U.S. Army Corps of Engineers
Galveston District

DRAFT ENVIRONMENTAL ASSESSMENT

MATAGORDA SHIP CHANNEL PROJECT DEFICIENCY STUDY, MATAGORDA COUNTY, TEXAS

U.S. Army Corps of Engineers
Southwestern Division
Galveston District
AUGUST 2018

Draft Environmental Assessment

Matagorda Ship Channel Project
Deficiency Study, Matagorda County,
Texas

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LIST OF ACRONYMS

AAHU Average annualized habitat units
ACHP Advisory Council on Historic Preservation
APE area of potential effect
ANS Aquatic nuisance species
BA Biological Assessment
BP Before Present
CAA Clean Air Act
CAR Coordination Act Report
CBRA Coastal Barrier Resources Act
CBRS Coastal Barrier Resources System
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CESWG U.S. Army Corps of Engineers, Galveston District
CEQ Commission on Environmental Quality
CFR Code of Federal Regulations
CWA Clean Water Act
Cy cubic yards
dBA Decibels
DNL Day-night average sound level
E endangered
EA Environmental Assessment
EFH essential fish habitat
EM Engineer Manual
EO Executive Order
EPA U.S. Environmental Protection Agency
ERDC U.S. Army Engineer Research and Development Center
ESA Endangered Species Act of 1973
FEIS Final Environmental Impact Statement
FONSI Finding of No Significant Impact
FUDS Formerly Used Defense Site
GIWW Gulf Intracoastal Waterway
GLO Texas General Land Office
GMFMC Gulf of Mexico Fishery Management Council
HTRW Hazardous, Toxic, and Radioactive Waste
LCRA Lower Colorado River Authority
LNG Liquified Natural Gas
MC munitions constituents
mcy million cubic yards
MEC munitions and explosives of concern
MLLW Mean Low Low Water
MLT mean low tide
MSC Matagorda Ship Channel
MSFCMA Magnuson-Stevens Fishery Conservation and Management Act
MRSPP Munitions Response Site Prioritization Protocol
NAAQS National Ambient Air Quality Standards
NANPCA Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990

NEPA National Environmental Policy Act
NISA National Invasive Species Act of 1996
NMFS National Marine Fisheries Services
NOS National Ocean Services
NPL National Priority List or Superfund
NRHP National Register of Historic Places
PA placement area
ppt parts per thousand
RSLC Relative Sea Level Change
RSLR Relative Sea Level Rise
SAV submerged aquatic vegetation
SIP State implementation plans
T threatened
TCEQ Texas Commission on Environmental Quality
TPWD Texas Parks and Wildlife Department
TSS Total Suspended Solids
TSWQS Texas Surface Water Quality Standards
TWDB Texas Water Development Board
TXDOT Texas Department of Transportation
USACE U.S. Army Corps of Engineers
USFWS U.S. Fish and Wildlife Service
USCG U.S. Coast Guard
WMA Wildlife Management Area

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Matagorda Ship Channel Deficiency, Matagorda County, Texas

1.0 Introduction:

This U.S. Army Corps of Engineers (USACE) Draft Environmental Assessment (EA) describes the environmental impacts associated with removing the bottleneck in the Matagorda Ship Channel (MSC) entrance and designating two placement areas (PA) for the beneficial use of dredged material placement. The MSC is a deep-draft navigation channel located on the central Texas coast (Figure 1) and connects the Gulf of Mexico and the Port of Port Lavaca-Point Comfort. The MSC is about 25 miles long and passes through Matagorda Bay, where it intersects the Gulf Intracoastal Waterway (GIWW). The MSC entrance cuts through the Matagorda Peninsula (Figure 2) for approximately 1 mile and is currently maintained to a depth of -40 feet Mean Low Low Water (MLLW). The distance between the jetties on the Gulf of Mexico side is 2,000 feet. In the landcut, the channel narrows to 950 feet (referred to as the bottleneck), greatly focusing the flow and increasing the current velocity in this area and on the Matagorda Bay side.

1.1 Purpose and Need:

The purpose of the project is to improve navigation safety on the MSC and reduce channel scouring. The project is needed to correct a deficiency in the original project's design. In the land cut, the channel narrows from 2,000 feet to 950 feet (referred to as the bottleneck), which constricts the flow and increases current velocity that lead to channel scouring. Navigation safety is hampered by the effect of the tidal current velocities on the pilots' control of ships.

1.2 Proposed Action: Alternative 3 Bottleneck Removal, Beach Restoration, and Sundown Island Expansion.

The plan includes removing the existing rock dike on both sides of the channel and reusing the stone to construct a new 2,800-foot dike on the west bank and 3,800-foot dike on the east bank of the MSC (Figure 3). A barge canal would be mechanically dredged to a depth of -14 MLLW from the bay side and material would be placed in the permanent placement area behind the new dikes and in the temporary PA to be hydraulically dredged later. A 3-foot blanket of stone would be placed for armoring the new channel slopes from elevation +4.0 to -17 ft. MLLW. The bottleneck between the jetties would be removed. Dredging would be performed using a hydraulic cutterhead dredge to a depth of -40 feet MLLW. Approximately 2,454,000 cubic yards (cy) would be dredged on the west channel side and placed in a 344-acre PA (Figure 4). The material would be discharged in the surf zone adjacent to the west jetty for beach restoration. Approximately 2,454,000 cy would be dredged on the eastern channel side; half would be placed in the in the surf zone adjacent to the west jetty. The other half would be placed adjacent to Sundown Island on the northwestern side creating a 51-acre island expansion with a 73-acre water bottom footprint. (Figure 5). Three areas of existing large jetty stone, 1,950 linear feet (1.4 acres) would be removed and reused for construction of the flare on the bay side. The flare extensions from the foreshore dikes are approximately 850 feet on the west side and 860 feet on the east side. Under the Proposed Action, the water velocity would be reduced, navigation would be safer and vessels would no longer need to wait, and channel scouring would be reduced. Thus, the Proposed Action would provide for more efficient movement of vessels transporting commodities through the MSC. There are several aids to navigation that may require relocation in order to implement

the Proposed Action. These include a light near Channel Station 0+000 and lighted buoys near Channel Station 3+800.

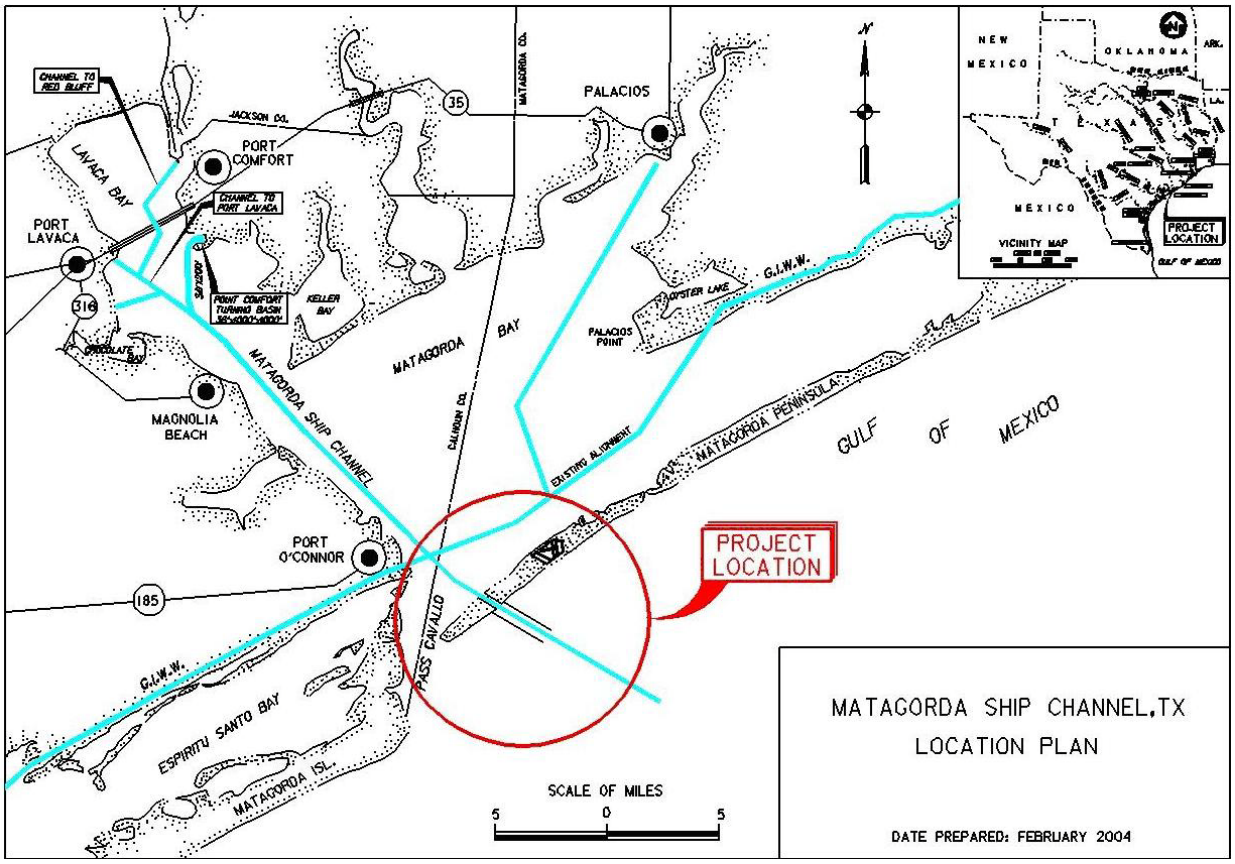

Figure 1: Location of the Matagorda Ship Channel Entrance Channel.

1.3 Project Background and Authority:

Construction of the MSC entrance began in 1963, when a land cut was dredged through the Matagorda Peninsula. A pair of jetties protects the ships and the channel from the Gulf of Mexico side currents. While the distance between the Gulf jetties is 2,000 feet, the land cut has a minimum width of 950 feet. The Entrance Channel in the Gulf is maintained at –40 MLLW plus 3 feet of advanced maintenance depth and 2 feet of over depth and 10 to 1 side slopes. The narrow landform area of the MSC Entrance Channel, termed the “bottleneck", constricts the flow and increases current velocity. Navigation safety is hampered by the effect of the tidal current velocities on the pilots' control of ships. The high currents in the channel make it difficult to overcome the cross current effect on the vessels navigating the channel. These currents have caused severe scouring and created difficulty for the users navigating the channel.

Figure 2. View of Matagorda Ship Channel Entrance and Sundown Island.

Navigation is further altered by crosscurrents passing between Matagorda Peninsula and Sundown Island. Sundown Island is a designated PA used for Matagorda Ship Channel (PA3) and is managed by the National Audubon Society's Texas Coastal Sanctuaries program. Sundown Island is the largest bird sanctuary island along the Gulf Coast and hosts substantial numbers of nesting brown pelicans and other birds.

Dredged material banks placed near the mouth of the MSC Entrance Channel on the bay side were designed to mitigate the effects of these crosscurrents. When the banks were lost to erosion, a replacement dike was constructed to reduce the cross-current. While the magnitude of these cross currents is not excessive, the varying lateral forces on a ship create a challenge for navigation because of their variation with tide and wind.

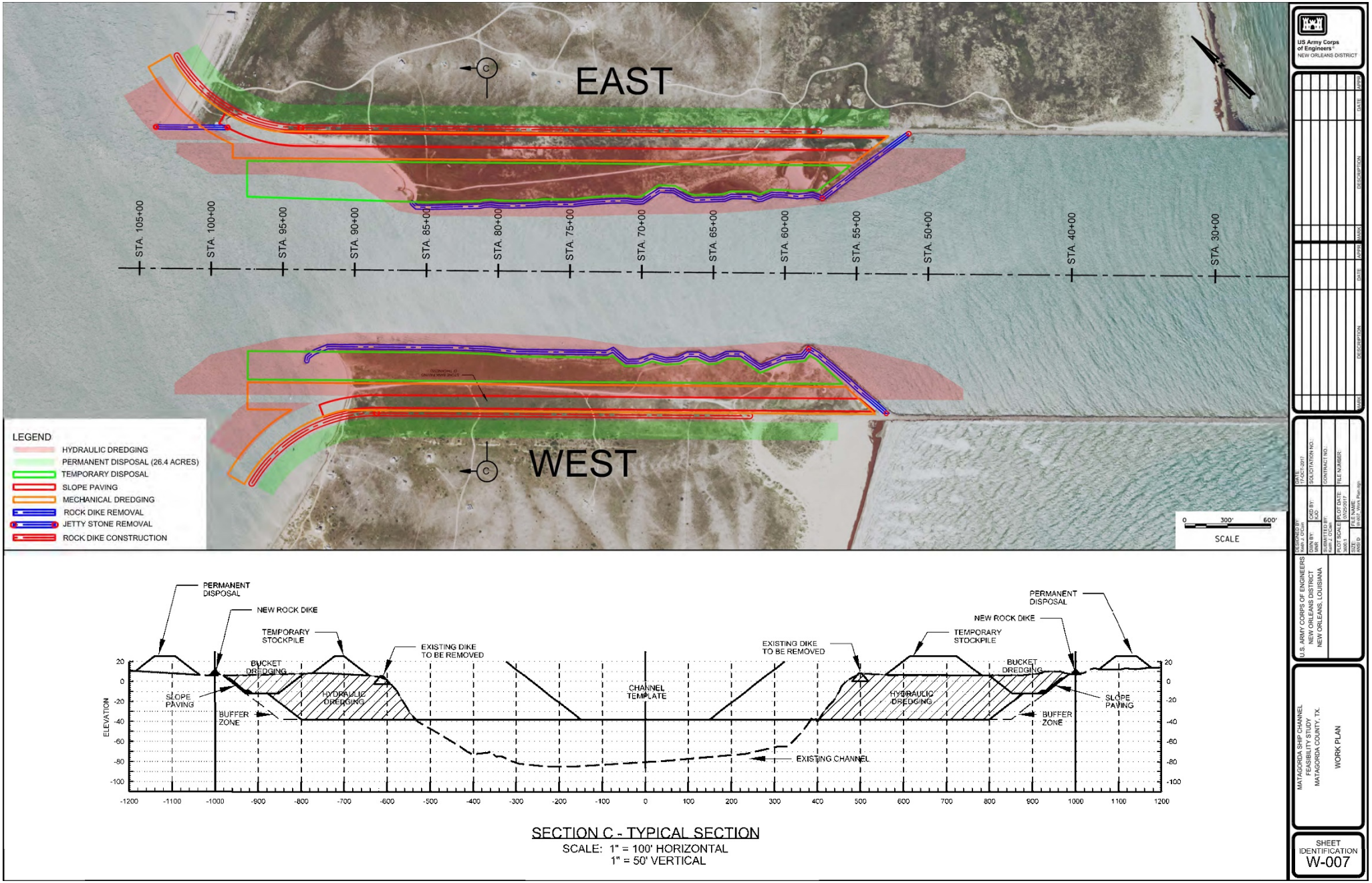

Figure 3 - Plan for Removal of Bottleneck

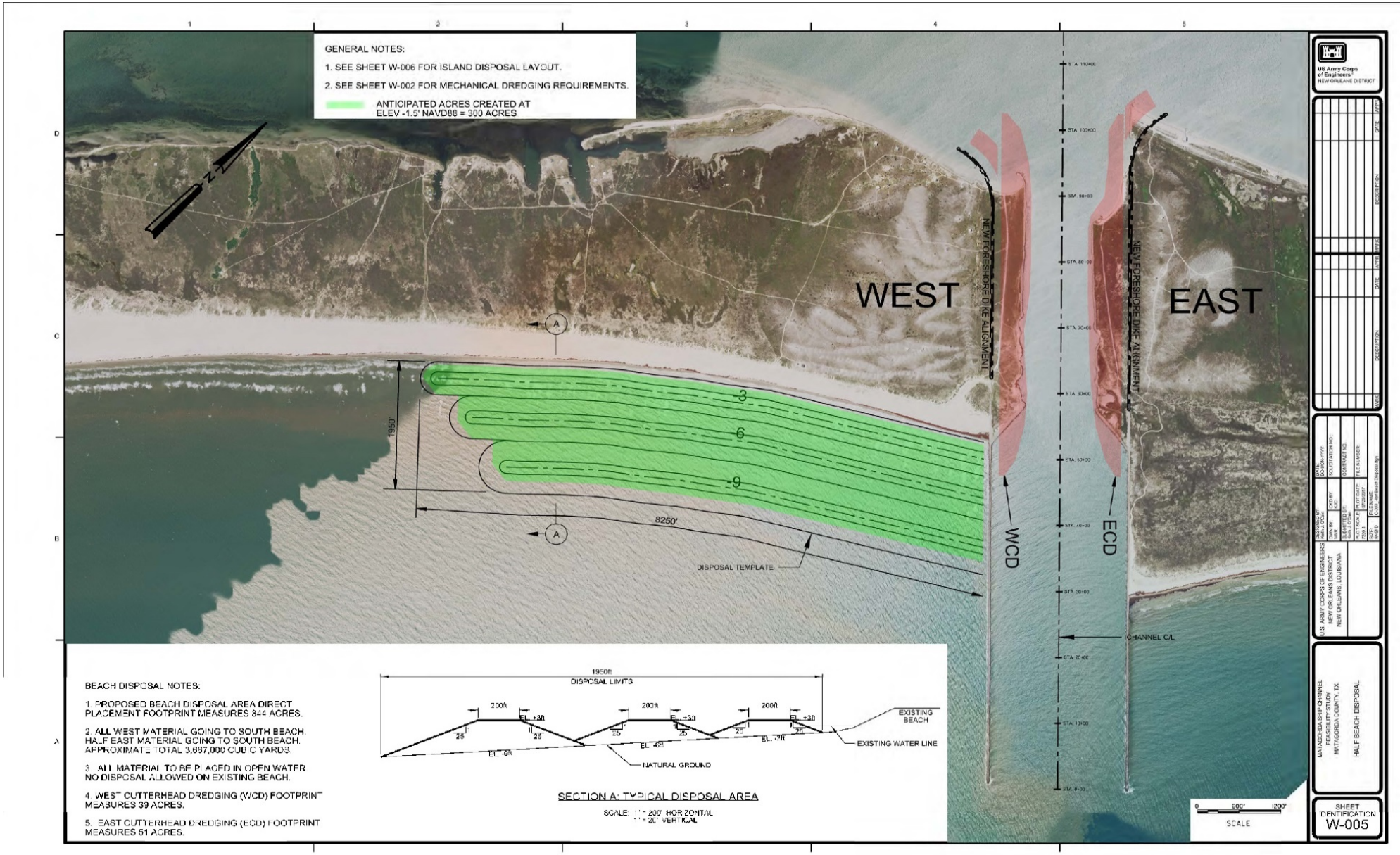

Figure 4. Beach Restoration Placement Area

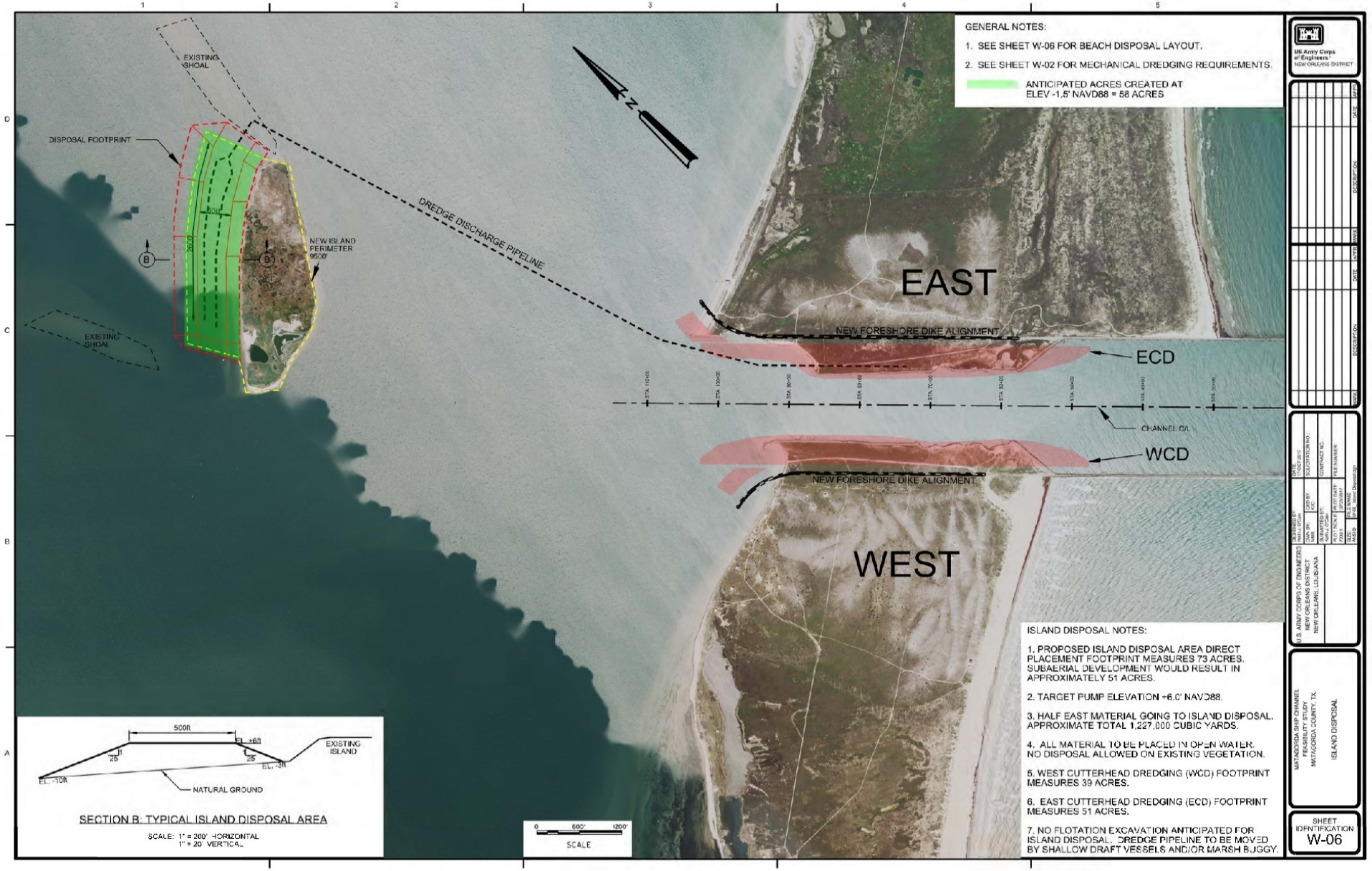

Figure 5. Sundown Island 73-acre Placement Area

The original design of the entrance channel called for dual parallel jetties to be spaced 2,000 feet apart. It is unknown why the bottleneck shape was implemented; however, this constriction decreases the inlet cross-sectional area and increases the current velocity to values beyond those estimated in the physical model causing a design deficiency. The project is deficient because the channel is frequently unusable for its authorized purpose of navigation. High longitudinal currents in the channel and bayside cross-currents create conditions that prevent the safe transit by ship, as navigation control is impossible under the effect of these flows. The risk is so severe that ships are held for long periods of time, waiting for safe transit conditions. The high velocity conditions are design-related, as assumptions made during design proved to be incorrect and project features designed on the basis of those assumptions are not performing correctly.

The RHA of July 3, 1958, as described in House Document 388, 84th Congress, second session, authorized the construction of a deep-draft navigation channel from the Gulf of Mexico through Pass Cavallo, 38 feet deep (which is equal to -40 MLLW), 300 feet wide and about 6 miles long; an inner channel 36 feet deep, 200 feet wide and about 22 miles long across Matagorda and Lavaca Bay, a turning basin at Point Comfort, 36 feet deep and 1,000 feet square; and dual jetties at the channel entrance (the dimension of the present day channel). During preconstruction project design, hydraulic modeling indicated the location of the entrance channel should be moved from Pass Cavallo to a man-made cut across Matagorda Peninsula. The relocated entrance channel would provide a shorter and straighter channel, shorter jetties, a short length of channel in which current velocities would be relatively high, and the probability that periodic maintenance requirements would be reduced.

1.4 Prior NEPA Documents: A Final Environmental Impact Statement (FEIS), titled "Proposed Matagorda Ship Channel Improvement Project Calhoun and Matagorda Counties, Texas" dated July 2009, was prepared for the Calhoun Port Authority's Section 10/404 Regulatory Permit SWG-2006-00092.

A FEIS titled "Matagorda Ship Channel, Ocean Dredged Material Disposal Site Designation" was prepared and dated July 1990.

A FEIS titled "Maintenance Dredging Matagorda Ship Channel, Texas" was prepared with a Statement of Findings dated March 15, 1975.

1.5 NEPA Scoping. Public concerns regarding dredging projects commonly include (1) use of the dredged material for beneficial use, (2) affects to recreation and water quality, (3) the protection of environmental resources, and (4) maintaining safe navigable channels for commerce and trade. Throughout the planning and development of the proposed project, public views and concerns have been considered and are reflected in this EA document. The main project objectives, evaluating impacts of various alternatives and identifying potential beneficial PAs, have been planned in a socially and environmentally beneficial manner. The EA will go out for a 30-day public review period allowing agencies and the public the opportunity to provide comments on the project.

2.0 ALTERNATIVES CONSIDERED

Both non-structural and structural alternatives were formulated and evaluated to identify the Recommended Plan in accordance with the following planning objectives and constraints:

Planning Objective:
Identify a safe, cost effective, environmentally acceptable corrective action to address a design deficiency on the MSC entrance channel, by reducing the currents in the entrance channel, and the cross currents at the intersection of Matagorda Bay to allow for safe navigation of ships, and reduce channel scouring.

Planning Constraints:

- The study process and plans must comply with Federal and State laws and policies;
- Placement of dredged material should not contribute significantly to the closure of Pass Cavallo;
- Enlargement of Sundown Island should not increase shoaling in the alternate route of the Gulf Intracoastal Waterway;
- Material used for beach restoration or enlargement of Sundown Island should not re-enter the MSC;
- Fish and wildlife habitat affected by a project should be minimized as much as possible and preserved, if possible.

During this project deficiency study, the project team relied heavily on the large body of work previously completed to address the navigation problem. Based upon these earlier studies, the following project alternatives, including the No-Action Alternative, were considered for addressing project need and planning objectives:

1. No-Action Alternative (i.e. Future Without-Project Condition)
2. Non-Structural Alternatives (same as No Action Alternative)
3. Structural Alternatives 2 and 3

The No-Action Alternative is synonymous with the Future Without-Project Condition and is developed for comparison with all other alternatives. For the structural plans, a variety of dredged material placement alternatives were developed, evaluated and screened. A discussion of each alternative is presented in more detail in the following sections.

2.1 No-Action Alternative

Alternative 1 the No-Action Alternative is not removing the bottleneck in the MSC and continue to have unsafe navigation conditions in the MSC. High longitudinal currents in the channel and bayside cross-currents create conditions that prevent the safe transit by ship, as navigation control is impossible under the effect of these flows. The risk is so severe that ships are held for long periods of time, waiting for safe transit conditions. Maintenance of the entrance channel between the jetties would be discharged in the offshore disposal site in accordance with the FEIS titled “Maintenance Dredging Matagorda Ship Channel, Texas” and FEIS titled “Matagorda Ship Channel, Ocean Dredged Material Disposal Site Designation”.

2.2 Non-Structural Alternatives

Waiting for safe transit conditions is the only viable non-structural alternative. This alternative is already in use as the No-Action Alternative.

2.3 Structural Alternatives

As documented in the 2006 report by the USACE Engineering Research and Development Center (ERDC), three alternatives were evaluated to assess relative performance for reducing the current velocity through the MSC entrance (Figure 6). According to ERDC's study, Alt. 3, which involves

removing both bottlenecks and removing material to flare the Matagorda Bay entrance would reduce velocities and produce the most uniform flow with the smallest current magnitude across the bay entrance. Therefore, ERDC Alt. 3, consisting of bottleneck removal with flaring the Matagorda Bay side design, was selected as the basic structural alternative for the Proposed Action.

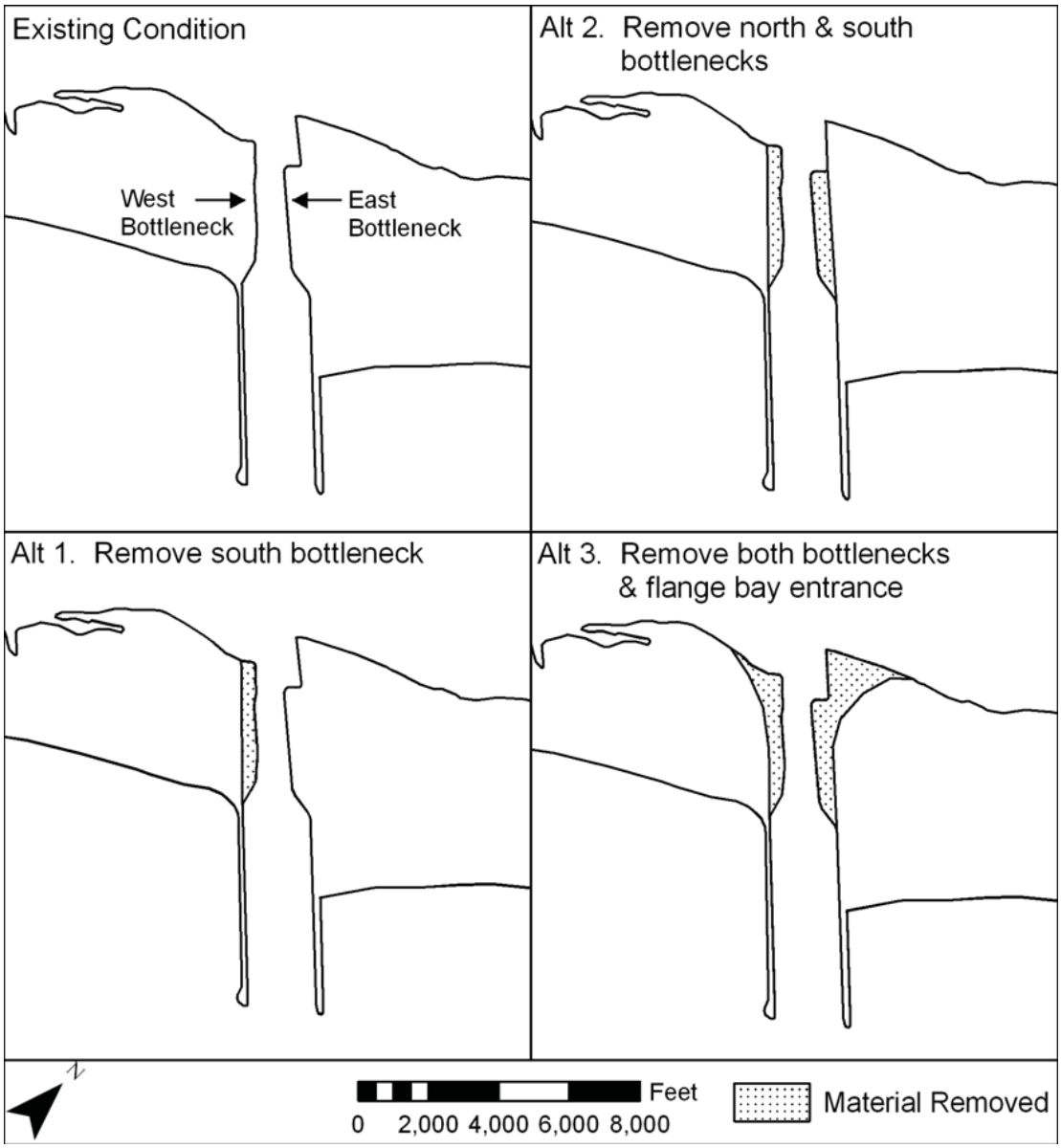

Figure 6. Jetty stability alternatives evaluated in ERDC/TR-06-7

2.4 Dredged Material Placement Alternatives

Several dredged material placement alternatives were evaluated in the 2011 ERDC report titled, "Analysis of Dredged Material Placement Alternatives for Bottleneck Removal, Matagorda Ship Channel, Texas." Alternatives for placing the material removed from the bottleneck on Sundown Island and/or adjacent beaches in varying combinations were considered and modeled for their effects on current magnitudes and sedimentation patterns. The beach and Sundown Island PAs were recommended for use in that report and were used as alternative PAs in this EA.

Another relevant report titled, “Sundown Shoreline Protection and Restoration Project Conceptual Design Alternatives Analysis" (Atkins, 2014) was considered for potential dredged material placement on Sundown Island. The Atkins report determined that the first and second priority areas for beach restoration from the perspective of Audubon Texas are shown in Figure 7.

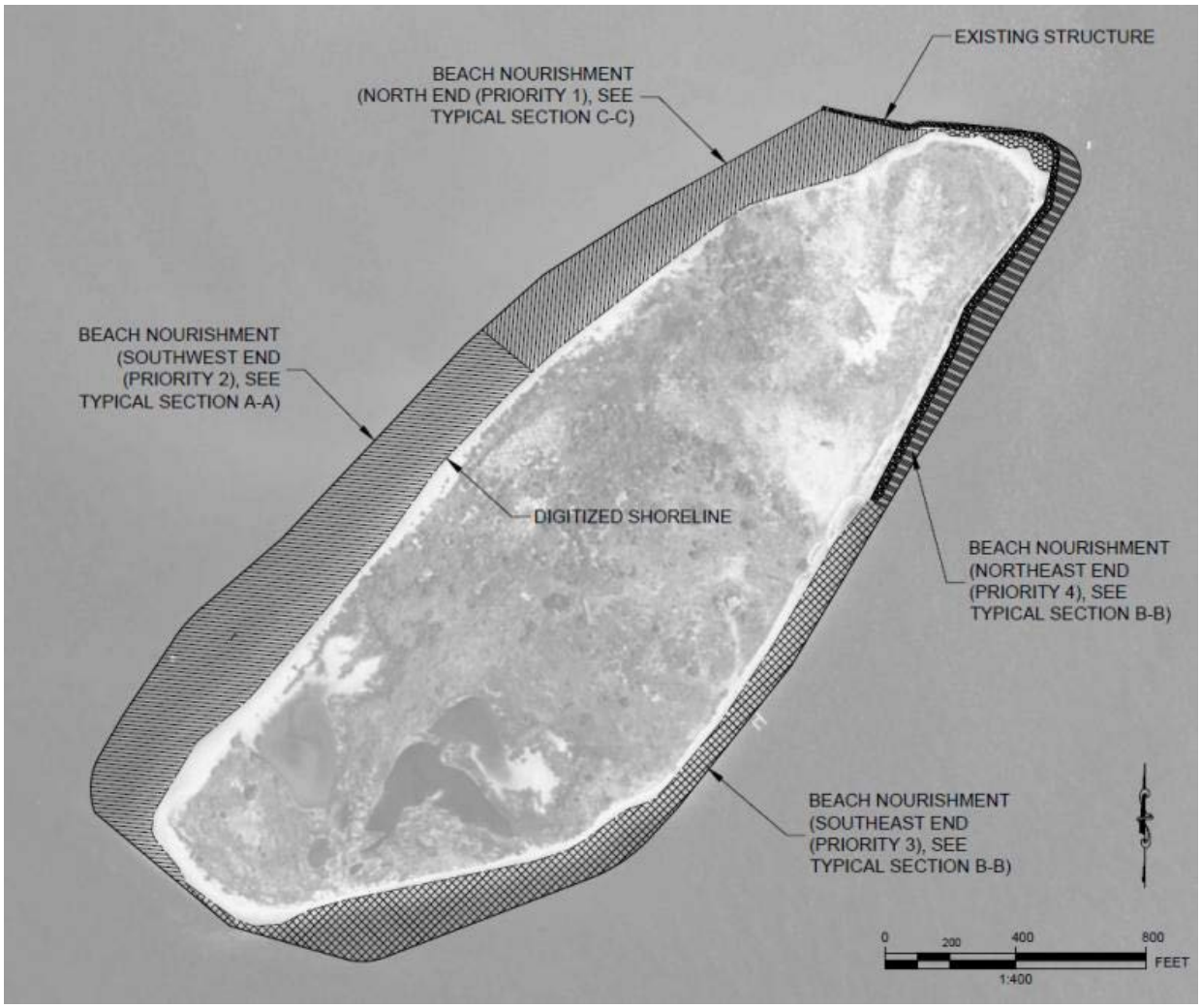

Figure 7. Audubon Texas beach nourishment conceptual plan view and priority areas on Sundown Island.

A reverse triangle and circular dome placement options were submitted by the Galveston District and evaluated by the MVN and the ERDC Team. The reverse triangle and circular dome placement options were removed from further consideration because waves will approach at an odd angle and break more rapidly to move the sediment (longshore and cross-shore) than along the normal east-west stretched shoreline. The priority 1 and 2 beach placement design in the Atkins report is considered better for longevity.

2.4.1. Alternative 2 Bottleneck Removal with 100% Placement on the Beach (Figure 8): Approximately 5 million cubic yards of material would be placed in the surf zone south of the west jetty for beach restoration resulting in the creation of 498 acres and 29.92 AAHUs of beach habitat. As the material is discharged, it would be reworked by wave action, and the deposited sand would

migrate along the seashore with the littoral drift. The proposed project would provide the benefit of reducing the recessional trend of the shoreline, thus preserving the beach and its habitat. This area was cut off from long-shore sediment transport when the channel and jetties were constructed.

2.4.2 Alternative 3 Bottleneck Removal with 75% Beach and 25% Sundown Island Placement (Figures 4 and 5): Approximately 3.7 million cy of material would be placed in the surf zone south of the west jetty for beach restoration resulting in the creation of 300 acres and 17.01 AAHUs of beach habitat. As the material is discharged, it would be reworked by wave action, and the deposited sand would migrate along the seashore with the littoral drift. The proposed project would provide the benefit of reducing the recessional trend of the shoreline, thus preserving the beach and its habitat. This area was cut off from long-shore sediment transport when the channel and jetties were constructed.

The placement of approx. 1.2 million cy of dredged material would directly create a 51-acre subaerial island adjacent to Sundown Island with a 73-acre underwater footprint. The initial dredged material fill height would be placed to 6 feet MLLW. The WVA Model projected that the 51-acre island feature would provide 30.58 AAHUs over the 50-year Native salt marsh species on Sundown Island are expected to colonize the area within 3 growing seasons. This alternative would provide a total of 47.59 AAHUs with both the beach and island features.

The final array of Alternatives presented in this Environmental Assessment are the No-Action, Alternative 2, and Alternative 3 (Proposed Action). The impacts analysis of these three alternatives will be discussed in Chapter 4.

3.0 AFFECTED ENVIRONMENT

3.0.1 Environmental Setting

Matagorda Bay is a large, shallow body of water generally paralleling the coastline in the upper Coastal Bend region of Texas and is separated from the Gulf of Mexico by Matagorda Peninsula. The bay system includes Lavaca Bay to the northwest, Carancahua and Tres Palacios Bays to the north, and a series of smaller secondary and tertiary bays, bayous, and marshes around its periphery. Geographically, the study area is predominantly surrounded by low-lying, undeveloped alluvial lands of the coastal plain, which are comprised of wetland and prairie vegetation typical of the upper Gulf Coast Region of Texas.

Sundown Island is in Matagorda Bay approximately 1.3 miles west of the Matagorda Peninsula (Figures 2 and 5). The 87-acre island is north of the Matagorda Ship Channel and southeast of the Gulf Intracoastal Waterway. The island is leased from the Texas General Land Office (GLO) and managed by the National Audubon Society‘s Texas Coastal Sanctuaries program. In 2014, Sundown Island hosted 16,070 breeding pairs of birds, representing 18 species, including many of conservation concern (e.g., Royal and Sandwich Terns, Black Skimmers, Reddish Egrets, and Roseate Spoonbills) (Wilkinson, 2014).

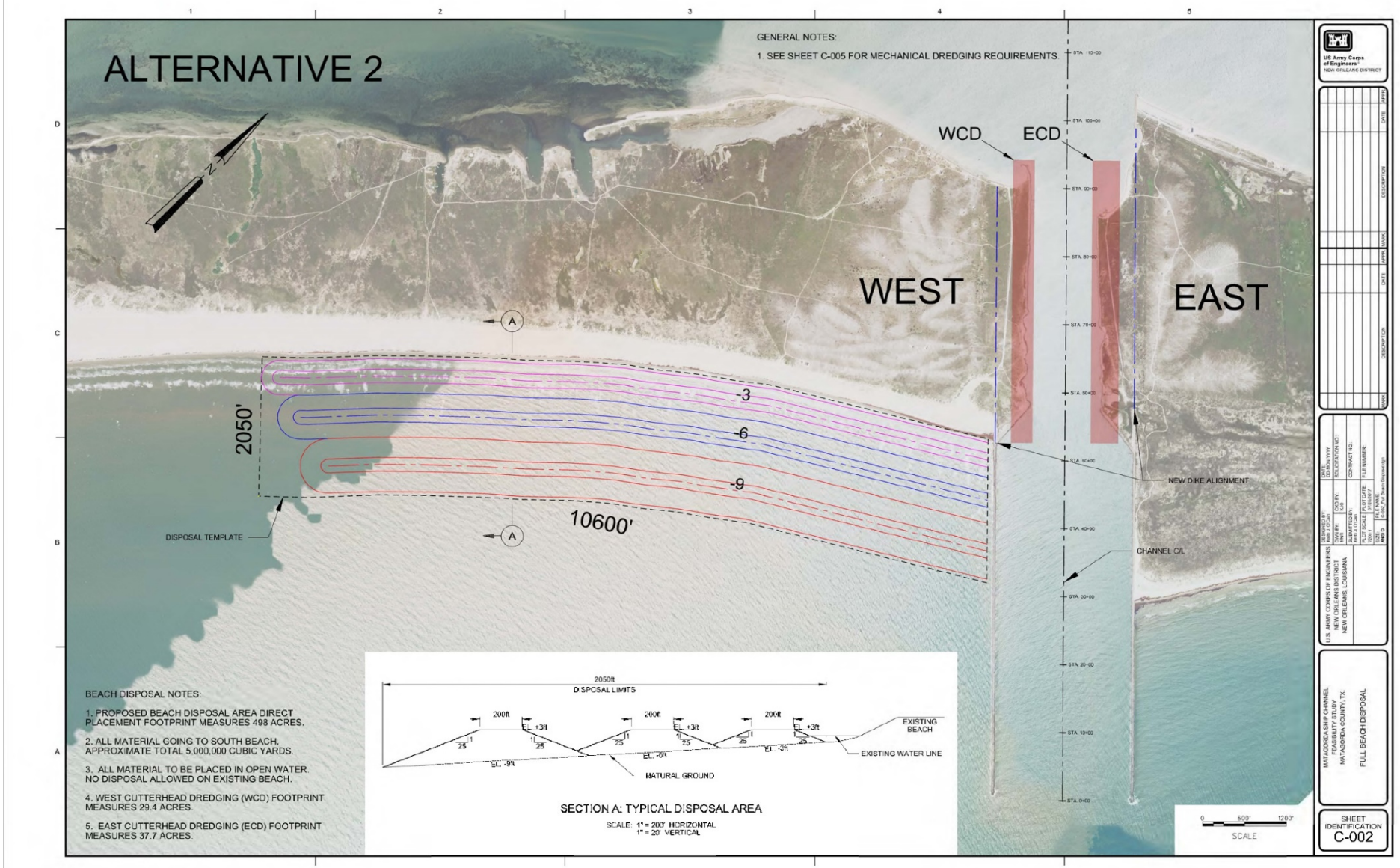

Figure 8. Alternative 2 Bottleneck Removal with flare and 498 acres of Beach Placement Area

Pass Cavallo, a 1.8 mile wide natural opening between Matagorda Peninsula and Matagorda Island, and the entrance channel across Matagorda Peninsula are the primary outlets into the Gulf. Pass Cavallo serves as the most direct tidal pass between Espiritu Santo Bay and the Gulf. Pass Cavallo, Matagorda Entrance Channel, and the pass between Sand and Indian Points are some of the important passes maintaining water circulation and migration of fish and crustaceans. The Lavaca River and its tributary, the Navidad River, and a series of smaller rivers and creeks drain into the bay system. The mean natural depth of Matagorda Bay is about 11 to 12 feet. The mean diurnal tide in Matagorda and connecting bays is about 0.7 feet.

3.0.2 Climate

The climate of the study area is humid subtropical with warm to hot summers and mild winters. The average annual high temperature is about 76 degrees Fahrenheit, with an average summer high of about 88 degrees for the months of June, July, and August, and an average annual winter low temperature of 66 degrees. Average annual precipitation is 42.8 inches with average monthly precipitation varying from 4.7 inches in September to 2.4 inches in April (U.S. Climate Data, 2017). Severe weather occurs periodically in the form of thunderstorms, tornadoes, tropical storms and hurricanes.

3.0.3 Geology

Matagorda Peninsula is a sand barrier feature separating the Gulf of Mexico from the Matagorda Bay complex. The peninsula is composed of fine sand about 50 feet thick which rests upon the red Beaumont Clay formation of the Pleistocene Age. Soil borings of the bottleneck area indicated the sands to be fine to very fine beach sands, similar to those encountered and tested along the Texas coastline from Galveston to Port Mansfield (USACE, 2017). Only the top few feet of the sand barrier are above sea level. The red Beaumont Clay varies from a plastic to stiff clay and contains occasional layers of sand.

3.1 IMPORTANT RESOURCES

The important resources described in this section are recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Important resources within the proposed project area include water exchange, current velocity, salinity, sea level change, coastal barrier resources, wetland, aquatic resources, fisheries and essential fish habitat, wildlife, aquatic nuisance species, threatened and endangered species, water quality, air quality, noise, sediment quality, recreational resources, cultural resources, socio-economics, and hazardous, toxic, and radioactive wastes. The following resources have been considered and found to not be affected: aesthetics, environmental justice, and prime and unique farmland soils. Because the project is located on a remote barrier island it was determined there would be no direct disproportionately high or adverse human health or environmental effects on any minority and/or low-income populations as per E.O. 12898. No, prime and unique farmland soils, as defined by the Farmland Protection Policy Act, would be affected by the proposed project. The proposed footprint of the bottleneck removal area does not include land or soil suitable for agricultural activities. Based on the Soil Survey of Matagorda County, Texas (Soil Conservation Service, 1991), soils within the bottleneck are Mustang fine sand, Galveston fine sand, and Beaches sand, none are considered prime farmlands. Cumulative impacts

will be evaluated in a subsequent section at the end of this document. Finally, the proposed action would cause no adverse impact to the area's floodplain, a resource requiring consideration per Executive Order 1988 (Floodplain Management).

3.1.1 Water Exchange (Tidal Prism)

The MSC discharges are greater in the winter than in the summer, mainly because the stronger wind in the winter drives more flow in and out of the bay. During January 2004, the mean discharge for MSC at flood, MSC at ebb, Pass Cavallo at flood and Pass Cavallo at ebb could be 225k, 211k, 86k and 79k cfs, respectively. During July 2004, the mean discharge for MSC at flood, MSC at ebb, Pass Cavallo at flood and Pass Cavallo at ebb could be 192k, 202k, 74k and 71k cfs, respectively (ERDC, 2006).

Pass Cavallo was the only permanent inlet connecting the Matagorda Bay and the Gulf of Mexico before the MSC was opened in 1963. The width of Pass Cavallo decreased from more than 11,500 ft at its throat before 1965 to about 2,200 ft in 2003. Pass Cavallo has achieved a new state of dynamic equilibrium caused by reduction of its tidal prism through flow capture by the MSC and by possible depletion of the ebb-tidal shoal that was abandoned in response to the decrease in tidal prism.

3.1.2 Current Velocity

The MSC design deficiency causes increased current velocity which results in scouring and loss of vessel control. Two different hydrological scenarios, January 2004 and July –August 2004, were selected to simulate the existing condition for speeds developed at five MSC entrance locations (a-f) under flood and ebb condition (Figure 9) (ERDC, 2006).

January 2004 Scenario

According to the "Matagorda Ship Channel, Texas: Jetty Stability Study," the maximum flood current at Stations a, b, c, d, e and f could be 3.8, 4.3, 5.1, 4.1, 4.1 and 1.4 knots, respectively. The maximum ebb current at Stations a, b, c, d, e and f could be 3.4, 4.6, 5.2, 4.4, 4.1 and 3.1 knots, respectively.

July-August 2004 Scenario

The maximum flood current at Stations a, b, c, d, e and f could be 3.6, 4.0, 4.8, 3.9, 3.9 and 1.3 knots, respectively. The maximum ebb current at Stations a, b, c, d, e and f could be 3.1, 4.2, 4.8, 4.0, 3.7 and 2.8 knots, respectively.

3.1.3 Relative Sea Level Change

The National Ocean Services (NOS) reports mean sea level trends for Rockport, TX (NOS station 8774770, approximately 45 miles southwest of the MSC), and Freeport, TX (NOS station 8772440, approximately 80 miles northeast of the MSC). Both stations exhibit a long-term trend of sea-level rise. Between 1948 and 1999, the mean sea-level trends at Rockport (1948-1999) and Freeport (1954-1999) were relative sea-level rises of 1.51 ft/century and 1.93 ft/century, respectively (ERDC, 2006).

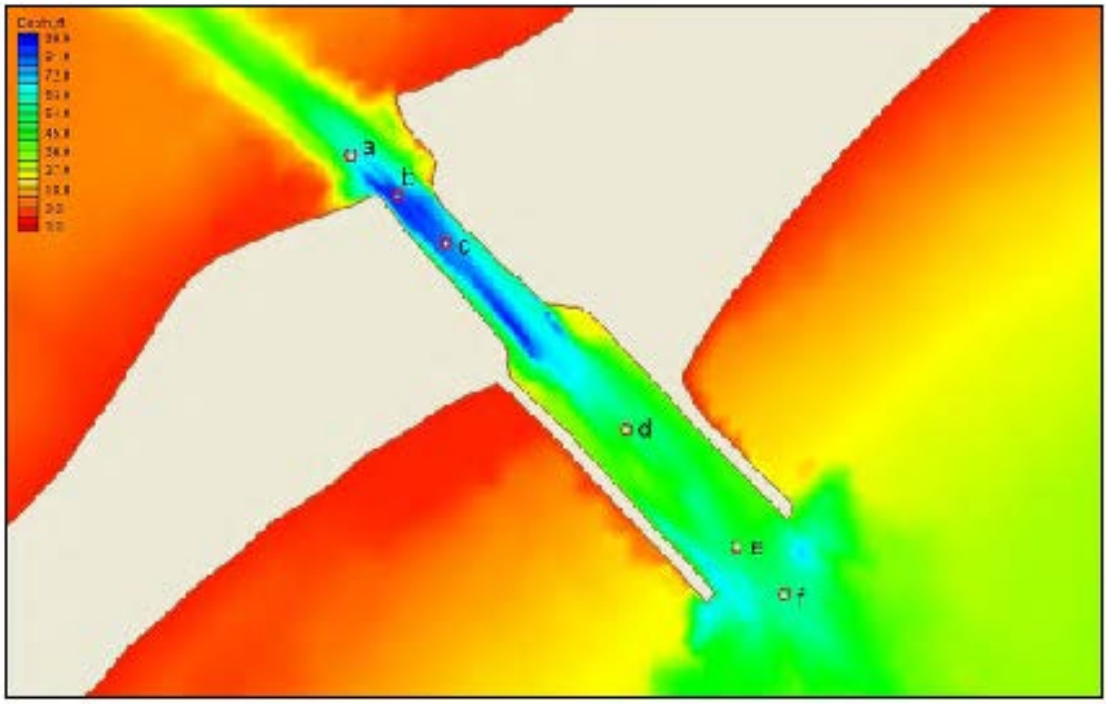

Figure 9. Locations of Comparison Stations (a to f)

Although NOS long-term tidal records document relative sea level rise (RSLR), they do not differentiate between rise of the sea and subsidence. Land surface subsidence due to oil and water extraction could cause subsidence; however, according to ERDC's report, these were not considered to be a primary factor for relative sea-level changes in the vicinity of the MSC (ERDC, 2006). An estimate shoreline recession losses due to RSLR for Matagorda Peninsula over time are provided in Appendix A.

3.1.4 Salinity

The annual average salinity for the existing configuration for the low, medium, and high flow years are presented in Appendix A.

3.1.5 Coastal Barrier Resources

The Coastal Barrier Resources Act (CBRA) of 1982 established the Coastal Barrier Resources System (CBRS) to minimize the loss of human life, wasteful Federal expenditures, and damage to fish, wildlife, and other natural resources associated with coastal barriers. The Coast Barrier Improvement Act of 1990 was enacted to reauthorize the CBRA of 1982. The act defines coastal barriers as "bay barriers, barrier islands, and other geological features composed of sediment that protect landward aquatic habitats from direct wind and waves." As part of the program, the Federal government refrains from spending money that encourages development on designated undeveloped coastal barriers. The Proposed Action includes features that are located within portions of CBRS units T-07 and T-07P Appendix F. The entire bottleneck on the Matagorda Peninsula and the beach beneficial use PA is located in CBRS unit T-07. The entire PA adjacent to Sundown Island is located in CBRS unit T-07P. A federal expenditure is allowable within the CBRS, if it meets any of the exceptions (16 U.S.C.

§ 3505(a)(1)-(5)). The Proposed Action meets the following 6(a)(2) exception:

- The maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant System unit or portion of the System unit was included within the CBRS.

The Proposed Action also satisfies the three purposes of the CBRA; which are to minimize the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife and other natural resources associated with coastal barriers. The proposed project would provide a safer navigation channel, reduce potential vessel collisions and oil spills, and benefit wildlife habitat. The proposed project is not intended to and will not encourage development in the coastal zone.

The MSC was authorized by the River and Harbor Act of 1958. The USACE has determined that the proposed MSC Deficiency Proposed Action meets the above referenced exception and is consistent with the CBRA. The USACE continues to coordinate with USFWS and will consider USFWS comments and take all appropriate steps necessary to assure CBRA compliance.

The project area is located in the Gulf Coast Prairies and Marshes Region. The existing Matagorda Ship Channel banklines are located in an area that was previously disturbed when the channel was constructed, but has since re-vegetated with dune and saline marsh plant species. The barrier island dune complexes are of two types, primary and secondary, each of which supports a unique plant community. The primary dunes are taller and offer more protection from wind and hurricane storm surge. Typical plant species of the primary dunes fronting the Gulf include sea oats (*Uniola paniculata*), bitter panicum *(Panicum amarum),* Gulf croton *(Croton punctatus),* beach morning glory *(Ipomea pes-caprae),* and fiddleleaf morning glory *(Ipomea stolonifera).*

Secondary dune species include marshhay cordgrass *(Spartina patens),* seashore dropseed (*Sporobolus virginicus*), seacoast bluestem (*Schizachyrium littorale*), seashore saltgrass (*Distichlis spicata*), pennywort *(Hydrocotyle bonariensis),* and partridge pea *(Chamaecrista fasciculata).*

Barrier shorelines and associated back marsh areas are dynamic areas with considerable spatial and temporal variation in plant species distribution. Vegetation is one of the most important factors in trapping and retaining sediments in the barrier shoreline system. The zones, or communities, of barrier island vegetation, and the extent of their diversity, are related to elevation, degree of exposure to salt spray, and storm events that cause overwash. Plant colonies trap and retain suspended sediment (those essential for platform accretion and dune formation), and protect newly deposited material from erosion. Vegetation also contributes to soil structure, nutrients, and trophic level food supply through their decomposition and subsequent accumulation of organic matter (detrital material). In addition to the structural and nourishment benefits, vegetation also provides habitat function and serves as an indirect indicator of wildlife and fisheries species vigor and condition.

Some areas of saline marsh are located on Matagorda Island. Salt marsh communities (those that are common and fundamental to barrier islands) are characterized by some degree of tidal inundation, waterlogged soils, and salt-tolerant vegetation. These communities develop in the lee of the barrier

islands, providing lateral support to the beach, and essential nursery grounds for finfish and shellfish.

In the Matagorda Bay area, low salt marsh is typically dominated by smooth cordgrass (*Spartina alterniflora*) and common species such as saltgrass (*Distichlis spicata*), glasswort (*Salicornia* spp.), saltwort (*Batis maritima*), saltmarsh aster (*Symphyotrichum tenuifolium*), and mangrove *(Avicennia germinans)*. High salt marshes may include more halophytic species such as shoregrass (*Monanthochloe littoralis*), annual seepweed (*Sueda linearis*), sea ox-eye daisy (*Borrichia frutescens*), and seapurslane (*Sesuvium portulacastrum*).

Sundown Island is north of the MSC and has similar vegetation as Matagorda Island with some common woody species in the scrub shrub wetland areas such as big-leaf sumpweed (*Iva frutescens*) and eastern false-willow (*Baccharis halimifolia*).

3.1.6 Aquatic Resources

Open-water habitats support communities of benthic organisms and corresponding fisheries populations. Phytoplankton (microscopic algae) are the major primary producers (plant life) in the open-bay, taking up carbon through photosynthesis and nutrients for growth. Phytoplankton are the base of the food chain and are fed upon by zooplankton (small crustaceans), fish, and benthic consumers. Zooplankton are most abundant during the spring, with the minimum occurring in the fall.

Nekton assemblages (organisms that swim freely in the water column) consist mainly of secondary consumers feeding on zooplankton or juvenile and smaller nekton. The Matagorda Bay system supports a diverse nekton population including fish, shrimp, and crabs. Some of these species are resident species, spending their entire life in the bay, whereas others are migrant species spending only a portion of their life cycle in the estuary (Armstrong et al., 1987).

3.1.7 Wildlife

Birds occasionally found in the area include a variety of waterfowl, shorebirds and wading birds, a variety of gulls and terns (*Laridae* family), and herons and egrets (*Ardeidae* family). Other birds that may be found in the area include the brown pelican (*Pelecanus occidentalis)*, white-faced ibis (*Plegadis chihi*), black rail (*Laterallus jamaicensis)*, red-winged blackbird (*Agelaius phoeniceus*), and the marsh hawk (*Circus cyaneus*) (The Nature Conservancy of Texas, 2009). Piping plover (*Charadrius melodus*) are also known to winter along the Texas Gulf Coast on beaches and bayside mud or sand flats.

In 2014, Sundown Island hosted 16,070 breeding pairs of birds, representing 18 species, including many of conservation concern (e.g., royal and sandwich terns, black skimmers, reddish egrets, and roseate spoonbills) (Wilkinson, 2014). Sundown Island was identified as 1 of 15 priority nesting sites for the reddish egret by the Gulf Coast Joint Venture (Vermillion and Wilson, 2009).

Mammals potentially found within terrestrial areas in and adjacent to the project area include the hispid cotton rat (*Siomodon hispidus*), the eastern cottontail (*Svlvilaous floridanus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and white-tailed deer (*Odocoileus virginianus*). The common bottlenose dolphin (*Tursiops truncatus)* is the most abundant, year-round marine mammal inhabiting the waters of project area.

3.1.8 Fisheries and Essential Fish Habitat

In the Gulf of Mexico, essential fish habitat (EFH) consists of those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity of species that are federally managed by the Gulf of Mexico Fishery Management Council (GMFMC) and by the National Marine Fisheries Service (NMFS), pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). By definition, EFH includes those waters and substrate necessary for fish and shellfish spawning, breeding, feeding, and growth through maturity. "Waters" include aquatic areas and associated physical, chemical, and biological properties currently or historically utilized by the fisheries. "Substrate" includes any sediment, hard bottom, structures underlying the waters, and associated biological communities. Those activities potentially impacting EFH may result in either direct (e.g., physical disruption) or indirect (e.g., loss of prey species) effects, and can be site-specific, habitat-wide, cumulative, and/or synergistic effects.

The project area is located in Ecoregion 5 and includes EFH designated by the GMFMC for red drum (*Sciaenops ocellatus*), white shrimp (*Litopenaeus setiferus)*, brown shrimp (*Farfantepenaeus aztecus,)* and Spanish mackerel (*Scomberomorus maculatus*). Details regarding specific habitat requirements for each of these species follow in Table 1. The project area also includes EFH for highly migratory species managed by NMFS including: scalloped hammerhead sharks (*Sphyrna lewini*), blacktip sharks (*Carcharhinus limbatus*), bull sharks (*Carcharhinus leucas*), lemon sharks (*Negaprion brevirostris*), spinner sharks (*Carcharhinus brevipinna*), bonnethead sharks (*Sphyrna tiburo*), Atlantic sharpnose sharks (*Rizoprionodon terraenovae*), and finetooth sharks (*Carcharhinus isodon*). EFH in the project vicinity includes estuarine emergent marsh, estuarine mud, sand and shell substrates, and the estuarine water column.

TABLE 1: Habitat Requirements of Species with EFH in the Project Study Area

Species	Location/Distribution
Red Drum	Red drum commonly occur in all of the Gulf's estuaries, but also occur in a variety of habitats, ranging from depths of about 130 feet offshore to very shallow estuarine waters; the GMRMC considers all estuaries to be EFH for the red drum. Estuaries are important for both habitat requirements and for dependence on prey species which include shrimp, blue crab, striped mullet, and pinfish. Schools are common in the deep Gulf waters, with spawning occurring in deeper water near the mouths of bays and inlets and on the Gulf side of the barrier islands. Red drum are associated with a variety of substrate types including sand, mud, and oyster reefs. (GMFMC 2010).
Brown Shrimp	Brown shrimp are most abundant in central and western Gulf of Mexico and found in estuaries and offshore waters to 360 feet with the post-larval individuals typically occurring within estuaries. Post-larval individuals and juveniles are associated with shallow vegetated habitats, but are also found over silty-sand; non-vegetated mud bottoms are preferred. Adults typically occur outside of bay areas in marine waters extending from mean low tide to the edge of the Continental Shelf and areas associated with silt, sand, and sandy substrates. (GMFMC 2010).
Spanish Mackerel	Pelagic species are found in neritic waters and along coastal areas, inhabiting the estuarine areas; especially higher salinity areas, during seasonal migrations. Spanish mackerel are rare and infrequent inhabitants of Gulf estuaries, where spawning occurs offshore from May to October. Nursery areas are in estuaries and coastal waters year-round. Larvae are found offshore over the inner continental shelf, most commonly in water depths less than 150 feet. Juveniles are found offshore, in beach surf, and occasionally in estuarine habitat; juveniles prefer marine salinity and clean sand substrate. (GMFMC 2010).

White Shrimp	White shrimp are offshore and estuarine dwellers; pelagic or demersal depending on their life stage. Eggs are demersal and larval stages are planktonic, and both occur in nearshore marine waters. Post-larvae become benthic upon reaching the nursery areas of estuaries, seeking shallow water with muddy sand bottoms that are high in organic detritus. Juveniles move from the estuarine areas to coastal waters as they mature. The adults are demersal and generally inhabit nearshore Gulf of Mexico waters in depths less than 100 feet on soft mud or silty bottoms. (GMFMC 2010).
Scalloped Hammerhead Sharks,	Common, large, schooling sharks of warmer waters, migrating seasonally north-south along the eastern coastal and offshore waters of the United States, including the Gulf of Mexico. Neonates may occur in nearshore coastal waters, bays and estuaries of the Gulf of Mexico from Texas to the southern west coast of Florida; Juveniles can be found in coastal areas in the Gulf of Mexico from southern mid-coast of Texas, eastern Louisiana to the southern west coast of Florida and the Florida Keys, and in offshore waters from the mid-coast of Texas to eastern Louisiana. Adults may occur in Coastal areas in the Gulf of Mexico along the southern Texas coast, and eastern Louisiana through the Florida Keys, as well as offshore from southern Texas to eastern Louisiana.
Blacktip Sharks	Blacktips are fast-moving sharks, occurring in shallow waters and offshore surface waters of the continental shelf. Blacktips are viviparous, and young are born in bay systems in late May and early June after a year-long gestation period. The reproductive cycle occurs every 2 years. Juveniles are found in all Texas bay systems in a variety of habitats and shallow coastal waters from the shore to the 82-foot isobath (NMFS, 2006a). They feed mainly on pelagic and benthic fishes, cephalopods and crustaceans, and small rays and sharks (Froese and Pauly, 2012). Juvenile blacktip sharks occur in the Gulf and estuarine portions of the study area and adults in the Gulf portions of the study area.
Bull Sharks	Bull sharks are coastal and freshwater sharks that inhabit shallow waters, especially in bays, estuaries, rivers, and lakes. They frequently move between fresh and brackish water and are capable of covering great distances. Adults are often found near estuaries and freshwater inflows to the sea (Froese and Pauly, 2012). Bull sharks are viviparous, have a gestation period of a little less than 1 year, and it is assumed the reproductive cycle occurs every 2 years. Juveniles are found in waters less than 82 feet deep in shallow coastal waters, inlets, and estuaries (NMFS, 2006a). They feed on bony fishes, sharks, rays, shrimp, crabs, squid, sea urchins, and sea turtles (Froese and Pauly, 2012). Juvenile bull sharks occur in the Gulf and estuarine portions of the study area.
Lemon Sharks	Feeds mainly on fish but also takes crustaceans and mollusks. (Froese and Pauly, 2012). Occurs on continental and insular shelves, frequenting mangrove fringes, coral keys, docks, sand or coral mud bottoms, saline creeks, enclosed bays or sounds, and river mouths. May enter fresh water. Occasionally moves into the open ocean, near or at the surface, apparently for purposes of migration.
Spinner Sharks	Found on the continental and insular shelves from close inshore to offshore. Makes vertical spinning leaps out of the water as a feeding technique in which the sharks spins through a school of small fish with an open mouth and then breaks the surface. Feeds mainly on pelagic bony fishes, also small sharks, cuttlefish, squids, and octopi. Viviparous. Forms schools. Highly migratory off Florida and Louisiana and in the Gulf of Mexico.
Bonnethead Sharks	Bonnethead sharks can be found on sand or mud bottoms in shallow coastal waters. The bonnethead shark is viviparous, reaching sexual maturity at about 30 inches. The pups are born in late summer and early fall, measuring 12 to 13 inches (Froese and Pauly, 2012). Both juveniles and adults inhabit shallow coastal waters up to 82 feet deep, inlets, and estuaries over sand and mud bottoms (Froese and Pauly, 2012; NMFS, 2006a). They feed mainly on small fish, bivalves, crustaceans, and octopi (Froese and Pauly, 2012). Juveniles and adults occur year-round in the Gulf and estuarine portion of the study area.
Atlantic Sharpnose Sharks	Atlantic sharpnose shark inhabits intertidal to deeper waters, often in the surf zone off sandy beaches, bays, estuaries, and river mouths (Froese and Pauly, 2012). They are viviparous, and mating occurs in June, with a gestation period of about a year (NMFS, 2006a). They feed on fish, shrimp, crab, mollusks, and segmented worms (Froese and Pauly, 2012). Juvenile Atlantic sharpnose shark occur in the Gulf and estuarine portions of the study area.

The MSFCMA established procedures for identifying EFH and required interagency coordination to further the conservation of federally managed fisheries. Any Federal agency that authorizes, funds or undertakes, or proposes to authorize, fund, or undertake an activity that could adversely affect EFH is subject to the consultation provisions of the above-mentioned Act. This EA serves to initiate EFH consultation under the MSFCMA.

The Gulf of Mexico and Matagorda Bay also support commercial and recreational fisheries.

Commercially caught finfish include black drum (*Pogonias cromis*), southern flounder (*Paralichthys lethostigma*), striped mullet (*Mugil cephalus*), and sheepshead (*Archosargus probatocephalus*). The main commercially harvested shellfish species in Matagorda Bay are brown shrimp, white shrimp, pink shrimp (*Litopenaeus duorarum*), and blue crabs (*Callinectes sapidus*).

Other commercial and recreational species in the project vicinity may include Atlantic croaker (*Micropogonias undulatus*), spot (*Leiostomus xanthurus*), sea trout (*Cynoscion nebulosus*), and sand trout (*Cynoscion arenerius*). These species are ubiquitous along the Texas coast with seasonal differences in abundance.

The bay system contains important habitat for estuarine fish and crustaceans, including red and black drum, sand trout, spotted seatrout, Atlantic croaker, southern flounder, striped mullet, sheepshead, brown and white shrimp, blue crab, and oyster (*Crassostrea virginica*).

3.1.9 Aquatic Nuisance Species

Ballast water discharged from ships may contribute to the introduction and spread of aquatic nuisance species (ANS) from distant ports of call into U.S. waters. ANS are invasive, non-native or exotic species that may displace native species, degrade native habitats, spread disease, and disrupt human social and economic activities that depend on water resources (U.S. Coast Guard (USCG), 2011a). ANS that are known to occur within the study area that may have been introduced as a result of ballast water discharge or boat hull fouling include the Australian jellyfish (*Phylloriza punctata*), the Pacific white shrimp (*Litopenaeus vannamei*), the white crust tunicate (*Didenum perlicidum*), and sauerkraut grass (*Zoobotryon vertcillatum*).

In response to national concerns, the National Invasive Species Act of 1996 (NISA) was reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA). Initially a voluntary program beginning in 1998, the USCG established a national mandatory ballast water management program in 2004 to comply with the NISA to prevent the introduction of ANS. The implementing regulations for the program may be found at 33 Code of Federal Regulations (CFR) 151 Subparts C and D (USCG, 2011b).

The program applies to all vessels equipped with ballast water tanks and requires mandatory ballast water management plans and practices for all vessels that operate in U.S. waters or are bound for ports or places in the United States. Ballast water management practices may include conducting mid-ocean ballast water exchanges, retaining ballast water onboard, or using an alternative environmentally sound ballast water management method approved by the USCG.

3.1.10 Threatened and Endangered Species

The corps identified the threatened or endangered species in Table 2 as possibly occurring in the project area. The bald eagle has been delisted but the protections provided by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act remain in effect. The brown pelican was removed from the Federal list of endangered and threatened species on December 17, 2009 (74 *Federal Register* 59443), but still receives protection under the Migratory Bird Treaty Act and the Lacey Act (16 U.S.C. 3371-3378).

A Biological Assessment (BA) has been prepared that includes information on the distribution and habitat requirements of these species, as well as their occurrence within the project area (see Appendix B). This BA also addresses the proposed project's potential impact on federally listed threatened and endangered species. Of these species listed in Table 2, only the piping plover, red knot, Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), and loggerhead (*Caretta caretta*) sea turtles are most likely to occur in and around the project area. Other species listed in Table 2 that are known to occur in Matagorda County are not likely to occur in the vicinity of the project due to lack of suitable habitat or known range limits. There is designated critical wintering habitat for the piping plover within the project area.

The piping plover critical wintering habitat Unit TX-22 occurs on the west Matagorda Island, within the proposed project. Suitable habitat for piping plover and red knot occurs along the sandy beach shorelines of the Gulf of Mexico and some islands in Matagorda County. These species are not likely to occur in the immediate vicinity of the project due to the commercial shipping and recreational vessel traffic and other human activities near the proposed project area making these areas unsuitable for the piping plover and red knot.

It is possible that green sea turtles, Kemp's ridley sea turtles, and loggerhead sea turtles may be found in or near the project area within Matagorda Bay as a transient species, since it contains and is surrounded by a warm estuarine bay.

Table 2. Federally-Listed Threatened and Endangered Species in Matagorda County, Texas

Species	**Status**
Northern aplomado falcon (*Falco femoralis septentrionalis*)	Endangered
Whooping crane (*Grus Americana*)	Endangered
piping plover (*Charadrius melodus*)	Threatened
red knot (*Calidris canutus rufa*)	Threatened
green sea turtle (*Chelonia mydas*)	Threatened
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
loggerhead sea turtle (*Caretta caretta*)	Threatened
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
West Indian Manatee (*Trichechus manatus*)	Threatened
Lobed star coral (*Orbicella annularis*)	Threatened
Mountainous star coral (*Orbicella faveolata*)	Threatened
Boulder star coral (*Orbicella franksi*)	Threatened
Elkhorn coral (*Acropora palmate*)	Threatened

USFWS, 2017. http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=48167

NOAA/NMFS, 2017. http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/texas.pdf

3.1.11 Cultural Resources

Human habitation along the central coast has only been identified in the region as early as 7,500 Before Present (BP). The study area is characterized by upland coastal prairies dissected by streams and rivers and extensive bay and estuarine systems along the coast. The Colorado, Lavaca, San Antonio, and Guadalupe rivers are the major drainages in the region. Sediments in the region consist of fluvial deposits and delta formations overlying Pleistocene aged clay. Prehistoric sites are commonly found within these upper sediments along streams and rivers and adjacent to brackish estuarine systems, close to prime areas for resource exploitation. These sites include campsites, dense shell middens, and cemeteries, containing projectile points, stone, bone, and shell tools, aquatic and terrestrial faunal remains, hearth features, ceramics, and in some cases human remains and associated funerary objects. Shell midden sites are especially common in the region along the shorelines and upland areas adjacent to rivers and bays and on the barrier islands. Historic age resources in the region consist of farmsteads, plantations, and ranches, houses, buildings, bridges, cemeteries, lighthouses, shipwrecks, and the ruins of these buildings and structures. Although historic age resources can occur anywhere, these sites tend to be concentrated in small towns and urban areas, along roads, and within current and historic navigation paths. Shipwrecks may also occur in numerous locales due to the dynamic nature of the sea floor and bay bottoms and the lack of navigation improvements until the latter part of the 19th century. Dynamic hydrologic conditions in the area can result in shifting shoals and reefs that endanger ships as well as bury their wrecks as shorelines and bars migrate through time.

There are over 600 recorded prehistoric and historic archeological sites located within this region of the central Texas Coast. These cultural resources include National Register of Historic Places (NRHP) listed properties, archeological sites, cemeteries, historical markers, and shipwrecks and submerged resources. A preliminary assessment of the cultural resources within three kilometers of the project area was conducted using a desktop review of the databases maintained by the Texas Historical Commission and the Texas Archeological Research Laboratory for terrestrial and marine cultural resources as well as the shipwreck and obstruction databases of the National Oceanic and Atmospheric Administration and the Bureau of Ocean Energy Management. Previous cultural resources investigations in the project area have included archeological surveys of the Matagorda Ship Channel for the El Paso LNG Terminal Company (McCormick et al., 1978), the USACE (Pearson and Hudson, 1990), and the Calhoun County Navigation District (Borgens et al., 2012). An archeological survey was also conducted along alternative routes of the Gulf Intracoastal Waterway for the USACE (Enright et al., 2002). A magnetic anomaly (anomaly M39 in Enright et al. 2002:E-7) was identified as a result of this survey just north of Sundown Island, outside of the project area, which was recommended for additional investigation. No terrestrial cultural resources investigations have been conducted in the project area. The closest recorded archeological site is Site 41MG40, the wreck of a small boat, which was recorded in the dunes approximately 2.5 kilometers southwest of the project area. Additionally, there are three potential shipwrecks (unknown marine anomalies) located outside of the project area within three kilometers. There are no historic properties or recorded cultural resources within the proposed project area.

The primary considerations concerning cultural resources in the project area are threats from direct impacts to intact archeological sites from new construction and improvements. The areas along the channel cut through the Matagorda Peninsula were impacted by previous dredging of the existing man-made cut, however some intact portions of the original landform may still exist. Previous marine investigations in the channel have not identified any submerged cultural resources or anomalies. There

is a low to moderate probability for encountering prehistoric archeological sites within intact areas adjacent to the channel cut. Since the channel cut is artificial, and based on previous investigations, there is a low probability for encountering submerged cultural resources within the channel portions of the project area. The dredged material placement within the surf zone west of the channel and along the north side of Sundown Island have a moderate probability for encountering submerged cultural resources.

3.1.12 Air Quality

To comply with the 1970 Clean Air Act (CAA) and the 1990 Amendments, the U.S. Environ- mental Protection Agency (EPA) has promulgated National Ambient Air Quality Standards (NAAQS) for the protection of the public health and welfare with the allowance of an adequate margin of safety. The EPA has set NAAQS for six criteria pollutants: lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matter. Achieving and maintaining compliance with the NAAQS incorporates the effects of population and industrial growth, technology changes, and national or statewide control measures, including state implementation plans (SIP) for complying with NAAQS.

The project area is located within Matagorda County, Texas, and is part of an area designated as in attainment, meaning concentrations of criteria pollutants are below the levels established by the NAAQS. Due to the de minimis finding and the area's NAAQS attainment status, a General Conformity determination is not required.

3.1.13 Noise

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise in terms of day-night average sound level (DNL). It is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 decibels (dBA). For outdoor activities, the EPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (EPA, 1974). Noise-sensitive receptors are facilities or areas where excessive noise may disrupt normal activity, cause annoyance, or loss of business. Land uses such as residential, religious, educational, recreational, and medical facilities are more sensitive to increased noise levels than are commercial and industrial land uses.

3.1.14 Water Quality

The long-term average (1985–2006) salinity value was 25.9 parts per thousand (ppt) at a TCEQ station located adjacent to the MSC in the vicinity of Sundown Island. The Texas Commission on Environmental Quality (TCEQ) (2014) Integrated Report of Surface Water Quality for the Clean Water Act Sections 305(b) and 303(d) has designated water quality segments for individual components of the Matagorda Bay system. Table 2 provides the status of 305(b) and 303(d) within the vicinity of the project area: Segment ID 2451-01 – Northern Matagorda Bay/Powderhorn Lake and Segment ID 2451-02 – Remainder of segment. The designated uses within the water segments, as defined by Texas Surface Water Quality Standards (TSWQS), include uses such as aquatic life,

recreation, general, fish consumption, and oyster waters. Table 3 also includes the water segments listed on the 303(d) list (TCEQ, 2014).

Inventory data from 2014 indicate the quality of water in the vicinity of the project is generally considered to be good; Aquatic Life Use, Fish Consumption Use, Contact Recreation Use and General Use are fully supported or of no concern.

Table 3. 305(b)/303(d) Water Quality Assessment Status for Matagorda Bay/Powderhorn Lake

Segment	Name	Uses	Level of Use	Use Impairment	303(d) Status
2451-01	Northern Matagorda	Contact Rec	Full	None	None
	Powderhorn Lake	General	Full	None	
2451-02	Remainder of	Oysters	Full	None	
	segment	Aquatic Life	Full	None	

3.1.15 Sediment Quality

The bottleneck soil borings indicated the sands to be fine to very fine beach sands, similar to those encountered and tested along the Texas coastline from Galveston to Port Mansfield (USACE, 2017). Sediment accumulated at the MSC entrance and vicinity is primarily sand, with littoral sediments serving as a source and with finer-grained sediment transported away from the entrance by the strong tidal current. ERDC analyzed the dredging records for the area from 1962 to 2004 and found that a large amount of sediment accumulated in the outer bar gulfward of the MSC entrance.

The sediment consisted primarily of sand between station 0+000 and -21+000 gulfward of the entrance channel. The median grain size was 0.233 mm at station -10+000, 0.207 mm at station -15+000, and 0.121 mm at station -20+000. Because the current is stronger in the entrance channel then elsewhere in the area, finer sand tends to be transported out of the entrance to settle in regions of weaker current. In the range of station 0+000 to 15+000, from the bay entrance channel to the junction of the GIWW, more than 75 percent of the dredged sediment was sand. This sand entered the channel from the Gulf of Mexico, carried by the flood current. Based on bottom samples collected in 1991 and 1995, the medium grain size was 0.18 mm at station 15+000 (MSC-GIWW junction). Farther north across the GIWW junction, the sediment contains more silt and clay in the channel, derived from bay and river sediment (ERDC, 2006).

Review of the Environmental Data Resources, Inc. database information, historical aerial photographs, and historical topographic maps, as well as the August 2007 Site Inspection Report for the Former Matagorda Peninsula Bombing Range did not reveal any significant environmental concerns, such as spills or toxic releases. The review did indicate that part of the project area was used as an aerial gunnery range (Aerial Gunnery Range No. 2) during World War II and that munitions and explosives of concern (MEC) were collected in 1946. There has been no MEC recovery since 1946 and no incidents have been recorded. Soil samples were collected at locations within the Formerly Used

Defense Site (FUDS), including the west shore of the Matagorda Ship Channel, and analyzed for munitions constituents (MC). None of the MC was detected above ambient soil concentrations in the sample that was collected along the west shore of the ship channel. Further review indicated that when applying the Munitions Response Site Prioritization Protocol (MRSPP), the aerial gunnery range within the project area appears to have a relatively low potential risk of finding MEC. The MRSPP's application results in assignment of a relative priority of 1 to 8, with 1 representing the highest possible relative risk category. Aerial Gunnery Range No. 2 is rated as a 7, a very low risk category. In summary, no Recognized Environmental Conditions were noted and there is a low potential of finding MEC.

3.1.16 Socioeconomics

The affected area lies on the westernmost border of Matagorda County near Calhoun County. The closest population center is Port O'Connor, of Calhoun County. This analysis addresses Calhoun County, Matagorda County, and Port O'Connor, as they are in the closest proximity to the project area. All statistics were obtained from the United States Census Bureau through the American Community Survey Program. This analysis utilizes the 2015 American Community Survey data, which is an estimate based on survey results.

3.1.16.1 Populations and Social Characteristics (Demographics)

Calhoun and Matagorda Counties have relatively small populations. Each county contains about 1% of the population of the State of Texas. Port O'Connor, a Census Designated Place (CDP), has about 923 residents (Table 4).

Table 4. Total Population of Selected Areas

	Texas	Calhoun County	Matagorda County	Port O'Connor CDP
Total population	26,538,614	21,666	36,598	923

In the affected area, the majority of residents identify as White. In Calhoun County, approximately 48% of the population identifies as Latino while about 40% of Matagorda County's population identifies as Latino (Table 5).

Table 5. Racial Identity of Residents in Selected Areas

	Texas	Calhoun County	Matagorda County	Port O'Connor CDP
White	74.9%	87.6%	80.4%	99.3%
Black or African American	11.9%	2.9%	10.2%	0.0%
American Indian and Alaska Native	0.5%	0.1%	0.5%	0.0%
Asian	4.2%	3.5%	2.1%	0.0%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%	0.2%	0.0%
Some other race	6.0%	1.1%	2.9%	0.0%

Two or more races	2.5%	4.7%	3.8%	0.7%
Hispanic or Latino (subset of any race)	*38.4%*	*47.8%*	*39.9%*	*41.4%*

3.1.16.2 Housing

The majority of the homes in the affected area are owner-occupied (Table 6). As a whole, the area has a higher owner-occupied rate than the State of Texas. The median value of homes falls below the state average. Homes in Calhoun County cost an average of $102,000, while in Matagorda County homes cost about $93,700. The average home price in Port O'Connor is significantly higher, $169,000, which may be due to the popularity of the area as a vacation destination.

Table 6. Home Occupancy Characteristics

	Texas		Calhoun County		Matagorda County		Port O'Connor CDP	
	Estimate	Percent	Estimate	Percent	Estimate	Percent	Estimate	Percent
Occupied housing units	9,149,196		7,994		13,382		333	
Owner-occupied	5,693,770	62.2%	5,663	70.8%	9,070	67.8%	283	85.0%
Renter-occupied	3,455,426	37.8%	2,331	29.2%	4,312	32.2%	50	15.0%

3.1.16.3 Economic Characteristics Leading Economic Sectors

Across the affected area the Educational Services, Healthcare, and Social Assistance industries employ a significant portion of the population (Table 7). This is in line with both state and national employment trends. Both Calhoun and Matagorda Counties also have a larger portion of residents employed in the Manufacturing sector. Port O'Connor, due to its status as a vacation destination, has the majority of its residents employed in the Hospitality and Entertainment industry.

Port Palacios is located on the Northeastern side of Matagorda Bay. Cargo, manufacturing, seafood, and ship repair and construction businesses all reside in the port. In addition to commercial activity, the port also has slip rentals available for private watercraft (portofpalacios.com, 2017).

Table 7. Percent of Population Employed by Industry

	Texas	Calhoun County	Matagorda County	Port O'Connor CDP
Agriculture, forestry, fishing and hunting, and mining	3.4%	5.3%	6.1%	10.3%
Construction	7.8%	12.1%	10.0%	11.1%
Manufacturing	9.1%	24.9%	11.1%	10.3%

Wholesale trade	3.0%	2.5%	2.2%	0.0%
Retail trade	11.6%	10.8%	10.3%	2.8%
Transportation and warehousing, and utilities	5.5%	3.9%	10.8%	0.0%
Information	1.8%	1.2%	0.4%	0.0%
Finance and insurance, and real estate and rental and leasing	6.6%	4.5%	3.40%	4.1%
Professional, scientific, and management, and administrative and waste management services	11.1%	6.1%	9.3%	14.5%
Educational services, and health care and social assistance	21.6%	18.5%	20.5%	16.3%
Arts, entertainment, and recreation, and accommodation and food services	8.9%	5.2%	8.4%	27.1%
Other services, except public administration	5.3%	2.5%	5.6%	0.8%
Public administration	4.3%	2.5%	1.8%	2.6%

3.1.16.4 Labor Force and Employment

The affected area has a higher rate of unemployment than the state. In 2016 the unadjusted annual unemployment rate for Calhoun County was 5.6% and 7.4% in Matagorda County. Statewide, the unadjusted unemployment rate was 4.6%.

The majority of residents in the two affected counties have only a high school diploma with no higher education (Table 8). Port O'Connor residents have, on average, a higher level of education with about 20% of the population holding a bachelor's degree.

Table 8. Educational Attainment

	Texas	Calhoun County	Matagorda County	Port O'Connor CDP
Less than 9th grade	9.1%	9.7%	13.1%	9.8%
High school graduate (includes equivalency)	25.2%	31.8%	35.4%	27.2%
Associate's degree	6.7%	8.9%	6.6%	14.3%

Bachelor's degree	18.2%	10.7%	11.7%	20.1%
Graduate or professional degree	9.4%	5.5%	3.5%	6.9%

3.1.16.5 Personal Income

Per capita income in the affected area falls below Texas' average, $26,999. Per capita income in Calhoun County is $24,372 while in Matagorda County it is $21,693.

3.1.16.6 Tourism

Matagorda Bay hosts a variety of attractions. Fishing and birding are most popular, given the abundant wildlife present in the bay. Numerous fishing expedition companies are located in Matagorda Bay, but fishing along the shore or off piers is also common.

In addition to fishing and birding, general outdoor activities are also available. Matagorda Bay nature Park offers structured programs for visitors as well as campsites (visitmatagordacounty.com, 2017).

3.1.17 Recreational Resources

Matagorda Peninsula is a low-profile, dynamic beach and dune system. The southwestern half has approximately 20-30 residences used primarily as temporary seasonal dwellings. Existing impacts are limited to fishermen, hunters, recreationists, and all-terrain vehicles. The bay system contains important habitat for recreationally sought estuarine fish and crustaceans, including red and black drum, spotted and sand seatrout, Atlantic croaker, flounder, striped mullet, sheepshead, brown and white shrimp, blue crab, and oyster. Sports fishermen find the bays excellent for recreation because of the quantity and diversity of game fish. Moderate hunting for waterfowl and a great amount of bird watching and other wildlife-oriented recreation also occur in the project area. The nearest port, Port Lavaca, ranked 7th out of 28 Texas ports in volume of fishing and pleasure craft. Recreational fishing includes both trips on commercial vessels (headboats, or boats that charge by the person for fishing trips) and privately owned recreational fishing boats. All of these are part of the commercial and recreational navigation baseline.

The marshes, lakes, bays, and other natural amenities found in the study area have historically attracted residents and tourists to the Matagorda Bay System, and the climate and area provide public and private recreational facilities year-round. For example, the 56,688-ac Matagorda Island Wildlife Management Area (WMA) just to the west of the project site, is an offshore barrier island with bayside marshes, yet access is restricted to private or charter boats. The WMA is jointly owned by the Texas GLO and the USFWS and cooperatively managed by TPWD as the Matagorda Island National Wildlife Refuge and State Natural Area. TPWD manages the WMA for public use, and the USFWS has the main responsibility for managing the wildlife and habitat on the island. The island is 38 miles long and varies in width from less than 1 mile to about 4½ miles. The island supports a wide variety of migratory birds, some State or federally listed threatened or endangered species, a large herd of white-tailed deer, and other wildlife. Seasonal hunting for deer and waterfowl is allowed. Other activities include saltwater fishing, biking, camping, hiking, birding, picnicking, and historical interpretation. A lighthouse dating from 1852 still stands at the north end of the island. Matagorda Island WMA is known for its seclusion and untouched natural beauty (TPWD, 2017).

Birding along the Texas Gulf Coast, including areas within and near the project area, is another major recreation activity. The Coastal Birding Trail is a 500-mile trail jointly sponsored by TPWD and the Texas Department of Transportation (TXDOT) that stretches along the Texas Gulf Coast from north of Beaumont to the Rio Grande Valley. The trail establishes viewing areas at feeding, roosting, and nesting points, thereby encouraging the preservation of woods and wetlands for both migrating and endemic bird species. Launched in October 1994, the central Texas coast section of the trail encompasses 95 of the total 308 distinct wildlife-viewing sites throughout communities on the Central Texas Gulf Coast. The Calhoun Loop encompasses seven sites within or near the project area and includes Matagorda Island WMA. In addition to the trail, numerous birding sites and facilities are available in Matagorda County, mainly in areas east of the project area. For instance, the Matagorda County Birding and Nature Center hosts multiple birding sites within the county, along West Matagorda Bay and several smaller lakes and bays in the area (Matagorda County Birding and Nature Center, 2004). All sites become especially active with people in the annual national Christmas bird count.

Sundown Island, located in Matagorda Bay, is also known as Bird Island because of the large rookery there. Sundown Island is the National Audubon Society's largest bird sanctuary island along the Gulf Coast. The island hosts substantial numbers of nesting Brown Pelicans, gull-billed tern, royal tern, sandwich tern, black skimmer and other birds. In 2014, Sundown hosted 16,070 breeding pairs, representing 18 species, including many of conservation concern (e.g., royal tern, sandwich tern, black skimmers, reddish egrets and rosette spoonbills). Sundown was identified as one of 15 priority nesting sites for the reddish egret by the Gulf Coast Joint Venture. The area around this island can be good for trout from late spring to early fall.

The Lower Colorado River Authority (LCRA) operates the Matagorda Bay Nature Park, a 1,600-ac park and preserve located at the mouth of the Colorado River on the Matagorda Peninsula, well east of the project area (LCRA, 2006a). The park offers fishing, camping, and 70 recreational vehicle (RV) sites with full utility hook-ups.

Many species of wildlife that occur within the project area provide human benefits through both consumptive and non-consumptive uses. Non-consumptive uses are those activities that do not require the physical taking of a species, such as photography, birding, and study of the natural environment.

4.0 ENVIRONMENTAL CONSEQUENCES

This section provides a discussion of the environmental impacts associated with the No-Action Alternative, Alternative 3 (the Proposed Action), and Alternative 2. For the Proposed Action and Alternative 2, the bottleneck design, dredge quantities, and rock quantities are the same. From an environmental perspective, the types of impacts would essentially be similar for the beach placement, but the footprint would be larger for Alternative 2. An environmental benefit of the proposed project is that it should reduce the potential for collisions, allisions and oil and chemical spills.

4.1 Water Exchange (Tidal Prism)

4.1.1 No-Action Alternative

The impacts of water exchange would be similar to those described for the existing condition.

4.1.2 Proposed Action: Alternative 3

With the bottleneck removed, the MSC becomes more efficient for flow exchange between the Gulf and Matagorda Bay. Removing the bottleneck between the jetties in the MSC entrance will not notably change the stability of Pass Cavallo, because the additional capture of the tidal prism by the ship channel will be small relative to the present value of tidal prism for Pass Cavallo and in comparison to past reductions in prism there (Kraus, 2008).

4.1.3 Alternative 2

Similar water exchange results as described in Alternative 3 would be expected since the bottleneck removal design is the same.

4.2 Current Velocity

4.2.1 No-Action Alternative

The impacts of current velocity would be similar to those described for the existing condition.

4.2.2 Proposed Action: Alternative 3

With the bottleneck removed, the MSC becomes more efficient and current velocity would be reduced.

4.2.3 Alternative 2

Similar effects on current velocity as described in Alternative 3 would be expected since the bottleneck removal design is the same.

4.3 Sea Level Rise

4.3.1 No-Action Alternative

The effects of RSLC (relative sea level change) would occur nearly uniformly throughout the bay, as the average sea level rise would be the same at various locations. The trend of RSLR should remain the same as discussed in 3.1.3.

Proposed Action: Alternative 3

No difference in water levels between the No-Action and Proposed Action is likely. Thus, the impacts of RSLC would be similar to those described for the No-Action Alternative. RSLC is not expected to have a significant impact on dredging frequency, shoaling, or ship handling.

4.3.2 Alternative 2

Similar RSLC results as described in Alternative 3 would be expected.

4.4 Salinity

4.4.1 No-Action Alternative

Under the No-Action alternative, the salinity variation at low, mean, high flows as well as hurricane scenario shall be similar to existing condition if no action is taken.

4.4.2 Proposed Action: Alternative 3

There is no observable salinity change in the eastern arm of Matagorda Bay for Alternative 3 (ERDC, 2006).

4.4.3 Alternative 2

Similar salinity outcomes as described in Alternative 3 would be expected since the bottleneck removal design is the same.

4.5 Coastal Barrier Resources

4.5.1 No-Action Alternative

Under the No-Action Alternative, the coastal barrier resources vegetation species would remain as described in Chapter 3. There would be continued erosion of coastal barrier resources in CBRS units T-07 and T-07P due to relative sea-level rise, subsidence, and erosion associated with tropical storms and vessel traffic. Change in shoreline position on the beach adjacent to the south jetty was small and indicated advance of about 3-4 ft/year near the south jetty and recession of about 6-7 ft/year about 2 miles south of the jetty (Rosati et al, 2011). Over time primary dunes would convert to secondary dunes then to saline marsh and eventually to open water. Figure 10 shows the 2011 beach shoreline in red and the 50-year modeled shoreline in blue.

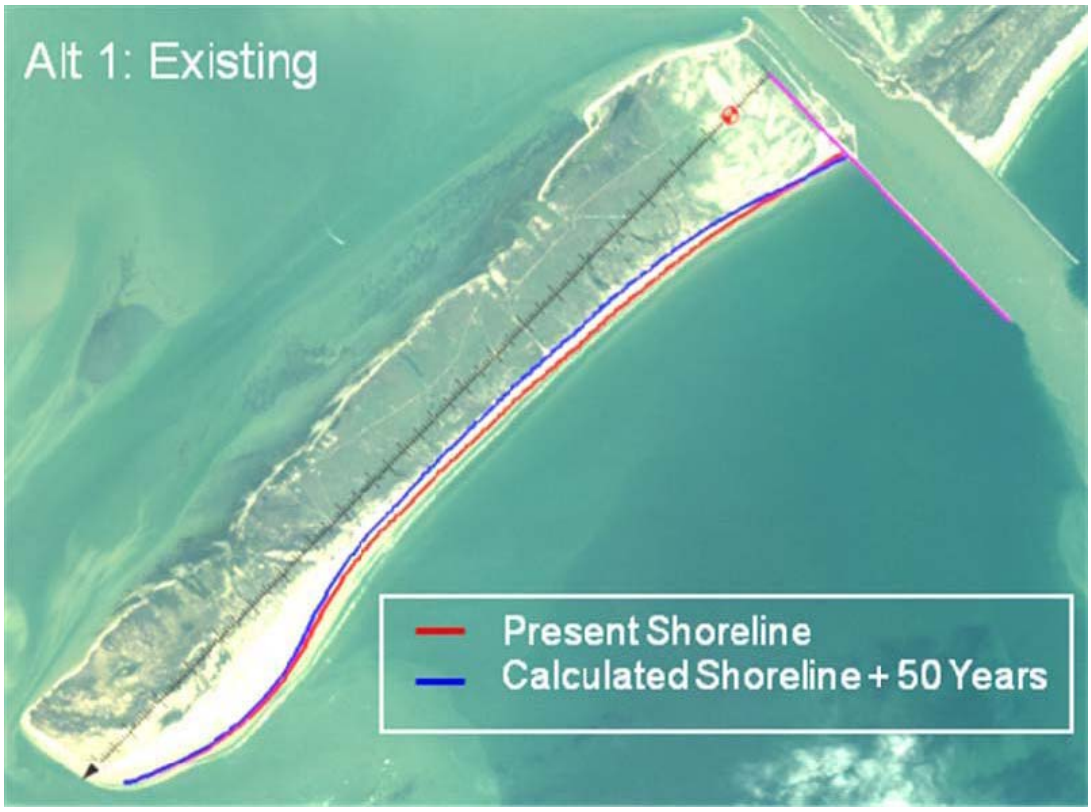

Figure 10. The calculated shoreline change from year 2011-2061.

4.5.2 Proposed Action: Alternative 3

With implementation of the Proposed Action Plan, 82 acres of CBRS unit T-07 would be directly impacted by removing the bottleneck between the jetties. The Wetland Value Assessment (WVA) methodology is a quantitative habitat-based assessment methodology developed for use in determining wetland benefits or losses. The WVA quantifies changes in wildlife habitat quality and quantity that are expected to result from a proposed project. The results of the WVA are measured in Average Annual Habitat Units (AAHUs). The WVA methodology provides an estimate of the number of acres benefited or lost due to the project's construction. The WVA model indicates 40.07 AAHUs would be lost due to the project's dredging.

The Proposed Action would directly restore 300 acres 17.01 AAHUs of CBRS unit T-07 adjacent to the west jetty. The initial dredged material fill height would be placed to 3 feet MLLW. As the material is discharged, it would be reworked by wave action, and the deposited sand would migrate along the seashore with the littoral drift. The proposed project would provide the benefit of reducing the recessional trend of the shoreline, thus restoring the beach and its habitat.

The placement of dredged material would directly create a 51-acre subaerial island in CBRS unit T-07P, adjacent to Sundown Island. The 51-acre island would have a 73-acre underwater footprint. The initial dredged material fill height would be placed to 6 feet MLLW. The WVA Model projected that the 51-acre island feature would provide 30.58 AAHUs over the 50 year period of analysis. Native dune and salt marsh species are expected to colonize the area within 3 growing seasons. The Proposed Action would provide a total of 47.59 AAHUs with both the beach and island features.

4.5.3 Alternative 2

With implementation of Alternative 2, 82 acres of CBRS unit T-07 would be directly impacted by dredging the bottleneck between the jetties. The WVA model indicates 40.07 AAHUs would be lost due to the project's dredging.

Alternative 2 would directly restore 498 acres, 29.92 AAHUs of CBRS unit T-07 adjacent to the west jetty. The initial dredged material fill height would be placed to 3 feet MLLW. The deposited sand would migrate down the shoreline overtime as discussed in the Proposed Action. Alternative 2 would not offset the project's impacts.

4.6 Aquatic Nuisance Species

4.6.1 No-Action Alternative

Vessel ballast water discharges or exchanges in coastal waters have the potential to introduce ANS. To minimize this potential threat, all vessels calling on the port must comply with established USCG regulations that: (1) require mandatory ballast water management practices for all vessels that operate in U.S. waters, (2) establish additional practices for vessels entering U.S. waters after operating beyond the extraterritorial economic zone, and (3) require the reporting and recordkeeping of ballasting operations by all vessels.

4.6.2 Proposed Action: Alternative 3

Fixing the deficiency, removing the bottleneck between the jetties in the channel would not result in an increase in the number of vessels. Therefore, the threat of introducing ANS as a result of the bottleneck removal is minimal.

4.6.3 Alternative 2

Alternative 2 would have similar effects on ANS as the Proposed Action.

4.7 Aquatic Resources

4.7.1 No-Action Alternative

Under the No-Action Alternative, the benthic habitat within and adjacent to the channel is disturbed due to potential maintenance dredging operations and ship traffic. Impacts from current maintenance dredging include increased water column turbidity during, and for a short time after, dredging activities and burial of benthic organisms. Maintenance dredging of the existing -40 feet MLLW portion of the MSC displaces marine benthic channel bottom. Maintenance activities may disturb and remove small free-swimming and benthic marine organisms in the immediate vicinity of the dredging work that are caught by the dredge cutter head or pulled into the pipeline by the pump. Most free-swimming organisms will not be impacted, since they are able to avoid the slow moving cutter head. Recolonization of the benthic community between maintenance cycles is expected to occur. As such, impacts to the existing marine benthic population that occurs during maintenance dredging is minor

and temporary. No long-term effects are expected.

4.7.2 Proposed Action: Alternative 3

The Proposed Action directly affects the aquatic organisms' habitat. Removing the bottleneck between the jetties in the MSC and dredging would directly affect an additional 110 acres of open-water and water bottom habitat for aquatic organisms. The 300-acre beach placement and 73-acre island expansion operation would have similar results to aquatic organisms as the No-Action Alternative. However, the area involved is a small fraction of the total available habitat within the entire system.

4.7.3 Alternative 2

Alternative 2 would have similar affects to aquatic organisms as the Proposed Action but for a 498-acre PA. Alternative 2 would negatively impact an additional 125 acres of water bottoms that aquatic organisms utilize.

4.8 Wildlife

4.8.1 No-Action Alternative

Maintenance dredging of the existing channel results in temporary, minor disturbances to wildlife that may occur in the project area. Maintenance dredging produces disturbances similar to those expected from the work being proposed. Continued residential development occurring in the area could have an impact on wildlife. Any temporarily displaced wildlife would have suitable habitat immediately available to them in the project vicinity.

4.8.2 Proposed Action: Alternative 3

Proposed dredging of the bottleneck between the jetties in the MSC would directly impact 82 acres 17.01 AAHUs of wildlife habitat on Matagorda Island. The proposed project would result in temporary, minor disturbances to wildlife in the project area during construction. The bottleneck removal between the jetties would produce wildlife disturbances similar to those incurred by wildlife during maintenance dredging activities. Temporarily displaced wildlife would relocate to available suitable habitat located immediately in the project vicinity as they do during routine maintenance dredging of the existing channel. The Proposed Action would directly restore 300 acres of beach which would provide wildlife habitat. The placement of dredged material would directly create a 51-acre subaerial island adjacent to Sundown Island that would provide wildlife including colonial bird nesting habitat. The Proposed Action would provide a total of 47.59 AAHUs with both the beach and island features.

4.8.3 Alternative 2

Alternative 2 would have similar affects to wildlife as the Proposed Action but would restore 498 acres of beach but with less habitat value 29.92 AAHUs.

4.9 Essential Fish Habitat and Fisheries

4.9.1 No-Action Alternative

The No-Action Alternative would have minimal impacts on EFH or fisheries. EFH and fisheries within the project vicinity would continue to gain open water areas because of land erosion and subsidence. The loss of edge habitat would continue to adversely impact essential spawning, nursery, and foraging habitats for important species of finfish and shellfish. Fish and shellfish would avoid direct dredging impacts from continued maintenance dredging of the exiting channel by swimming away from the disturbance. While maintenance dredging would periodically increase turbidity levels in the water column, these impacts would be minor in nature and of short duration, resulting in no adverse effects to EFH or fisheries.

4.9.2 Proposed Action: Alternative 3

The impacts of construction dredging on EFH and fisheries would be similar to those experienced under the No-Action Alternative. Finfish and shellfish within the project vicinity would swim out of the area and avoid direct dredging impacts. Dredging and placement would directly impact a total of 457 acres of water bottoms. Both sides of the MSC would be lined with stone creating additional fish habitat. Bottleneck removal and placement as beneficial use of material adjacent to the beach and Sundown Island would result in temporary increases in turbidity levels in the water column similar to levels experienced during routine MSC maintenance dredging. The beach and Sundown Island placement as beneficial use would directly impact 417 acres of sand/shell/water bottoms of EFH. The beach restoration would slow the erosion of Matagorda Island, which provides a line of defense for protecting marsh and provide a higher quality EFH on the bay side. The 73-acre Sundown Island PA would also provide protection of wetlands and as the site degrades overtime some portions may convert to saline marsh. Although existing EFH would be initially negatively impacted, such impacts would be offset by the formation of transitional habitats over time, which are considered a higher quality EFH.

4.9.3 Alternative 2

The impacts of construction dredging on EFH and fisheries would be similar to those experienced under the Proposed Action. Dredging and placement would directly impact a total of 538 acres of water bottoms.

4.10 Threatened and Endangered Species

4.10.1 No-Action Alternative

Under the No-Action alternative, there would be more potential impacts to sea turtle species because the material removed from the MSC entrance during maintenance would be placed offshore according to the FEIS titled “Matagorda Ship Channel, Ocean Dredged Material Disposal Site Designation”. No piping plover critical wintering habitat would be impacted because the bottleneck would remain.

4.10.2 Proposed Action: Alternative 3

The Proposed Action “may affect-but not likely to adversely affect” the piping plover. Although the

Proposed Action would remove 0.85-acre of TX-22 critical wintering habitat the overall benefits of beach restoration would offset the impacts. The proposed project would provide the benefit of reducing the recessional trend of the shoreline, thus reducing erosion rates of the beach and piping plover critical habitat. The Proposed Action "may affect-but not likely to adversely affect" the red knot. The Proposed Action would have similar beneficial effects as discussed for the piping plover. The Proposed Action would have "no effect" on the Northern aplomado falcon, whooping crane, West Indian manatee, whales, corals, hawksbill and leatherback sea turtles; "may affect, but not likely to adversely affect" non-nesting Kemp's ridley, green, or loggerhead sea turtles; "no effect" on nesting green or loggerhead sea turtles; and "may affect, but not likely to adversely affect" nesting Kemp's ridley sea turtles.

4.10.3 Alternative 2

The impacts of construction dredging and placement to threatened and endangered species would be similar to those experienced under the Proposed Action.

4.11 Cultural Resources

4.11.1 No-Action Alternative

Without implementation of the Proposed Action, no archaeology resources would be affected.

4.11.2 Proposed Action: Alternative 3

The Proposed Action includes removing the bottleneck in the entrance channel on the Matagorda Peninsula, construction of dikes along the edges of the channel, and the construction of two flares on the bay side of the peninsula extending from the ends of the dikes. Additionally, dredged material from the bottleneck removal will be placed within the surf zone west of the western jetty and along the northwest side of Sundown Island. The area of potential effect (APE) for the proposed action consists of the footprint of all areas directly affected by dredging and bottleneck removal, rock placement along the dikes and flares, and dredged material placement.

Based on the current information for the proposed action, there is a potential to affect historic properties. These affects consist of direct impacts from earth moving and dredging activities related to construction and impacts from dredged material placement, specifically disturbance of the gulf and bay bottom. The USACE recommends cultural resources investigations to identify and evaluate any historic properties within proposed construction areas. The scope of these investigations will be determined in concert with the Texas State Historic Preservation Officer and Native American Tribes and in accordance with the Programmatic Agreement for this project (Appendix C).

4.11.3 Alternative 2

Alternative 2 includes removing the bottleneck in the entrance channel on the Matagorda Peninsula, construction of dikes along the edges of the channel, and the construction of two flares on the bay side of the peninsula extending from the ends of the dikes. Additionally, all dredged material from bottleneck removal will be placed within the surf zone west of the western jetty. The APE for

Alternative 2 consists of the footprint of all areas directly affected by dredging and bottleneck removal, rock placement along the dikes and flares, and dredged material placement.

Based on the current information, there is a potential to affect historic properties. These affects consist of direct impacts from earth moving and dredging activities related to construction and impacts from dredged material placement, specifically disturbance of the gulf and bay bottom. The USACE recommends cultural resources investigations to identify and evaluate any historic properties within proposed construction areas. The scope of these investigations will be determined in concert with the Texas State Historic Preservation Officer and Native American Tribes and in accordance with the Programmatic Agreement for this project.

4.12 Air Quality

4.12.1 No-Action Alternative

The project is within an area classified as "attainment". No new construction or dredging air contaminant emission sources are associated with the No-Action Alternative. Air contaminant emissions that may result from ongoing maintenance dredging activities would include exhaust emissions from fuel combustion in engines that power the marine vessels (dredge and support), on-shore construction equipment for dredged material placement, and employee commuter vehicles. Emissions associated with maintenance dredging are not expected to change from current conditions.

4.12.2 Proposed Action: Alternative 3

The project is within an area classified as "attainment". The primary air pollution sources resulting from project implementation would be similar to the No-Action Alternative. Project related contributions of air born contaminants would be anticipated to be site specific and introduced in small inconsequential volumes resulting in no long-term impacts on current or future air quality attainment standards. It has been determined that the activities proposed under this project would not exceed *de minimis* levels of direct emissions of a criteria pollutant or its precursors and would be exempted by 40 CFR Part 93.153. Overall impacts to air quality would be expected to be minimal. With the Proposed Action, project activities would be expected to produce less than 5 tons per year of Volatile Organic Compounds and NO_X emissions. Thus, the ambient air quality in Matagorda County would not noticeably change from current conditions, and the status of ambient air quality for the county would not be directly or indirectly altered.

4.12.3 Alternative 2

The impacts of Alternative 2 on air quality would be similar to those experienced under the Proposed Action.

4.13 Noise

4.13.1 No-Action Alternative

Under the No-Action Alternative, impacts related to noise would continue to be associated with periodic maintenance dredging and placement activities for the existing channel, primarily from the

use of a cutterhead dredge (68 dBA). These impacts would continue to be short term, lasting only the duration of the maintenance dredging event.

4.13.2 Proposed Action: Alternative 3

Noise impacts associated with proposed dredging and placement activities are expected to be short term and would be very similar to noise levels during current maintenance dredging by cutterhead dredge (68 dBA) for the existing channel. Other equipment such as excavators, bulldozers, dump trucks, and a mechanical dredge would be used but not expected to produce noise levels over the cutterhead dredge. No adverse impacts are anticipated for sensitive receptors in the project area vicinity.

4.13.3 Alternative 2

The impacts of Alternative 2 on noise would be similar to those experienced under the Proposed Action.

4.14 Water Quality

4.14.1 No-Action Alternative

Under the No-Action Alternative, periodic maintenance dredging and placement activities for the existing MSC may result in elevated levels of suspended solids (TSS). However these levels are expected to be similar to levels experienced at times in Matagorda Bay, which is often naturally turbid due to wind-induced re-suspension of bay sediments. Consequently, aquatic organisms are adapted to this type of disturbance. Therefore, any such impacts from continued dredged material placement operations are expected to be minor and would be temporary. These impacts would continue to be short term, lasting only the duration of the maintenance dredging event.

4.14.2 Proposed Action: Alternative 3

Dredged material from the proposed bottleneck removal between the jetties would be placed in open water adjacent to the south jetty and adjacent to Sundown Island PA. Discharge operations may result in elevated levels of TSS; however these levels are expected to be similar to levels experienced under the No-Action Alternative during routine maintenance dredging of existing MSC north of the entrance. Any impacts from dredged material placement operations during project construction are expected to be minor and temporary.

The proposed dredged material placement plan has been evaluated with regard to the requirements of Section 404(b)(1) of the Clean Water Act (CWA) Appendix D.

4.14.3 Alternative 2

The impacts of Alternative 2 on water quality would be similar to those experienced under the Proposed Action.

4.15 Sediment Quality

4.15.1 No-Action Alternative

Under the No-Action alternative, periodic maintenance dredging and placement activities for the existing MSC may result in increased turbidity. Visual inspection indicated the sands to be fine to very fine beach sands, similar to those encountered and tested along the Texas coastline from Galveston to Port Mansfield. However these levels are expected to be similar to levels experienced at times in Matagorda Bay, which is often naturally turbid due to wind-induced re-suspension of bay sediments. Therefore, any such impacts from continued dredged material placement operations are expected to be minor and would be temporary.

4.15.2 Proposed Action: Alternative 3

The bottleneck soil borings indicated the sands to be fine to very fine beach sands, similar to those encountered and tested along the Texas coastline from Galveston to Port Mansfield (USACE, 2017). The Environmental Site Assessment Phase 1 concluded there is a low probability of encountering munitions and explosives of concern (MEC) or Hazardous, Toxic, and Radioactive Waste (HTRW) at this site. Therefore, unacceptable adverse impacts on sediment quality are not expected to result from dredged material discharge operations.

4.15.3 Alternative 2

The impacts of Alternative 2 would be similar to those experienced under the Proposed Action.

4.16 Socioeconomics

4.16.1 No-Action Alternative

4.16.1.1 Populations and Social Characteristics (Demographics)

Populations in the affected area will continue to grow according to historic trends. According to data from the Texas Demographic Center, Matagorda County's population is projected to grow by about 7,600 residents between 2010 and 2017. Calhoun County's population is expected to grow about by about 3,700 residents in the same time frame.

4.16.1.2 Housing

Housing stock is expected to increase in order to meet the demands of increased population growth. Projections show modest population growth in the area, so it would be expected that increases in housing stock would be modes, as well.

4.16.1.3 Leading Economic Sectors

The affected area historically has had industry growth patterns similar to that of the United States as a whole. This trend would be expected to continue into the future. According to the Bureau of Labor Statistics, the Healthcare industry will experience the largest employment growth into 2024. Nationally, the Construction industry will experience employment growth into 2024, as well, while

Manufacturing is expected to experience a decline of 0.7 percent annually into 2024.

4.16.1.4 Labor Force and Employment

The Dallas Fed projects an increase in the state's total nonfarm employment through 2018. Given the affected area's historical trend of maintaining slightly lower employment than the state as a whole, employment rates in the area would be expected to grow at a more moderate pace than the state.

4.16.1.5 Personal Income

Personal income would be expected to rise, due to inflation, but at a moderate pace. Historical trends have shown the per capita income falls below that of the state average. As such, moderate gains would be expected, but at a lesser rate than the state average.

4.16.1.6 Tourism

The Tourism industry would continue to grow. The nature and sporting attractions have historically attracted a number of visitors. This trend would be expected to continue at a similar pace into the future.

4.16.2 Proposed Action: Alternative 3

4.16.2.1 Populations and Social Characteristics (Demographics)

The population of the surrounding area would not be impacted by the Proposed Action. Changes in population would be expected to change over the lifespan of the project in a manner similar to that which was described in the No Action Alternative.

4.16.2.2 Housing

Given the project's location, approximately three (3) structures have been observed from aerial images that would be impacted on the east side of the channel on the Matagorda Bay side from the flare construction. Housing stock in the affected area would continue to grow and change in the same way as described in the No Action Alternative.

4.16.2.3 Leading Economic Sectors

The Proposed Action would have little to no impact on the affected area's leading economic activity. Economic activity would continue to grow and change as described in the No Action Alternative.

4.16.2.4 Labor Force and Employment

The Proposed Action would have no impact on the labor force and employment conditions of the project area. Growth or shrinkage of the labor force and changes in the employment status of residents in the project area would continue to occur as described in the No Action Alternative.

4.16.2.5 Personal Income

The Proposed Action would have no impact on the income of residents within the project area. Any changes to personal income over the life of the project would be similar to those described in the No Action Alternative.

4.16.2.6 Tourism

The Proposed Action would have little to no impact on the region's tourism industry. During the construction period, any boating excursions in the vicinity of the project may be disrupted or detoured due to construction. Otherwise, the tourism projections made in the No Action Alternative would apply to this alternative, as well.

4.16.3 Alternative 2

The impacts of Alternative 2 on socioeconomics would be similar to those experienced under the Proposed Action.

4.17 Recreational Resources

4.17.1 No-Action Alternative

Under the No-Action Alternative, continued land erosion and subsidence is likely to increase open water areas. Recreational fishing opportunities would be indirectly impacted by the resulting effect on spawning, nursery and foraging habitats. Current maintenance dredging operations would continue and impacts to recreational resources would include altering productive fishing grounds and short-term increases in turbidity, although reductions in the numbers of important species are not expected. Fish would avoid direct dredging impacts from continued maintenance dredging of the exiting channel by swimming away from the disturbance. Recreational fishing opportunities in the vicinity of maintenance dredging would likely temporarily decrease. The channel would continue to be maintained at its present dimensions. Recreational navigation activity would be expected to continue along historical trends.

4.17.2 Proposed Action: Alternative 3

The impacts of construction dredging on recreational resources would be similar to those experienced under the No-Action Alternative. Recreational vessels may experience some additional delays that arise during construction of the MSC. Because recreational vessels tend to be small, there will be no offsetting benefits to those vessels from a larger channel to reduce these delays. However, the Proposed Action is not expected to have a significant effect on existing recreational navigation uses.

The Proposed Action would have primarily positive impacts on recreation in the study area. Placement of dredged material would enhance public beaches and protect recreational areas and enhance the Sundown bird rookery. During placement of dredged material adjacent to beaches, and Sundown Island, there would be minor disruption to use of the public beaches and to recreational fishing in the vicinity of the project activities. No impacts are expected to birds on Sundown Island as all material will be placed in open water usually during the non-nesting season. The placement of dredge material is likely to result in more nesting sites on the island.

Temporary and minor adverse effects to the recreational fishery may result from altering or removing productive fishing grounds and interfering with fishing activity during construction and maintenance dredging. However, no significant impacts to food sources for nekton are likely; thus, recreational fishing would not be expected to suffer from reductions in the numbers of important species. Repeated dredging and placement operations for channel maintenance may temporarily reduce the quality of recreational fisheries in the vicinity of construction and dredging operations. This may result from decreased water quality and increased turbidity during dredging as well as from a loss of attractiveness to game fish resulting from loss of benthic prey. This condition is not permanent, and the quality of fishing in the vicinity of the channel should steadily improve after dredging is completed.

4.17.3 Alternative 2

The impacts of construction dredging on recreational resources would be similar to those experienced under the beach restoration portion of the Proposed Action but for a 498-acre area.

5.0 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The USACE is obligated under Engineer Regulation (ER) 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of proposed actions. ER 1165-2-132 identifies that HTRW policy is to avoid the use of project funds for HTRW removal and remediation activities. An ASTM E 1527-05 Phase 1 Environmental Site Assessment (ESA), HTRW 17-01 dated November 16, 2017, has been completed for the project area. The Phase I ESA identified one recognized environmental condition (REC) – a Formerly Used Defense Site (FUDS) within which the Matagorda Ship Channel Deficiency Study is located. Three plugged dry-hole oil & gas wells were identified within or near the study area; these are considered to be potential RECs.

A Final Site Inspection Report for the Former Matagorda Peninsula Bombing Range was completed in August 2007 as part of a FUDS investigation. The August 2007 report noted that munitions and explosives of concern (MEC) were collected in 1946 and that no additional MEC has been recovered since then and no incidents have been recorded. Soil samples were collected at locations within the FUDS, including the west shore of the Matagorda Ship Channel, and analyzed for munitions constituents (MC). None of the MC was detected above ambient soil concentrations in the sample that was collected along the west shore of the ship channel. It was also noted that no MEC was identified during the construction of the current ship channel during the 1962 and 1966 time frame.

The three plugged dry-hole oil & gas wells within or near the study area have been plugged for several years and are likely to not impact the project.

CEMVN personnel made a field inspection of the study area on April 13, 2017 and again on November 2, 2017. No signs of HTRW were found. The records and database searches identified one FUDS and three potential RECs. However, based on information gathered during the Phase I ESA, there is a low probability of encountering MEC or HTRW at this site. No further HTRW investigation related to the proposed project is necessary, and the project may proceed as scheduled.

6.0 MITIGATION

Based on the current level of data, the potential for encountering historic properties that require mitigation is low to moderate. The mitigation of historic properties may be necessary following an evaluation of impacts to any historic properties identified during survey investigations of the APE. It is anticipated that any historic properties encountered will most likely be terrestrial or submerged archeological sites. Archeological historic properties would require data recovery excavations or avoidance.

An assessment of the potential environmental impacts to important resources found that the Proposed Action would remove 82 acres (40.07 AAHUs) of barrier island habitat of which 0.85-acre is piping plover critical habitat. Other impacts would be mainly related to the loss of shallow open water bottom habitat and associated fisheries resources, and wildlife displacement due to construction activities as part of the Proposed Action. The presence of comparable habitat within the project vicinity minimizes the loss of shallow open water bottom habitats due to the Proposed Action. Furthermore, any loss of fisheries resources related to the removal of shallow open water bottom by placement of dredged material are out-weighed by the considerable wildlife and fisheries benefits anticipated from the beneficial use of material dredged, which would potentially create up to approximately 300 acres (17.01 AAHUs) of beach/dune habitat and 51 acres (30.58 AAHUs) of Sundown Island expansion. The Proposed Action would provide a total of 47.59 AAHUs with both the beach and Sundown Island PAs. Once constructed and when these areas start eroding productive wetlands including beach, dune, scrub/shrub, marsh, marsh-related EFH (e.g., marsh edge, inner marsh, tidal creeks, marsh/water interface, etc.), and other aquatic habitat in the surrounding waters would be created. With the creation of marsh and other productive habitat types in the proposed beneficial use placement areas, the long-term and cumulative impacts of the placement of dredged material are generally beneficial. Beneficial utilization of the dredged material for beach/dune restoration and Sundown Island expansion would result in overall positive environmental benefits including a net increase of valuable breeding, nesting, foraging, and cover habitat utilized by a wide variety of fish and wildlife species; therefore, no wetlands mitigation is required for the proposed project activities. This determination is consistent with the recommendations of the USFWS Planning Aid Letter (PAL) for the MSC Deficiency Project.

7.0 CUMULATIVE IMPACTS

Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Impacts include both direct effects (caused by the action and occurring at the same time and place as the action), and indirect effects (caused by the action but removed in distance and later in time, and reasonably foreseeable).

The economy of Port O'Connor, Texas, is deeply rooted in tourism, commercial fishing, and marine commerce. As a result of a long history of continuing urbanization and commercialization, both land and water resources in the project vicinity have been altered. Past and present projects involving alterations of land and water within the vicinity of the MSC Deficiency Project include the original construction and maintenance of the MSC, the original construction and maintenance of the nearby GIWW, development and ongoing modification of private dwellings on Matagorda Island, and oil &

gas exploration.

Reasonably foreseeable future projects in the vicinity of the project include improvements to infrastructure and the existing MSC navigation channel. A few representative projects are listed below.

1) Matagorda Ship Channel, TX Section 216 – Review of Completed Projects Draft Integrated Feasibility Report and Environmental Impact Assessment
2) GIWW maintenance
3) Matagorda Island residential development

From a NEPA standpoint, proposed bottleneck removal between the jetties would occur within an area that has undergone channel construction and maintenance dredging in the past as well as residential development. As such, the area is considered a disturbed area with little to no vegetated shoreline because of previous placed stone and poor quality benthic and open water habitats compared to other areas of the open bay.

Dredged material generated from the construction and maintenance of the MSC Deficiency project would be placed in two open water PAs (Figures 4 and 5), that would have minimal impacts to terrestrial and aquatic resources. Any impacts associated with the proposed MSC Deficiency project would involve only minor, temporary or short-term impacts during the duration of project construction.

The project would temporarily displace fish and wildlife species and marine benthic organisms during construction activities. Mobile fish and wildlife species would relocate to nearby suitable habitat. Much of the benthic substrate in the project footprint is poor quality disturbed habitat due to the vessel traffic. As such, impacts to the benthic population from construction of the project are considered negligible.

The water column and water quality would be temporarily affected by turbidity during construction activities during periodic maintenance dredging north of the entrance. The MSC Deficiency project would have long term beneficial impacts on the socioeconomics of tenants and customers in the project area by eliminating vessel wait time of the existing vessels calling on the port facilities.

In conclusion, the anticipated adverse impacts of the proposed project to human health and the environment are minimal and would not significantly contribute to the cumulative effects of past, present, and future projects within the project vicinity. The result of the project would provide a safer navigation channel for the port and the public.

8.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Environmental compliance for the proposed action would be achieved upon coordination of this EA and draft Finding of No Significant Impact (FONSI) with appropriate agencies, organizations, and individuals for their review and comments; receipt and acceptance or resolution of all USFWS threatened and endangered species coordination; NMFS, Habitat Conservation Division EFH recommendations; and receipt and acceptance or resolution of all TCEQ comments. A Coastal Zone Consistency Determination was submitted to the Texas General Land Office and is being reviewed.

The Proposed Action would be undertaken in a manner consistent with the goals and priorities of the Texas Coastal Management Program which was developed in compliance with the Coastal Zone Management Act of 1972. The Texas General Land Office concurred in a letter dated . A USFWS Planning Aid Letter was received on February 15, 2018. The Coastal Barrier Resources Act of 1982 established the Coastal Barrier Resources System to minimize the loss of human life, wasteful Federal expenditures, and damage to fish, wildlife, and other natural resources associated with coastal barriers. The Coast Barrier Improvement Act of 1990 was enacted to reauthorize the Coastal Barrier Resources Act (CBRA) of 1982. The act defines coastal barriers as "bay barriers, barrier islands, and other geological features composed of sediment that protect landward aquatic habitats from direct wind and waves." As part of the program, the Federal government refrains from spending money that encourages development on designated undeveloped coastal barriers. The Proposed Action includes features that are located within portions of Coastal Barrier Resources System (CBRS) units T-07 and T-07P. The entire bottleneck on the Matagorda Peninsula and the beach beneficial use PA is located in CBRA unit T-07. The entire PA adjacent to Sundown Island is located in CBRA unit T-07P. A federal expenditure is allowable within the CBRS, if it meets any of the exceptions (16 U.S.C. § 3505(a)(1)-(5)). The Proposed Action meets the meets the following 6(a)(2) exception:

- The maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant System unit or portion of the System unit was included within the CBRS.

The Proposed Action also satisfies the three purposes of the CBRA; which are to minimize the loss of human life, wasteful expenditure of Federal revenues, and damage to fish, wildlife and other natural resources associated with coastal barriers. The proposed project would provide a safer navigation channel, reduce potential vessel collisions and oil spills, and benefit wildlife habitat. The proposed project is not intended to and will not encourage development in the coastal zone.

The MSC was authorized by the River and Harbor Act of 1958. The USACE has determined that the proposed MSC Deficiency Proposed Action meets the above referenced exception and is consistent with the CBRA. The USACE continues to coordinate with USFWS and will consider USFWS comments and take all appropriate steps necessary to assure CBRA compliance.

Compliance with the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 306108), requires the consideration of effects of the undertaking on all historic properties in the project area and development of mitigation measures for those adversely affected properties in coordination with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation. It has been determined that there is a potential for new construction, improvements to existing facilities, and maintenance of existing facilities to cause effects to historic properties. Therefore, in accordance with 36 CFR 800.14, the USACE will execute a Programmatic Agreement among the USACE, the Texas SHPO, and any non-federal sponsors to address the identification and discovery of cultural resources that may occur during the construction and maintenance of proposed or existing facilities. The USACE will also invite the Advisory Council on Historic Preservation (ACHP) and Native American tribes to participate as signatories to the Programmatic Agreement. A draft of the Programmatic Agreement is provided in Appendix C.

9.0 CONCLUSION

This EA has been prepared to evaluate the environmental impacts associated with the proposed bottleneck removal between the jetties of the MSC and utilization of dredged material PAs located adjacent to the west jetty and adjacent to Sundown Island in order to reduce currents and channel shoaling. Dredging and placement would impact 82 acres of barrier island habitat and 0.85-acre of piping plover critical wintering habitat. Beneficial use placement of dredged material could result in temporary, minor, adverse impacts to aquatic resources, wildlife, water quality, air quality, noise, essential fish habitat, fisheries, and recreational activities in the immediate project area. The threat of introducing aquatic nuisance species is low. Based on information gathered during the Phase I Environmental Site Assessment, there is a low probability of encountering MEC or HTRW at this site.

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Appendix A

Salinity Flow Scenarios
Estimated Shoreline Recession

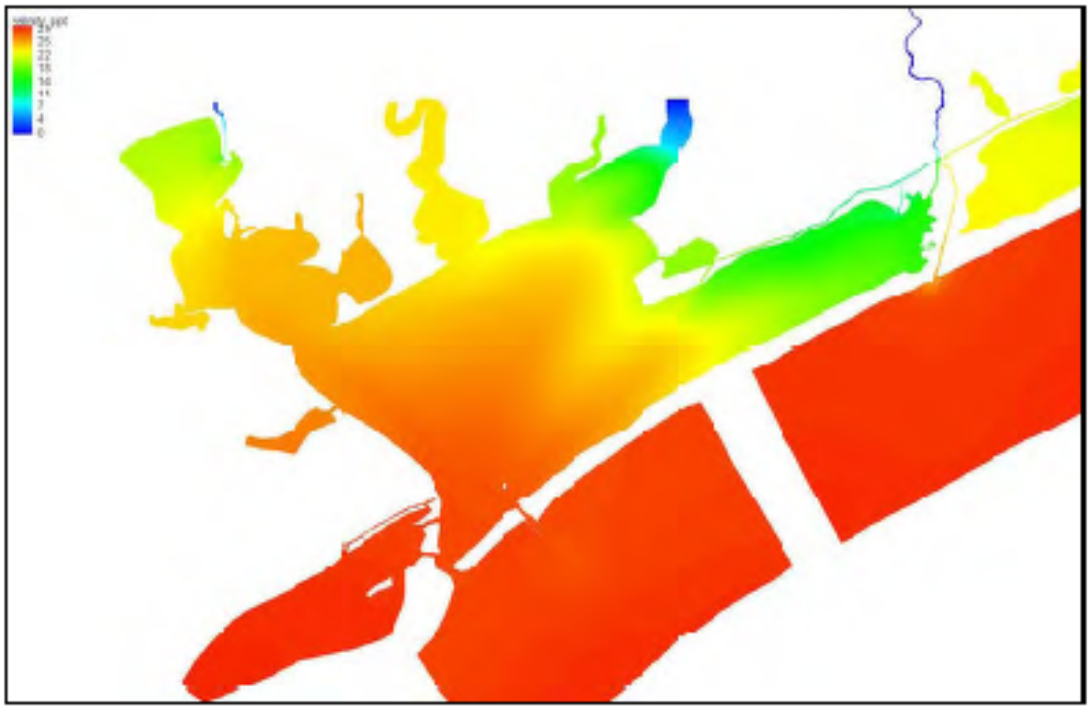


Figure 1. Annual Average Salinity for Existing Configuration, Low Flow Scenario

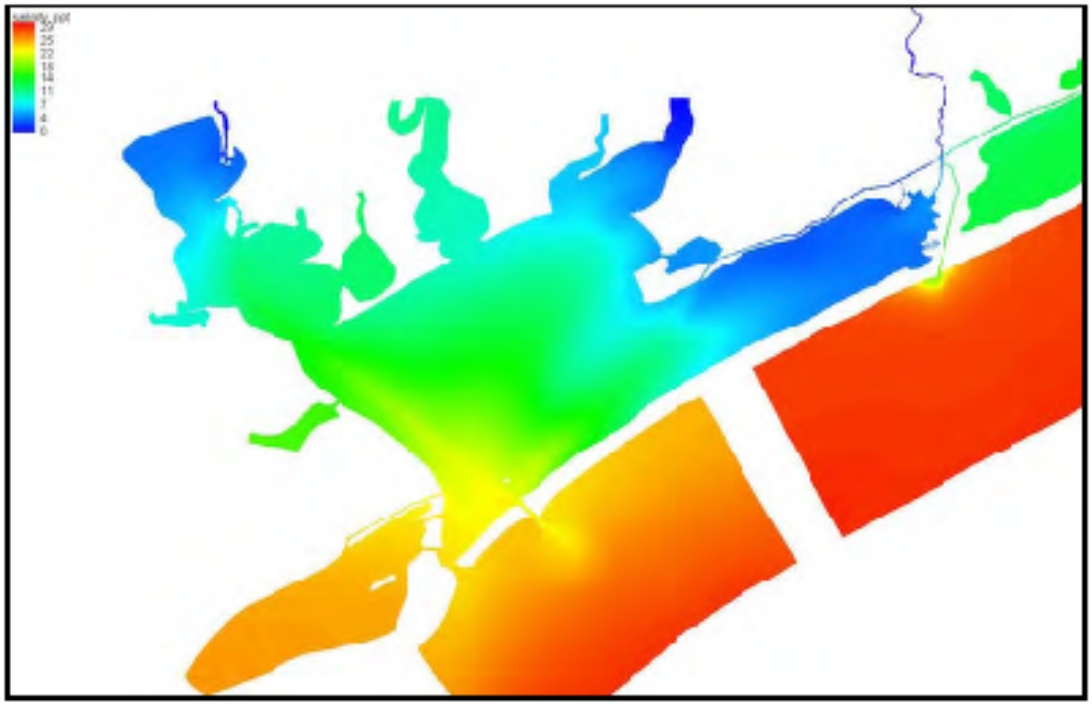


Figure 2. Annual Average Salinity for Existing Configuration, Medium Flow Scenario

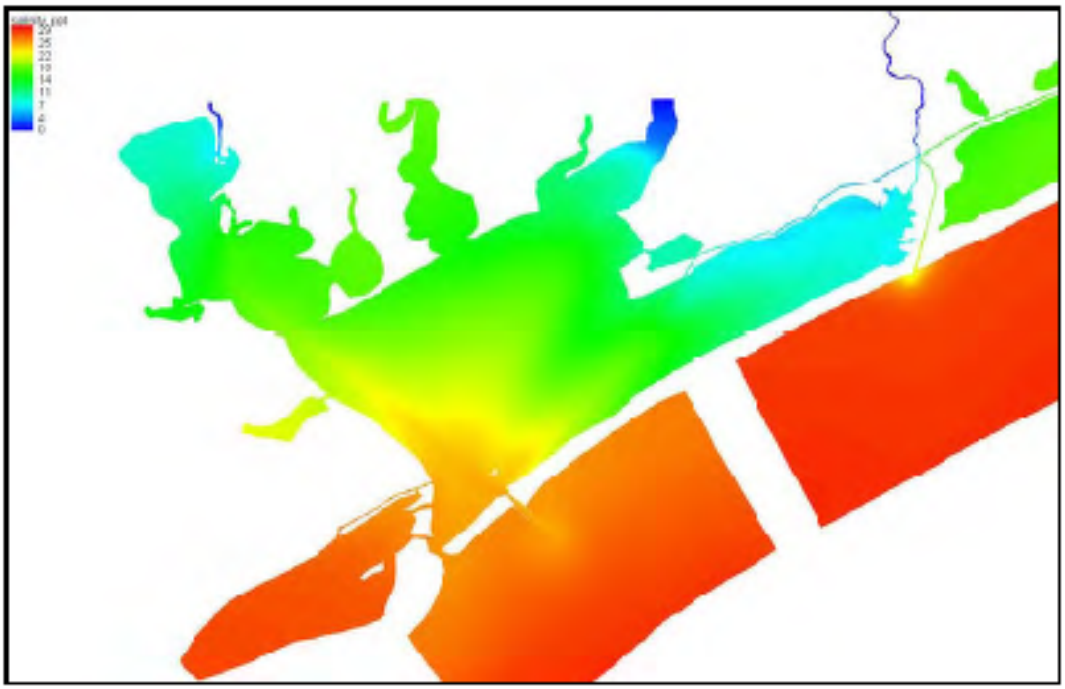


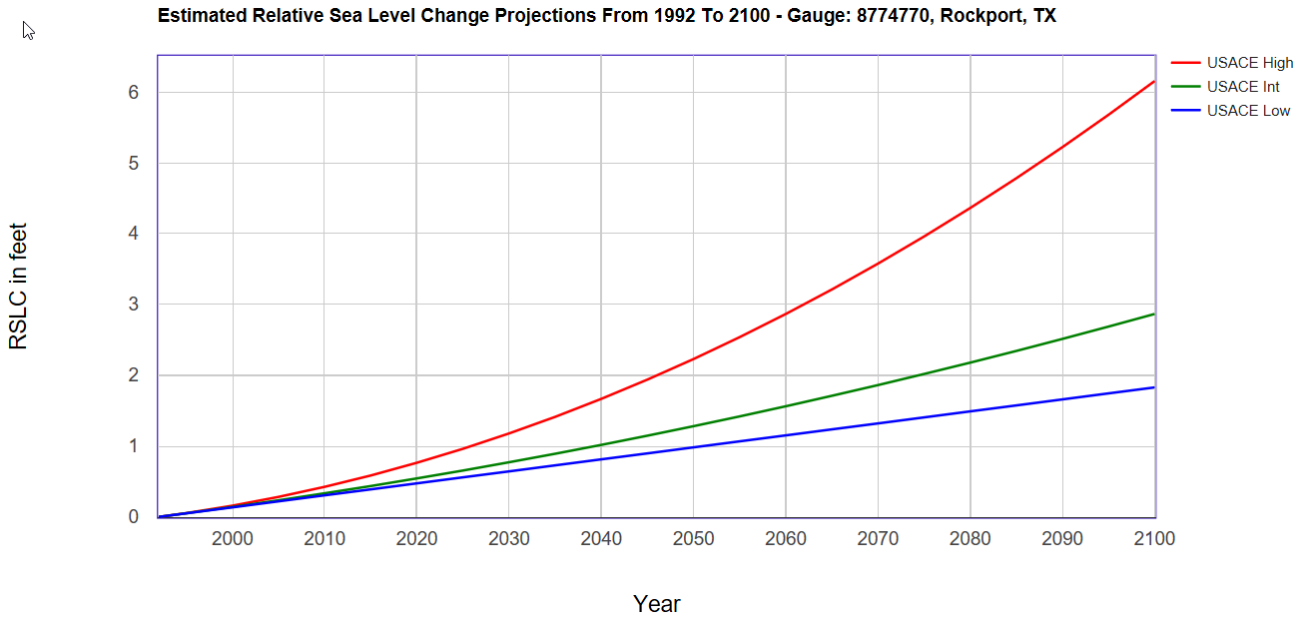
Figure 3. Annual Average Salinity for Existing Configuration, High Flow Scenario

Table 3
Estimated Shoreline Recession Due to Sea-Level Rise, Matagorda Peninsula[1]

Interval, year	Recession, ft
1	1
5	6
10	11
25	29
50	57
75	86
100	115

[1] Assumed foreshore slope of 0.015 and rate of sea-level rise of 1.72 ft/century.

Estimated Shoreline Recession Due to Sea-Level Rise, Matagorda Peninsula



Estimated Sea-level rise.

APPENDIX B

Biological Assessment

APPENDIX C

Programmatic Agreement

Appendix D

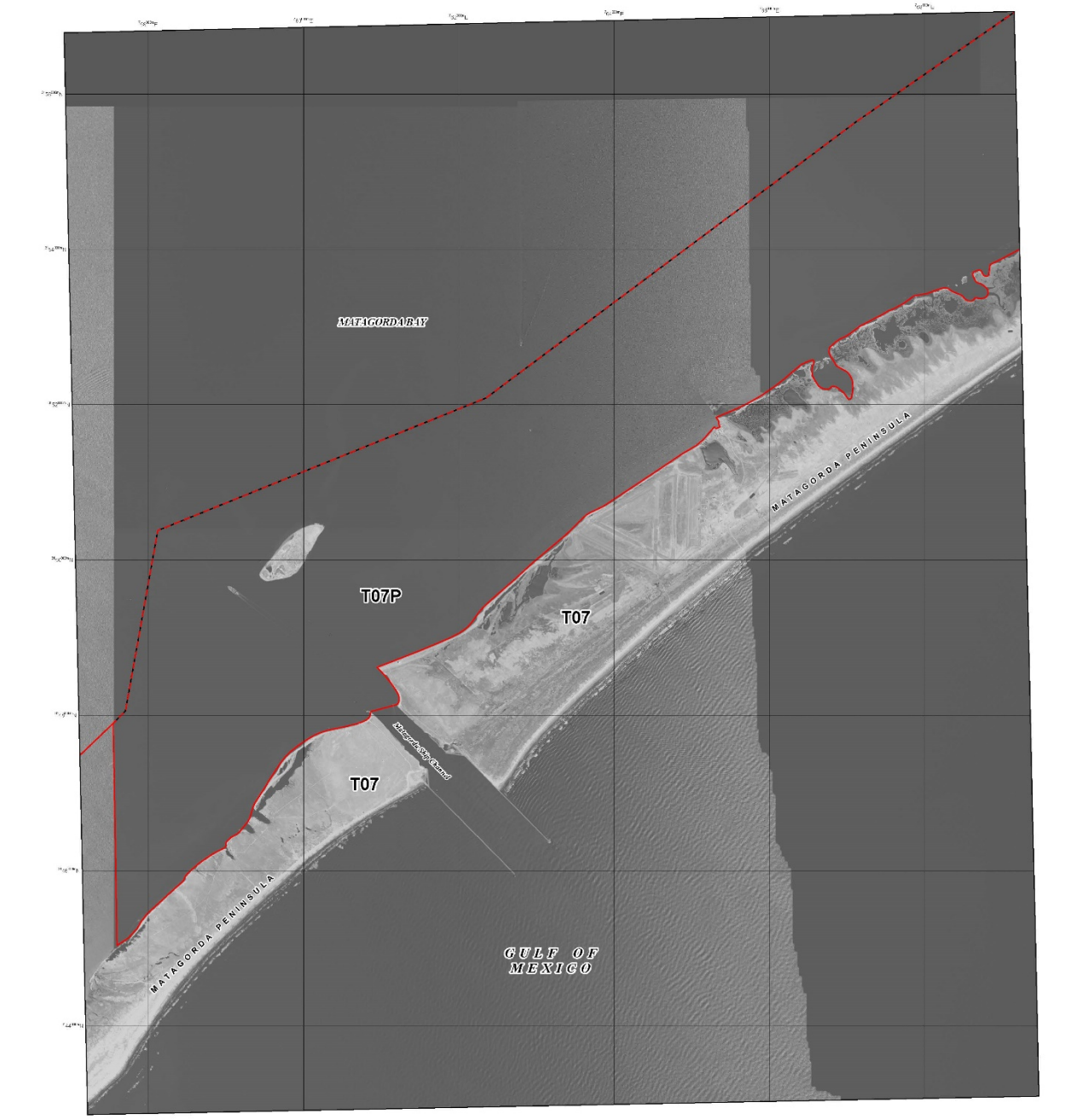
Section 404 (b) (1) Evaluation

APPENDIX E

Coastal Management Program Consistency Determination

APPENDIX F

CBRA Unit Map



JOHN H. CHAFEE COASTAL BARRIER RESOURCES SYSTEM

This map has been produced by the U.S. Fish and Wildlife Service as authorized by Section 4(c) of the Coastal Barrier Resources Act (CBRA) of 1982 (Pub. L. 97-348), as amended by the Coastal Barrier Improvement Act of 1990 (Pub. L. 101-591). The CBRA requires the Secretary of the Interior to review the maps of the Coastal Barrier Resources System (CBRS) at least once every 5 years and make any minor and technical modifications to the boundaries of the CBRS units as are necessary solely to reflect changes that have occurred in the size or location of any CBRS unit as a result of natural forces.

Matagorda Peninsula Unit T07/T07P (6 of 7)

System Unit Boundary

Otherwise Protected Area (OPA) Boundary; OPAs are identified on the map by the letter "P" following the unit number

Approximate State Boundary

$^{4}18^{XXm}E$ 2000- meter Universal Transverse Mercator grid values, zone 14N