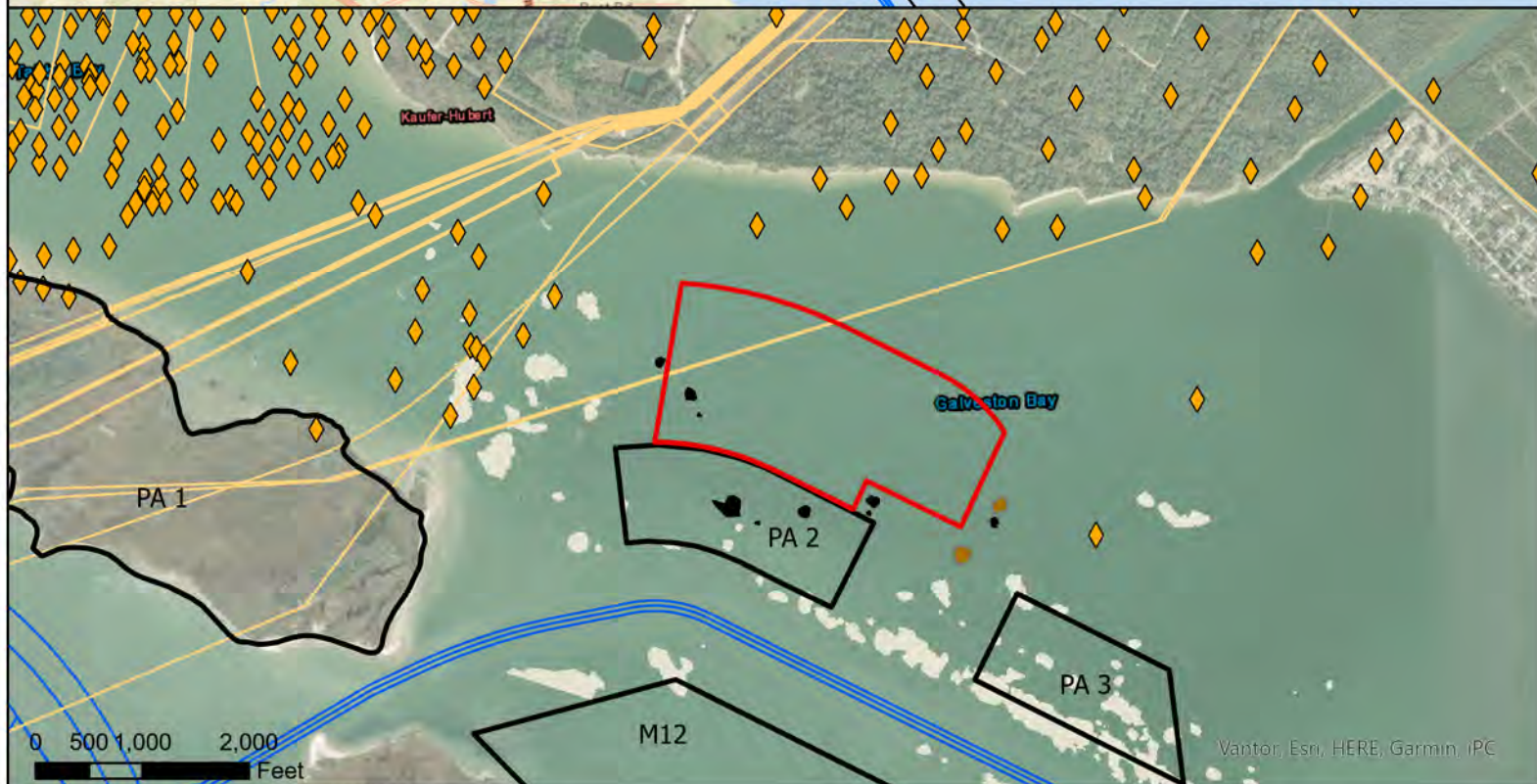
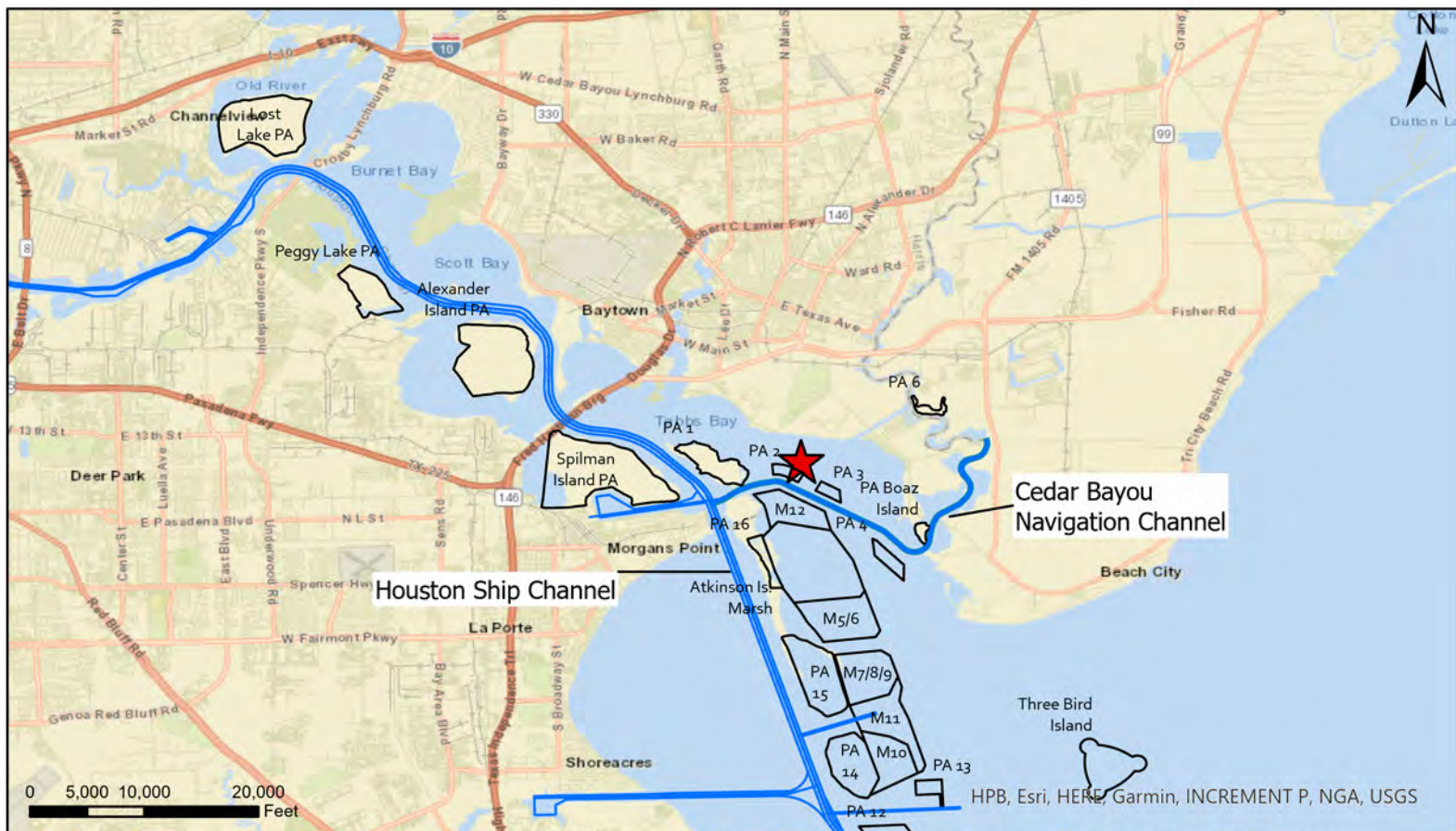
USACE Action

Jurisdictional Impacts

Fill/Excavate	Wetland (Cowardin Class), Seagrass, Oyster	Acres	Stream (linear feet)		
			<i>intermittent</i>	<i>perennial</i>	<i>tidal</i>
Temporary Fill	Open bottom	100			

Best Management Practices (BMPs)

As the PA 2 expansion area is expected to be dispersive, it is anticipated that the change in bathymetry would be temporary and would return to subtidal bottom elevations over time. Turbidity at the project area would increase beyond ambient levels during, and immediately following, dredged material placement. Dissolved oxygen levels are likely to decrease during placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode.



Legend

- Proposed PA 2 Expansion (100 ac)
- Existing Placement Area
- ◆ Oil and Gas Well
- Pipeline

Confirmed Hard Bottom Habitats (Delineated in 2016)

Habitat Classification

- Buried Shell
- Viable Oyster Habitat
- Previously Delineated Oyster Resource (2016)
- Navigation/Ship Channel

Figure 1: Project Area Map

Cedar Bayou Channel
Placement Area 2 Expansion Project
U.S. Army Corps of Engineers
Harris County, Texas

Date: Jan 29, 2026

Prepared By: LEI

Prepared For: USACE

Project: PA2 Expansion



**US Army Corps
of Engineers**



Texas Commission on Environmental Quality

Tier II

401 Certification Questionnaire

Applicant and Project

Lisa Finn – USACE Galveston District

Contact Information

lisa.m.finn@usace.army.mil

I. Impacts to surface water in the state, including wetlands

A. What is the area of surface water in the state, including wetlands, that will be disturbed, altered, or destroyed by the proposed activity?

Waters of the State as defined under §26.001 of the Texas Water Code include “groundwater, percolating or otherwise, lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state, and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or non-navigable, and including the beds and banks of all watercourses and bodies of surface water, that are wholly or partially inside or bordering the state or inside the jurisdiction of the state.”

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the CBNC. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

B. Is compensatory mitigation proposed? If yes, submit a copy of the mitigation plan. If no, explain why not.

No. Compensatory mitigation will not be required as the project is impacting unvegetated submerged bottom and will not impact any other resource areas. The area will remain unvegetated bay bottom after the placement is complete.

C. Please complete the attached Alternatives Analysis Checklist

Refer to Attachment A for the Alternatives Analysis checklist.

II. Disposal of waste materials

A. Describe the methods for disposing of materials recovered from the removal or destruction of existing structures.

The proposed Project includes the placement of dredged materials from the authorized Cedar Bayou Channel maintenance dredging.

B. Describe the methods for disposing of sewage generated during construction. If the proposed work establishes a business or a subdivision, describe the method for disposing of sewage after completing the project.

All sanitary waste generated during construction would be collected from portable units as necessary or as required by local regulation by a licensed sanitary waste management contractor. It will be the responsibility of each contractor for the disposal of waste generated on barges to ensure compliance with all local, state, and federal regulations.

C. For marinas, describe plans for collecting and disposing of sewage from marine sanitation devices. Also discuss provisions for the disposing of sewage generated from day-to-day activities.

The facility will not be a marina; therefore, no sewage collection or disposal plan is required.

III. Water quality impacts

A. Describe the methods to minimize the short-term and long-term turbidity and suspended solids in the waters being dredged and/or filled. Also, describe the type of sediment (sand, clay, etc.) that will be dredged or used for fill.

The Best Management Practices (BMPs) will be used, where possible during the placement of the beneficial use material, to minimize temporary impacts to water quality to the maximum extent practicable. The proposed activities will be completed in a manner consistent with the goals and policies of the Texas Coastal Management Program.

Dredged material is anticipated to originate from the CBNC

The dredged material proposed for placement at the PA 2 expansion area would have undergone sediment, water, and elutriate testing and approval prior to placement at the site. The material itself would have originated from the nearby CBNC. The O&M material to be placed in the PA 2 expansion area would therefore most likely have physical, chemical, and toxicity properties comparable to what currently exists in and around the project area. No significant long-term changes are expected for water quality and sediment quality from the placement of material.

Turbidity at the project area would increase beyond ambient levels during, and immediately following, dredged material placement. Dissolved oxygen levels are likely to decrease during placement activities. This increase in turbidity and decrease in dissolved oxygen levels would dissipate within hours following completion of each placement episode. Estuarine organisms within the bay are generally evolutionarily prepared for such stressors and have mechanisms that allow them to survive such ephemeral perturbations

successfully. Overall, impacts to water and sediment quality due to the expansion of PA 2 would be comparable with those associated with current placement activities at the existing PA 2 and would be temporary and minor

- B. Describe measures that will be used to stabilize disturbed soil areas, including: dredge material mounds, new levees or berms, building sites, and construction work areas. The description should address both short-term (construction-related) and long-term (normal operation or maintenance) measures. Typical measures might include containment structures, drainage modifications, sediment fences, or vegetative cover. Special construction techniques intended to minimize soil or sediment disruption should also be described.**

BMPs will be used where possible to minimize temporary impacts to coastal resources to the maximum extent practicable. The proposed activities will be completed in a manner consistent with the goals and policies of the Texas Coastal Management Program. There are no proposed disturbed soil areas with the project other than the submerged project area. All work will be conducted with aquatic vessels and barges

Examples of BMPs that the project contractors will follow include:

- Refueling and maintenance of vehicles and equipment in designated areas to prevent accidental spills and potential contamination of water sources and the surrounding soils.
- Limiting idling of vehicles and equipment to reduce emissions.
- Minimizing project equipment and vehicles transiting between the dredging and placement site to the greatest extent practicable, including but not limited to using designated routes, confining vehicle access to the immediate needs of the project, and coordinating and sequencing work to minimize the frequency and density of vehicular traffic.
- Minimizing use of construction lighting at night and when in use, directing lighting toward the construction activity area and shielding from view outside of the project area to the maximum extent practicable.

- C. Discuss how hydraulically dredged materials will be handled to ensure maximum settling of solids before discharging the decant water. Plans should include a calculation of minimum settling times with supporting data. (Reference: Technical Report, DS-7810, Dredge Material Research Program, GUIDELINES FOR DESIGNING, OPERATING, AND MAINTAINING DREDGED MATERIAL CONTAINMENT AREAS). If future maintenance dredging will be required, the disposal site should be designed to accommodate additional dredged materials. If not, please include plans for periodically removing the dried sediments from the disposal area.**

The material will be hydraulically dredged and hydraulically pumped and placed with a temporary dredge material pipe. Water from the CBNC pumped with the dredged material would be discharged back into Galveston Bay within project area. While settling times have not been calculated, BMPs would be used to prevent uncontrolled release of material outside the PA 2 area.

As the site reaches the target elevation, the material will be allowed to naturally settle.

- D. Describe any methods used to test the sediments for contamination, especially when dredging in an area known or likely to be contaminated, such as downstream of municipal or industrial wastewater discharges.**

All maintenance dredged material will be tested for contamination prior to placement at the PA according to the Federal requirements specific for open water placement of dredged material.

ATTACHMENT A

Tier II Alternatives Analysis Checklist

I. Alternatives

A. How could you satisfy your needs in ways which do not affect surface water in the state?

The purpose and need of the proposed action is to provide additional open-water disposal capacity at PA 2 for future operations and maintenance (O&M) dredging events to ensure continued navigational efficiency and safe transit within the CBNC. The objective of this project can be achieved through the identification of a suitable submerged area adjacent to PA 2 for the expansion of the PA 2 limits that can be used for placing O&M dredged material from the CBNC.

B. How could the project be redesigned to fit the site without affecting surface water in the state?

Due to the nature of the Project, temporary impacts to waters of the state are unavoidable. Temporary impacts to waters of the state will be minimized through the use of BMPs during construction activities. The dredging of material will be completed using BMPs, where practicable, to minimize the potential of adverse effects to waters of the state.

C. How could the project be made smaller and still meet your needs?

Various alternatives were investigated to identify the most beneficial and least damaging practical alternative that satisfied the needs of the project. Refer to the EA for the full alternatives analysis conducted for the project.

D. What other sites were considered?

Refer to the EA for the full alternatives analysis conducted for the project.

1. What geographical area was searched for alternative sites?

The detailed Environmental Assessment conducted for the Project concentrates on alternatives within the CBNC area.

2. How did you determine whether other non-wetland sites are available for development in the area?

The no-action alternative consists of the continued use of the existing PA 2 for placement of O&M dredged material to the maximum volumes as water depth allows. The proposed 100-acre expansion area would not be constructed, and the total volume of material able to be placed at PA 2 would remain limited to the existing 48-acre PA 2. The existing PA 2 is estimated to be able to accommodate approximately 150,000 cubic yards (cy) of dredged material per O&M dredging cycle.

Without expansion, available placement capability would be exhausted after a limited number of maintenance events due to the limited water depth, requiring transport of dredged material to more distant and costly disposal locations for subsequent dredging cycles. Examples of such locations

include upland confined placement areas and ocean disposal. These options involve much greater travel distances, fuel use, overall dredging duration, and costs.

**3. In recent years, have you sold or leased any lands located within the vicinity of the project?
If so, why were they unsuitable for the project?**

In recent years, USACE has not sold or leased any lands located within the vicinity that would be suitable for the development of the proposed Project.

E. What are the consequences of not building the project?

The consequence of not proceeding with the Project as planned would constrain the ability of the CBNC to provide continued safe and operable conditions. Material would otherwise be disposed of in confined placement areas inland that may potentially impact wetland vegetation. No action alternative was considered as a part of the detailed alternatives analysis conducted for the project.

II. Comparison of alternatives

A. How do the costs compare for the alternatives considered above?

The project encourages competitive bidding of dredging contracts, and minimizes dredging costs, by allowing the use of a variety of equipment types for dredge material transport and placement.

B. Are there logistical (location, access, transportation, etc.) reasons that limit the alternatives considered?

Without expansion, available placement capability would be exhausted after a limited number of maintenance events due to the limited water depth, requiring transport of dredged material to more distant and costly disposal locations for subsequent dredging cycles. Examples of such locations include upland confined placement areas and ocean disposal. These options involve much greater travel distances, fuel use, overall dredging duration, and costs.

C. Are there technological limitations for the alternatives considered?

The design that would best satisfy this criterion is one constructed with accessible points of entry for various types of dredging equipment into the PA while allowing for the competitive bidding of dredging contractors based on their available equipment and cost estimates. The project design should not limit the ability to choose from dredging equipment best suited for the conditions within CBNC or Galveston Bay or from providing the most economical cost possible.

D. Are there other reasons certain alternatives are not feasible?

The following selection criteria were used in the analysis:

1. The project would allow the placement of at least 400,000 cy of O&M dredged material per dredging event in an area allowing material dispersal, accommodating additional O&M material during the next dredge cycle.
2. Avoid or minimize impacts to existing natural resources to the extent practicable.
3. Avoid impacts to other federal projects and navigation.
4. Avoid risk of interference with major active oil and gas related infrastructure.

III. If you have not chosen an alternative that would avoid impacts to surface water in the state, explain:

A. Why your alternative was selected.

An extensive alternatives analysis was conducted as part of the Environmental Assessment. The analysis considered alternatives which were evaluated to determine which resulted in the least amount of potential impacts to special aquatic sites and other resources while fulfilling the project purpose and need.

B. What do you plan to do to minimize adverse effects on the surface water in the state impacted?

BMPs would be adhered to during PA 2 dredged-material placement activities to minimize adverse effects. When considering impacts, it was assumed that, at a minimum, BMPs identified throughout this section would apply during placement activities. These BMPs are based primarily on widely accepted federal, state, and industry standards for relevant construction activities. The discussion below sets the minimum protective conditions for the proposed action. Environmental effects from the proposed action would be minimized to the extent practicable through implementation of the following BMPs:

- Refueling and maintenance of vehicles and equipment in designated areas to prevent accidental spills and potential contamination of water sources and the surrounding soils.
- Limiting idling of vehicles and equipment to reduce emissions.
- Limiting ground disturbance necessary for staging areas, access routes, pipeline routes, etc. to the smallest area necessary to safely operate during construction and restoring staging area and access routes to result in no permanent loss.
- Minimizing project equipment and vehicles transiting between the staging area and restoration site to the greatest extent practicable, including but not limited to using designated routes, confining vehicle access to the immediate needs of the project, and coordinating and sequencing work to minimize the frequency and density of vehicular traffic.
- Utilizing specialized project vehicles and mats when feasible to further minimize temporary disturbance to aquatic areas within the transportation.
- Minimizing use of construction lighting at night and when in use, directing lighting toward the construction activity area and shielding from view outside of the project area to the maximum extent practicable.

Water & Sediment Quality

- Placement of dredged material will adhere to the standards of the Texas Council on Environmental Quality's Water Quality Certification.

Fish & Wildlife Resources Including Protected Species & Essential Fish Habitat

- 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.
- All recommendations and requirements for avoidance of protected species from USFWS and (or) NOAA Fisheries will be incorporated where feasible for applicable species located in the project area.

IV. Please provide a comparison of each criteria (from Part II) for each site evaluation in the alternatives analysis.

Refer to the EA for the full alternatives analysis conducted for the project.

D-7:
TRIBAL COORDINATION LETTERS

**CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS**

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





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

REPLY TO
ATTENTION OF

Operations Division-Navigation Section

MARCH 3, 2025

SUBJECT: Cedar Bayou PA 2 Expansion Project Draft Environmental Assessment & EFH Coordination

To whom it may concern,

The U.S. Army Corps of Engineers (USACE), Galveston District (CESWG), has prepared a Draft Environmental Assessment (EA) to evaluate potential impacts associated with the proposed expansion and operation of the Cedar Bayou Placement Area 2 (PA 2).

The proposed action is the expansion of the existing PA 2 for placement of O&M dredged material from the Cedar Bayou Navigation Channel. The existing PA 2 area consists of approximately 48 acres of submerged bay bottom north of the channel, between miles 2.5 and 3.0. The proposed expansion area would add approximately 100 acres to the existing PA 2, extending this area approximately 1,500 by 3,200 feet to the north/northeast.

A public notice has been issued for this project to inform interested parties that the USACE has prepared the draft 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 1500-1508.

Refer to the public notice of the project under the CESWG Project page at <https://www.swg.usace.army.mil/Projects/Cedar-Bayou-Placement-Area-2-Expansion/>

There are no known or expected impacts to Native American historic or cultural resources due to the proposed project.

Agencies or persons or desiring to provide comments on the project are requested to submit their comments in writing within 30 days of the date of the notice to:

U.S. Army Corps of Engineers, Galveston District
Attention: Ms. Lisa M. Finn
P.O. Box 1229
Galveston, TX 77553

or by email: Lisa.M.Finn@usace.army.mil The comments should make specific reference to Cedar Bayou PA 2, Public Notice No. HSC-M-7.

We appreciate your cooperation in coordinating the proposed project and request that you provide your comments by June 2, 2026. Should you need additional information or have any questions, please call me at (409) 766-3949.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Finn", with a stylized flourish at the end.

Lisa Finn
Environmental Program Manager, Navigation

APPENDIX E
404(b)(1) CHECKLIST

CEDAR BAYOU PLACEMENT AREA 2
EXPANSION
HSC-M-7
GALVESTON BAY, TEXAS

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



EVALUATION OF SECTION 404(b)(1) GUIDELINES (SHORT FORM)

PROPOSED PROJECT: Cedar Bayou Placement Area 2 Expansion Project

	Yes	No*
1. Review of Compliance (230.10(a)-(d))		
A review of the proposed project indicates that:		
a. The placement represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with the placement must have direct access or proximity to, or be located in the aquatic ecosystem, to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative).	X	
b. The activity does not appear to:		
1) Violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act;	X	
2) Jeopardize the existence of Federally-listed endangered or threatened species or their habitat; and	X	
3) Violate requirements of any Federally-designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies).	X	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, an economic values (if no, see values, Section 2)	X	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see Section 5)	X	

	Not Applicable	Not Significant	Significant*
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below.)			
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
1) Substrate impacts		X	
2) Suspended particulates/turbidity impacts		X	
3) Water column impacts		X	
4) Alteration of current patterns and water circulation	X		
5) Alteration of normal water fluctuation/hydroperiod	X		

	Not Applicable	Not Significant	Significant*
6) Alteration of salinity gradients	X		
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
1) Effect on threatened/endangered species and their habitat		X	
2) Effect on the aquatic food web		X	
3) Effect on other wildlife (mammals, birds, reptiles and amphibians)		X	
c. Special Aquatic Sites (Subpart E)			
1) Sanctuaries and refuges	X		
2) Wetlands	X		
3) Mud flats	X		
4) Vegetated shallows	X		
5) Coral reefs (Oyster Reef)		X	
6) Riffle and pool complexes	X		
d. Human Use Characteristics (Subpart F)			
1) Effects on municipal and private water supplies	X		
2) Recreational and Commercial fisheries impacts		X	
3) Effects on water-related recreation		X	
4) Aesthetic impacts		X	
5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves	X		

	Yes
3. Evaluation of Dredged or Fill Material (Subpart G)	
a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material (check only those appropriate)	
1) Physical characteristics	X
2) Hydrography in relation to known or anticipated sources of contaminants	X
3) Results from previous testing of the material or similar material in the vicinity of the project	X
4) Known, significant sources of persistent pesticides from land runoff or percolation	

5) Spill records for petroleum products or designated (Section 311 of Clean Water Act) hazardous substances	X
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6) Other public records of significant introduction of contaminants from industries, municipalities or other sources	X
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	

	Yes	No
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredged or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and placement sites and not likely to degrade the placement sites, or the material meets the testing exclusion criteria.	X	

List appropriate references:

	Yes
4. Placement Site Delineation (230.11(f))	
a. The following factors as appropriate, have been considered in evaluating the placement site:	
1) Depth of water at placement site	X
2) Current velocity, direction, and variability at placement site	X
3) Degree of turbulence	X
4) Water column stratification	X
5) Discharge vessel speed and direction	X
6) Rate of discharge	X
7) Fill material characteristics (constituents, amount, and type of material, settling velocities)	X
8) Number of discharges per unit of time	X
9) Other factors affecting rates and patterns of mixing (specify)	

List appropriate references:

	Yes	No
b. An evaluation of the appropriate factors in 4a above indicates that the placement site and/or size of mixing zone are acceptable.	X	

	Yes	No
5. Actions to Minimize Adverse Effects (Subpart H)		
All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X	

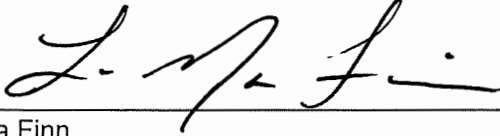
List actions taken:

	Yes	No*
6. Factual Determination (230.11)		
A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:		
a. Physical substrate at the placement site (review Sections 2a. 3, 4, and 5 above)	X	
b. Water circulation, fluctuation and salinity (review Sections 2a. 3, 4, and 5)	X	
c. Suspended particulates/turbidity (review Sections 2a. 3, 4, and 5)	X	
d. Contaminant availability (review Sections 2a. 3, and 4)	X	
e. Aquatic ecosystem structure and function (review Sections 2b and c, 3, and 5)	X	
f. Placement site (review Sections 2, 4, and 5)	X	
g. Cumulative impacts on the aquatic ecosystem	X	
h. Secondary impacts on the aquatic ecosystem	X	

7. Evaluation Responsibility
a. This evaluation was prepared by: Lisa Finn Position: Environmental Program Manager – Navigation

8. Findings	Yes
a. The proposed placement site for discharge of or fill material complies with the Section 404(b)(1) Guidelines.	X
b. The proposed placement site for discharge of dredged or fill material complies with the Section 404(b)(1) Guidelines with the inclusion of the following conditions:	

List of conditions:

c. The proposed placement site for discharge of dredged or fill material does not comply with the Section 404(b)(1) Guidelines for the following reason(s):		
1) There is a less damaging practicable alternative		
2) The proposed discharge will result in significant degradation of the aquatic ecosystem		
3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem		
<u>5/19/26</u> Date	 Lisa Finn Environmental Program Manager SWD/SWG/ODN	

NOTES:

- * A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

Negative responses to three or more of the compliance criteria at the preliminary stage indicate that the proposed projects may not be evaluated using this "short form" procedure. Care should be used in assessing pertinent portions of the technical information of items 2a-e before completing the final review of compliance.

Negative response to one of the compliance criteria at the final stage indicates that the proposed project does not comply with the Guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

APPENDIX F

FONSI

CEDAR BAYOU PLACEMENT AREA 2

EXPANSION

HSC-M-7

GALVESTON BAY, TEXAS

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



**US Army Corps
of Engineers®**

**FINDING OF NO SIGNIFICANT IMPACT
ENVIRONMENTAL ASSESSMENT FOR
CEDAR BAYOU PLACEMENT AREA 2 EXPANSION (HSC-M-7)
HARRIS COUNTY, TEXAS**

The U.S. Army Corps of Engineers, Galveston District (USACE) has conducted an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969, as amended. The EA for the Cedar Bayou Placement Area 2 (PA 2) expansion addresses potential impacts associated with the expansion and use of a beneficial use placement area for future maintenance dredged material from the Cedar Bayou Federal Navigation Channel.

For all alternatives, the potential effects were evaluated as appropriate. A summary assessment of the potential effects of the recommended plan is listed in Table 1 below.

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant Negative Effects	Insignificant effects assuming avoidance & minimization measures	Resource unaffected by action
Aesthetics	☐	☐	☒
Air quality	☒	☐	☐
Aquatic resources/wetlands	☐	☒	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☐	☒	☐
Threatened/Endangered species/critical habitat	☐	☒	☐
Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☐	☐	☒
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☒	☐	☐
Navigation	☒	☐	☐
Noise levels	☒	☐	☐
Public infrastructure	☐	☐	☒
Socio-economics	☐	☐	☒
Soils	☒	☐	☐
Tribal trust resources	☐	☐	☒
Water quality	☐	☒	☐
Climate change	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts where necessary. No compensatory mitigation is required as part of the recommended plan.

There was a public review of the DEA and FONSI. All comments submitted during the public review period will be responded to in the Final EA and FONSI. There were no public comments received.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, USACE determined that the recommended plan may affect, but is not likely to adversely affect the giant manta (*Mobula birostris* [Threatened]), green sea turtle (*Chelonia mydas* [Threatened]), Kemp's ridley sea turtle (*Lepidochelys kempii* [Endangered]), loggerhead (*Caretta caretta* [Threatened]), and the West Indian manatee (*Trichechus manatus* [Threatened]). Conservation measures described in the EA will be implemented to ensure the effects of the proposed work will not adversely affect the species listed above.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE determined that the recommended plan does not affect historic properties through coordination with the Texas Historical Commission.

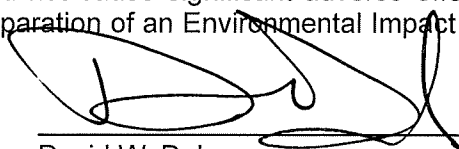
Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with Clean Water Act Section 404(b)(1) Guidelines (40 CFR 230). These guidelines are included in Appendix E to the EA.

A water quality certification pursuant to section 401 of the Clean Water Act has been issued by the Texas Commission on Environmental Quality. All conditions of the water quality certification will be implemented to minimize adverse impacts to water quality.

A determination of consistency with the Texas Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 has been obtained from the Texas General Land Office for the EA. All conditions of the consistency determination shall be implemented to minimize adverse impacts on the coastal zone.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials will be completed. Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

12 June 2024
Date:



David W. Dake
Colonel, Corps of Engineers
District Commander