

Matagorda Ship Channel Improvement Project, Port Lavaca, Texas Final Validation Report and Supplemental Environmental Impact Statement, Calhoun and Matagorda Counties, Texas

June 2026



P2 – 451954

**US Army Corps
of Engineers®**
Galveston District

Matagorda Ship Channel Improvement Project

Final Integrated Validation Report / Supplemental Environmental Impact Statement

Lead Agency: U.S. Department of the Army, Corps of Engineers – Galveston District

Cooperating Agencies: National Marine Fisheries Service; U.S. Coast Guard; U.S. Environmental Protection Agency; Natural Resource Conservation Service

Participating Agencies: Texas Parks and Wildlife Department, Texas Commission of Environmental Quality, Texas Water Development Board, Texas Department of Transportation, Texas General Land Office

Title: Matagorda Ship Channel Improvement Project, Calhoun and Matagorda, Texas

State Involved: Texas

Abstract: Due to differences between the 2019 authorized plan calculations and actual dredge quantities, a Validation Report, a type of Post-Authorization Change Report, with a Supplemental Environmental Impact Statement (SEIS) was deemed appropriate to reanalyze the Recommended Plan, Alternative A at three scales and determine which depth is the plan that maximizes net benefits. The 2026 final integrated Validation Report and Environmental Impact Statement (V/SEIS) documents the changes and updates from the 2019 final Feasibility Report / Environmental Impact Statement.

The U.S. Army Corps of Engineers Galveston District (USACE), in partnership with the Calhoun Port Authority, is proposing to widen and deepen the Matagorda Ship Channel. This effort aims to improve port efficiency, reduce transportation costs, and enhance navigational safety by addressing limitations in the channel's current width and depth. The 2026 final V/SEIS evaluates and compares three different potential depths and widths of the ship channel. The recommended scale would include a deepening to -47 feet (ft) mean lower low water (MLLW) and widening of bottom width to 300 ft of the main channel, deepening to -49 ft MLLW and widening of bottom width to 550 ft of the entrance channel, and a 1,200-foot diameter turning basin in Lavaca Bay. The 2026 final V/SEIS evaluates effects to the full spectrum of cultural, social, and biological resources. The 2026 final V/SEIS also documents measures to avoid, offset, or minimize impacts to resources affected by the Recommended Plan. At the completion of the final V/SEIS, and upon approval by the Chief of Engineers of the United States Army, a plan would be recommended to Congress for authorization and funding. If authorized and/or funded by Congress, subsequent phases of the project would include Preconstruction Engineering and Design; Construction; and Operations, Maintenance, Repair, Replacement and Rehabilitation.

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Visit the project website: <https://www.swg.usace.army.mil/Projects/Matagorda-Ship-Channel-Improvement-Project/>



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
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EXECUTIVE SUMMARY

STUDY DESCRIPTION

The 2019 Matagorda Ship Channel Improvement Project (MSCIP), Port Lavaca, Texas, Feasibility Report and Environmental Impact Statement (F/EIS), Review of Completed Projects, Calhoun and Matagorda Counties study was a Section 216 – Review of Completed Projects study.

The Recommended Plan included deepening the main channel to -47 feet (') with an addition of a new 1,200' turning basin in the Lavaca Bay reach to accommodate the larger vessels needing to navigate to and from the Port of Calhoun (the Port). This plan also included extending the entrance channel 13,000' further into the Gulf to allow for deepening to -49', as well as dredging a 1,600-ft long sediment trap in the area of the offshore bar. This improvement would allow larger and deeper draft ships to navigate the channel.

Due to differences between the 2019 authorized plan calculations and actual dredge quantities, a Validation Report, a type of Post-Authorization Change Report (PACR), with a Supplemental Environmental Impact Statement (SEIS) was deemed appropriate to reanalyze Alternative A at three scales and determine which depth is the plan that maximizes net benefits.

VALIDATION REPORT PURPOSE

The purpose of this Validation Report and Supplemental Environmental Impact Statement (V/SEIS) is to evaluate the original project under current policies, criteria and guidelines and present the results of the analyses undertaken.

NOTE: Unless otherwise specified, information in this document is considered to be accurate for both the 2019 F/EIS and for the 2025 V/SEIS.

The U.S. Army Corps of Engineers (USACE) has prepared this Supplemental EIS in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] § 4321, et seq.), the USACE NEPA implementing regulations (33 Code of Federal Regulations [C.F.R.] part 230), and the Council on Environmental Quality (CEQ) 2020 NEPA implementing regulations, as amended in 2021 (40 C.F.R. parts 1500 – 1508). The CEQ has provided notice in the Federal Register dated February 25, 2025, to initiate eventual removal of their NEPA regulations at 40 C.F.R. Parts 1500 – 1508. However, the preparation of this SEIS began, and the Notice of Intent (NOI) was published, prior to the CEQ's notice. As such, this SEIS continues to reference the 2020 CEQ NEPA regulations, as amended in 2022, that were in effect when this SEIS was prepared.

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AUTHORITIES

The 2019 MSCIP F/EIS was conducted in response to Section 216 of Public Law 91-611, 91st Congress, House Resolution 19877, dated 31 December 1970, which reads as follows:

“The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.”

The 2025 MSCIP V/SEIS is being conducted in accordance with PL 99-662; Title IX – General Provision, Water Resources Development Act (WRDA) 1986.

“In order to insure against cost overruns, each total cost set forth in this Act, or an amendment made by this Act, for a project shall be the maximum cost of the project, except that such maximum amount—(1) may be increased by the Secretary for modification which do not materially alter the scope or functions of the project as authorized, but not by more than 20percent of the total cost stated for the project in this Act or in an amendment made by this Act; and (2) shall be automatically increase for—(A) changes in construction costs applied to unconstructed features...from the date of enactment of this Act...as indicated by engineering and other appropriate cost indexes; and (B) additional studies, modifications, and actions (including mitigation and other environmental actions) authorized by this Act or required by changes in Federal law.”

The original authorization for the construction of the MSC comes from PL 85-500, 85th Congress, TITLE I – RIVER AND HARBOR ACT dated 3 July 1958, which reads in part:

“Sec. 101. That the following works of improvement of rivers and harbors and other waterways for navigation...are hereby adopted and authorized to be prosecuted under the directions of the Secretary of the Army and supervision of the Chief of Engineers, in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in the respective reports hereinafter designated: Provided, That the provisions of section 1 of the River and Harbor Act approved March 2, 1945 (PL 14, 79th Congress, 1st session), shall govern with respect to projects authorized in this title; and the procedures therein set forth with respect to plans, proposals, or reports for works of improvement for navigation...shall apply as if herein set forth in full:

Texas. Matagorda Ship Channel, Port Lavaca, Texas, at an estimated cost of \$9,944,000.”

PURPOSE AND NEED STATEMENT

The purpose of the MSCIP is to increase operational efficiencies of maritime commerce movement through the MSC, Matagorda and Calhoun Counties, Texas. A variety of products are transported along the MSC, including crude oil, chemicals, and allied products. The need for the MSCIP is due to increasing levels of maritime traffic, increasing vessel size, and a growing number of channel users active in the oil and petrochemical industry, resulting in larger vessels utilizing the port and light loading. The need has been derived from an analysis of current and projected vessel transits, cargo tonnage, and capacity at existing and proposed terminal

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facilities as summarized below. Expanding channel dimensions can help to reduce or eliminate light loading for cargo vessels, and allow for larger cargo vessels, which have been unable to transit the existing channel configuration, to use of the Port and adjacent facilities.

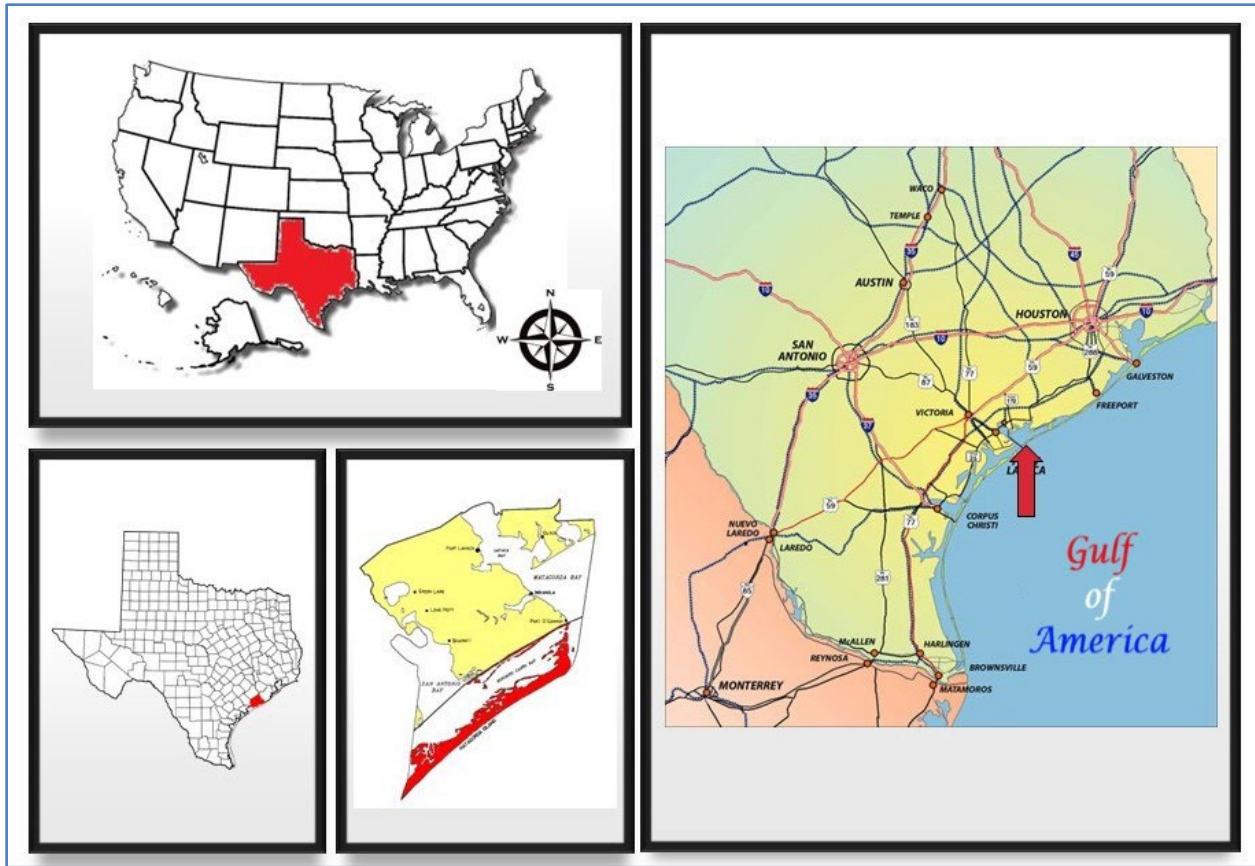
Since the construction of the existing Matagorda Ship Channel, vessels in the world fleet have become larger in every dimension – they are wider, longer, and have additional depth capacity, requiring deeper sailing drafts. To maintain safety, existing vessels transiting Matagorda Ship Channel are only able to load to a fraction of their designed capacity due to the channel's existing dimensions. This results in more vessels transiting to carry a given quantity of goods, leading to increased transportation costs that are passed on to the consumer. Eventually, depth and width limitations in the Matagorda Ship Channel will prevent larger vessels from calling in the future.

The Matagorda Ship Channel is regionally significant, supporting over 48,000 jobs with an impact of \$2.6 billion a year in overall personal income. Matagorda Ship Channel moved about 5.1 million tons of cargo annually between 2019 and 2023 (Waterborne Commerce Statistics Center). The vessels currently transiting the harbor have drafts of over 40 feet when fully loaded. With channel depth at a maximum of -38 feet MLLW in the harbor, these vessels are required to light load or perform reverse lightering operations, increasing transportation costs.

SCOPE

The scope of the study area includes the entire MSC, which is being evaluated for current and projected vessel size and traffic. Beginning at the Gulf of America (Gulf) end of the MSC, the study examines various management measures to provide for safe and efficient navigation opportunities, including both non-structural and structural measures. The channel extends from offshore in the Gulf through Matagorda Bay and Lavaca Bay to the Port.

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ES Figure 1 – Calhoun County, Texas

LOCATION

The study area encompasses the 26-mile existing Federal MSC located 125 miles southwest of Galveston, Texas and 80 miles northeast of Corpus Christi, Texas. The channel extends from offshore in the Gulf through Matagorda Bay and Lavaca Bay to the Port.

The northern reach of the MSC is located in Calhoun County (ES Figure 1) and the southern reach and entrance channel are in Matagorda County (ES Figure 3). The MSC is comprised of an entrance channel about four miles long from the Gulf through a man-made cut across Matagorda Peninsula, with dual jetties at the entrance from the Gulf. The Gulf Intracoastal Waterway (GIWW) intersects the channel approximately 2.5 miles north of the cut through Matagorda Peninsula. The bayside channel is about 22 miles long across Matagorda and Lavaca Bays to Point Comfort with a turning basin at the Port (ES Figure 2)

SPONSOR

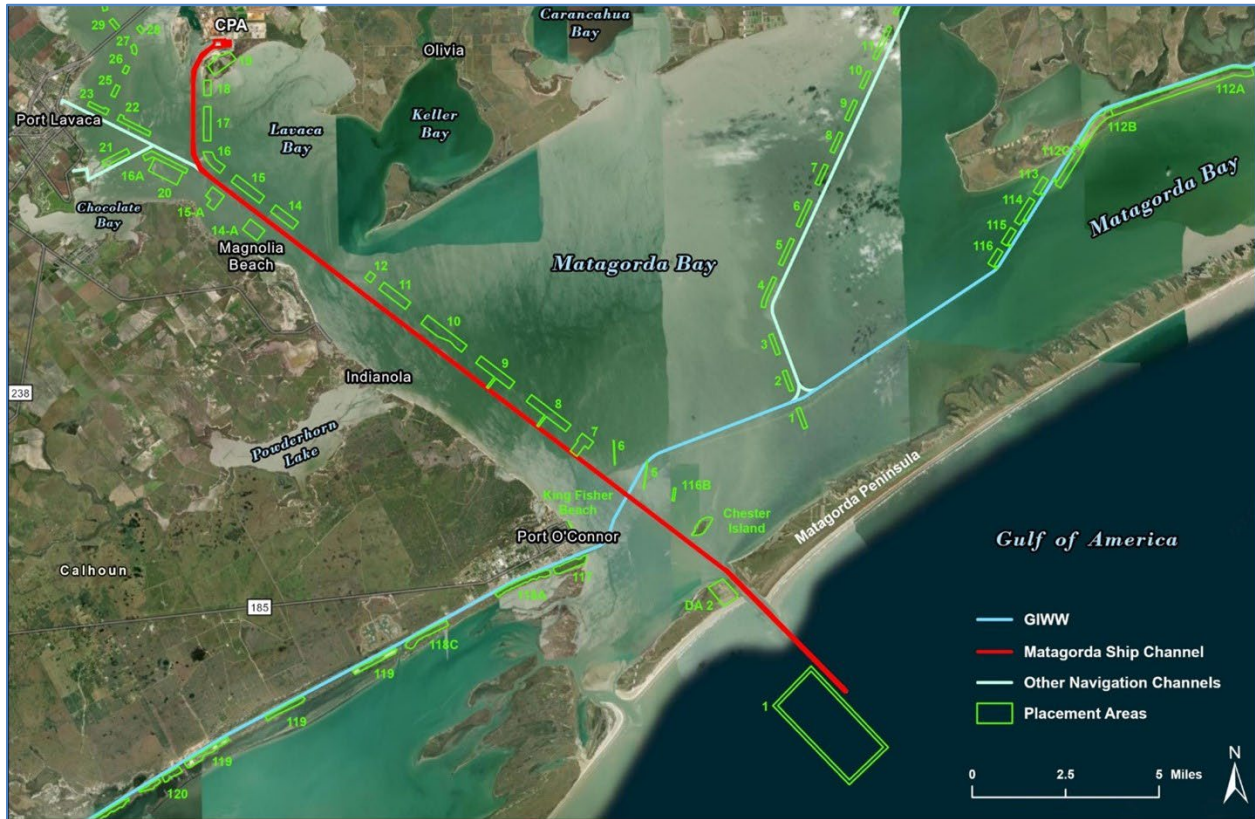
The non-Federal sponsor for the study is the Calhoun Port Authority, formerly known as the Calhoun County Navigation District, of Point Comfort, Texas.

PROBLEMS

- The existing designed channel depth limits channel use to vessels whose drafts are -38' Mean Lower Low Water (MLLW) or less.
- Vessels that require deeper drafts cannot come into the Port fully loaded.

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- The existing designed channel bottom width is 200' and limits channel use to a single vessel with a maximum width (beam) of 109'.
- The existing designed channel bottom width is 200' and leaves little room for pilot error during times of high winds, waves, or changes in shoaling. Pilots would only move vessels through the MSC with a length overall (LOA) of 639' or longer during daylight.
- The existing designed turning basin (1,000' by 1,000') (Figure 7) limits the size of vessels which can call on the Port facilities



ES Figure 2 – Current Matagorda Ship Channel with DMMP

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OPPORTUNITIES

- To modify the existing turning basin so it can accept larger vessels with larger transport capacities.
- To modify the existing designed channel such that the Pilots feel it is safe for themselves, vessel's crews and the environment to move these, and larger vessels, during nighttime hours.
- To modify the existing designed channel so that deeper draft vessels can come into Port fully loaded.
- To modify the existing designed channel such that deeper draft vessels do not have split their cargoes before coming to Port.
- To modify the existing designed channel such that it can accept vessels whose drafts are greater than -38' MLLW.
- To increase the Nation's Trade, Energy and Defense capabilities.

2025

- To strengthen national security by boosting energy exports, improving our energy trade balance with allies, and supporting defense priorities as outlined in Executive Order 14156 Declaring A National Energy Emergency. The EO emphasizes the need for a reliable, diversified, and affordable energy supply to sustain our manufacturing, transportation, agriculture, and defense industries. It also highlights the urgent importance of maintaining and expanding our energy infrastructure to protect national and economic security. The MSCIP project is expected to enable the Assistant Secretary of the Army and the Secretary of Commerce to leverage their emergency authorities to facilitate the transportation, refining, and generation of domestic energy resources.

SPECIFIC PLANNING OBJECTIVES

2019

- Improve the navigational efficiency of the deep-draft navigation system over the period of analysis (2024 – 2073)
- Improve the operational safety of the deep-draft navigation system over the period of analysis (2024 – 2073)

2025

- Contribute to the Nation's Trade, Energy and Defense goals.

NOTE: The new base year is 2030 with a 50-year period of analysis of 2030 – 2079.

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ES Figure 3 – Matagorda County, Texas

FINAL ARRAY OF ALTERNATIVE PLANS

ES Table 1 – 2019 Final Array of Alternatives

Alternative	Scale Depth	Width
	Main / Entrance (MLLW)	Main / Entrance
No Action Plan	-38' / -40'	200' / 300'
A	-41' / -43'	300' / 550'
	-43' / -45'	300' / 550'
	-45' / -47'	300' / 550'
	-47' / -49'	300' / 550'

NOTE: The two deepest 2019 scales of Alternative A (-49/-51' and -51/-53') were removed from consideration as the NFS cannot deepen the existing turning basin deeper than -47' MLLW.

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ES Table 2 – 2025 Final Array of Alternatives

Alternative	Scale Depth	Width
	Main / Entrance (MLLW)	Main / Entrance
No Action Plan	-38' / -40'	200' / 300'
A	-43' / -45'	300' / 550'
	-45' / -47'	300' / 550'
	-47' / -49'	300' / 550'

Turning basin dimensions are the same for both the 2019 and 2025 designs.

ES Table 3 – 2025 Final Array of Alternatives, Project First Costs

–	Cost at -43'/-45'	Cost at -45'/-47'	Cost at -47'/-49'
TOTAL PROJECT FIRST COST	\$471,248,000	\$538,111,000	\$615,567,000
October 2025 Price Level			

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Summaries of the existing condition (affected environment) and the environmental consequences for various resources are in ES Table 4. The existing condition, also known as the affected environment, provides a “snapshot” in time and lays the foundation for evaluating the potential environmental impacts to existing resources. The environmental consequences provide an evaluation of the potential environmental effects or impacts of the no action alternative (future without project [FWOP]) and proposed action or recommended scale (future with project [FWP]). The no action alternative (FWOP) forms the basis against which other alternative plan is measured. The proposed recommended scale would consist of deepening the MSC to -47 ft MLLW and widening of bottom width to 300 ft of the main channel, deepening to -49 ft MLLW and widening of bottom width to 550 ft of the entrance channel, and the placement of the dredged material as described in the Dredged Material Management Plan (Appendix E – DMMP) which represents the largest scale and therefore would disclose the greatest effects associated with proposed recommended scale.

Impacts to the oyster habitat would result in significant, long term, unavoidable impacts and therefore compensatory mitigation would be required. To offset impacts to oyster habitat (approximately 94.8 acres), approximately 95 acres of oyster habitat would be created by constructing oyster pads using clean crushed, limestone or concrete (Figure 62). The draft Mitigation Plan outlining the habitat modeling and proposed mitigation can be found in Appendix B-1. To address impacts to cultural and historic resources, USACE executed a Programmatic Agreement which is designed to identify appropriate avoidance, minimization or mitigation actions (see Appendix B-4). The PA was executed in 2020 and does not expire until 2030.

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ES Table 4 – Summary of Existing Condition and Environmental Consequences

Resource	Existing Conditions	No Action Alternative	Proposed Recommended Scale
Topography, soils, geology, and groundwater	The project area is mostly open water (90%) with adjacent flat terrain on the West Gulf Coastal Plain, featuring bluff banks formed by wave erosion. Soils consist of loams, clays, and sands, with areas of prime farmland identified in Calhoun and Matagorda Counties. Geologically, the region lies within the Gulf Coast geosyncline, underlain by the Beaumont Formation and Quaternary Alluvium, with offshore sediments transitioning from sand to mud. Groundwater withdrawal is not a major issue, though localized subsidence (0.8-0.9 ft.) has occurred due to oil and gas extraction nearby.	Same or similar to existing condition.	Minor effects to topography and soils due to dredging activities and no impacts to geology, and groundwater
Coastal Hydrology and Hydraulics	Matagorda Bay is a broad, shallow estuary separated from the Gulf by the Matagorda Peninsula and barrier islands. Freshwater inflows come from the Lavaca-Navidad River system and smaller rivers. The bay is connected to the Gulf primarily through the MSC and the Colorado River Mouth Complex. Tides are semi-daily with an average range of about one foot. The MSC entrance is a high-energy zone with strong currents and depths exceeding 100'. The bay itself has relatively low energy due to the barrier islands and peninsula, with an average depth of 12 ft., while adjacent bays average 6-7 ft. Salinity ranges from 8-31 ppt, with seasonal variations. Vertical stratification is generally absent due to shallow depths and wind-induced mixing, except in deeper areas like the MSC. Relative sea level change is projected to continue, potentially causing shoreline retreat and coastal habitat transformation.	Same or similar to existing condition. Relative sea level change and shoreline erosion would continue as projected.	Negligible effect on the currents and waves based on hydraulic modeling. Impact to salinity is expected to be minor based on modeling. Any impacts from RSLC would be the same to those described in the No Action Alternative.
Water and Sediment Quality	The waters of Matagorda Bay are designated for recreation and exceptional aquatic life use, including oyster waters. Some areas are listed as impaired for bacteria, low dissolved oxygen, and copper. Sediment quality is influenced by natural processes and land contamination within the watershed. Industrial activity near Lavaca Bay has caused measurable impacts, including elevated mercury levels in some areas. The area within the project footprint has been sampled and found to be at an acceptable level for dredging.	Same or similar to existing condition.	Short-term construction related impacts to water quality are expected resulting in a minor impact. For sediment quality no or negligible impact would result based on all relevant data.
Hazardous, Toxic, and Radioactive Waste	The study area includes industrial facilities such as the Alcoa Corporation's Point Comfort Operation and Formosa Plastics, which have historically impacted groundwater, surface water, soil, and sediment. Mercury contamination from Alcoa led to fishing restrictions in Lavaca Bay and subsequent cleanup under a Superfund agreement. Mercury levels in sediments are now below 0.5 mg/kg within the project area. Groundwater monitoring at the Formosa facility has limited contamination migration. Additionally, 14 petroleum storage tanks are located in the area, with one in Point Comfort and 13 in Port Lavaca.	Same or similar to existing condition.	Short-term construction-related impacts to HTRW are expected to be no or negligible. For HTRW, no or negligible impact would result based on all relevant data.
Air Quality	The project area is in attainment for all NAAQS criteria pollutants. Major emission sources include power generation, oil and gas operations, and manufacturing facilities. Mobile sources, such as towboats and recreational vessels, also emit CO, NO _x , hydrocarbons, and particulate matter. The area has no major metros within 50 miles, and prevailing winds are not expected to carry air contaminants to nonattainment areas.	Same or similar to existing condition.	Construction-related emissions would have a moderate impact for three years of the 52-month project schedule. Operational related emissions would be considered to be negligible to minor impact since Calhoun County is in attainment, and the project area is not near a population center.
Noise	The existing noise environment is influenced by ships, barges, commercial and recreational boats, and marine terminal activities like cranes and pumps. Background noise levels range from 52.4 to 65.1 A-weighted decibels (dBA) / Day-Night Average Sound Level (Ldn). Sensitive receptors, including residential and recreational areas located in Port Lavaca and Point Comfort are generally distant from the project area. Underwater noise sources include vessel traffic, tidal currents, and natural sounds. Marine species are likely adapted to these current conditions. No long-term noise impacts are expected from maintenance dredging, which typically produces sound levels comparable to large tugboats.	Same or similar to existing condition.	No to negligible airborne and underwater impacts from noise in comparison to the No Action Alternative.
Wetlands	Wetlands in the study area include estuarine and marine deepwater (62,948 acres), estuarine and marine wetlands (1,537 acres), and freshwater emergent wetlands (543 acres). These habitats support fish, birds, and other wildlife. Common vegetation includes smooth cordgrass, saltgrass, and glasswort in low marshes, and shoregrass and sea ox-eye daisy in	Same or similar to existing condition.	Short-term construction-related impacts to wetlands would be similar to the No Action Alternative and long-term beneficial impact

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Resource	Existing Conditions	No Action Alternative	Proposed Recommended Scale
	high marshes. Freshwater wetlands feature coastal cattail and bulrush. These habitats filter runoff and reduce storm impacts. Sea level rise and stronger storms may convert salt marshes to open water.		with possible increase in salt marsh (up to ~ 337 acres).
Wildlife	The study area supports diverse wildlife, including wading birds, songbirds, migratory waterfowl, and mammals such as raccoons and coyotes. Located along the Central Flyway, Matagorda Bay is an important wintering area for waterbirds. Chester Island and Lavaca Bay Spoil Island provide key nesting habitat, with Chester Island hosting over 22,000 nesting pairs of 19 species in 2023. Coastal marshes offer essential nesting and feeding areas, and bay aquatic species supply prey for coastal wildlife. While habitat loss from development and erosion remains a concern, maintenance dredging at Chester Island helps reduce erosion and supports bird nesting habitat.	Same or similar to existing condition. Maintenance dredging would result in short-term turbidity impacts to aquatic prey species, indirectly affecting wildlife. Continued placement at Chester Island would benefit nesting habitat for colonial waterbirds.	The initial dredging activities would be short-term, indirect resulting in minor impacts to wildlife. Proposed maintenance dredging activities would have the same impacts as those described for the No Action Alternative. Creation of the bird island, continued placement at Chester Island, and the sand engine would result in long term beneficial impacts to specifically birds.
Aquatic Resources	The Matagorda Bay system, including Lavaca Bay, is a highly productive estuarine ecosystem supporting diverse aquatic species. Common fish include bay anchovy, Atlantic croaker, white and brown shrimp, and spot. Benthic species, such as marine worms, amphipods, and bivalves, are key to the food web and are indicators of ecosystem health. Oyster habitats, covering approximately 4,260 acres in Lavaca Bay and 3,678 acres in Matagorda Bay, provide water filtration and habitat for various species. Submerged aquatic vegetation, including shoalgrass and turtlegrass, supports nursery habitats for fish and invertebrates. Commercial fisheries target species like black drum, southern flounder, and blue crab. Maintenance dredging has historically impacted benthic habitats, but recovery occurs through recolonization.	Same or similar to existing condition.	Similar impacts to fish and commercial fishery as described in the No Action Alternative. Minor impacts to benthos. Significant impact to oyster habitat. No impact to submerged aquatic vegetation.
Special Status Species	The study area supports several Federally listed threatened and endangered species, including birds (Piping Plover, Rufa Red Knot, Whooping Crane), sea turtles (Green, Kemp's Ridley, Loggerhead, Leatherback, Hawksbill), and marine mammals (West Indian Manatee, Bottlenose Dolphin). Critical habitats for Piping Plover and Loggerhead sea turtles are present within the action area. The area also includes Essential Fish Habitat (EFH) for dozens of species including red drum, shrimp, and snapper. Maintenance dredging has historically impacted sea turtles, with mitigation measures such as dredging windows and deflector drag heads in place to minimize harm. Salt marsh creation at existing placement areas like PA 19 provides beneficial habitat for species like Whooping Crane and Eastern Black Rail.	Same or similar to existing condition.	ESA: Moderate impacts to 4 species of sea turtles from dredging activities; minor impacts to 4 species of sea turtle from placement activities; minor impact to West Indian manatee and 3 birds from dredging and placement activities. EFH: Impacts to EFH would be considered significant, mainly due to the oyster habitat impacts. impacts to Federally managed fish would be minor. Marine Mammals: Similar impacts as described in the No Action Alternative resulting in no to negligible impacts to marine mammals.
Special Management Areas	The study area includes several SMAs that help preserve ecological balance and biodiversity. These include the Aransas National Wildlife Refuge, Powderhorn WMA, Matagorda Island WMA, and Chester Island Bird Sanctuary. These areas provide essential habitats for migratory birds, endangered species like the Whooping Crane, and native coastal prairie ecosystems. Chester Island supports over 73 nesting bird species, including the brown pelican, and benefits from ongoing placement of dredged material to minimize erosion. Powderhorn WMA is one of the largest undisturbed coastal prairie habitats in Texas. These SMAs continue to function as important ecological sanctuaries under current conditions.	Same or similar to existing condition.	Minor short-term construction-related effects to Powderhorn Wildlife Management Area and Chester Island Bird Sanctuary
Cultural Resources	The study area has been occupied by humans for over 7,500 years and contains over 600 recorded prehistoric and historic archaeological sites, including shell middens, cemeteries, shipwrecks, and historic structures. A preliminary assessment identified 113 cultural resources within five miles of the project area, including 42 archaeological sites, five cemeteries, 31 historical markers, and 35 potential marine resources. Surveys conducted in 2006, 2013, and 2023 identified magnetic anomalies and acoustic targets, some of which may represent shipwrecks or other submerged cultural resources. Portions of the beneficial use areas and placement areas have not been fully investigated for cultural resources. Erosion and coastal storms continue to pose risks to these resources.	Same or similar to existing condition.	Significant impact to cultural resources due to direct impacts from dredging activities and dredged material placement related to construction, specifically disturbance of the gulf and bay bottoms.

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Resource	Existing Conditions	No Action Alternative	Proposed Recommended Scale
Recreation	The Matagorda Bay area offers recreation such as fishing, boating, bird watching, camping, and swimming. Parks such as Matagorda Bay Nature Park and Jetty Park offer boat ramps, beaches, and camping facilities. WMAs, including Powderhorn Ranch and Matagorda Island, offer nature walks and bird-watching opportunities. Chester Island supports bird-watching activities due to its role as a nesting site for over 73 bird species. Recreational fishing is popular for Red Drum, Spotted Seatrout, and Southern Flounder, though fishing for Red Drum is restricted within the Alcoa site. Recreational uses are well-established and expected to increase with population growth.	Same or similar to existing condition.	Similar impacts as described in the No Action Alternative resulting in no to negligible impacts to recreation.
Socioeconomics	The region includes Calhoun, Jackson, Victoria, and Matagorda counties, with a combined population of 162,668 as of 2020. The economy is supported by petrochemical industries, commercial fishing, agriculture, livestock, construction, mineral extraction, and growing tourism and recreation. Median household incomes in the region are generally lower than the state average, and Jackson and Matagorda counties have higher poverty rates than the state. With a per capita income of \$34,372, the region is considered economically disadvantaged. Unemployment rates in the region are higher than the state average, except in Victoria County. The population is slightly older than the state average, with 18% aged 65 or older, and the racial composition is similar to the statewide average: 42% White, 43% Hispanic or Latino, 6% Black, and 6% Asian.	Same or similar to existing condition.	Similar impact as described in the No Action Alternative resulting in no to negligible impacts to socioeconomics.

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AUTHORIZED PLAN

The 2019 economic analyses indicated that Alternative Plan A at scale -47'/-49' MLLW was the National Economic Development (NED) Plan. It was the plan that reasonably maximized net economic benefits consistent with protecting the Nation's environment. The Calhoun Port Authority agreed that -47'/-49' MLLW was the NED Plan.

For the 2025 V/SEIS, Alternative Plan A at scale -47'/-49' MLLW is the Recommended Plan. The NED Plan is the No Action alternative because no scale of Alternative A has positive net benefits. The Galveston District requested, and received, a NED waiver dated March 25, 2026 to recommend implementation of the -47'/-49' MLLW authorized depth.

ENVIRONMENTAL COMPLIANCE

Compliance with the following laws, regulations, and Executive Orders (ES Table 5), is required for environmental acceptability of the project alternative, which includes but is not limited to the following:

ES Table 5 – Compliance with Federal Laws, Regulations, and Executive Orders

Title of Law/Executive Order	U.S. Code or Executive Order Number	Compliance Status
Clean Air Act of 1972, as amended	42 U.S.C. 7401 et seq.	Complaint. The study area is in attainment for all NAAQS standards.
Clean Water Act of 1972, as amended	33 U.S.C. 1251 et seq.	Compliant: Section 401 – a Water Quality Certification has been obtained on March 12, 2026. Compliant: Section 404 – 404(b)(1) included in Appendix B-3
Coastal Barrier Resources Act of 1982	PL 97-348	Compliant. USACE received concurrence from USFWS with the exception for this project on January 27, 2026.
Coastal Zone Management Act of 1972, as amended	16 U.S.C. 1451 et seq.	Complaint. TxGLO concurred that proposed project is consistent with the TCMP goals and enforceable policies in letter dated February 3, 2026.
Comprehensive Environmental Response, Compensation and Liability act of 1980	42 U.S.C. 9601	Continuous
Endangered Species Act of 1973	16 U.S.C. 1531	Complaint. NMFS' Biological Opinion dated April 17, 2026 was received. USFWS, has provided concurrence dated March 13, 2026 with the proposed project except for Bird

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Title of Law/Executive Order	U.S. Code or Executive Order Number	Compliance Status
		Island, which will require more coordination during the design phase.
Federal Water Project Recreation Act	16 U.S.C. 460I-12 et seq.	Compliant. Effects to recreation are analyzed in Section 6.
Fish and Wildlife Coordination Act of 1958, as amended	16 U.S.C. 661	Compliant. USFWS provided their recommendations on March 13, 2026 and USACE has responded to the recommendations, refer to Appendix B-7.
Magnuson-Stevens Fishery Conservation and Management Act – EFH Amendment	16 U.S.C. 1801	Compliant. EFH Consultation complete upon receiving NMFS concurrence letter dated December 10, 2025.
Marine Mammal Protection Act of 1972, as amended	16 U.S.C. 1361	Compliant. There would be no, to negligible, impacts to marine mammals in the project area.
Marine Protection, Research, and Sanctuaries Act of 1972	33 U.S.C. 1401	Compliant. The dredged material to be placed in the ODMDS would meet ODMDS requirements.
Migratory Bird Treaty Act of 1918, as amended	16 U.S.C. 703	Compliant. No to negligible impacts to migratory birds due to no vegetation removal and colonial birds work window.
National Environmental Policy Act of 1969, as amended	42 U.S.C. 4321 et seq.	In Progress. NOI published June 2 and August 4, 2023; 45-day comment period for draft SEIS was November 14, 2025 to December 29, 2025. Record of Decision is expected to be signed summer 2026.
National Historic Preservation Act of 1966, as amended	54 U.S.C. Section 300101	Compliant. Programmatic Agreement has been executed
Native American Graves Protection and Repatriation Act of 1990	25 U.S.C. 3001	Compliant. No Federal undertakings occur on Federally or tribally owned lands
Rivers and Harbors Act of 1899	33 U.S.C. 401 et seq.	In Progress. Compliance is expected by Chief of Engineers' approval of the final V/SEIS.

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Title of Law/Executive Order	U.S. Code or Executive Order Number	Compliance Status
Protection of Wetlands	11990	Compliant. No to negligible impacts are expected in the short term; beneficial impacts in the long term
Protection of Children from Environmental Health and Safety Risks	13045	Compliant. No disproportionate effects on children because there are no expected environmental health or safety risks are expected.
Responsibilities of Federal Agencies to Protect Migratory Birds	13186	Compliant. No to negligible impacts to migratory birds due to no vegetation removal and colonial birds work window.

COST AND BENEFITS

ES Table 6 – 2019 Cost Summary (thousands)

Alt A Scale	Project Cost	IDC	Total Investment	AAEQ Total Investment	AAEQ OMRR&R	Total AAEQ
-47'/-49'	\$212,498	\$11,019	\$231,211	\$8,774	\$7,112	\$15,886
Oct 2018 Prices, 2.875% Discount Rate (\$ in thousands)						

ES Table 7 – 2025 Cost Summary (thousands)

Alt A Scale	Project Cost	IDC	Total Investment	AAEQ Total Investment	AAEQ OMRR&R	Total AAEQ
-47'/-49'	\$615,567	\$55,159	\$709,095	\$28,882	\$7,584	\$36,466
Oct 2025 Prices, 3.25% Discount Rate						

ES Table 8 – 2019 Economic Costs and Benefits of Recommended Plan (thousands)

Alt A Scale	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Benefit/Cost Ratio
-47'/-49'	\$15,886	\$35,858	\$19,972	2.26
Oct 2018 Prices, 2.875% Discount Rate (\$ in thousands)				

The annualized transportation cost savings (benefits); annualized costs, net benefits, and benefit/cost ratio for -47/ -49 Scale Depth is summarized in ES Table 8.

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ES Table 9 – 2025 Economic Costs and Benefits of Recommended Plan (thousands)

Alt A Scale	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Benefit/Cost Ratio
-47'/-49'	\$36,466	\$16,700	(\$19,755)	0.46
Oct 2025 Prices, 3.25% Discount Rate				

PUBLIC INVOLVEMENT

After the NOI was published in the Summer of 2023, stakeholder and public scoping meetings were held on June 6, 2023, and June 7, 2023, respectively. During the scoping period, 216 substantive comments were received and broken down into four general categories: plan formulation/general, NEPA process, impact/analysis, and placement areas.

For this V/SEIS, the 45-day public comment period was November 14 to December 29, 2025. The purpose of this review is to seek input on the alternatives considered, effects of the alternatives, and associated mitigation. The public comments and responses are included in Appendix C of the V/SEIS. USACE hosted one public meeting on December 3, 2025, during the public comment period.

EVALUATION AND COMPARISON OF 2019 AND 2025 ALTERNATIVE A, SCALE - 47'/-49'

ES Table 10 – 2019 Project First Cost Estimate for Alternative Plan A at -47'/-49' MLLW

Construction Item	Cost at -47'/-49'
01 – Lands and Damages	\$1,554,000
02 – Relocations	\$31,061,000
06 – Fish and Wildlife	\$26,257,000
12 – Navigation	\$121,494,000
Subtotal	\$180,366,000
30 & 31 – PED & Construction Management (E&D & S&A)	\$32,132,000
TOTAL FIRST PROJECT COST	\$212,498,000
E&D – Engineering and Design, S&A – Supervision and Administration October 2018 Price Level	

2019 – Benefits were calculated using the U.S. Army Corps of Engineers (USACE) approved HarborSym model. Benefits and costs were calculated with a base year of 2024 and a 50-year period of analysis (2024-2073) using the fiscal year 2019 discount rate of 2.875 percent. Construction of the Recommended Plan would generate total average annual benefits of \$35,858,000 with total average annual costs of \$15,886,000, producing a benefit-to-cost ratio (BCR) of 2.26 at the 2.875 percent discount rate.

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Project First Costs of the project were \$212,498,000 with a Federal share of \$134,913,000, and a NFS cost share of \$77,585,000. Project First Cost for Aids to Navigation were 100% Federal with funds going to the U.S. Coast Guard (USCG) for \$2,220,000.

ES Table 11 – 2025 Project First Cost Estimate for All Three Scales

Construction Item	Cost at -43'/-45'	Cost at -45'/-47'	Cost at -47'/-49'
01 – Lands and Damages	\$31,000	\$31,000	\$31,000
02 – Relocations	\$40,168,000	\$40,168,000	\$40,168,000
06 – Fish and Wildlife	\$39,999,000	\$47,182,000	\$51,456,000
12 – Navigation	\$316,262,000	\$366,472,000	\$428,684,000
18 – Cultural Resources	\$2,893,000	\$2,893,000	\$2,893,000
Subtotal	\$399,353,000	\$456,746,000	\$523,232,000
30 & 31 – PED & Construction Management (E&D & S&A)	\$71,896,000	\$81,365,000	\$92,336,000
TOTAL PROJECT FIRST COST	\$471,248,000	\$538,111,000	\$615,567,000
E&D – Engineering and Design, S&A – Supervision and Administration October 2025 Price Level			

2025 – Project First Costs of Alternative A Scale -47'/-49' is \$615,567,000 with a Federal share of \$431,526,000, and a NFS cost share of \$184,041,000. Project First Cost for Aids to Navigation is 100% Federal with funds going to the USCG for \$2,373,000.

ES Table 12 – General Cost Allocation

Feature	% Federal Cost ¹	% NFS Cost ¹
General Navigation Features (GNF)	90% from 0' to 20' 75% from >20' to 55' 50% for >55'	10% from 0' to 20' 25% from >20' to 55' 50% for >55'
Mitigation	75%	25%
Navigation Aids	100% USCG	0%
Operations and Maintenance		

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Feature	% Federal Cost ¹	% NFS Cost ¹
GNF	100% except cost share 50% costs for maintenance > 50'	0% except cost share 50% costs for maintenance > 50'
The non-Federal interests for a project to which paragraph (1) applies shall pay an additional 10 percent of the cost of the general navigation features of the project in cash over a period not to exceed 30 years, at an interest rate determined pursuant to section 2216 of WRDA 2024. LERR may be credited against the additional 10 percent amount of the total construction cost for GNF.		

ES Table 13 - Summary of 2019 to 2025 Changes

ITEM OR FEATURE	2019	2025	Change	% Change
Entrance Channel Extension Length	13,000'	6,000'	(7,000')	(53.8)
Entrance Channel Depth	-49'	-49'	0	0
Entrance Channel Bottom Width	550'	550'	0	0
Sediment Trap Length	1,600'	0'	(1,600')	(100.0)
Main Channel Length	118,502'	118,581'	(79')	(0.1)
Main Channel Depth	-47'	-47'	0	0
Main Channel Bottom Width	300'	300'	0	0
Turning Basin Depth	-47'	-47'	0	0
Turning Basin Bottom Width	1,200'	1,200'	0	0
Total Length in feet	151,502	144,581	(6,921)	(4.6)
New Work Dredging Quantities CY	20,963,397	39,333,500	18,370,103	87.6
O&M Quantities CY	154,030,311	282,110,088	128,079,777	83.2
Aids to Navigation	Same	Same	0	0
Pipeline Relocations	16	1	(15)	(93.8)

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ITEM OR FEATURE	2019	2025	Change	% Change
Mitigation Acres	—	—	—	—
Oyster Reef Lost	129	94.8	(34.2)	(26.5)
Oyster Reef Habitat	130	95	(35)	(37)
Marsh Impacted	1.5	0	(1.5)	(100.0)
Sand Engine Acres	165	165	0	0
Project First Costs	\$281,037,000	\$615,567,000	\$334,530,000	119
Federal	\$177,681,000	\$431,526,000	\$259,545,000	143
Non-Federal	\$103,356,000	\$184,041,000	\$80,685,000	78
Associated Costs	\$10,029,000	\$38,369,000	\$22,483,000	283
AAEQ Costs	\$15,886,000	\$36,466,000	\$20,580,000	130
Total Net Benefits	\$19,972,000	(\$19,755,000)	(\$39,727,000)	(199)
BCR	2.26	0.46	(1.8)	(80)

NON-FEDERAL SPONSOR SUPPORT

The Calhoun Port Authority, serving as the non-Federal sponsor, confirms its longstanding support of the Matagorda Ship Channel (MSC) Improvement Project. This project is vital for industries in the Texas Mid-Coast Region that depend on the port for domestic and global trade, and the project further supports the nation to achieve and maintain global energy dominance. The planned widening and deepening of the channel, including the addition of a turning basin, will enable larger Aframax-class tankers to safely access Point Comfort, Texas. This will improve supply chain efficiency by allowing for larger shipments, which in turn reduces transportation costs for port users.

In support of this project, the Port Authority has received the 404 authorization to finalize design and initiate construction for Phase I of the South Peninsula Development Project. This phase includes four new barge berths and three deep-draft docks with a design depth of 47 feet MLLW, engineered to handle primarily crude oil and condensate, then eventually petrochemicals. Two of the deep-draft docks are scheduled for completion by 2030 for crude, with a third to follow based on market demand for petrochemicals.

Current infrastructure development upstream is set to increase the port's initial crude export capacity up to 140,000 barrels per day. The successful completion of the channel improvement

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project is expected to trigger further investments by port customers and channel users to scale this capacity to 1 million barrels per day of crude oil exports.

DREDGED MATERIAL MANAGEMENT PLAN

The DMMP addresses the dredging needs, disposal capabilities, capacities of placement areas, environmental compliance requirements, and potential for beneficial use of dredged material, and indicators of continued economic justification. The DMMP will be updated periodically to identify any potentially changed conditions.

The DMMP identifies specific measures necessary to manage the volume of material likely to be dredged over a 50-year period, from both construction and maintenance dredging. Non-Federal, permitted dredging within the related geographic area shall be considered in formulating management plans to the extent that disposal of material from these sources affects the size and capacity of placement areas required for the MSC.

CONCLUSION

The Matagorda Ship Channel Improvement Project is an opportunity to deliver resilient, strategic energy infrastructure that safeguards national interests while fostering economic prosperity. The MSCIP is a forward-looking investment that ensures America's energy future remains strong, competitive, and secure. The MSCIP will strengthen national security by boosting energy exports, improving our energy trade balance with allies, and supporting defense priorities as outlined in Executive Order 14156 Declaring A National Energy Emergency. It is expected to enable the Assistant Secretary of the Army and the Secretary of Commerce to leverage their emergency authorities to facilitate the transportation, refining, and generation of domestic energy resources.

The selection of Alternative Plan A at Scale -47'/-49' MLLW is again the Recommended Plan. It reflects the best information available, and current federal policies governing Post-Authorization Change Documentation and deep-draft navigation projects. However, the Galveston District has determined that the 2025 Recommended Plan does not fall within the Chief's Discretionary Authority and that new Congressional Authorization, with updated costs, is required.

Based on current costs and benefits, none of the scales of Alternative A evaluated, result in positive net benefits and all alternatives have a Benefit to Cost Ratio of less than 1.0. Therefore, the NED Plan is the No Action alternative.

The Galveston District requested, and received, a NED waiver to recommend implementation of the -47'/-49' MLLW authorized depth. The waiver had not been approved, nor disapproved, at the time of Policy and Legal Compliance Review of the draft Validation Report. Galveston District did receive permission for the draft V/SEIS to go out for public review.

The staff of the Assistant Secretary of the Army for Civil Works (ASA(CW)) reviewed the Galveston District's memorandum requesting an exception to the requirement to recommend the National Economic Development plan and to allow the U.S. Army Corps of Engineers (USACE) to recommend a plan that does not provide positive net benefits when evaluated solely on economic outputs. The staff concluded that the total benefits associated with the MSCIP are significant enough to justify continued investment in this project. ASA(CW) signed a memorandum to this effect on March 25, 2026.



ES Figure 4 – 2025 Proposed Recommended Scale Including the DMMP

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1 GENERAL INFORMATION

1.1 Study History

The Calhoun Port Authority, of Point Comfort, Texas, sent a letter of intent to the Galveston District's Commander in June of 2015. The letter contained their desire to initiate a study partnership, as a Non-Federal Sponsor (NFS) to address water resource opportunities. A Feasibility Cost Share Agreement was signed between the United States Army Corps of Engineers (USACE) Galveston District (SWG) and the NFS on 5 August 2016.

Section 216 of the Flood Control Act of 1970, Public Law (PL) 91-611 authorizes the Secretary of the Army to review existing the USACE constructed projects due to changes in physical and / or economic conditions. The USACE then reports to Congress with recommendations on the advisability of modifying the project or its operation and improving the quality of the environment in the overall public interest.

The Matagorda Ship Channel Improvement Project (MSCIP), Port Lavaca, Texas, Feasibility Report and Environmental Impact Statement (F/EIS), Review of Completed Projects, Calhoun and Matagorda Counties study was a single purpose, Section 216 – Review of Completed Projects study. The study was completed in 2019 and a Chief's Report signed on 15 November 2019.

Pre-Construction, Engineering and Design activities began in fiscal year (FY) 2020 with initial Federal funding of \$253,939,000. As a result of new hydro-surveys in 2022, a volume discrepancy was found; the actual new work volumes needed for the authorized plan (38,196,959 cubic yards), as opposed to those reported in the feasibility report (20,963,397 cy) were off by approximately 45.12% or 17.23 million cubic yards (mcy).

Following this discovery, USACE determined that a SEIS would be prepared because the agency (i) made substantial changes to the proposed action that are relevant to environmental concerns and (ii) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts in accordance with the Council of Environmental Quality regulations (40 C.F.R. parts 1500 through 1508), 40 C.F.R. 1502.9(d). As such, USACE begun the development of a SEIS.

When there are significant location, scope, design and/or cost deviations from the authorized project, a project delivery team (PDT) is required to analyze and attempt to mitigate those deviations. If the deviations are sufficiently different from the authorized project, the PDT must prepare a post-authorization change report (PACR). The USACE determined that the appropriate way to move forward was with an integrated Validation Report and Supplemental Environmental Impact Statement (V/SEIS). This 2025 V/SEIS looks only at the 2019 F/EIS Final Array of Alternatives to include No Action and Alternative A at scales -43'/-45', -45'/-47, and -47'/-49' Mean Lower Low Water (MLLW). To that end, the PDT compared metrics for their individual disciplines between the 2019 F/EIS and this V/SEIS.

The U.S. Army Corps of Engineers (USACE) has prepared this Supplemental EIS in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] § 4321, et seq.), the USACE NEPA implementing regulations (33 Code of Federal Regulations [C.F.R.] part 230), and the Council on Environmental Quality (CEQ) 2020 NEPA implementing regulations, as amended in 2021 (40 C.F.R. parts 1500 – 1508). On January 8, 2026, the CEQ adopted the February 25, 2025 interim final rule to rescind their CEQ regulations implementing the NEPA from the Code of Federal Regulations. However, the preparation of this SEIS began, and the Notice of Intent (NOI) was published, prior to the CEQ's

notice. As such, this SEIS continues to reference the 2020 CEQ NEPA regulations, as amended in 2022, that were in effect when this SEIS was prepared.¹

Mean Low Tide (MLT) – The mean average of all the low tides (high-low tides and low-low tides) occurring over a certain period of time, usually 18.6 years (one lunar epoch) (Coastal States Organization 1997). MLT in the SWG was a locally defined navigation datum used for project authorization and construction. Historic projects are referenced to this datum. It has since been superseded by MLLW which is a tidal datum as described herein.

Mean Lower Low Water (MLLW) = MLT + .303 feet ('). Vertical datum conversion, MLT to MLLW per USACE Engineering Documentation Report dated July 2015.

NOTE: All depths will be presented in MLLW datum from this point forward unless specifically stated otherwise.

1.2 Validation Report Purpose

The purpose of this Validation Report and Supplemental Environmental Impact Statement (V/SEIS) is to evaluate the original project under current policies, criteria and guidelines and present the results of the analyses undertaken.

NOTE: Unless otherwise specified, information in this document is considered to be accurate for both the 2019 F/EIS and for the 2025 V/SEIS.

1.3 Authorization

Congress originally authorized navigation improvements in the Matagorda Bay area under the River and Harbor Act (RHA) of 25 June 1910. This authorization provided for an eight-mile-long channel measuring seven feet (') deep and 80' wide from deep water in lower Matagorda Bay to Port Lavaca.

The RHA of 30 August 1935 authorized the upper end of the MSC to be extended a distance of ~one mile to the shoreline at the entrance of Lynn Bayou.

The RHA of 26 August 1937 authorized the enlargement of the channel from Lynn Bayou at Port Lavaca to deep water in Matagorda Bay near Port O'Connor. This channel had a depth of nine feet and a width of 100' and was ~11 miles long. This Act provided for a channel extension 100' wide and 6' deep from Port Lavaca, via Lavaca Bay, Lavaca River, and Navidad River, to Red Bluff located at about mile three on the Navidad River, for a total distance of 20 miles.

The RHA of 2 March 1945 extended the channel provided for a "harbor of refuge" nine feet deep near Port Lavaca, with an approach channel 9' deep and 100' wide.

¹ Since the NOI predates the latest update to § 1502.11 (g), this project was not given an unique identification number for tracking purposes.

1.3.1 Construction Authorities

PL 85-500, RHA of 3 July 1958, Title 1 – Rivers and Harbors, Section 101 states:

“That the following works of improvement of rivers and harbors and other waterways for navigation...are hereby adopted and authorized to be prosecuted under the direction of the Secretary of the Army and supervision of the Chief of Engineers, in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in the respective reports hereinafter designated:

“Texas. Matagorda Ship Channel Improvement Project, Port Lavaca, Texas: House Document Numbered 388, Eighty-fourth Congress, at an estimated cost of \$9,944,000.”

PL 116-260; Title IV – Water Resources Development Act of 2020, Section 401. Project Authorizations

“The following projects for water resources development and conservation and other purposes, as identified in the reports titled “Report to Congress on Future Water Resources Development” submitted to Congress pursuant to section 7001 of the Water Resources Reform and Development Act of 2014 (33 U.S.C. 2282d) or otherwise reviewed by Congress, are authorized to be carried out by the Secretary substantially in accordance with the plans, and subject to the conditions, described in the respective reports or decision documents designated in this section: (1) NAVIGATION.—8. TX – Matagorda Ship Channel Improvement Project, Port Lavaca. Chief’s Report signed 15 November 2019.

Federal: \$140,156,000

Non-Federal: \$80,500,000

Total: \$220,656,000”

1.3.2 Study Authority

PL 91-611; Title II – River and Harbor and Flood Control Act of 1970, Section 216, dated 31 December 1970, 33 U.S.C. § 549a, which states:

“The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of project the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.”

Following the initial appraisal, the Section 216 study process is the same as that for normal General Investigations studies.

PL 99-662; Title IX – General Provisions, Section 902, Water Resources Development Act of 1986, 17 November 1986, which states:

“In order to insure against cost overruns, each total cost set forth in this Act, or an amendment made by this Act, for a project shall be the maximum cost of the

project, except that such maximum amount—(1) may be increased by the Secretary for modification which do not materially alter the scope or functions of the project as authorized, but not by more than 20 percent of the total cost stated for the project in this Act or in an amendment made by this Act; and (2) shall be automatically increase for—(A) changes in construction costs applied to unconstructed features...from the date of enactment of this Act...as indicated by engineering and other appropriate cost indexes; and (B) additional studies, modifications, and actions (including mitigation and other environmental actions) authorized by this Act or required by changes in Federal Law.”

1.4 Funding Since Authorization

The Chief’s Report was signed on November 15, 2019 and authorized by the Water Resources Development Act (WRDA) of 2020. PED monies followed between FY2020 to the present (Table 1).

Table 1 – MSCIP Funding Since Chief’s Report (as of 10 APR 2026)

Fiscal Year	Funds Appropriated	Fed Funds Allocated	Non-Fed Funds Allocated	Total Funding Received
FY20*	\$253,939	\$253,939	-	\$253,939
FY21	\$1,809,000	\$1,809,000	\$627,979	\$2,436,979
FY22**	\$199,000	\$199,000	\$66,666	\$265,666
FY23	\$1,400,000	\$1,400,000	\$350,000	\$1,750,000
FY24	-	-	\$176,334	\$176,334
FY25***	\$3,240,000	\$1,620,000	-	\$1,620,000
FY26	\$1,995,000	\$1,620,000	\$114,875	\$1,734,875
TOTAL****	\$8,896,939	\$6,901,939	\$1,335,854	\$8,237,793
*Remaining Feasibility Funds Reallocated to PED Phase **Reprogrammed to continue V/SEIS ***Includes FY25 \$1.62M PBUD and CGR to complete V/SEIS ****Does not include NFS \$965K In-Kind Contribution				

1.5 Study Purpose and Need

The role of the U. S. Army Corps of Engineers with respect to navigation is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation. The Corps accomplishes this mission through a combination of capital improvements and the operation and maintenance of existing projects. Capital improvement activities include the planning, design, and construction

of new navigation projects. These activities are performed for the navigation of shallow draft (equal to or less than 15-foot draft) and deep-draft (greater than or equal to 15-foot draft) vessels on both inland waterways and harbors, and coastal and lake ports, harbors and channels.

1.5.1 Changes in Project Purpose

There have been no changes to Project Purpose since the 2019 Chief's Report or WRDA 2020. The purpose remains to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs along the MSC.

1.5.2 Changes in Scope of Authorized Project

There have been no changes to the Scope of the Authorized Project since the 2019 Chief's Report or WRDA 2020. The scope remains the entirety of the MSC from the entrance channel out in the Gulf of America (Gulf) to the turning basin at the Port of Calhoun (the Port) as well as the open bay areas to each side of the main channel.

1.5.3 Purpose and Need Statement

The purpose of the MSCIP is to increase operational efficiencies of maritime commerce movement through the MSC, Matagorda and Calhoun Counties, Texas. A variety of products are transported along the MSC, including crude oil, chemicals, and allied products. The need for the MSCIP is due to increasing levels of maritime traffic, increasing vessel size, and a growing number of channel users active in the oil and petrochemical industry, resulting in larger vessels utilizing the port and light loading. The need has been derived from an analysis of current and projected vessel transits, cargo tonnage, and capacity at existing and proposed terminal facilities as summarized below. Expanding channel dimensions can help to reduce or eliminate light loading for cargo vessels, and allow for larger cargo vessels, which have been unable to transit the existing channel configuration, to use of the Port and adjacent facilities.

Since the construction of the existing Matagorda Ship Channel, vessels in the world fleet have become larger in every dimension – they are wider, longer, and have additional depth capacity, requiring deeper sailing drafts. To maintain safety, existing vessels transiting Matagorda Ship Channel are only able to load to a fraction of their designed capacity due to the channel's existing dimensions. This results in more vessels transiting to carry a given quantity of goods, leading to increased transportation costs that are passed on to the consumer. Eventually, depth and width limitations in the Matagorda Ship Channel will prevent larger vessels from calling in the future.

The Matagorda Ship Channel is regionally significant, supporting over 48,000 jobs with an impact of \$2.6 billion a year in overall personal income. Matagorda Ship Channel moved about 5.1 million tons of cargo annually between 2019 and 2023 (Waterborne Commerce Statistics Center). The vessels currently transiting the harbor have drafts of over 40 feet when fully loaded. With channel depth at a maximum of -38 feet MLLW in the harbor, these vessels are required to light load or perform reverse lightering operations, increasing transportation costs.

1.6 Federal Interest

Federal interest in navigation was established by the Commerce Clause of the Constitution and subsequent court decisions. Navigable waterways are important to the Nation as a primary means of commercial transportation and as a part of national defense. USACE's role in navigation is to provide safe, reliable, efficient, and environmentally sustainable waterborne transportation systems.

The 2019 F/EIS focused on addressing the major problems contributing to MSC inefficiencies and transportation cost concerns by reviewing and analyzing management measures and then alternative plans to address the insufficient channel depth and width, as determined by fleet forecasts, as well as current and future users. The USACE identified economic benefits, associated costs, and environmental and social impacts for proposed channel modifications, and made recommendations to maximize project benefits consistent with the project purpose.

For the 2025 V/SEIS, Federal Interest is determining whether one of the 2019 final alternatives, including the No Action Plan, will provide safe, reliable and efficient waterborne transportation for the movement of commerce and national security needs while contributing to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders and other Federal planning requirements.

1.7 Study Area Location

The 26-mile existing Federal MSC is located 125 miles southwest of Galveston, Texas and 80 miles northeast of Corpus Christi, Texas (Figure 1 and Figure 2). The channel extends from offshore in the Gulf through Matagorda Bay and Lavaca Bay to the Port (Figure 3).

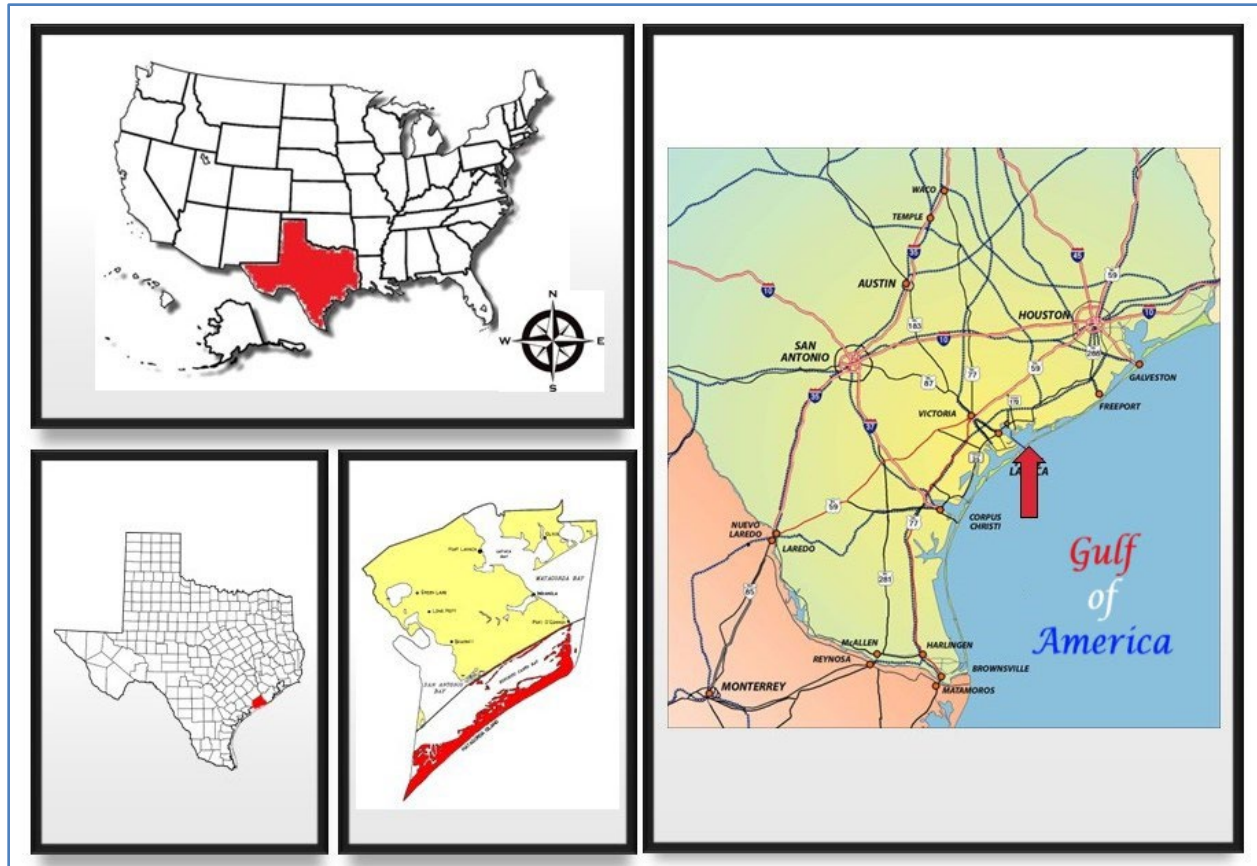


Figure 1 – Calhoun County, Texas

Matagorda Bay is about 12 miles wide and 16 miles long, with natural depths of nine to 12'. A narrow arm of water, about four miles wide, extends 35 miles northeast from the main body of the bay. This is divided into two bays by the Colorado River Delta. Matagorda Bay is separated from the Gulf by the Matagorda Peninsula and tidal throughout.

In Matagorda and Lavaca Bays, the authorized channel depth is -36' MLT, or -38' MLLW, and the width is predominately 200'. Offshore, the channel has 300' bottom width. It is maintained at a depth of -38' MLT or -40' MLLW. Maintenance dredging also includes increased depth to account for advance maintenance and allowable over-depth.

1.7.1 Change in Project Location

There have been no changes to Project Location since the 2019 Chief's Report or WRDA 2020.

Non-Federal Sponsor

The NFS is the Calhoun Port Authority (CPA), formerly known as the Calhoun County Navigation District, of Point Comfort, Texas.

Congressional Representatives

Representatives to Congress from the Study Area / Project Area are:

- Texas State Senator John Cornyn
- Texas State Senator Ted Cruz
- Texas Congressional House District #27, Michael Cloud

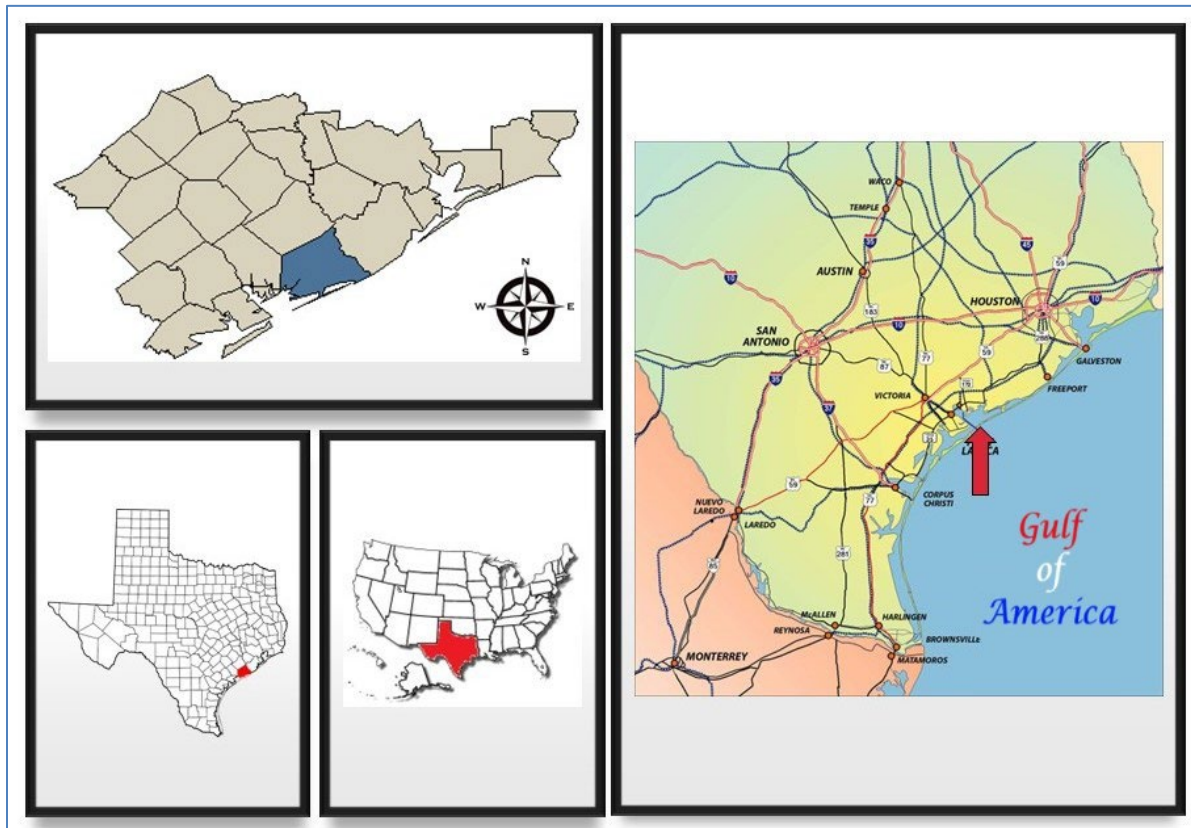


Figure 2 – Matagorda County, Texas

1.8 Existing Water Projects

This section describes the originally authorized MSCIP as constructed in the 1960s.

1.8.1 Description of the Originally Authorized Project

The originally authorized project provided for a channel depth of -36' deep MLT, by 300' wide from the -38' MLT depth in the Gulf to the Gulf side of the Matagorda Peninsula; -36' MLT deep by 300' wide through the Peninsula; and -36' MLT deep by 200' wide from the bay side of the Peninsula to and including a -36' MLT deep by 1,000' square turning basin at Point Comfort, Texas (Figure 4 and Figure 5).

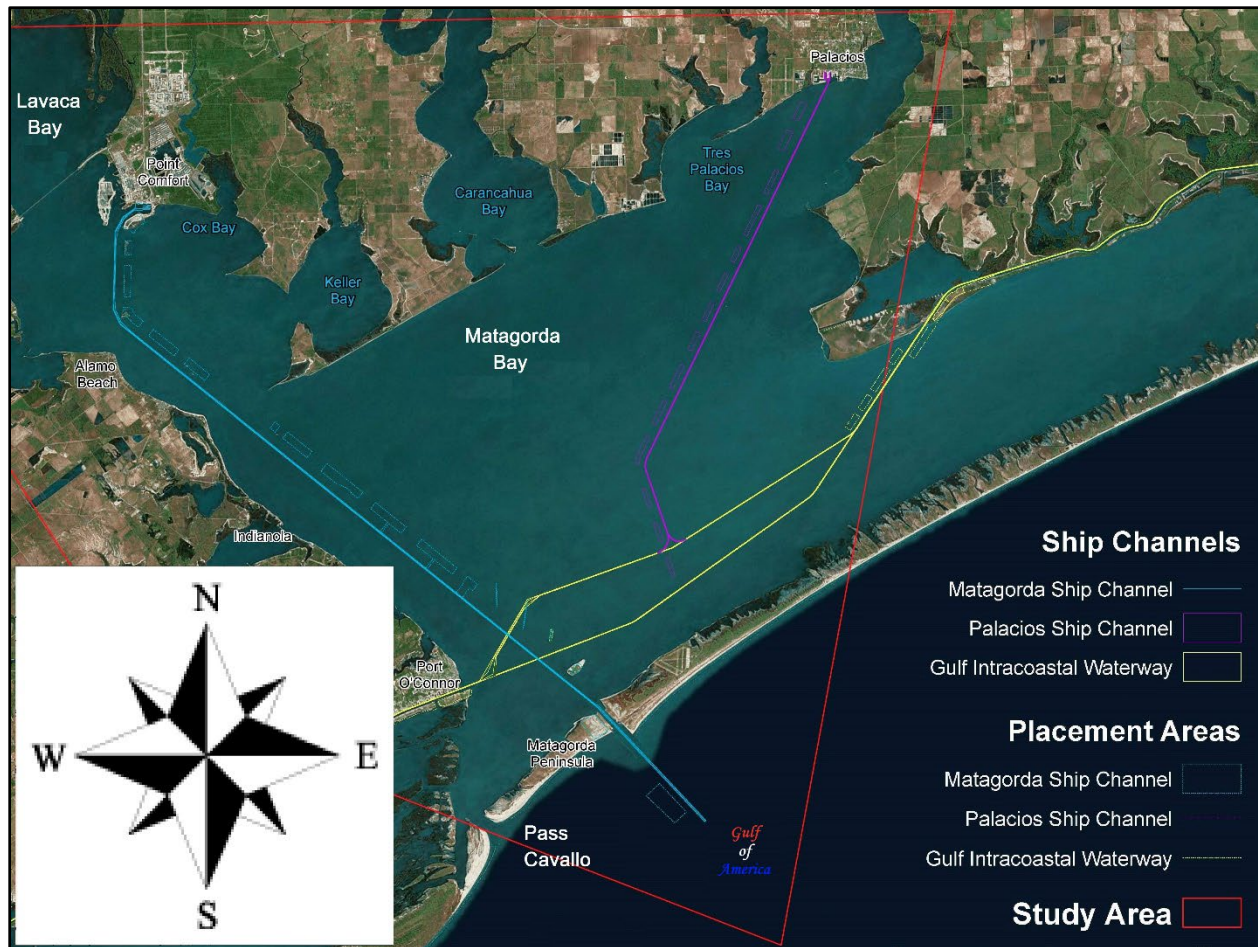


Figure 3 – MSCIP, Texas Study Area

The project provided for the enlargement of shallow-draft channels to and including the turning basin at Port Lavaca and to and including the Port Lavaca Harbor of Refuge. Dual rubble mound jetties were constructed from Matagorda Peninsula to the -24' MLT depth in the Gulf. Dredge material jetties were constructed to flank the channel across Matagorda Peninsula, extending into Matagorda Bay for 1,000'.

The deep-draft channel was cut through Matagorda Bay and crossed the Gulf Intracoastal Waterway (GIWW) in Matagorda Bay about 475 channel miles from New Orleans, Louisiana. From the GIWW, the channel extended in a direct line to and along the existing Port Lavaca Channel to a turning basin at Point Comfort (Figure 5).

Channel side slopes through the peninsula were flattened to 1V:5H in lieu of the more usual 1V:3H. This was considered advisable because of the relatively high velocity of flow through the peninsula and the composition of the channel slope being of sand.

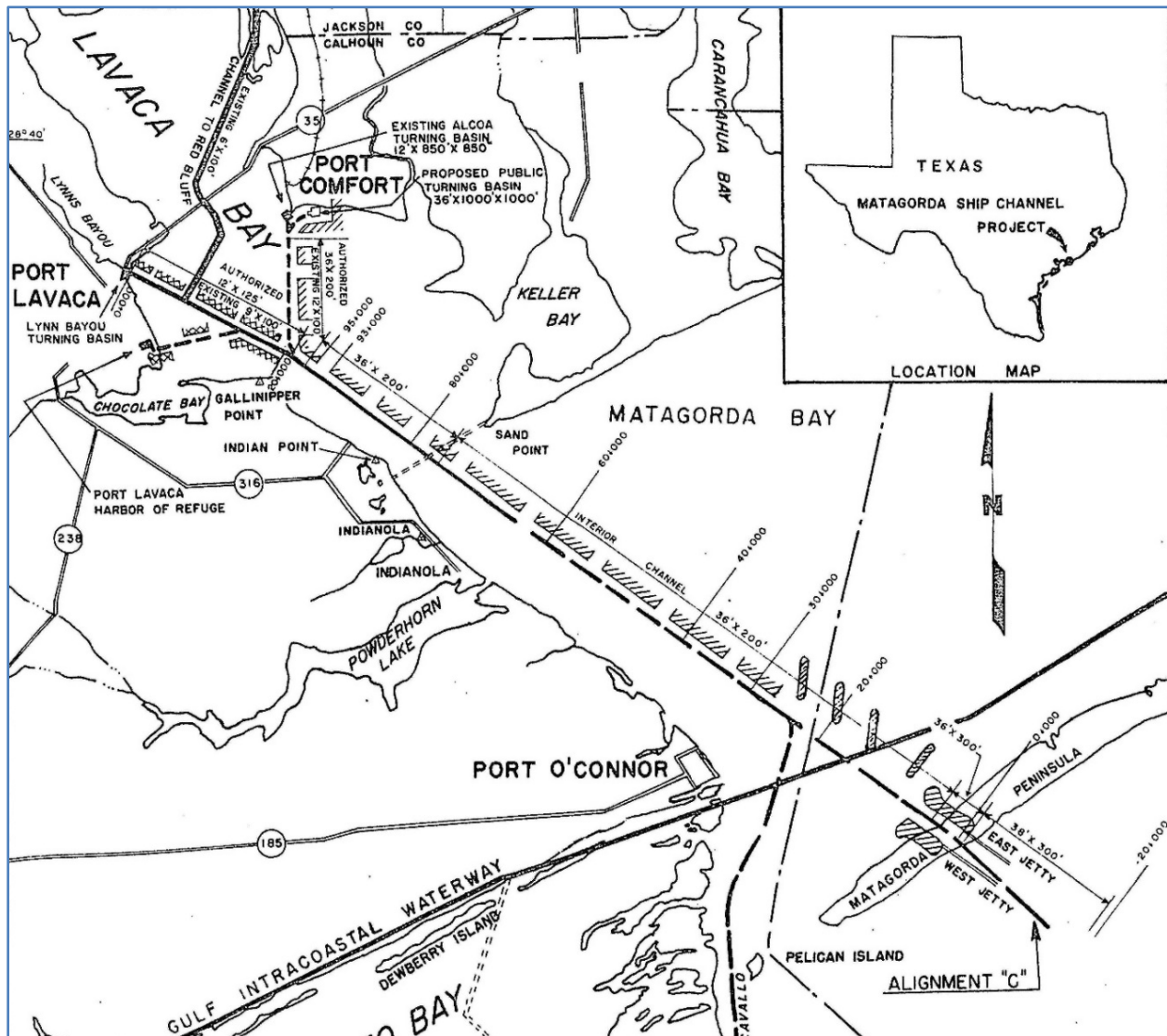


Figure 4 – General Map section from the 1963 General Design Memorandum No. 3

The initial recommendation called for a total of only two feet of over-depth to the proposed project. During the writing of the 1963 General Design Memorandum No. 3, standard practices for the deep-draft navigation channel began to include an additional two feet of advance maintenance. This additional depth was included in the final design.

The authorized public turning basin was constructed adjacent to a track of land containing ~13 acres owned by the Calhoun County Navigation District. Public wharf facilities were to be provided by local interests (Figure 5).

Operation and maintenance of the deep-draft channel from the Gulf to and including the turning basin at Point Comfort, Texas, as well as the jetties, were the responsibility of the USACE.

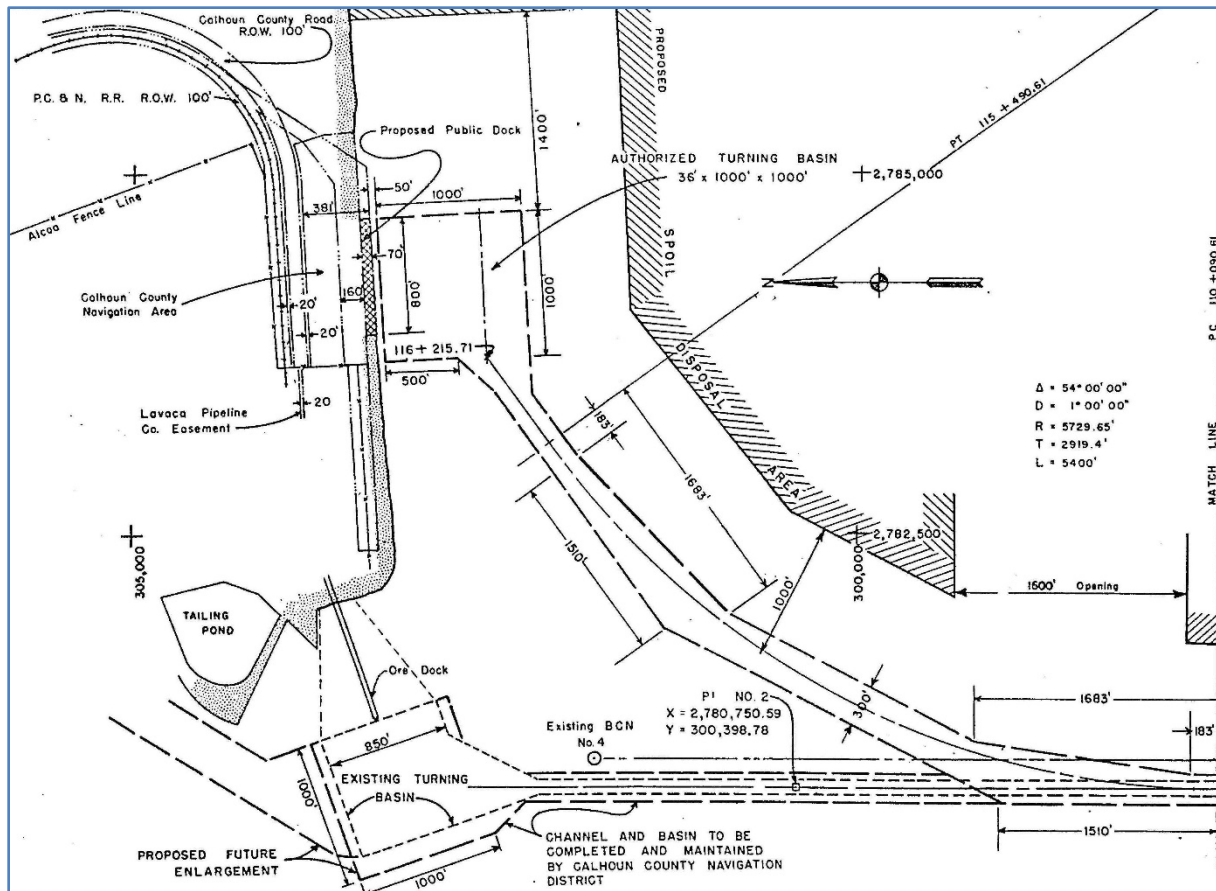


Figure 5 – Original MSCIP Turning Basin at Point Comfort, Texas

1.8.2 Description of the Currently Authorized Project

The 26-mile MSCIP is located 125 miles southwest of Galveston, Texas and 80 miles northeast of Corpus Christi, Texas (Figure 3). The northern reach of the MSCIP is located in Calhoun County and the southern reach and Entrance Channel are in Matagorda County. The MSCIP is comprised of an Entrance Channel (also known as the Offshore) about four miles long from the Gulf through a man-made cut across Matagorda Peninsula, with dual jetties at the entrance from the Gulf.

The GIWW intersects the channel ~2.5 miles north of the cut through Matagorda Peninsula. The bayside channel is about 22 miles long across Matagorda and Lavaca Bays with a turning basin at Point Comfort (Figure 6).

The current MSCIP was constructed for a 25,000-30,000 dead weight ton (DWT) design vessel. Today, vessels up to 80,000 DWT use the channel. As such, the channel dimensions limit shippers' ability to efficiently load the vessels and/or use vessels with the most cost-effective dimensions. The largest vessel that is able to enter the channel is one with a 109' beam. The largest vessel to call regularly at the Port is a 750' long x 106' wide Panamax vessel. Due to the narrow width of the channel, larger classes of vessels cannot call, even with tug assistance. Within the harbor, tugs are only used for berthing and un-berthing.

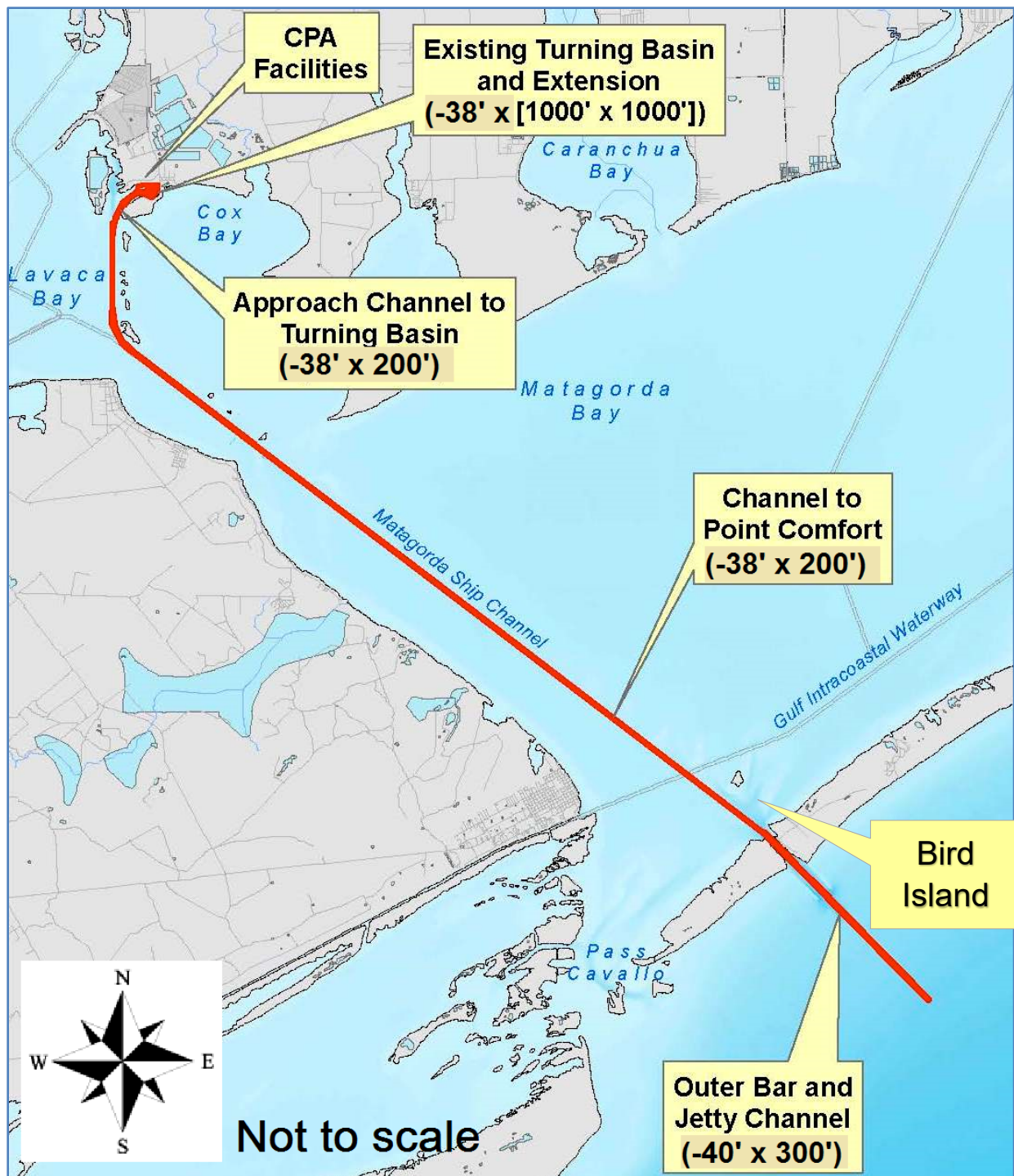


Figure 6 – MSCIP Current Path and Dimensions

1.8.2.1 Channel and Basin Descriptions and Maintenance

Offshore (Entrance Channel), the channel has a 300' bottom width, 10H: 1V side-slopes (X' horizontal by Y' vertical), and is maintained at a depth of -40' plus three feet of advance maintenance depth and two feet of allowable over-depth (Figure 7).

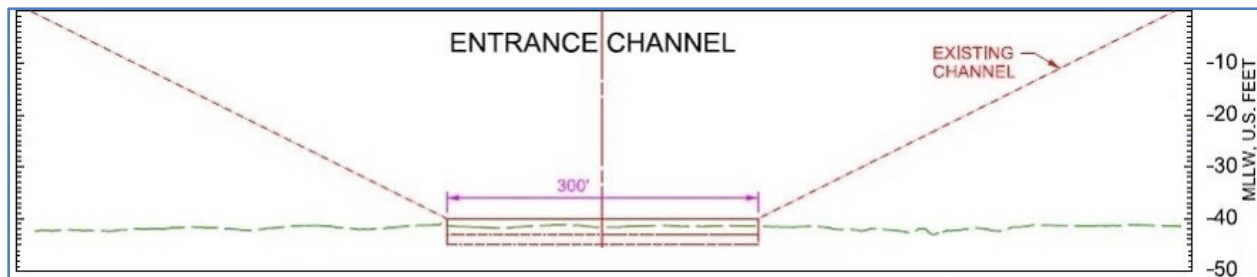


Figure 7 – Existing Entrance Channel Cross Section

Through Matagorda Peninsula, the MSCIP is authorized to a depth of -38', with a 300' bottom width. Generally, in Matagorda and Lavaca Bays, the channel has a 200' wide bottom width with 3H:1V side-slopes and is authorized to a project depth of -38', plus two feet of advance maintenance depth and an additional two feet of allowable over-depth outside the advance maintenance dredging prism (Figure 8).

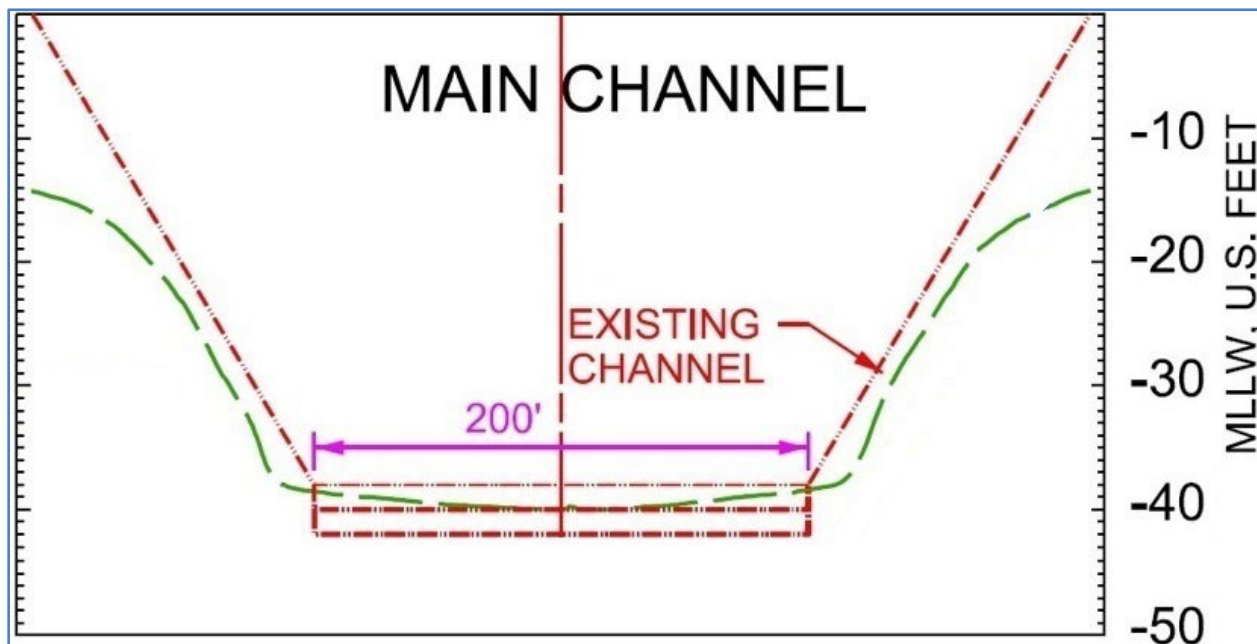


Figure 8 – Existing Main Channel Cross Section

The primary turning basin is maintained to a depth of -38' and is 1,000' by 1,000' (Figure 9).

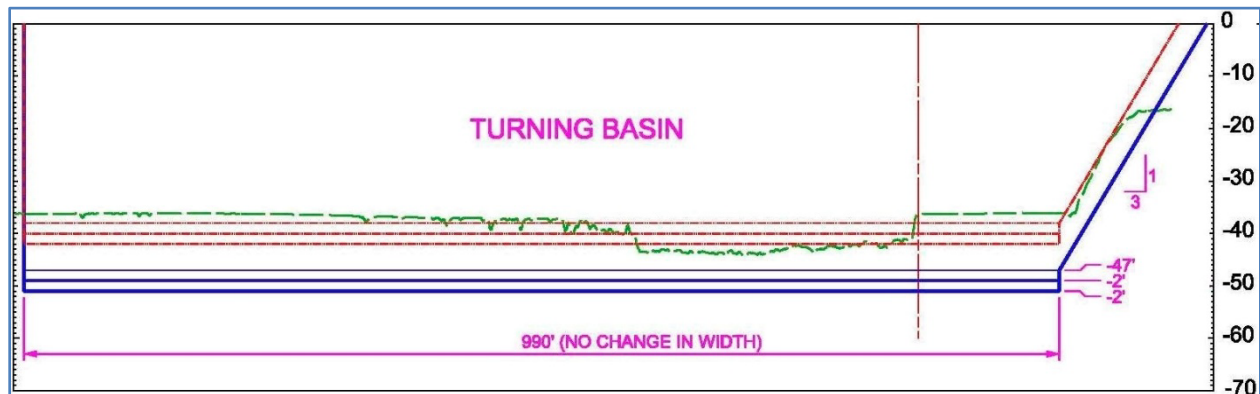


Figure 9 – Existing Turning Basin Cross Section

Dimensions of the channel segments, that are part of the study, are provided below (Table 2 and Table 3).

Table 2 – Currently Authorized MSCIP Sections and Dimensions

Channel Section	Authorized Depth ¹	Width	Length (mi)
Offshore & Jetty Channel	-40'	300'	3.2
Channel to Point Comfort	-38'	200'	20.9
Approach Channel to Turning Basin	-38'	200'	1.1
Point Comfort Channel to Turning Basin	-38'	1,000'	1,000'
Point Comfort Turning Basin Extensions (North & South)	-38'	300'	1,279'

¹ Authorized depth referenced as MLLW

Based upon headquarters' guidance, the USACE is allowed to increase the authorized depth by rounding to the nearest foot in favor of safety. Therefore, current authorized channel depth may be rounded from -36' MLT to -38' MLLW, rather than -37.697'.

Table 3 – Existing, As Maintained Channel

Channel Section	Authorized Depth ¹	Width	Length (mi)
Entrance Channel	-40'	300'	2.7
Jetty Channel	-38'	200'	1.14
Matagorda Peninsula to Light 48	-38'	200'	12.34
Light 48 to Alcoa Channel	-38'	200'	8.49
Alcoa Channel to CPA Turning Basin	-38'	200'	1.18
CPA Turning Basin	-38'	1,000'	0.19
CPA Turning Basin North & South Basins	-38'	*Varies	0.24
AM = Advance Maintenance OD = Overdepth * Varies: North Basin: Width narrows from 345' to 159' South Basin: Width is 284'			

1.8.2.2 Calhoun Port Authority Facilities

The primary turning basin is maintained to a depth of -38' and is 1,000' by 1,000'.

The Port has facilities to handle break bulk, containerized, heavy-lift, dry bulk, and bulk liquid cargoes (Figure 10). There are no aerial restrictions (such as bridges) to vessels entering from the MSCIP or the GIWW. Principal cargoes imported are liquid fertilizer and petrochemical feed stocks, including naphtha, fluorspar, and anhydrous ammonia. Primary exports are petrochemical products. Much of the liquid cargos are either inputs or outputs of the nearby petrochemical and refining facilities.

The Point Comfort 1,100' bulk liquid cargo pier allows for the loading and unloading of chemical, petroleum-related, liquid fertilizer, and other liquid bulk cargoes. The terminal includes two vessel berths at an operating depth of -38', with positions for 12 marine liquid loading arms. The piers were constructed to accommodate a dredged berth depth of -47' without modification. A new bulk dock was recently built in the northeast corner of the harbor to handle pet coke and limestone used at Formosa; however, Formosa no longer has need for dry bulk feedstock, so this dock was converted for liquid bulk.

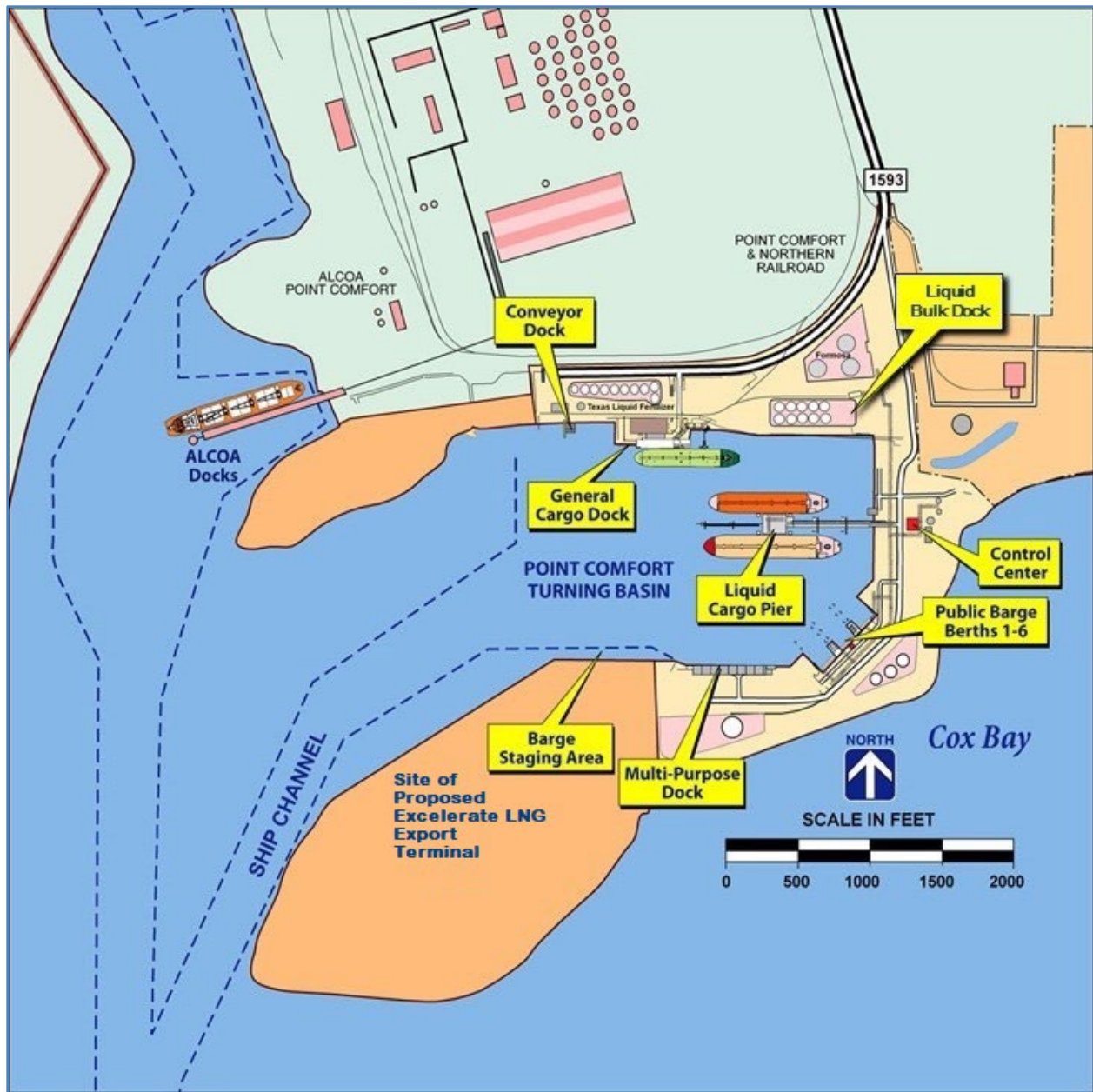


Figure 10 – Point Comfort Existing Facilities

1.8.2.3 Pilot's Rules

The pilots were consulted during both the 2019 F/EIS and 2025 V/SEIS to provide input on the rules associated with the MSCIP. The Pilots indicated daylight restrictions, as well as the one-way nature of the channel, frequently cause transportation delays. Strong currents at the jetties can also restrict the movement of vessels drafting within four feet of the maximum allowable draft, though there is not a specific rule regarding currents.

The current restrictions placed on vessels transiting the MSC are:

- All ocean-going traffic is one way.
- Any vessel within 4' of maximum allowable draft is restricted to daylight only.
- Any vessel 195 meters (639') or greater in length is restricted to daylight only.
 - **2025** – Any vessel 175 meters (575') or greater in length is restricted to daylight only. This change is due to increased inland barge traffic and barge sizes which share the narrow bay channel.
- No passing of ocean-going vessels.
- No movement of any vessel that is drafting within 4' of the maximum allowable draft when current is greater than four knots.
 - **2025** – No movement of any vessel that is drafting 33' or more when current is greater than four knots, ebb or flood currents. This change is due to the narrow entrance channel and the jetty system.

The USACE engineers have confirmed that the three feet under-keel (UKC) requirement is consistent with USACE UKC guidance in Engineer Manual (EM) 1110-2-1613. Therefore, a three-foot UKC requirement was used for this analysis.

1.8.3 Current Dredged Material Management Plan

The SWG uses the 2000 MSCIP Preliminary Project Assessment as the most current iteration of MSCIP Dredged Material Management Plan (DMMP). The USACE determined that there was no capacity, environmental, or economic limitations within the MSCIP to continued maintenance dredging of the existing project. The MSCIP was compliant with all environmental requirements.

A total of 19 placements areas (PAs) are used for maintaining the MSCIP. Additional PAs are used to maintain the channel to Port Lavaca and are not part of this study. The Entrance Channel is maintained by hopper dredge on a four-year maintenance dredging cycle with all material placed in PA-1, which is an offshore open water PA (Figure 11). The Matagorda Peninsula – Point Comfort Reach is maintained on a two-year cycle dredging cycle. This reach contains 13 open water PAs, three unconfined upland sites, and two open water emergent areas. These areas are all relatively small (10 – 140 ac), with nine of these areas in the process of becoming emergent wetlands.

PA3 is known by various names such as Bird Island, Chester Island and Sundown Island. To help the reader distinguish the newly proposed Beneficial Use Placement Area called "Bird Island", the 2025 V/SEIS will use only "Chester Island" when discussing PA3.



Figure 11 – Map of Current DMMP for the MSCIP

2 POST AUTHORIZATION CHANGE REPORT PROCESS

This section presents the rationale for the development of this V/SEIS. This USACE Validation Report, as specified in ER 1105-2-100 (Planning Guidance Notebook) Appendix G, Section III – Post-Authorization Changes, identifies changes in scope, location, project purpose, location, design, benefits, cost allocation or apportionment and environmental considerations.

This 2025 V/SEIS looks only at the 2019 F/EIS Final Array of Alternatives in order to validate that Alternative A, Scale -47' / -49' MLLW continues to be the plan with the highest net benefits. To that end, the PDT compared metrics for their individual disciplines between the 2019 F/EIS and this 2025 V/SEIS.

Information is considered to be still good unless otherwise specified with changes marked with a date.

2.1 2019 and 2025 Final Array of Alternative Plans

FINAL ARRAY OF ALTERNATIVE PLANS

Table 4. 2019 Final Array of Alternatives

Alternative	Scale Depth	Width
	Main / Entrance (MLLW)	Main / Entrance
No Action Plan	-38' / -40'	200' / 300'
A	-41' / -43'	300' / 550'
	-43' / -45'	300' / 550'
	-45' / -47'	300' / 550'
	-47' / -49'	300' / 550'

NOTE: The two deepest 2019 scales of Alternative A (-49/-51' and -51/-53') were removed from consideration as the NFS cannot deepen the existing turning basin deeper than -47' MLLW.

Table 5. 2025 Final Array of Alternatives

Alternative	Scale Depth	Width
	Main / Entrance (MLLW)	Main / Entrance
No Action Plan	-38' / -40'	200' / 300'
A	-43' / -45'	300' / 550'
	-45' / -47'	300' / 550'
	-47' / -49'	300' / 550'

Turning basin dimensions are the same for both the 2019 and 2025 designs.

2.2 Problems and Opportunities

General Problem Statement: Analysis of the physical characteristics of the MSCIP, and of the economics of the goods shipping into and out of the Port, demonstrates that there have been significant changes in both the physical and economic conditions since the MSCIP was completed in 1966. Cargo vessels have continued to increase in size (length, beam, and displacement) since the MSCIP was completed; with large numbers unable to use the existing channel and turning basin (Figure 12).

2.2.1 Specific Problem Statements

Initial Problem Identification – The USACE and NFS held a public scoping meeting in Port Lavaca, Texas on January 24, 2017. These problems, and their related opportunities, represent some of the public concerns communicated to the USACE and the NFS at that time.

- The existing designed channel depth limits channel use to vessels whose drafts are 35' or less.
- Vessels capable of deeper drafts cannot come into the Port fully loaded.
- The existing designed channel bottom width is 200' and limits channel use to a single vessel with a maximum width (beam) of 109'.
- The existing designed channel bottom width is 200' and leaves little room for pilot error during times of high winds, waves, or changes in shoaling. Pilots only move vessels through the MSCIP with a length overall (LOA) of 639' or longer during daylight.
- The existing designed turning basin (1,000' by 1,000') (Figure 10) limits the size of vessels which can call on the Port facilities.

2.2.2 Specific Opportunities

- To modify the existing channel such that it can accept vessels whose drafts are greater than -38'
- To modify the existing channel such that deeper draft vessels can come into the Port fully loaded
- To modify the existing channel such that deeper draft vessels do not have split their cargoes before coming to the Port
- To modify the existing channel such that it can accept vessels with beams greater than 109'
- To modify the existing channel such that the Pilots feel it is safer for themselves, vessel's crews and the environment to move these, and larger vessels, during nighttime hours
- **2025** – To strengthen national security by boosting energy exports, improving our energy trade balance with allies, and supporting defense priorities as outlined in Executive Order 14156 Declaring A National Energy Emergency. The EO emphasizes the need for a reliable, diversified, and affordable energy supply to sustain our manufacturing, transportation, agriculture, and defense industries. It also highlights the urgent importance of maintaining and expanding our energy infrastructure to protect national

and economic security. The MSCIP project is expected to enable the Assistant Secretary of the Army and the Secretary of Commerce to leverage their emergency authorities to facilitate the transportation, refining, and generation of domestic energy resources.

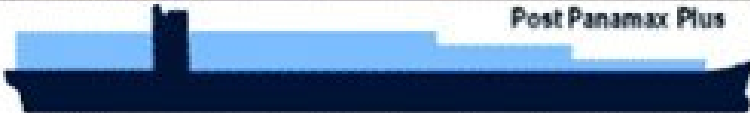
		Length (ft)	Draft
First (1956-1970)	 Converted Cargo Vessel	443	< 9 m
	 Converted Tanker	666	< 30 ft
Second (1970-1980)	 Cellular Containership	706	10 m 33 ft
Third (1980-1988)	 Panamax Class	820	11-12 m
	 Panamax Class	960	36-40 ft
Fourth (1988-2000)	 Post Panamax	902 – 1,000	11-13 m 36-43 ft
Fifth (2000-2005)	 Post Panamax Plus	1,100	13-14 m 43-46 ft
Sixth (2006-)	 New Panamax	1,300	15.5 m 50 ft

Figure 12 – Examples of changes in vessel size since the MSCIP was constructed

2019 Only

- To modify the existing designed channel, it can accept vessels moving in both directions simultaneously

The Pilots were asked whether they felt that a 550' Entrance Channel was sufficient for two vessels to meet and pass. They expressed the opinion that due to the strong currents between the jetties, it would not be safe for vessels to pass regardless of their size (beam). In the outer part of the Entrance Channel, that section out in the Gulf, the National Association of Navigational Congress Rule states that two vessels may pass as long as their combined beam is less than 54% of the channel bottom width (54% Rule). For the Gulf section of the Entrance Channel, as long as the combined beam of two vessels is less than 324' (600' x .54), the Pilots are comfortable allowing two vessels to meet and pass each other. For the Main Channel, the Pilots would also use the 54% Rule to determine whether to allow vessels to meet and pass each other. For the Main Channel, the combined beam of two vessels would need to be less than 189' (350' x .54).

To modify the existing turning basin so it can accept larger vessels with larger transport capacities. Modification of the existing turning basin would cost more, for no additional benefits, than would dredging a new turning basin of the appropriate size and depth. Therefore, this structural measure was removed from further consideration.

2025

- To increase the Nation's Trade, Energy and Defense capabilities

2.3 Objectives and Constraints

An objective is a statement of the intended purposes of the planning process; it is a statement of what an alternative plan should try to achieve. More specific than goals, a set of objectives effectively constitutes the mission statement of the Federal/non-Federal planning partnership.

2.3.1 Federal Goals

The Federal objective of water and related land resources project planning is to contribute to NED consistently with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders (EOs), and other Federal planning requirements.

The role of the USACE with respect to navigation is to provide safe, reliable, and efficient waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation. The USACE accomplishes this mission through a combination of capital improvements and the operation and maintenance of existing projects.

2.3.2 Specific Study Planning Objectives

- Improve the navigational efficiency of the deep-draft navigation system over the period of analysis (2024 – 2073)
- Improve the operational safety of the deep-draft navigation system over the period of analysis (2024 – 2073)
- **2025** – Contribute to the Nation's Trade, Energy and Defense goals

NOTE: The new base year is 2030 with a 50-year period of analysis of 2030 – 2079.

2.3.3 Specific Planning and Institutional Constraints

Planning Constraints

- None known at this time

Institutional Constraints

- Plans must be consistent with existing Federal, State, and local laws
- Plans must include a Least Cost DMMP in which activities are performed in an environmentally acceptable manner, use sound engineering techniques, are

economically warranted, and that include sufficient confined disposal facilities available for at least the next 20 years.

Planning Considerations

- Sediment sampling will not occur during construction; placement areas will only be monitored for turbidity as is common practice. Hence the need to ensure sediment quality in advance of dredging by means of the sediment and elutriate sampling and analyses and the Tier 1 Evaluation described in Appendix B-10. Data older than 5 years are not considered reliable; thus, the PDT team will need to repeat sampling before Contracting if that action occurs after 2028, or if any events occur that could affect the sediment quality (e.g., a new spill or release, a storm event of hurricane strength, etc.). The PDT (USACE Galveston and RPEC) will continue to coordinate with EPA, the potentially responsible party (PRP), and the NFS (Calhoun Port Authority) should any future sampling identify hazardous, toxic, radioactive waste (HTRW) material so that the PRP (Alcoa) can delineate and remove any HTRW material prior to Contracting. (Figure 13).

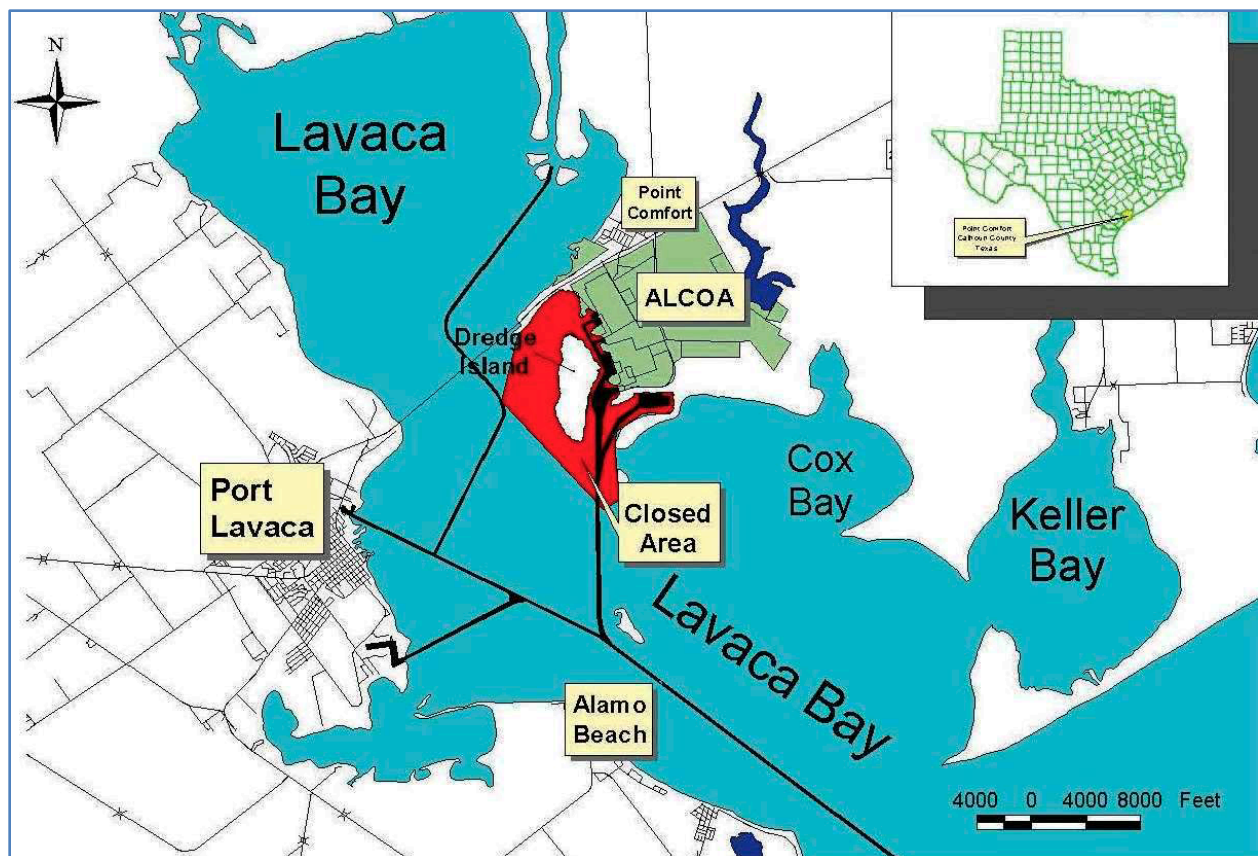


Figure 13 – Area of Alcoa's Dredge Island and area closed to fishing

2.4 Key Assumptions

2.4.1 Economic Assumptions

2019 – Benefits of the deepening project were based in part on a new type of activity, crude oil, and condensate exports, from the Port. Due to the lack of historical tonnage data for petroleum product exports from the Port, an assumption about throughput tonnage was made based on the users' capacity. The assumptions were as follows:

- Users would operate at 75% of capacity; and
- Fifty percent of this capacity would benefit by channel deepening.

The design vessel for this study (mid-sized Aframax tanker of 110,000 DWT) was not calling in the existing condition and could not call in the future without project (FWOP) condition due to its displacement and its beam. The assumption was that the design vessel (a mid-sized Aframax tanker) would begin calling in the future with project condition (FWP). Reasons for the assumption were as follows:

- The Aframax tanker's cost per ton was cheaper than that of the smaller, Panamax tanker.
- The percentage of newly built Aframax tankers, as compared to the rest of the tanker fleet, was increasing.
- Aframax tankers call at the other ports on the Texas Gulf Coast, and were available for backhaul, since the United States (U.S.) was becoming a net energy exporter.

Since it was new activity, the loading practices of crude oil and condensate exports at The Port were based on the loading practices of petroleum product exports from a nearby Gulf port, Corpus Christi. The Port of Corpus Christi (PCC) was chosen as the representative port based on:

- Its location on the Gulf and proximity to the MSCIP
- Its commodity profile, which was similar to the Port, consisting of mainly petroleum and petroleum products, chemicals and related products, and crude materials
- Discussions with the MSCIP users

Assumption	Planning Risk	Management
Throughput Tonnage based on User Capacity	Low	Use PCC as model

2025 – The crude export volume evaluated in the FWOP and FWP conditions is based on user input and existing infrastructure. The 2019 study evaluated only origin-destination transportation costs, whereas the 2025 study evaluates both origin-destination transportation costs in addition to reverse lightering transportation costs based on user input. This study also assumes the distribution of vessels and destinations used in reverse lightering operations will be consistent

with the rest of the U.S. Gulf Coast based on data available as of 2022, limited to a maximum size of Panamax class vessels.

2.4.1.1 Transportation Cost Savings Analysis Methodology

2019 – Channel improvements result in reduced transportation cost by allowing a more efficient future fleet mix and less wait time when traversing the channel, resulting in at-sea and in port cost savings.

Channel restrictions limit a vessel’s capacity by limiting its draft. Deepening the channel reduces this constraint and the vessel’s maximum practicable capacity increases towards its design capacity. This increase in vessel capacity results in fewer vessel trips being required to transport the forecasted cargo.

HarborSym was set up with the basic required variables. To estimate origin-destination (OD) cost saving benefits, the Bulk Loading Tool was used to generate a vessel call list based on the commodity forecast at the MSCIP for a given year and available channel depth. The resulting vessel traffic was simulated, producing average annual vessel OD transportation costs. The recommended plan was identified by considering the highest net benefit based on the OD transportation cost saving benefits.

Assumption	Planning Risk	Management
Origin-Destination	Medium	Use of Bulk Loading Tool

2025 – The study assumes that 50% of crude trade from MSC will be reverse lightered, where Panamax vessels are used to load larger tankers at lightering zones in the Gulf. The remaining 50% of crude trade would be origin-to-destination.

2.4.1.2 Environmental Assumptions

2019 – The environmental and cultural resource analysis of alternative plans made extensive use of the 2009 EIS and the draft 2014 Section 204(f) Assumption of Maintenance Report for the similar permitted project, with updates as needed. Consultants were required to update the air emissions and hazardous materials analysis provided in the previous reports. This assistance was provided by the NFS as a work-in-kind contribution.

An existing Ocean Dredged Material Disposal Site (ODMDS) designated for maintenance material would continue to be used as needed for maintenance dredging.

Assumption	Planning Risk	Management
2009 & 2014 data still good	Low	Resource Agency Coordination

2025 – The existing placement areas would continue to be used for the life of the project (2030-2079). Since 2019, USACE and the NFS had conducted aquatic resources and cultural

resources surveys in Matagorda Bay. This V/SEIS utilized these surveys in the analysis along with Geo-Information Service data from Federal and state resource agencies.

2.4.1.3 Geotechnical Engineering Assumptions

There is no new geotechnical data for this study. All stability and design analyses would be conducted using the existing geotechnical information from 2021 boring logs.

Between boring locations in the existing information, it is assumed that depths of material layers changed linearly. In some locations, the boring logs did not show vertically the depths extending fully to the bottom of the proposed channel. In these instances, it would be assumed that the last shown material layer continued to the proposed depth. In areas where there is laterally limited information, it would be assumed that the soil conditions are similar to the closest available boring log. Stability analyses for the channel cuts and the PAs would be performed with the GeoStudio 2016 Slope/W computer program using the Modified Bishop method. The required shear strength parameters for these analyses would be obtained from correlations with soil index properties provided in the existing geotechnical information. Additional geotechnical investigation and analyses would be necessary for detailed design during the Pre-Construction, Engineering, and Design (PED) phase. The USACE, including the vertical team, have agreed that samples need to be collected in PED to verify the assumptions of soil conditions and finalize the geotechnical feature design.

Assumption	Planning Risk	Management
2021 data is valid	Medium	Borings during PED

2.4.1.4 Real Estate Assumptions

2019 – Based on available information, ~22 pipelines were identified as needing to be removed or relocated. (Post-recommended plan, the number of pipelines for removal, or relocation, was reduced to 16.)

Clearance requirements for underground pipelines, cables, and conduits crossing deep-draft channels were given in the USACE SWG (1998) Operations and Maintenance (OM) 1145-2-15: “Regulatory Permit Insurance, Inspection, Reporting, and Clearance Requirements Deep-Draft Channels District Policies and Practices.” SWG’s policy stated that existing pipelines (measured from the top of the pipe) shall have, “a minimum of 20’ below the authorized project depth of the channel, plus a distance of 50’ on each side of the channel measured from the bottom edge of cut and perpendicular to the centerline.” Any of the items that are not deep enough to comply with the district’s clearance requirements with the proposed channel template would have to be removed or relocated.

2025 – Since the F/EIS was completed, the NFS went through an exhaustive effort to identify and confirm potential pipeline obstructions for the MSCIP including a review of existing documentation (CPA documents, online research, Texas General Land Office (GLO) resources, and Texas Railroad Commission records), ROW investigations by a sub-contracted ROW agent, a magnetometer survey conducted in September 2021, and stakeholder engagement of suspected pipeline owners. In addition to these efforts, the NFS contracted Mott MacDonald, a management, engineering, and development consultancy, to perform an in-depth analysis of the

pipelines. Mott McDonald provided the “Matagorda Ship Channel (MSCIP) – Due Diligence Report,” dated January 18, 2022. From this effort, the NFS was able to provide a disposition of remove, relocate or remain in place (Appendix D – Figure 12). As a result of the new information provided by these efforts, the required actions for pipeline crossings have been significantly refined from the original assumptions of the authorized plan. That authorized plan made a conservative, feasibility-level assumption that all 16 conflicting pipelines would require full relocation.

In contrast, the current analysis defines a more precise and less costly set of required actions:

- Removal: Thirteen of the pipelines that conflict with the template will require removal only.
- Relocation: One pipeline – a 30-inch Federal Energy Regulatory Commission (FERC) regulated pipeline, will require relocation.
- To Remain by Waiver: The final two conflicting pipelines will be allowed to remain in place. The CPA has deemed them exempt from USACE's clearance template requirements and will issue a formal waiver to that effect.

Further discussion of why the four pipelines marked as unknown are not included in the number of pipelines accounted for removal or relocation can be found in the Engineering Appendix of this report.

Additionally, in 2023 SWG updated the clearance requirements for underground pipelines, cables, and conduits crossing deep-draft channels. The USACE SWG (1998) Operations and Maintenance (OM) 1145-2-15: “Regulatory Permit Insurance, Inspection, Reporting, and Clearance Requirements Deep-Draft Channels District Policies and Practices” was rescinded and replaced with a new memorandum for record, “Pipelines Depth Cover Requirements in the Galveston District” dated February 1, 2023. Although the guidance document was updated, the requirement that an existing pipeline must be deeper than 20’ below the authorized project depth plus 50’ on each side of the channel remains the same.

Assumption	Planning Risk	Management
Numbers of pipelines	High	New Research post-recommended plan

2.4.1.5 Design Assumptions

- **2019** – Construction occurs between 2020 and 2024
 - **2025** – 2026 and 2030
- Project design life is 50 years
- Design vessel is a mid-sized Aframax 110,000 DWT petroleum tanker with average dimensions of 800’ LOA, 138’ beam, and a -49’ design draft
- Vessel traffic is one-way

2.5 Key Uncertainties

2019 – One of the key economic uncertainties was attributed to developing the crude oil and condensate portion of the commodity forecast. The HarborSym model (Section 4.8.3) results showed that 68% of benefits came from the new crude oil and condensate activity, while 32% of benefits came from other, existing activity for the recommended plan in the most likely scenario. Since there was no baseline upon which to forecast growth of the new activity, and since it comprised the majority of transportation cost savings for the project, it is a source of risk and uncertainty.

On December 18, 2015, the U.S. enacted legislation authorizing the export of U.S. crude oil without a license. Prior to December 2015, there were restrictions on crude oil exports to overseas locations. Given that this type of export activity is new and there is uncertainty about how the country as well as the global economy would respond long term to the lifting of the ban, there is likewise uncertainty surrounding the new activity at the Port. The outlook for the U.S. as an exporter of crude oil looks strong for the near future. In 2016, the year after the crude oil export ban was lifted; exports from the U.S. averaged 591,000 barrels per day (bpd). In 2017, that average increased to 1.037 million bpd, reaching its all-time high in October 2017 with 2.13 million bpd. This trade is largely attributed to the advancement in output from shale fields. Given the Port's proximity to the Eagle Ford and Permian Basin shale, it is expected that it would receive NED benefits from this new activity. However, it is also accepted that there is a large level of uncertainty surrounding the amount of tonnage (i.e., benefits) that would be realized from the widening and deepening project. This under- or over-estimation of tonnage is not expected to change the recommended plan, but could potentially under- or over-estimate net benefits, and therefore the Benefit to Cost (BCR) ratio.

The width of the channel in this study was calculated based on the design vessel, a mid-sized Aframax tanker, which was to be used for the new crude oil traffic, as described above. Should this activity not emerge as expected, the project width could be over-designed. Conversely, if the activity proved to be more substantial than expected, it could attract even larger vessels than the Aframax, as other ports along the Texas Gulf have, and the project could potentially be under-designed.

At one time, Alcoa was the world's sixth largest producer of aluminum with operations in 10 countries. The Alcoa dock, which began operating in 1948, was considered to produce zero benefits for this project. The indefinite idling of this plant was tied to the price of alumina. If the price of alumina rebounds and the alternative plant opens in the future, or if the alternative plant closes and the docks are sold to another tenant, it was possible that benefits could be realized from this dock and NED benefits of the improvement project could be underestimated.

2025 – There is still significant uncertainty related to future commodity throughput at the Port, especially given the lack of historical crude exports. Additional landside investment (pumping capacity and storage) is required to reach the channel users expected maximum export volumes. This added infrastructure is currently in the planning stages but is not guaranteed to be built in the FWOP condition. As a result, these additional crude export volumes are considered separately in the economic analysis.

3 EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS

Existing conditions are defined as those conditions that exist within the study area, at the time of the study. The term baseline is also often used to refer to the existing conditions at the time of a measurement, observation, or calculation, and may be used occasionally throughout this report.

FWOP conditions are defined as those conditions that would exist within the study area, during the 50-year period of analysis (2019 F/EIS = 2024 – 2073, 2025 = 2030 – 2079), in the absence of a proposed water resources project. The expected FWOP condition is the same as the “No Action” alternative plan (channel depth of -38 ft / -40 ft, channel width of 200 ft / 300 ft, and existing placement areas [Figure 11]) and is therefore a projection of how these conditions are expected to change over time if the USACE plan is not implemented.

A quantitative and qualitative description of resources within the study area is characterized for both existing and future conditions. The second step of plan formulation, and the starting point in any USACE analysis, is to develop an accurate picture of the existing and FWOP conditions.

Forecasts extend from the base year (the year when the proposed project is expected to be operational) to the end of the period of analysis.

The resources discussed in Step 2, and again as part of the FWP condition are:

- Hydrology, Hydraulics and Sedimentation
- Economics
- Environmental Resources
- Cultural Resources
- Environmental Engineering, including HTRW
- Geology and Structural Setting, and
- Socioeconomics

NOTE: Unless otherwise specified, information in this document is considered to be accurate for both the 2019 F/EIS and for the 2025 V/SEIS.

3.1 Hydrology, Hydraulics and Sedimentation

3.1.1 Existing Coastal Hydrology and Hydraulics

Matagorda Bay is a broad, shallow estuary, separated from the Gulf by the Matagorda Peninsula and a barrier island complex. The bay is interspersed with multiple dredged navigation channels, the largest of which are the MSC and GIWW. Freshwater sources for the estuary include the Lavaca-Navidad River system and several smaller rivers and creeks. Matagorda Bay is connected to the Gulf primarily through the MSC land cut, and the Colorado River Mouth Complex.

The Lavaca delta is characterized by a variety of marsh types, salt, intermediate and freshwater (McGowen et al. 1976). Marsh areas expand in conjunction with delta growth. Woody vegetation is sparse at most places, but oak clusters and other vegetation can be found in the more-sandy

areas and in the riparian uplands. Broad areas of coastal prairies, pastureland, and farmland occur inland from the Gulf.

3.1.1.1 Tides, Currents, and Water Levels

The project area experiences semi-daily tides with two high and two low tidal periods, each with an average range of approximately one foot. Table 6 provides the diurnal tide ranges in the study area. Tide date along the Texas coastline is provided by NOAA's Center for Operational Oceanographic Products and Services. The datum for this product is MLLW. There are two gages in the interior of the bay and one in the Entrance Channel. The gage at the Entrance Channel is in deeper water due to the scouring by laterally compressed inflow at the channel's opening. The two interior gages experience decreased tidal range due to timing lags as the tide travels up through the bay. The mean diurnal tide can be significantly altered by area winds. Strong north winds from winter cold fronts can lower water surfaces by up to 2 ft. below MLT. Tropical storms can increase water levels up to 15 ft.

The study area contains one major estuarine system (Matagorda Bay) and three rivers (Lavaca River, Colorado River, and Tres Palacios River). The GIWW flows through the study area creating a complex movement of water. The study area also encompasses a portion of the northern Gulf.

Table 6 – Diurnal tide ranges within the study area.

Area	Tidal Range (ft)
Matagorda Bay Entrance Channel	1.25
Port O'Connor, Texas	0.80
Port Lavaca, Texas	0.92

The MSC extends about four miles into the Gulf and is confined to the inner continental shelf area. The shelf slopes at a rate of approximately 36 ft. /mile from 0 to 18 ft., about 17 ft. /mile from 18 to 30 ft., and about 5 ft. /mile from 30 to 48 ft. (McGowen et al. 1976). The entrance channel is a high-energy environment flanked by two man-made rock jetties. The barrier islands and peninsula help make the Matagorda Bay system a relatively low-energy environment.

The study area has been modified by human activity by channel dredging and dredged material placement areas. USACE currently maintains water depths in the bay and offshore segments of the MSC to depths of -38 and -40 ft. MLLW, respectively. The MSC is approximately 300 ft. in width for the entrance channel (offshore) and 200 ft. in width within the bay. Increased flow through the jetties at the MSC entrance channel has scoured the water bottoms to over 100 ft. inside the bottleneck at the bay and on both sides of the bottleneck as it opens to the wider part of the jetties, and at the Gulfward end of the north and south jetties (USACE 2000). The tidal channels, passes, and dredged channels within the bay are deeper than average depth of the bay as a whole. Mean natural water depth in Matagorda Bay is approximately 13ft while depth in the adjacent bays ranges from seven to eight feet.

The Matagorda Bay system consists of the Lavaca-Guadalupe and Coastal Colorado-Lavaca Basins. Freshwater inflows primarily come from the Colorado River, Tres Palacios Creek, and

the Lavaca River. Tidal exchange with the Gulf through the MSC and the mouth of the Colorado River through to the GIWW and to Matagorda Bay, to a limited degree.

The average tidal range at Port O'Connor is 0.8 ft. (TCOON 2017). Based on an average bay depth of approximately 5 ft., roughly 16 percent of the bay volume is exchanged on each tidal cycle. The general movement of water is from the freshwater inflows in the north to the Gulf, considering average wind, freshwater inflow, and tidal influence conditions (Mueller and Matthews 1987). Circulation patterns are complex and vary greatly from month to month. One of the main drivers of circulation in the bay is the MSC. Frontal passages can also affect circulation through changes in water levels, exchanges between the bays and the Gulf, and forcing water from one bay to another.

3.1.1.2 Waves – Existing

2019 – Wave measurements at the Entrance Channel did not appear in public or the USACE databases. Two Wave Information Studies (WIS) hindcast stations were used in this analysis: 73051 and #73050.

The Coastal Texas project utilized the Advanced Circulation Model + Steady-State Spectral Wave numerical models to produce wave information along the entire Texas coast. Wind data from the entire Gulf were shoaled into shallow water.

CONCLUSION from hindcast model: Wave height $H_{mo} = 1.2\text{m} = 3.94'$ and $T_p = 5\text{s}$, both offshore and at the jetties' end. Inner-bay waves generally have a 10-yr limiting significant wave height of 4'.

Conclusion from the Pilots: "I would say our significant wave height is much larger than 4'. The ebb (outbound) currents are also a contributing factor in sea height. While it may only be 6' wave height out in the gulf, a strong ebb would increase the height of those waves to eight or 9' in the jetties and the Entrance Channel, sometimes even out two miles past the entrance buoy. I would say, in the winter, our predominant wave height is 5' while the significant wave height can be 10'."

2025 – WIS station #73051 was referenced to ascertain the "typical" wave conditions offshore of the entrance channel. $H_{mo} = 1.2\text{m} = 3.94'$ and $T_p = 5\text{s}$ is generally supported. The 50-yr wave height is roughly 20 ft at this location offshore. Inside the bay, the 10-yr fetch-limited wave height of 4' is still supported.

3.1.1.2.1 Ship Generated Waves and Drawdown – Existing

2019 – Wise (2006) performed an analysis of ship-generated waves between the jetties for three scenarios (Existing Vessel in Existing Channel, Existing Vessel in Proposed Ship Channel, and Proposed Liquid Natural Gas Vessel in Proposed Ship Channel). In Chapter 6, ship-generated waves and wind waves were compared. The conclusion was that "The relative wave energy from wind waves is estimated to comprise 97% to 99% of the total wave energy. Only ~1% – 3% of the total wave energy is from the existing ship traffic."

CONCLUSION: Wave Heights at the Entrance Channel were much greater than ship-generated Drawdown. Thus, wave heights (over the offshore bar) would be the limiting factor in depth design, and ship drawdown could be ignored.

2025 – Ship generated waves are not a pressing concern to western shoreline erosion. Existing conditions support that wind-generated waves comprise the majority of wave energy present to

the west of the MSC. Vessel call frequency, size, and distance to shore maintain relatively low vessel wave energy.

3.1.1.3 Currents – Existing

Unfortunately, the only overlap in the measurements was the ongoing measurements at the Bird Island and the newly installed (November 2018) Entrance Channel sites (Figure 14).

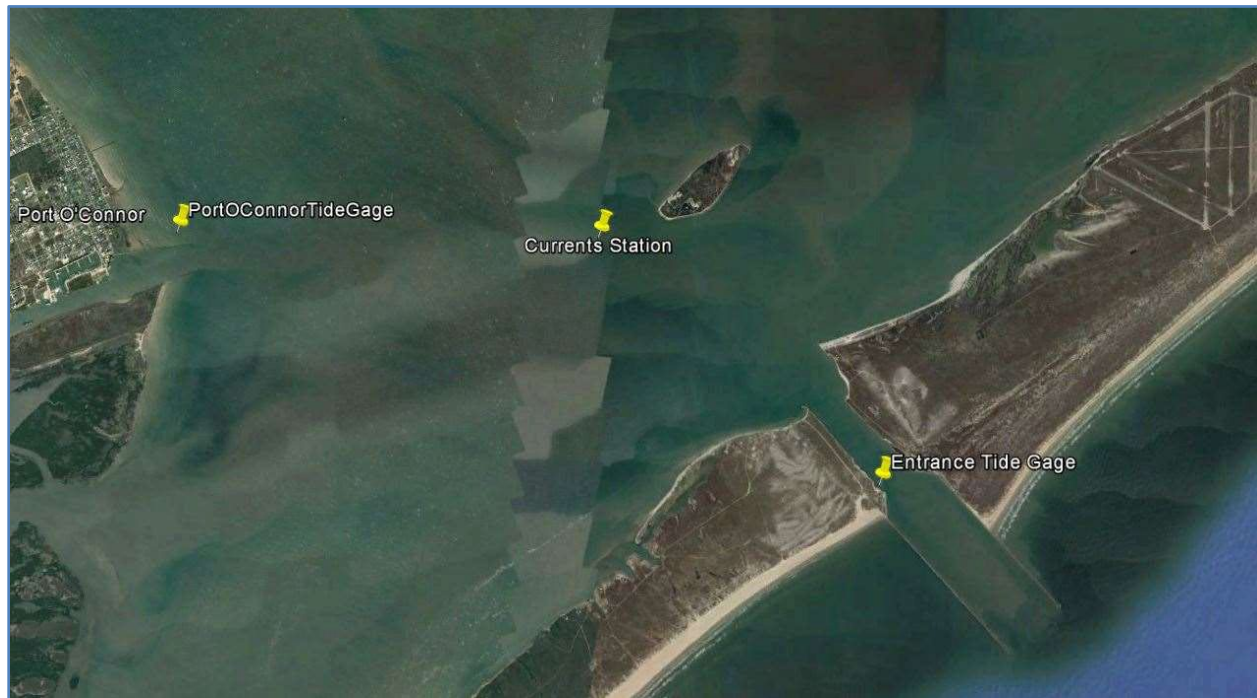


Figure 14 - Map showing locations of NOAA Gages

Thus, there was only one inter-comparison possible. Currents were measured only briefly in test mode in November 2017. Routine broadcasting of the currents to the pilots began in 2018.

2019 – Existing hydraulic conditions at this site presented several unique challenges:

- Dangerous currents between the jetties (greater than four knots at the peak of every tidal cycle)
 - The Coast Guard's Ports and Waterways Safety Assessment (PAWSA) panel of experts classified the MSCIP as: 1) The third most dangerous ship channel in the U.S., and 2) The ship channel with the most dangerous currents (U.S. Coast Guard 2001).
- Strong cross-channel currents between Matagorda Peninsula and Bird Island
- Currents between the jetties scour the bed, in places more than -140ft deep
- Winter waves routinely exceeding 10' at the entrance (2019 Appendix F – Engineering, Sections 2.4.3 and 2.4.4):
- An offshore bar, which was un-surveyed, limiting the draft of vessels entering the channel

- Although the bar had not been surveyed since Hurricane Harvey (August 26, 2017), several pre-hurricane surveys were found. A shoaling analysis using one set of field measurements from test pits dug in the Gulf at Matagorda and three different analytical methods was performed to estimate existing shoaling rates and a rate for the new deeper channel. (Permanent International Association of Navigation Congresses (PIANC) Report #102, p. 21, "Minimizing harbor siltation"). Three solutions were evaluated: 1) More frequent dredging, 2) Deeper dredging, or 3) A sediment trap north of the channel. The method selected was to dig deeper at the location where the channel intersects the offshore shoal.
- No wave measurements between the jetties or offshore (only Sep-Dec 2005 in the Bay), and
- ADCP datasets that disagree with each other

2025 – Existing hydraulic conditions:

- The tides in Matagorda bay are mixed, and the currents generated by tidal exchange between the gulf and bay continue to scour the seabed at the MSC inlet.
- Strong cross-channel currents exist at the entrance, both offshore of the jetties and just past the bayside throat between Chester Island and the Matagorda Peninsula.
- Average currents trend from east to west in the bay, controlling the predominant direction of sediment transport; currents in the shipping channel are generally aligned with the channel.

3.1.1.4 Salinity

The salinity regimes within the Matagorda Bay system from 1952 to 1980 were studied by Ward and Armstrong (1980). Their study showed the mean salinity in the bay area ranged between 8-31 parts per thousand (ppt). Areas of lower salinity were located near the mouths of the rivers (freshwater inflows) and higher salinities were found in areas more tidally influenced (saltwater inflows). Lavaca Bay, influenced by the Lavaca River, was consistently the freshest bay area, while the open water areas of Matagorda Bay and the western half of eastern Matagorda Bay were the most saline.

Vertical stratification was generally absent due to the average shallow depth and mixing strongly induced by winds, except for the MSC (Ward and Armstrong 1980). Stratification in the MSC was normally associated with differences in freshwater inflow, with stronger stratification resulting from higher freshwater inflow. Vertical stratification, though infrequent outside of the MSC, did occur in the areas where saltwater inflow was high, such as the MSC land cut. The seasonal pattern of salinity variation was related to seasonal inflows of freshwater. High freshwater inflows in the spring resulted in lower salinities. The gradual decrease in inflows from late fall and winter resulted in increases in salinity until a maximum in March is observed. The areas of the bay system more directly impacted by inflows, which showed more pronounced seasonal variation in salinity. Ward and Armstrong (1980) noted a significant increase in salinities after October 1963, which corresponds to the MSC land cut through Matagorda Peninsula, with an increase that ranged from 2 to 5 ppt in adjacent areas.

The Texas Water Development Board has been using data sondes to collect water quality data, including salinity, in Matagorda and Lavaca bays since fall 1986. The data for three years (1988, 2010, and 2011) with complete monthly data available were downloaded for comparison. In 1988 both the station at the mouth of the entrance channel and at The Port were similar in

salinity ranges. The station at the mouth of the entrance channel ranged from 24.8-33.6, while the station at The Port ranged from 23.4-33.1. 2010 appears to be an anomalous year with very low salinities at the Port station, ranging from 4.1-22.9, while the station at the mouth of the entrance channel ranged from 23.6-31.9. In 2011 the salinities at the different stations were again closer to each other. The station at the mouth of the entrance channel ranged from 26.7-36.9, while the station at The Port ranged from 21.0-37.6.

3.1.1.5 Relative Sea Level Change

Relative sea level change (RSLC) is projected for a 50-year project life by use of the USACE sea level rise curves. Shoreline recession and coastal habitat transformation are expected as the MSL continues to rise.

3.1.2 No Action Alternative / FWOP

No changes to the channel depth or width would occur under the FWOP condition, and the tidal prism would continue to follow historical trends, consistent with RSLC.

The current level of wave energy and shoreline erosion would continue under the No-Action Alternative. The majority of wave energy present in Matagorda Bay can be attributed to wind waves, with a rather insignificant contribution from vessel traffic. There is no considerable increase expected in ship-induced shoreline erosion under the No-Action Alternative.

3.1.2.1 Tides – FWOP

2019 – The tidal range in the Gulf was very small, approximately one foot on a diurnal cycle. The meteorologically driven tide could be greater than the astronomically driven tide, especially during frequent winter cold fronts that may depress the water level up to three feet.

2025 – No changes to tides would occur in FWOP.

3.1.2.2 Waves – FWOP

2019 – Wave heights and periods in deep water were little affected by changes in currents or water levels (sea level rise), thus there was no reason to expect significant changes in the wave climate. A ship wake analysis was performed for both existing and new project conditions. Results showed that the new project will increase ship wake wave heights by only 0.1ft, which was well within the error bar of the methods. On this basis, it was decided not to perform a shoreline erosion analysis.

2025 – Average wave conditions would not change in the FWOP scenario. Likewise, without an increase in vessel calls, the potential for increased vessel-wave energy is very low. FWOP vessel wakes would be similar to existing.

3.1.2.3 Currents – FWOP

2019 – Matagorda Bay has two inlets: the channel through Matagorda Peninsula and Pass Cavallo. Additional information can be found in the 2006 Matagorda Ship Channel, Texas: Jetty

Stability Study2 (MSCJD). The FWOP condition assumption was that the Jetty Deficiency project would be implemented. This project was not dependent upon the Jetty Deficiency project.

Analysis of cross-sectional areas of the three inlets is underway. $Q = V A$ would then be used to estimate change in currents V in the entrance channel.

FWOP currents would be largely reduced through construction of bottleneck removal. Changes in bay circulation patterns are not anticipated.

2025 – The main contribution to changes in FWOP currents is at the MSC entrance where the bottleneck is planned for removal by the MSCJD project. Crosscurrents and severe erosion will be reduced between Chester Island and Matagorda Peninsula with the bottleneck removal. Changes to bay circulation patterns are not expected.

3.1.2.4 Salinity

Under the FWOP condition, changes in salinity would continue to follow historical trends.

3.1.2.5 Relative Sea Level Change

2019 – Because of the much larger expected changes in currents and bathymetry, RSLC effectively had no effect on hydraulic design of the new channel. As sea levels rise, the channel depth is increased; the gain in mean sea level would offset any potential draft restriction created by more shoal material. The main effect of RSLR would be to raise water levels, thus decreasing dredging costs.

2025 – RSLC is a much smaller factor in with project sedimentation when compared to the channel modifications, bottleneck removal, and inclusion of open water placement areas. The overall effects of RSLC for Matagorda Bay are listed below in accordance with ER-1100-2-8162:

- Navigation within the MSC is improved for vessel's requiring more draft.
- Costs to maintain the Federal waterway are reduced with less dredging.
- Capacity at dredged material disposal sites increases.
- Wave energy in the bay has the potential to increase with more available depth since waves are often depth limited.
- Erosion and shoreline loss may consequently increase.
- Loading on existing infrastructure may increase.
- Existing infrastructure, such as piers, bulkheads, wharves, docks, and piles may require modification to adapt to RSLC.
- Port facilities.
- Aids-to-navigation (ATONs)

²https://www.researchgate.net/publication/235091543_Matagorda_Ship_Channel_Texas_Jetty_Stability_Study

- Federal structures will experience higher impacts and will need to be improved to deal with RSLC. The primary Federal structure is the MSC jetty system, which has a separate project authorization.
- Higher water levels create more coastal wetlands and reduce upland habitat.
- Upland riparian zones slowly become more suitable for marsh plants, also known as marsh migration.
- Marshes with no ability to migrate landward may drown.

The FWOP wave and sea level rise assessment is unchanged from 2019. Relative Sea Level Change (RSLC) is validated per ER-1100-2-8162. 2 ft of RSLC over 50-yr is selected for design.

3.2 Economics

3.2.1 Design Vessel

The design vessel, the mid-sized Aframax tanker of 110,000 DWTs, is the largest vessel that is expected to call regularly in the FWP conditions. Given the narrow dimensions of the existing channel and as stated previously, the fact that the widest vessel that can physically fit into the channel is currently being used, the design vessel in this study is expected to be wider (and longer) than vessels currently calling at the Port. The largest vessel in the chemical fleet would remain the same as in the FWOP conditions. The largest vessel in the petroleum tanker fleet in the FWOP condition would remain a PT-PX2 (60,000-80,000 DWT). Though petroleum product exports do not have a long history at the Port, this type of vessel has called at the Port in the past. In the FWOP condition, the largest petroleum tanker calling at the Port is expected to transition from a 70,000 DWT petroleum tanker (PT-PX2) to a mid-size Aframax tanker (Figure 15).

Aframax tankers refer to tankers between 80,000 and 120,000 DWTs. These vessels are used extensively in non-OPEC (Organization of Petroleum Exporting Countries) companies that generally do not have the infrastructure to accommodate Very Large Crude Carriers (VLCCs) or Ultra-Large Crude Carriers (ULCCs). Also, according to the U.S. Department of Energy's Energy Information Administration (EIA), this vessel size is popular with oil companies for logistical purposes, and therefore, many vessels have been built with these specifications. To validate the efficiencies of the Aframax tankers compared to the Panamax tanker, cost per ton calculations were completed using the Institute for Water Resources' Vessel Operating Costs. As Table 7 shows, the Aframax (110,000 DWT) cost per ton is cheaper in each alternative depth when compared to the Panamax (70,000 DWT).

NOTE: Aframax is not an official vessel classification on the AFRA scale but shown only for comparison.

Aframax tanker new builds are increasing faster than Panamax tankers. As of 2017, 7% of the in-service tanker fleet is Panamax tankers. The percentage of new builds that were Panamax tankers increased by only 1%, but 20% of new builds were Aframax tankers (Table 8). The only vessel classes that showed an increase in new builds as compared to in-service vessels were the Aframax and the Suezmax (125,000 – 199,999 DWT) tankers.

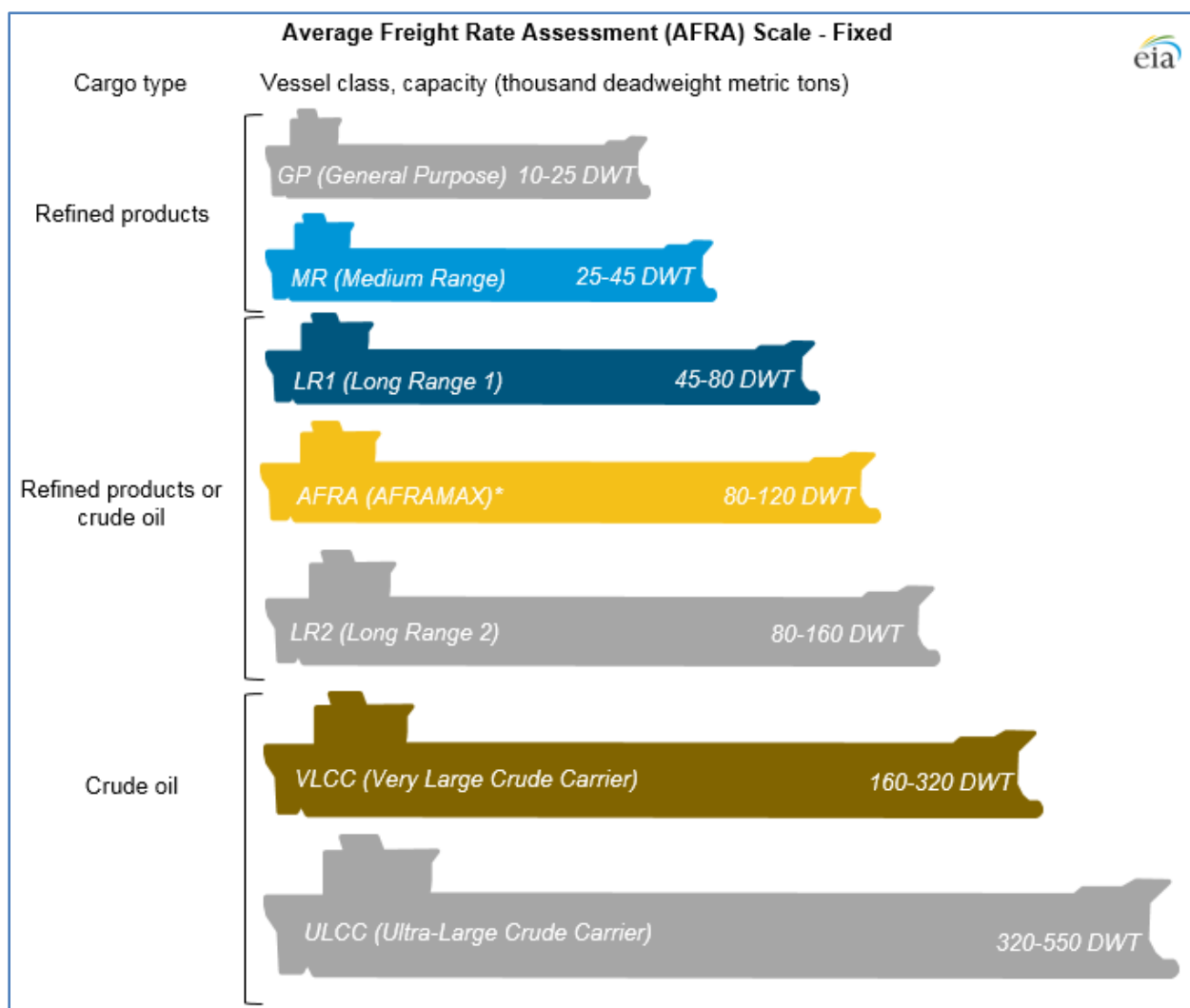


Figure 15 – Petroleum Tanker Average Freight Rate Assessment (AFRA) Scale

Table 7 – 2019 Costs per Ton Aframax vs. Panamax

Channel Depth	-38'	-41'	-43'	-45'	-47'
Tonnage Carried Panamax	51,984	58,165	62,286	66,407	70,527
Cost per Ton Panamax	\$11.41	\$10.20	\$9.52	\$8.93	\$8.41
Tonnage Carried Aframax	68,730	77,215	82,872	88,529	94,186
Cost per Ton Aframax	\$10.64	\$9.47	\$8.83	\$8.26	\$7.77
Savings per Ton Aframax	\$0.77	\$0.73	\$0.70	\$0.67	\$0.64

Table 8 – Tankers in the 2017 World Fleet

Vessel Class	In Service	%	New Build	%	% Growth
Handy	1385	23	122	17	▼ -5
MR1	607	10	33	5	▼ -5
MR2	1602	26	161	23	▼ -3
PT Panamax	424	7	57	8	► 1
Aframax	939	15	140	20	▲ 4
Suezmax	472	8	101	14	▲ 7
VLCC	689	11	92	13	► 2
ULCC	2	.0003	0	0	► 0

In addition to the Aframax tanker class becoming a larger percentage of the world fleet and therefore more readily available, since the U.S. is still a net importer of petroleum products, specifically crude oil, Aframax tankers delivering the crude oil to the Texas Gulf would be able to be chartered for backhaul. Therefore, the design vessel used for this analysis is a 110,000 DWT petroleum tanker with average dimensions of 800' LOA, 138' beam, and a -49' design draft.

3.2.2 Crude Oil Export History

2019 – Following the 1973 Arab oil embargo, the U.S. passed a law that prohibited the exportation of crude oil. Following the removal of restrictions on U.S. crude oil exports in December 2015, the U.S. exported crude oil to 26 different countries in 2016, compared with 10 countries the previous year. In 2015, 92% of U.S. crude oil exports went to Canada, which was exempt from U.S. crude oil export restrictions. After restrictions were lifted, Canada remained the top destination but received only 58% of U.S. crude exports in 2016.

Figure 16 displayed a recent history of crude oil exports from the U.S. in terms of thousands of bpd. For the time period December 2016 through September 2017, exports of crude oil averaged 55% of foreign shipments out of the CCSC.

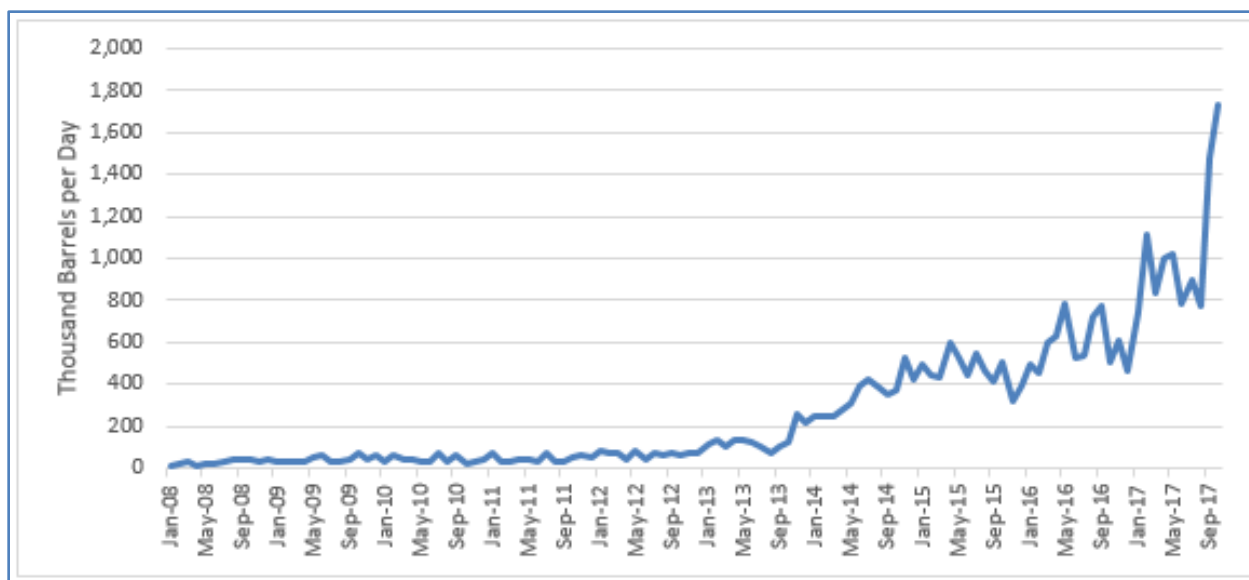


Figure 16 – U.S. Exports of Crude Oil January 2008 – September 2017 (1,000 bpd)

After the crude oil ban was lifted, foreign exports of crude oil gradually outpaced domestic shipments as a result of the ban being lifted. For the last twelve months of available data, foreign exports have accounted for 55% of crude oil and condensate shipped via the CCSC (Figure 17).

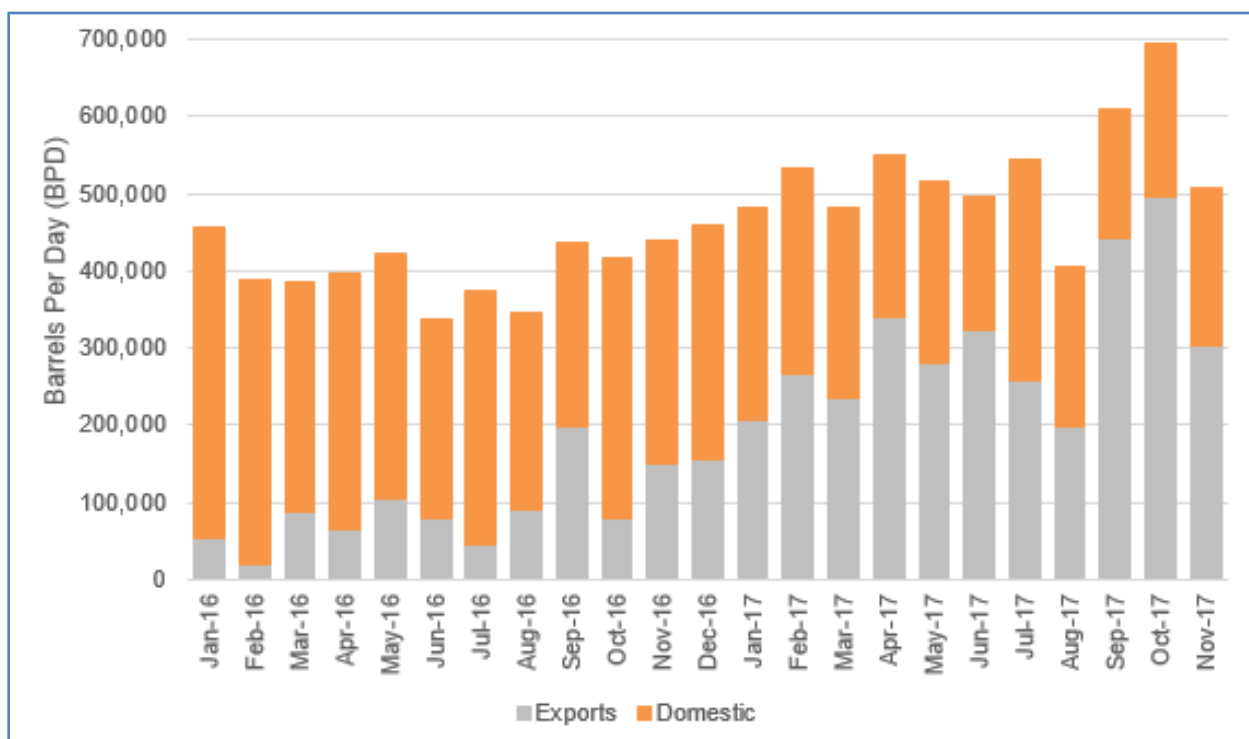


Figure 17 - Crude Oil & Condensate Shipments January 2016 – November 2017 (bpd)

2025 – U.S. exports of crude oil have continued to grow, reaching approximately 3,762,000 bpd in June 2025 from just 500,000 bpd in October 2015 (Figure 18).

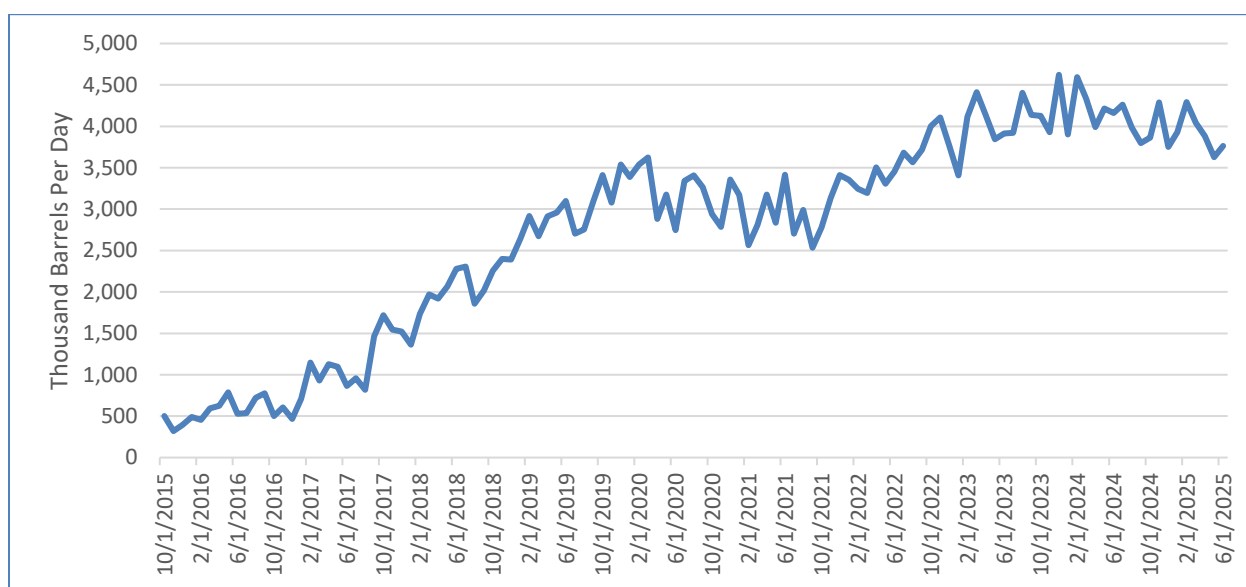


Figure 18 – U.S. Exports of Crude Oil October 2015 – June 2025 (1,000 bpd)

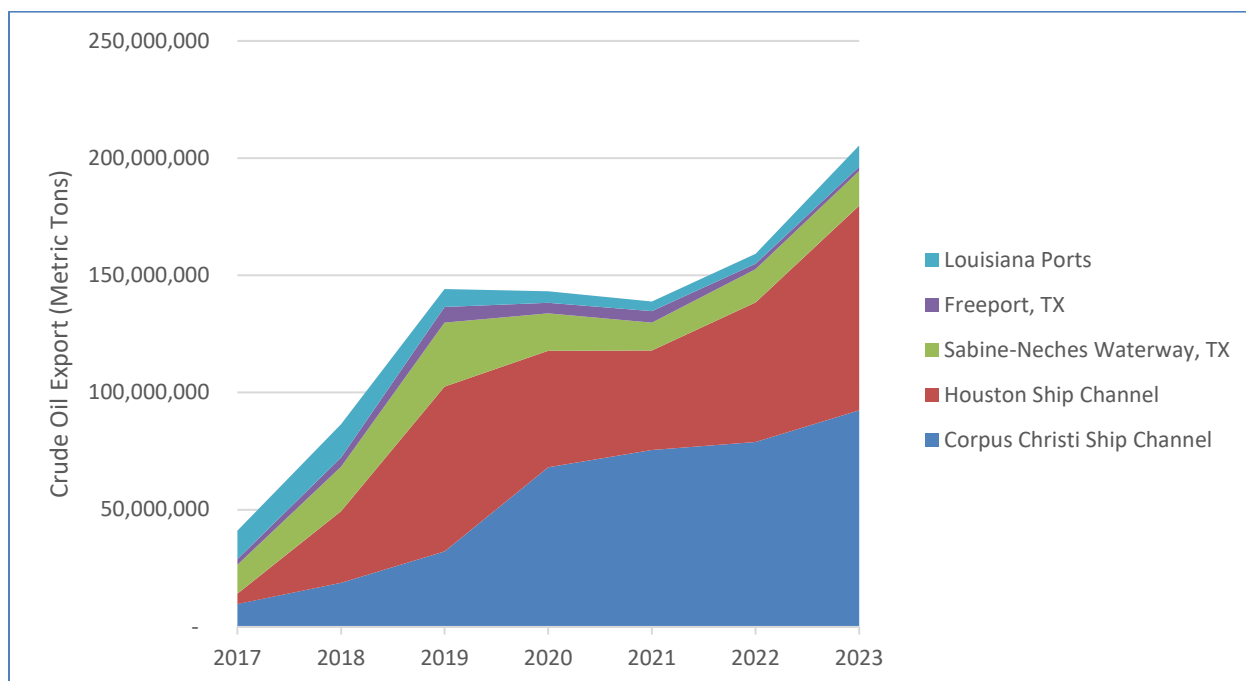


Figure 19 – Crude Exports by Gulf Coast Port

In 2023, marine crude exports from Petroleum Administration for Defense Districts (PADD) 3 primarily flowed through Corpus Christi (41%), Houston Ship Channel (38%), and the Sabine-Neches Waterway (13%). Figure 19 summarizes primary export terminals in the Gulf Coast

Region. To date, MSC does not export significant volumes of crude oil; however, the port handles crude oil by barge bound for domestic refineries and storage facilities.

3.2.2.1 Eagle Ford Shale

Discovered in 2008, the Eagle Ford Shale in South Texas spans northeast from the United States-Mexico border to just below Houston. The formation is ~50 miles wide by 400-miles long, covering a 23-county, mostly rural, area. The shale produces natural gas, condensate, oil, and natural gas liquids, adding billions of dollars annually to the South Texas economy and supporting thousands of jobs. Operators expect that the shale play will continue to be developed for decades (<http://eaglefordshale.com>). Eagle Ford Shale's proximity to the Port shown in Figure 20, positions the Port to be an efficient exporter of commodities produced by the Shale.



Figure 20 – Map of Eagle Ford Shale Area

3.2.2.2 Petra Nova Project

The Petra Nova Project (Figure 21) came online in 2016 and is the world's largest post-combustion carbon capture facility that is installed on an existing coal-fueled power plant. The proven carbon capture process utilized by the project captures carbon dioxide emissions produced by the power plant as part of the Clean Coal Power Initiative Program (CCPI). Once captured, the carbon dioxide is compressed and transported 80 miles via pipeline to the West Ranch oil field near Vanderbilt, Texas, only 15 miles from The Port. At the oil field, the

compressed carbon dioxide will be used in a process called Enhanced Oil Recovery (EOR) to recover previously unreachable oil and then will be stored permanently underground. Oil production at the West Ranch oil field is expected to increase from 300 bpd to 15,000 as a result of the project.³

Arrowhead Offshore is an affiliate of Hilcorp's Harvest Pipeline, a midstream service provider that operates various crude oil and natural gas gathering, storage, transportation, and treatment services. Arrowhead Offshore, a new tenant at the Port, along with its parent company is responsible for moving the oil recovered from the Petra Nova Project by ship and has positioned itself at the Port based on its proximity to the West Ranch oil field. The crude oil estimated to be recovered and transported from the Petra Nova project accounts for a portion of crude oil tonnage in the baseline forecast.



Figure 21 – Petra Nova Project

3.2.3 Multi-port Analysis

Multiport impacts, or the potential effects the deepening of the MSCIP could have on other ports, were assessed qualitatively for this study. Multiport analysis is necessary to consider, because with project alternatives could induce regional transfer of cargo among competing ports. Therefore, it must be determined to what extent competition exists and how it affects the with- and without project conditions.

³ NRG Energy, <http://www.nrg.com/generation/projects/petra-nova/>, accessed November 2017

In multiport analysis, port hinterlands must be defined as either captive or competitive. Competitive cargo hinterlands are those in which there is a choice between ports for the origin or destination of cargo. Captive cargo hinterlands will use the study port exclusively for either origin or destination. The historical users of the MSCIP, such as Formosa, Invista, and INEOS, have a long history at the port and have facilities and infrastructure in close proximity to the Port. Though there are several ports along the Texas Gulf Coast that handle similar types of cargo to the Port, the Port has historically had a captive cargo hinterland, with its onsite/nearby channel users exclusively utilizing the MSCIP to receive and ship chemical products to and from their facilities.

The new users of the channel who are beginning to export crude oil via the MSCIP create more of a competitive cargo hinterland at the Port, because there are multiple ports along the Texas Gulf Coast that are equipped to export crude oil. However, these new channel users have recently made considerable investments in their facilities at The Port. The Recommended Plan was intended to allow these users to more efficiently move cargo, either by loading vessels deeper, or by using larger vessels. There are many factors that may influence the growth of a particular harbor: landside development and infrastructure, location of distribution centers for imports, source locations for exports, population and income growth and location, port logistics and fees, business climate and taxes, carrier preferences, labor stability and volatility, and business relationships. Though the deepening and widening may make the Port more desirable location for shippers in the future, it is not expected that the recommended plan will cause a shift in traffic from nearby ports.

3.2.4 Existing Conditions

3.2.4.1 Proximity to the Port of Corpus Christi

2019 – The PCC was another deep-draft port along South Texas Gulf Coast with similar proximity to the Eagle Ford Shale as the Port (Figure 20). The Corpus Christi Ship Channel (CCSC), which provided access to its port, was a 36-mile, -47' channel that handled both international and domestic marine commerce. Like the MSCIP, the CCSC handles liquid chemicals and petroleum products, among other commodities.

To assist with assumptions discussed in detail later in the 2019 Economic Appendix, the PCC was used as a reference port on which to base some of the economic inputs in both the FWP and FWOP conditions. This was considered reasonable based on the close proximity, similar commodities, and the fact that the CCSC's current channel depth was within the range being analyzed for MSCIP deepening.

2025 – Economic inputs for both the FWP- and FWOP conditions were updated based on historical commodity and fleet information for the MSCIP. Other Gulf Coast port data was considered in the analysis (CCSC, Houston Ship Channel, Sabine-Neches Waterway, Freeport, and Louisiana ports).

History of Project

2019 – Historically, the three main commodity groups handled by the MSCIP were Crude Materials, Chemicals and Related Products, and Petroleum/Petroleum Products. The Crude Materials category was made up almost exclusively of aluminum ore shipped to the Alcoa docks in the form of bauxite. The rest of the tonnage handled within the Port was in the form of liquid bulk. Annual throughput tonnage levels by commodity for the latest available years of Waterborne Commerce (WCSC) data (2004-2016) (Figure 22).

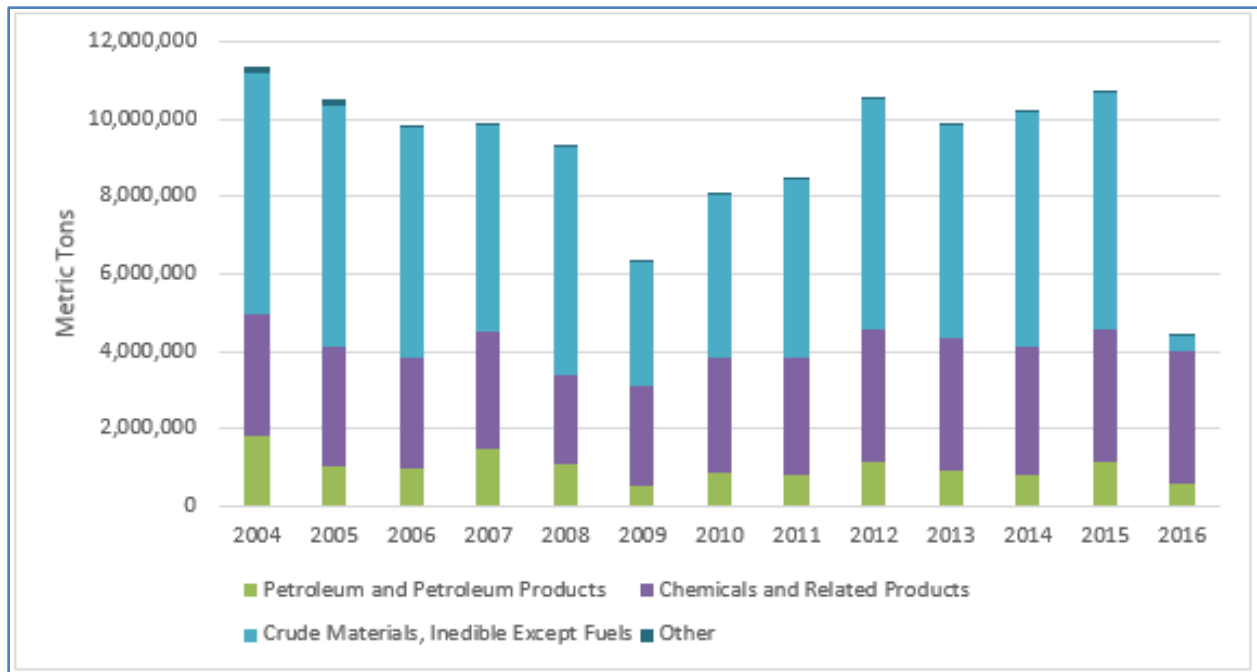


Figure 22 – MSCIP Tonnage by Commodity (Receipts and Shipments 2004 – 2016)

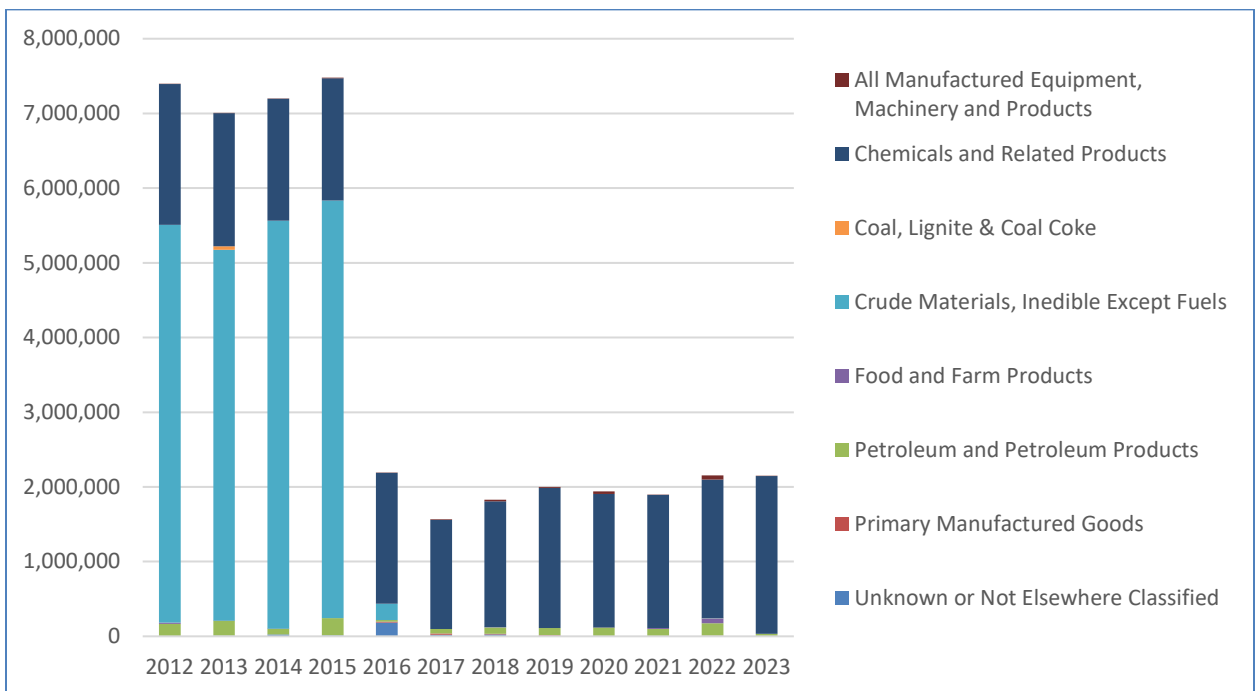


Figure 23 – MSC Tonnage by Commodity (Receipts and Shipments, 2012-2023)

Despite a decline in tonnage spurred by the 2008 global economic recession, tonnage levels steadily increased until 2016 when a cease in production by Alcoa caused a drop in tonnage levels.

2025 – The port continues to handle Chemicals and Related Products and Petroleum/Petroleum Products (Figure 23). As noted in the 2019 F/EIS, the closure of the aluminum ore facility (Alcoa) resulted in a significant decline in Crude Materials imports beginning in 2016.

3.2.4.2 The Fleet

2019 – This study focused on the various Panamax petroleum tankers, and the mid-sized Aframax petroleum tanker. Information on other sized tankers was presented for comparison purposes only.

The vast majority of deep-draft tonnage moved via the MSCIP was carried on tankers (petroleum/chemical), with the occasional ocean-going barge. Data on the existing fleet was obtained from the Waterborne Commerce Statistical Center (WCSC) and verified by the Pilot's log provided by the Port. The data obtained from WCSC was available for the three most recent years, 2013 through 2015, at the time of the analysis. The year 2015 was isolated and used to analyze vessel characteristics, as it was considered to be a reasonable representative year after comparing it to previous years' data. Where historical data did not exist for a new type of commodity traffic, i.e., crude oil, WCSC data for the PCC was obtained and used as a proxy for developing the existing fleet.

Vessels were distinguished based on physical and operation characteristics, LOA, design draft, beam, and tons per inch (TPI) data.

2025 – The majority of deep-draft tonnage moved via the MSC is carried on tankers (petroleum/chemical), general cargo vessels, and barges. The study separates vessels into vessel types based on the commodity type they carry. The study further divides vessel types into vessel classes based on the physical dimensions of each vessel including LOA, design draft, beam, and tons per inch immersion (TPI). These classifications inform the fleet forecast and are used to assign vessel operating costs used to estimate transportation cost savings.

Chemical Fleet

2019 – Vessels carrying chemicals ranged in size from 4,500 to 60,000 DWTs and were split into three classes (Table 9).

Table 9 – Chemical Tanker Vessel Class Attributes

Vessel Class Name	Vessel Class ID	DWT Range	Min Design Draft	Max Design Draft	Min Beam	Max Beam	Min LOA	Max LOA
Sub-Panamax 1	SPX1	0 -20,000	-20'	-34'	-49'	97'	326'	529'
Sub-Panamax 2	SPX2	20,000 - 40,000	-30'	-42'	77'	105'	459'	604'
Panamax 1	PX1	40,000 - 60,000	-36'	-44'	101'	108'	577'	673'

Annually, ~45% of tonnage is moved on Sub-Panamax 1 (SPX1) tankers, 28% was moved on Sub-Panamax 2 (SPX2) tankers, and 31% was moved on Panamax tankers (Figure 24).

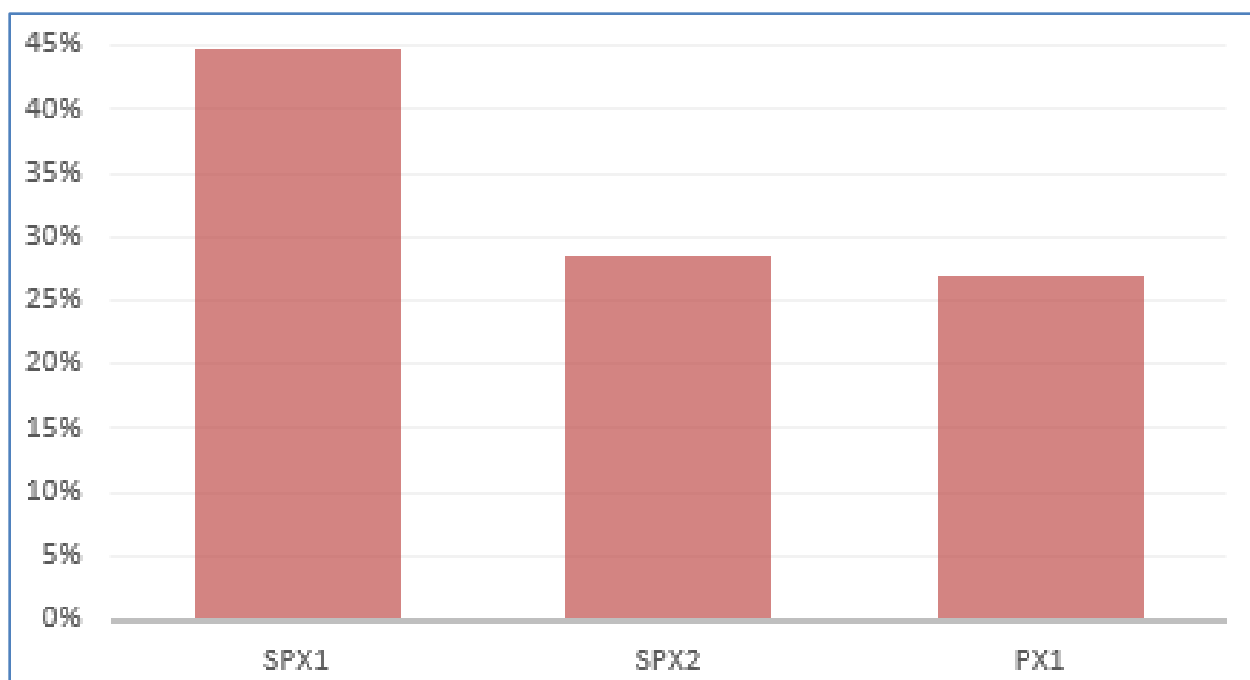


Figure 24 – MSCIP Chemical Tonnage Distribution by Vessel Type (2015)

2025 – Like the 2019 F/EIS, this Validation Report used two primary vessel classes for the chemical tanker fleet: Panamax and Sub-Panamax. Table 10 summarizes the chemical tanker vessel class definitions used for transportation cost modeling.

Table 10 – Chemical Tanker Vessel Class Attributes

Vessel Class Name	DWT Range	Design Draft (ft)		Beam (ft)		LOA (ft)	
		Min	Max	Min	Max	Min	Max
Sub-Panamax	0-39,999	20	42	49	100	350	610
Panamax	40,000-60,000	36	44	101	108	550	700

Figure 25 summarizes chemical tanker calls from 2020 through 2022 by vessel class. As shown, approximately 25% of all chemical import calls are Panamax class. The study further distributes classes by import and export in Section 3.6 of the Economics Appendix.

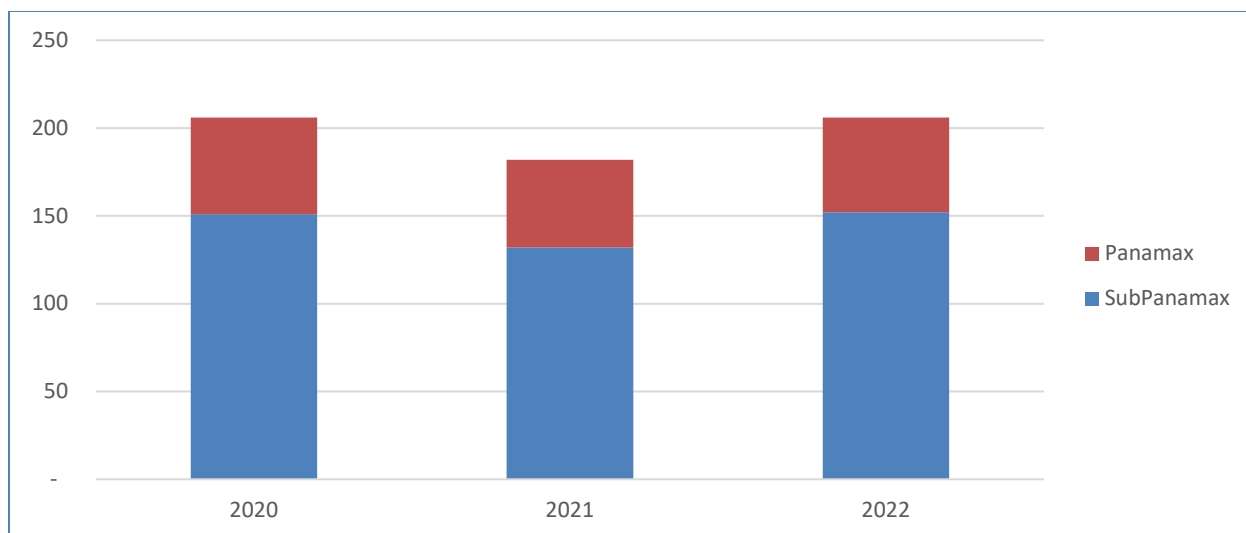


Figure 25 – Chemical Import Calls by Vessel Class

Petroleum Product Fleet

2019 – Because exports of crude oil and condensate was a new type of traffic for the MSCIP, the CCSC was used as a proxy to develop a baseline fleet distribution for the new activity. Since The Port’s users were not anticipating any receipt of crude oil and condensate at the time interviews were conducted, only petroleum product exports from Corpus Christi were analyzed for development of the fleet forecast. Petroleum Products were exported from Corpus Christi on vessels ranging in size from 6,000 to 116,000 DWT. Petroleum tankers were split into five categories, or vessel classes, for this analysis (Table 11). Like chemical tankers, DWT was used to categorize the vessels into classes.

In 2015, ~82% of CCSC’s petroleum product exports were moved on Panamax tankers, 9% were on Aframax tankers, and another 9% were on sub-Panamax tankers (Figure 26).

The USACE determined that 2015 was an acceptable representative year for Corpus Christi from which a vessel fleet distribution could be extrapolated for the MSCIP. However, it was noted that the composition of the petroleum-product tanker fleet utilizing the CCSC for exports was likely to change. These changes were considered when developing the future vessel fleet forecast. A major contributor to the changing vessel fleet was attributed to the lifting of the crude oil ban at the end of calendar year 2015. According to a September 2017 article from Global Trade Magazine, PCC was the number one exporter of crude oil in the nation. Given the efficiencies of Aframax tankers for exporting crude oil, it was anticipated that a larger portion of Corpus Christi’s petroleum products would be exported on Aframax tankers in the future.

Table 11 – Petroleum Tanker Vessel Class Attributes

Vessel Class Name	Vessel Class ID	DWT Range	Min Design Draft	Max Design Draft	Min Beam	Max Beam	Min LOA	Max LOA
PT Sub-Panamax 1	PT-SPX1	0 – 20,000	-21'	-29'	57'	75'	350'	529'
PT Sub-Panamax 2	PT-SPX2	20,000 - 40,000	-30'	-43'	78'	104'	462'	605'
PT Panamax 1	PT-PX1	40,000 - 60,000	-33'	-45'	86'	105'	557'	655'
PT Panamax 2	PT-PX2	60,000 - 80,000	-41'	-48'	104'	121'	656'	752'
PT Aframax	PT-Afra1	80,000 - 110,000	-43'	-51'	137'	1-38'	750'	810'

2025 – The largest vessel capable of using the MSC under the FWP condition will be an Aframax tanker. As a result, the study limits analysis to Aframax-class tankers and smaller. Table 12 summarizes the dimensions for each tanker class.

Figure 27 shows exports in metric tons by vessel class for all U.S. Gulf Coast Crude Oil exports from 2020 through 2022. The primary vessel classes exporting crude are Aframax (61%), Suezmax (23%), and VLCCs (12%). Panamax vessels make up less than 3% of exports (Figure 27). The figure excludes exports bound for lightering zones.

The study assumes the primary method of crude trade from MSC will be reverse lightering, where Panamax vessels are used to load larger tankers at lightering zones in the Gulf. Figure 28 presents the estimated percentage of cargo that is exported directly versus reverse lightered from 2020 through 2022 for all U.S. Gulf Coast ports. An average of 31% of total tonnage was involved in lightering and light loading operations from 2020 through 2022.

Table 12 – Tanker Class Dimensions

Vessel Class Name	DWT Range	Design Draft (ft)		Beam (ft)		LOA (ft)	
		Min	Max	Min	Max	Min	Max
Panamax	40,000-77,000	30	50	104	107	350	790
Aframax	80,000-125,000	40	60	108	160	740	900

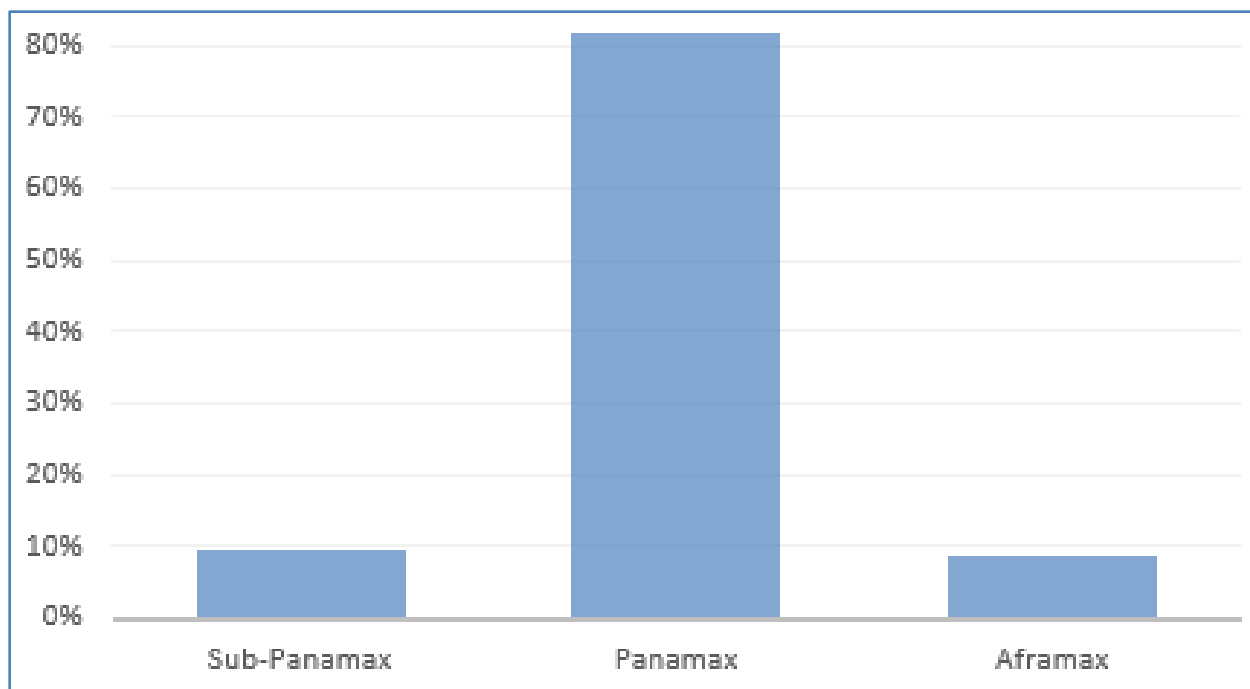


Figure 26 – CCSC Petroleum Product Tonnage Distribution by Vessel Type, 2015

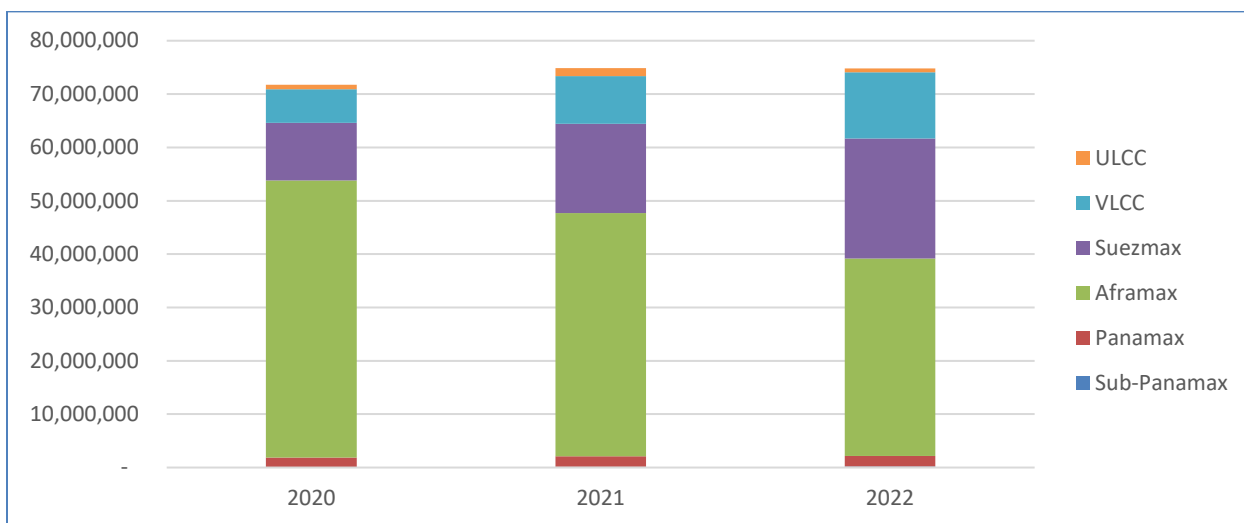


Figure 27 – U.S. Gulf Coast Export of Crude Oil Tonnage Distribution by Vessel Class

EFuels Fleet

The study assumes eFuels will follow similar vessel class distributions as crude oil.

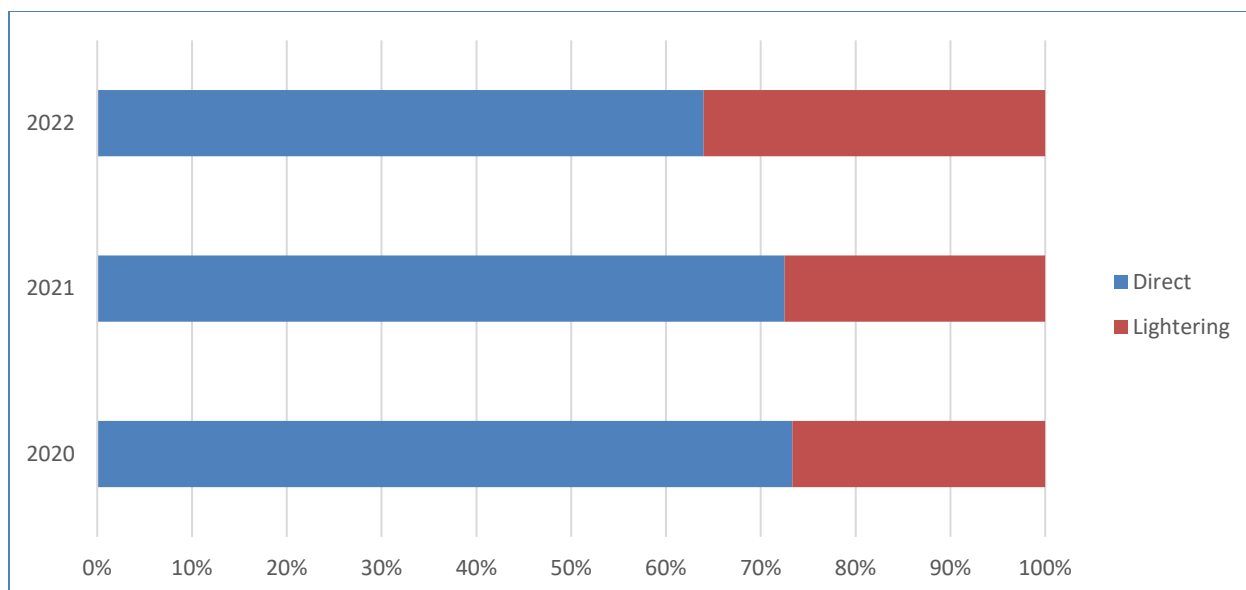


Figure 28 – Reverse Lightering versus Direct Shipment (2020 – 2022)

Other Bulk Fleet

The Port is anticipating new customers in the FWOP that will carry cement and other project bulk cargos. This user will likely carry cargo on Panamax vessels given current channel conditions. Table 13 summarizes vessel dimensions for the new bulker category.

Table 13 – Bulker Vessel Class Dimensions

Vessel Class Name	DWT Range	Design Draft (ft)		Beam (ft)		LOA (ft)	
		Min	Max	Min	Max	Min	Max
Panamax	60,000-85,000	43	49	105	106	660	760

3.2.4.3 Commerce

The composition of The Port's commodity profile has changed in recent years. These changes began in 2015, when the first energy user acquired land at the Port and continued with the addition of two more energy companies in 2016. Also in 2016, the primary user of the MSCIP, Alcoa, ceased production due to the decline in the price of alumina.

Chemical Traffic

Chemical products in the form of liquid bulk have a long history at the Port. Therefore, historical tonnage was used to develop a baseline tonnage number upon which to forecast growth for chemical tonnage. The Port is a net exporter of chemical products, typically importing ~25% of its foreign chemical tonnage and exporting ~75%. Most of the chemicals imported to the Port are used as raw materials for specialty chemicals produced and exported by the Port users.

Dry Bulk Traffic

Dry bulk traffic moved via the MSCIP has been attributed almost exclusively to Alcoa since 1948. As of 2017, there is no cargo moving to or from the plant. This can be attributed to the downturn in the alumina price index in 2015 and the ending of production at the plant in 2016.

Crude Oil and Condensate Traffic (Petroleum Products)

Crude oil and condensate export is a new type of commerce at the Port beginning in 2015. Capacity projections from each facility were collected via interviews with representatives of the three new companies that would be using the MSCIP to ship petroleum products. These companies are Arrowhead Offshore, NGL Energy Partners (NGL), and NorthStar Midstream.

The projections were combined to develop a baseline crude oil and condensate tonnage level for the year 2018 (i.e., the first year in which all three facilities would be done with construction and in full operation). To protect proprietary information of these companies, the forecasts from the three companies will remain aggregated in this report.

Using the projections provided by the new channel users, three baseline scenarios were developed to estimate the amount of benefitting tonnage that would be moved via the MSCIP in the form of petroleum products (crude oil and condensate). The tonnage levels for these three scenarios, low, medium, and high are displayed in Table 14. The high scenario was estimated by obtaining the three users' capacity forecasts, combining them, and multiplying them by 75%. The median scenario is 50% of the high scenario, and the low scenario is 25% of the high scenario. For purposes of this analysis, the median scenario was considered to be the most likely, and it is the baseline upon which growth rates are applied.

Table 14 – Project Baseline for Crude Oil & Condensate Tonnage (2018)

Scenario	Low 25% of High Scenario	Median 50% of High Scenario	High 75% of Capacity
Metric Tons	1,412,444	2,576,546	4,904,751

2025 – Figure 29 presents foreign import and export tonnage through the Port from 2012 through 2023. As shown, the Port is primarily an export port since the Alcoa closure in 2016. Exports in 2023 were 86 percent Chemicals and Related Products, 14 percent Petroleum and Petroleum Products, and 1 percent Crude Materials.

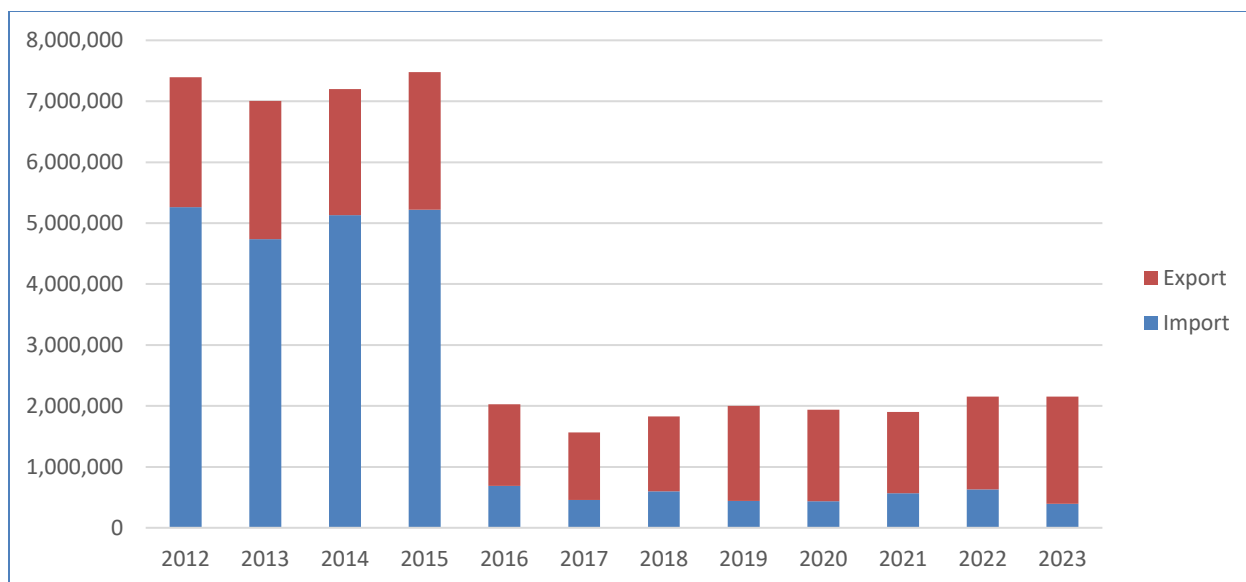


Figure 29 – Import and Export Volumes

Chemical Traffic

Most chemical and related products imported to the Port are used as raw materials for specialty chemicals produced and exported by the Port users. Chemical imports are primarily ammonia (75%) and acyclic hydrocarbons (9%), and nitrogenous fertilizer (8%). Exports are primarily sodium hydroxide (27%), hydrocarbons (20%), alcohols (16%), and nitrogenous functional components (9%).

Vessels importing/exporting these chemicals are typically chartered by the facility owners, and shipments are cyclical based on production/demand. Therefore, each vessel call is typically dedicated to one type of commodity, where a vessel unloads/loads the same commodity type throughout its various stops in the Gulf Coast; and vessel calls are round trip in nature (i.e., a vessel does not unload one type of chemical and load another in the same call). Figure 30 displays the major import and export chemicals moved via the MSC.

Dry Bulk Traffic

Historic dry bulk traffic moved via the MSC has been attributed almost exclusively to Alcoa, an alumina producer with operations at The Port since 1948. As of 2017, there is no cargo moving to or from the plant. This can be attributed to the downturn in the alumina price index in 2015 and the ending of production at the plant in 2016. The study assumes this activity will not resume at any point during the period of analysis.

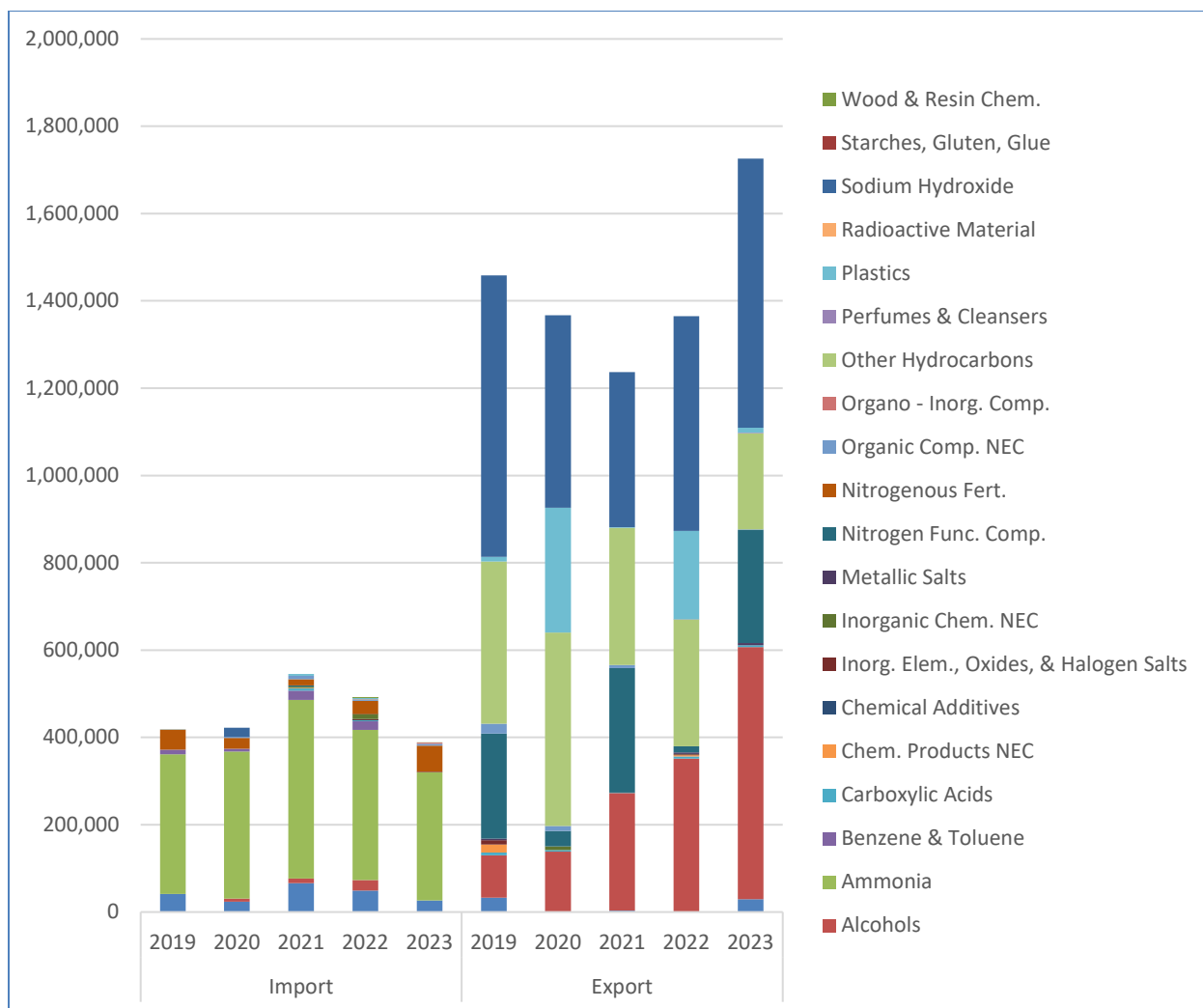


Figure 30 – Chemical Imports and Exports by Commodity

Crude Oil and Condensate Traffic (Petroleum Products)

The Port primarily handles petroleum coke (60%), crude oil (18%), gasoline (7%), and distillate fuel oil (3%) within the Petroleum and Petroleum Products category. International volumes remained relatively low for import and export at 5,000 and 27,000 metric tons in 2023, respectively. Figure 31 summarizes petroleum product imports and exports by commodity.

Improvements in drilling technology (i.e., horizontal drilling and hydraulic fracturing) precipitated a shale oil boom beginning in 2009. Increased extraction from was primarily light, sweet crude. This created a mismatch with U.S. refining capacity, which were designed to handle heavier crude products. The repeal of the crude oil export ban under the Consolidated Appropriation Act of 2016 granted access to the global markets, leading to increased exports, prices, and production for U.S. Crude. Figure 32 illustrates the increase in crude exports from PADD 3 and the rest of the U.S.

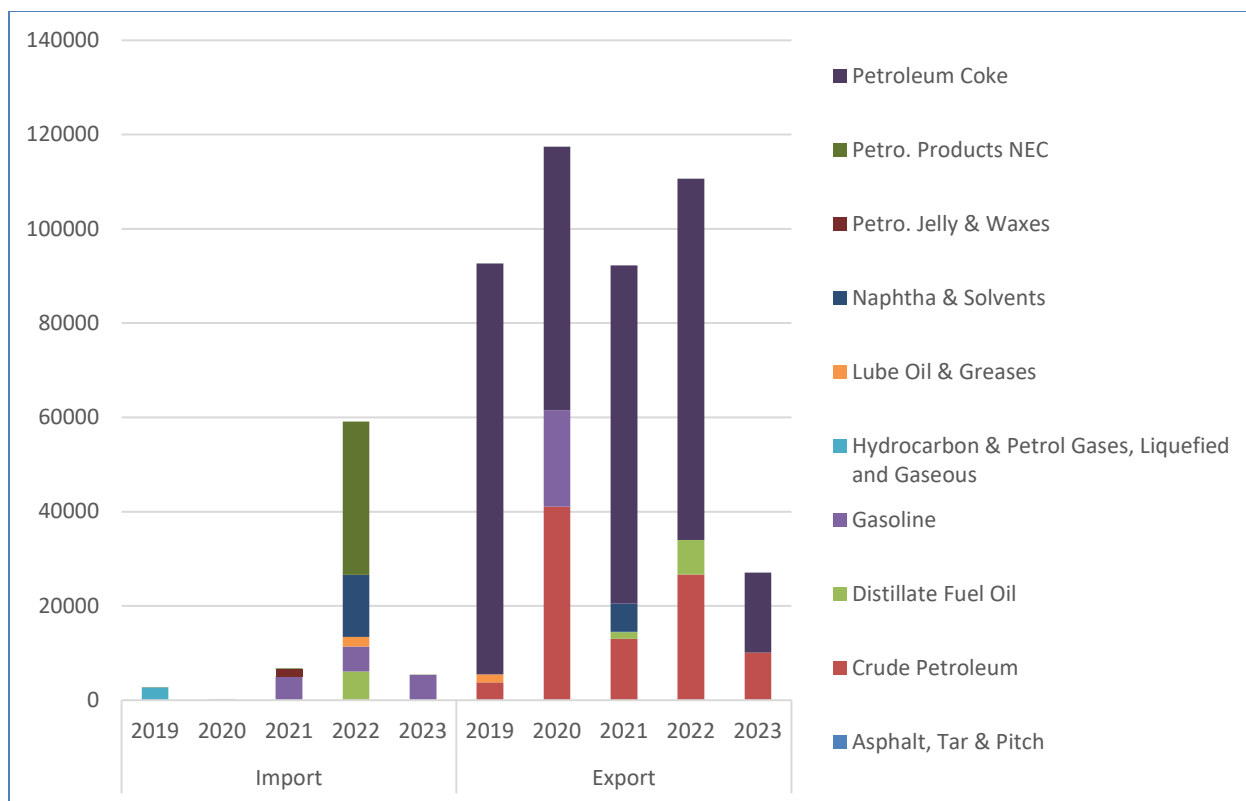


Figure 31 – Petroleum Product Imports and Exports

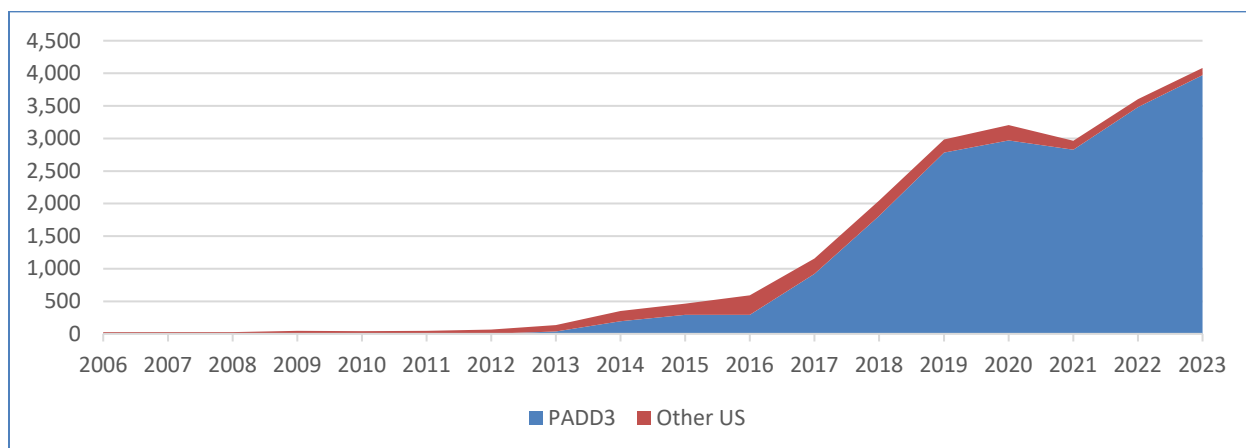


Figure 32 – U.S. Crude Oil Exports by Source

The majority of crude exports originate from the Permian Basin and Eagle Ford Shale. The Permian produced 46% of U.S. oil in 2023, up from roughly 16% in 2015 (Federal Reserve Bank of Dallas 2023). The Eagle Ford Shale produced roughly 9% of U.S. Oil in 2023, down from nearly 18% in 2015 (Federal Reserve Bank of Dallas 2023). Figure 33 presents major production regions across the U.S. with the Permian and Eagle Ford in brown and dark blue, respectively.

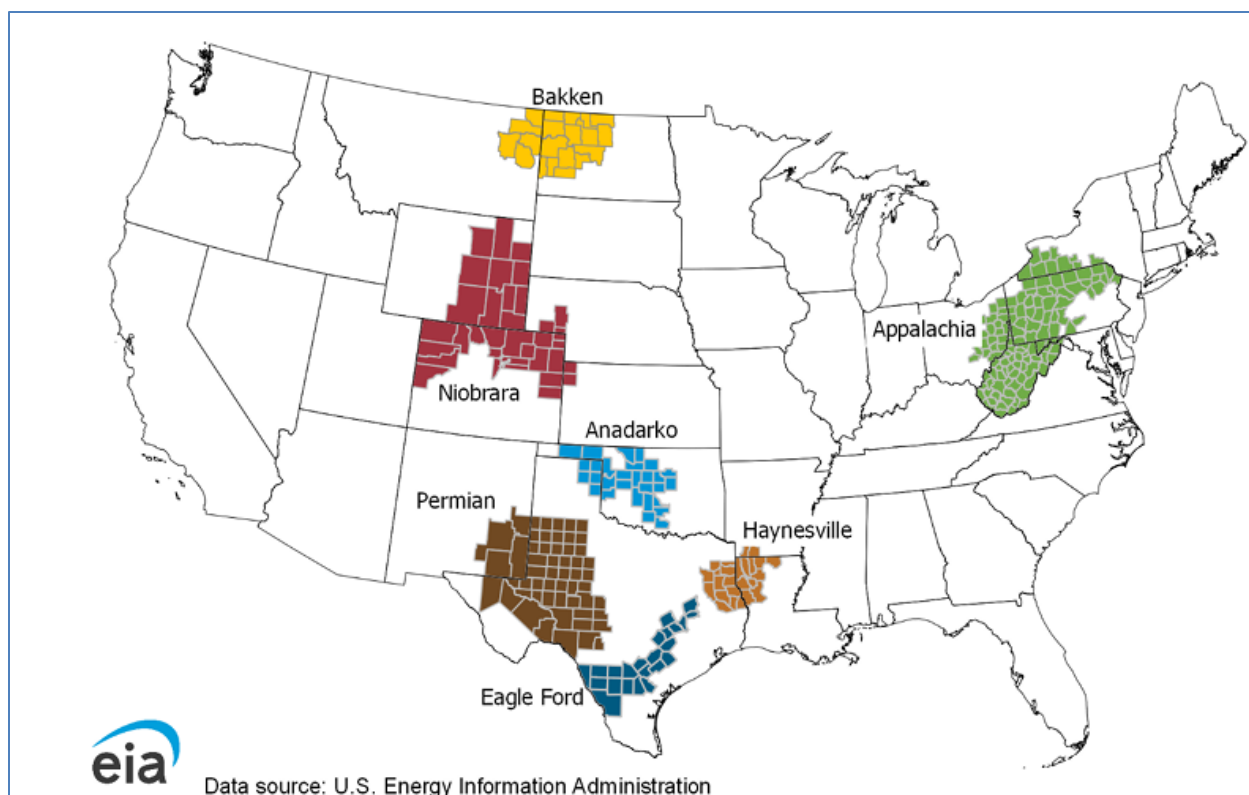


Figure 33 – U.S. Major Production Regions

In 2023, marine crude exports from PADD 3 primarily flowed through Corpus Christi (41%), Houston Ship Channel (38%), and the Sabine-Neches Waterway (13%). Figure summarizes primary export terminals in the Gulf Coast Region. To date, MSC does not export significant volumes of crude oil; however, the port handles crude oil by barge bound for domestic refineries and storage facilities. Figure 34 summarizes crude exports by Gulf Coast port.

Green methanol, referred to as eFuels, is a colorless liquid used for producing other chemicals such as formaldehyde, acetic acid and plastics (World Economic Forum 2023). Green methanol can also be used as a fuel source for engines (eFuel). eFuel's advantage over other fuel sources is that it is primarily produced using low-carbon sources such as biomass or via carbon capture. The International Maritime Organization (IMO) established net-zero emissions targets including a commitment to increase the use of alternative zero and near-zero fuels by 2030 (IMO 2023). This target is likely to significantly increase the global demand for eFuels. MSC is strategically located near new carbon capture projects and Port users have existing agreements for eFuel export prior to the project base year and continuing through the period of analysis.

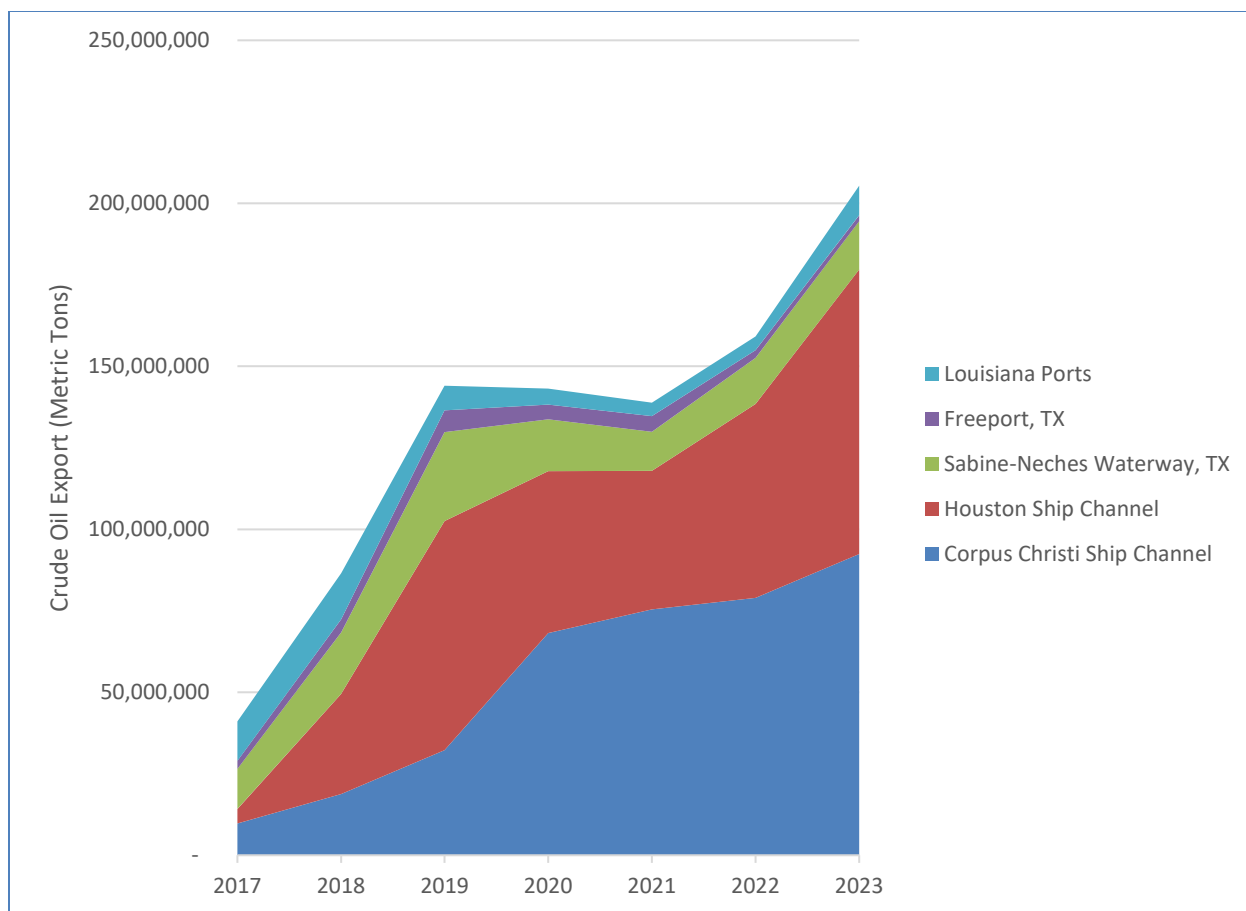


Figure 34 – Crude Exports by Gulf Coast Port

3.2.5 FWOP Conditions

3.2.5.1 Port Expansions

At the onset of this study, in addition to the crude oil users whose facilities were under construction and whose throughput tonnage is considered part of existing conditions for the purposes of this analysis, both the Port and its tenants were in the process of expanding their facilities and infrastructure.

Terminal Expansions

2019 – The Port was in the permitting stages of a South Peninsula Development Project (Figure 35). The project included the addition of four bulk liquid product barge berths and three bulk liquid product docks to be used for the shipment and receipt of petrochemical products, crude oil, and condensate, with the possibility of being used for other liquid products in the future. The docks were designed for an Aframax class vessel with dimensions of 840' LOA and 140' beam. The design depth for the liquid bulk docks were -47' in the future with- or without project condition.

The development project was projected to be fully complete by 2020. The first liquid dock and the barge berths were scheduled to be operational in 2019, the second liquid dock in 2020, and the third liquid dock was to be operational based on market demand. Though not included in the

HarborSym model, these new developments at the Port supported the growth in the throughput tonnage that was forecasted for the analysis.

2025 – The Port has completed the final design of the South Peninsula Development Project Phase I (Port Authority Advisory Committee 2020) and has begun construction of a mitigation site for the project. The development project, including 2 liquid docks, is projected to be complete by the Base Year (2030). A third liquid dock is to be operational based on market demand. These developments support the growth in the throughput tonnage that was forecasted for this analysis and is discussed in more detail in Section 3.2 of the Economics Appendix.



Figure 35 – NFS South Peninsula Development Project

Formosa Plastics Corporation

2019 – Formosa Plastics Corporation (Formosa) supplies plastic resins and petrochemicals and has used the MSCIP since 1982. Formosa's Point Comfort facility expanded in 1994 at a cost of \$1.5 billion. It expanded a second time in 1998 for \$900 million. The company's sales in 2015 totaled ~\$5.7 billion.

Since 2015, Formosa has undergone a third expansion, The expansion, pictured in Figure 36 added 800 acres to the plant, bringing the facility's footprint in Point Comfort from 1,500 acres to 2,300 acres. The company, which employees ~2,000 full-time employees and 922 contract staff,

was projected to add 340 permanent jobs to the region. The growth experienced by Formosa supported the forecasted growth in the chemical's commodity category.

2025 – The Formosa expansion project began in 2015 and was completed in 2020.



Figure 36 – Formosa's Plant Facilities Undergoing Construction

3.2.5.2 Commodities Forecast

2019 – Commodity throughput was forecast for benefitting commodities, i.e., chemicals and petroleum products, over a 50-year period (2024-2073). To estimate future tonnage levels, annual growth rates were applied to the baseline tonnage levels for chemicals and petroleum products. The methodology used to obtain and apply the commodity forecasts for the two major commodity groups were detailed in this economics section. Several sources of data were used to establish the commodity forecasts including historical data, the EIA's Annual Energy Outlook, and a 2015 IHS Global Insight forecast prepared for the Gulf Coast.

2025 – Commodity throughput was forecasted for benefitting commodities, i.e., chemicals and crude petroleum, over a 50-year period (2030-2079). The study assumes future benefitting cargo volumes will remain relatively constant in the FWOP and FWP conditions based on Port user interviews and the capacity of the landside infrastructure. Several sources of data were used to establish the commodity forecasts including historical data, individual user forecasts, the EIA's Annual Energy Outlook (EIA 2023) and a 2023 S&P Global forecast (S&P Global 2023).

Global Insight

2019 – IHS Global Insight (Global Insight) provided comprehensive economic, financial, and political coverage of countries, regions, and industries and utilized models, data, and software within a common analytical framework to support planning and decision-making. For trade forecasting, Global Insight's model was based on the IHS World Trade Service (WTS) model. Conceptually, the WTS real value trade model used a three-level process (Figure 37). This multi-stage forecasting used a combination of bottom-up and top-down approaches.

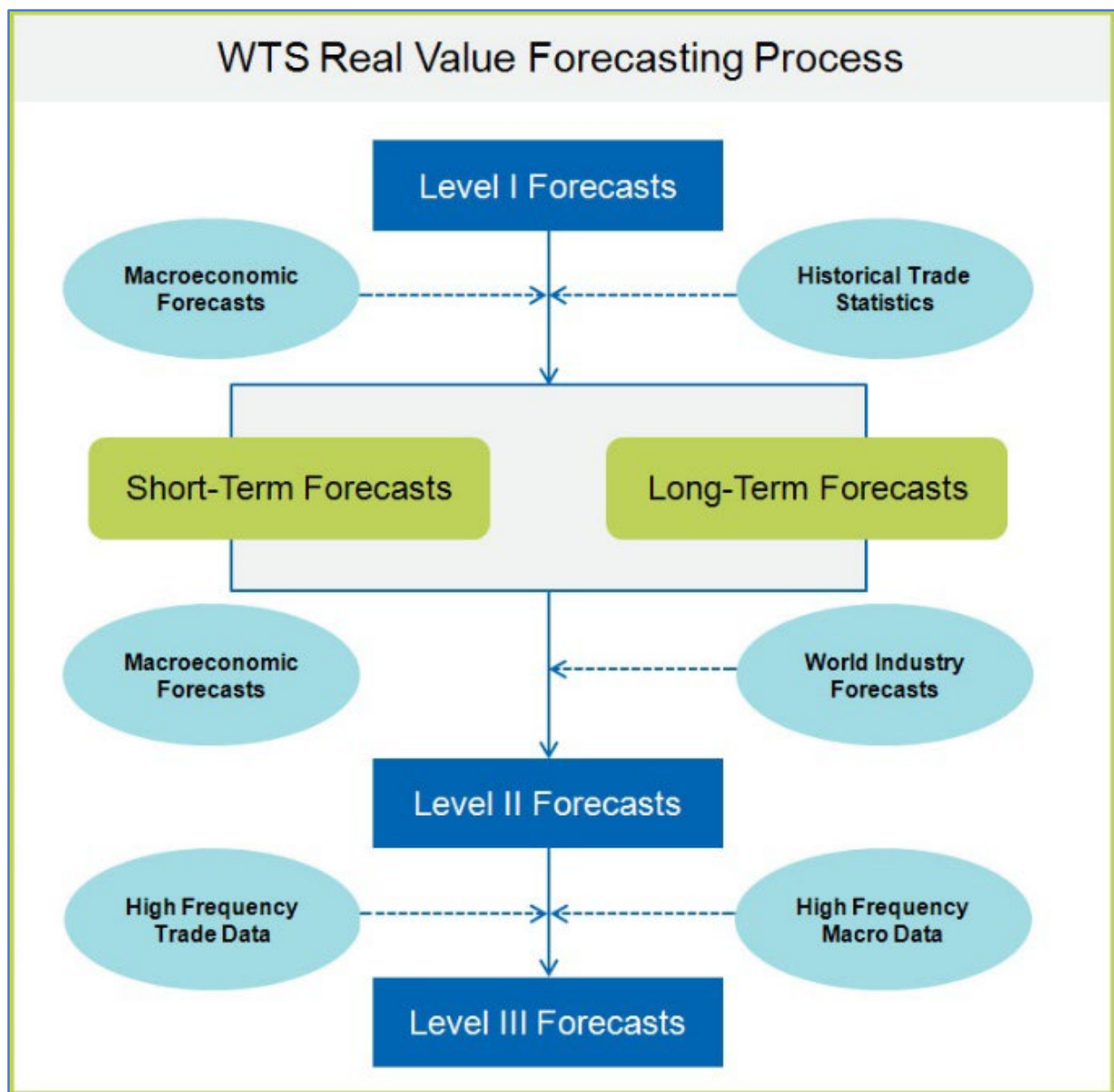


Figure 37 – World Trade Service Real Value Forecasting Process

A 2015 Global Insight forecast for the Port of Houston was consulted when developing projected growth rates for MSCIP. The forecast was divided into major commodity categories including petroleum products, chemicals, primary manufactured goods, food and farm, manufactured equipment, and crude materials, as well as sub-categories within the major commodity categories.

2025 – The 2015 Global Insight forecast for Houston was not used for this analysis. Instead, a 2023 S&P Global forecast was used.

American Energy Outlook

2019 – The American Energy Outlook (AEO) is a report on trends and projections for energy use and supply that is published annually by the EIA. The AEO was developed using the National Energy Modeling System, an integrated model that aims to capture various interactions of economic changes and energy supply, demand, and prices, and it provided modeled projections of domestic energy markets through the year 2050. This forecast used the “reference” case, which assumes trend improvement in known technologies, along with a view of economic and demographic trends reflecting the current central view of leading economic forecasters and demographers. As of 2017, given the strong domestic production and relatively flat demand, the AEO projected that the U.S. becomes a net energy exporter (in most cases) between 2017 and 2050.

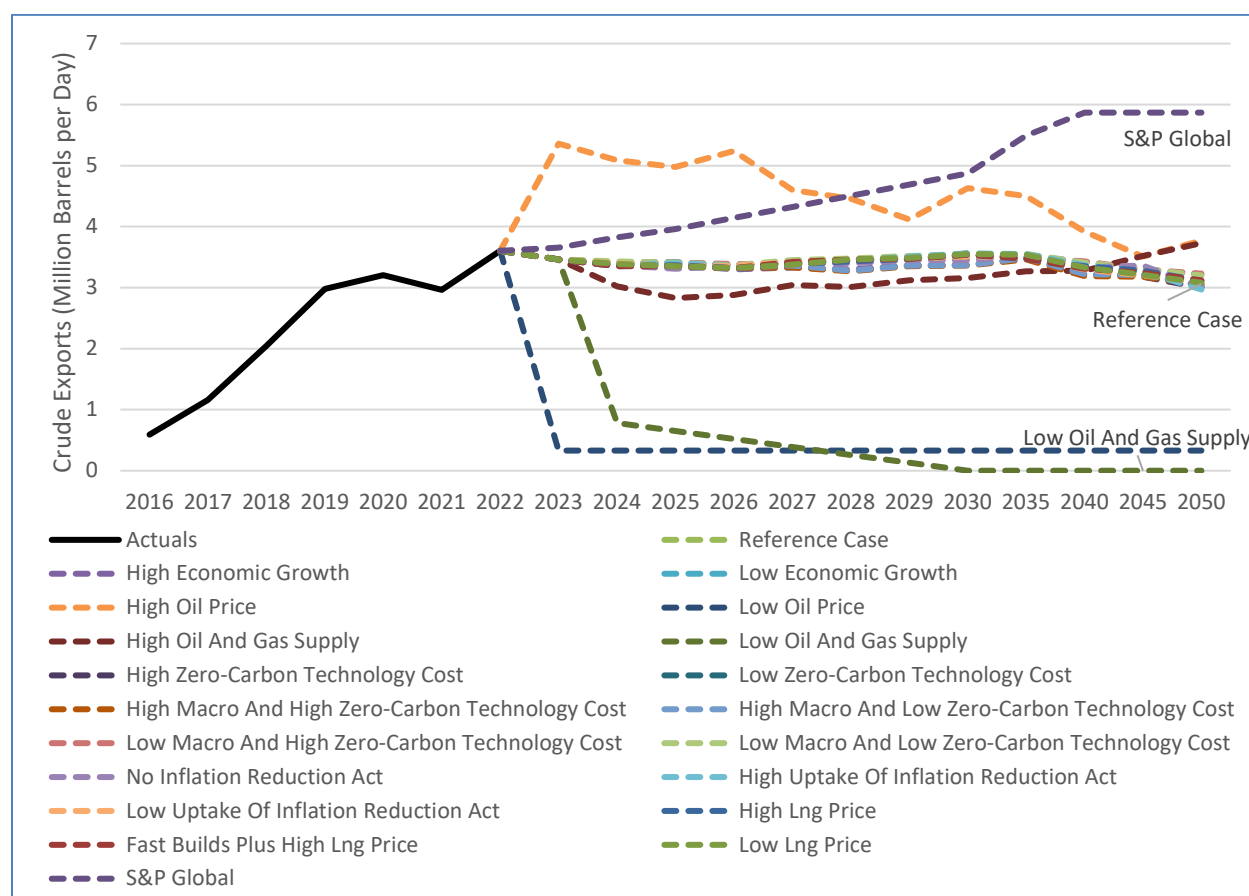


Figure 38 – Crude Export Forecast Scenarios

2025 – Crude exports volumes depend on total crude production, refining capacity, energy demand, world prices, and other market shock factors that are difficult to predict with certainty. Figure 38 presents all 19 forecast scenarios included in the EIA’s Annual Energy Outlook for 2023 (EIA 2023) as well as an S&P Global crude export forecast for the U.S. (S&P Global 2023). As shown, there is significant uncertainty in future crude export volumes through the period of analysis. The EIA announced in July 2023 that it would not release an Annual Energy Outlook for 2024 due to the need for significant updates to its National Energy Modeling System. As a result, the study relies on national crude oil export growth forecasts for the U.S.

from the S&P Global Trade Analytics Suite and inputs from Port users for the project-specific forecast. This leads to an estimated national seaborne crude export forecast of roughly 5.87 MMB/D by 2040.

Chemical Imports and Exports

2019 – Data collected by the WCSC between the years 1996 and 2014 was obtained. Foreign traffic was isolated, because domestic barge traffic will not benefit from the channel deepening and widening.

First, the compound annual growth rate (CAGR) for both imports and exports were calculated to identify trends in historical chemical tonnage. The calculations of CAGR for “2001” through “2015” resulted in growth rates of 1.18% for exports and 6.17% for imports. Since a large majority of Port imports were used as raw materials for the Port’s exports, the Global Insight forecast prepared for the Port of Houston was consulted to assist in projecting the growth of chemical import (Figure 39).

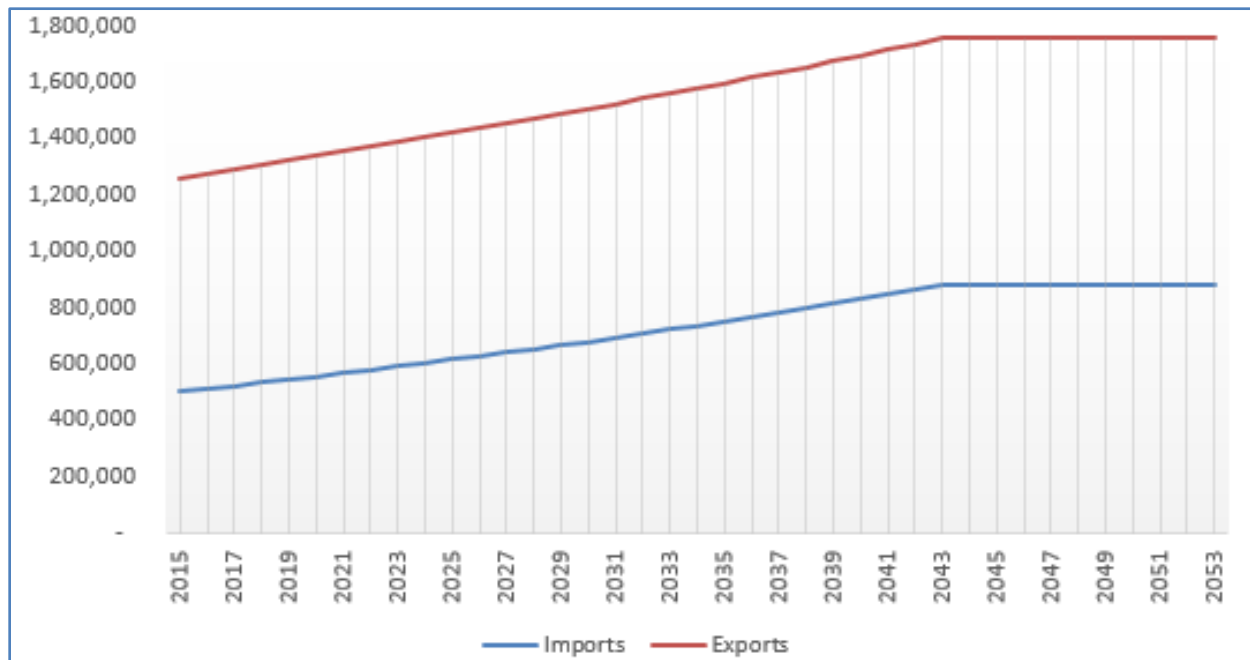


Figure 39 – MSCIP Chemical Tonnage Forecast (2015 – 2053)

2025 – Chemical imports average 1.3 million metric tons per year from 2018 through 2022. Input from the Calhoun Port Authority and harbor users indicate no significant changes in operations through the period of analysis (2030 – 2079). As a result, the study holds chemical imports constant at the 5-year average.

Chemical exports average 490 thousand metric tons per year from 2018 through 2022. Input from the Calhoun Port Authority and harbor users indicate no significant changes in operations through the period of analysis (2030 – 2079). As a result, the study holds chemical exports constant at the 5-year average.

Crude Oil and Condensate Exports

2019 – The export of petroleum products from the Port was a new type of commerce. The 2017 AEO growth rates for petroleum product exports were applied to the baseline tonnage number, 2.6 million metric tons, to develop the forecast for crude oil and condensate exports (Figure 40).

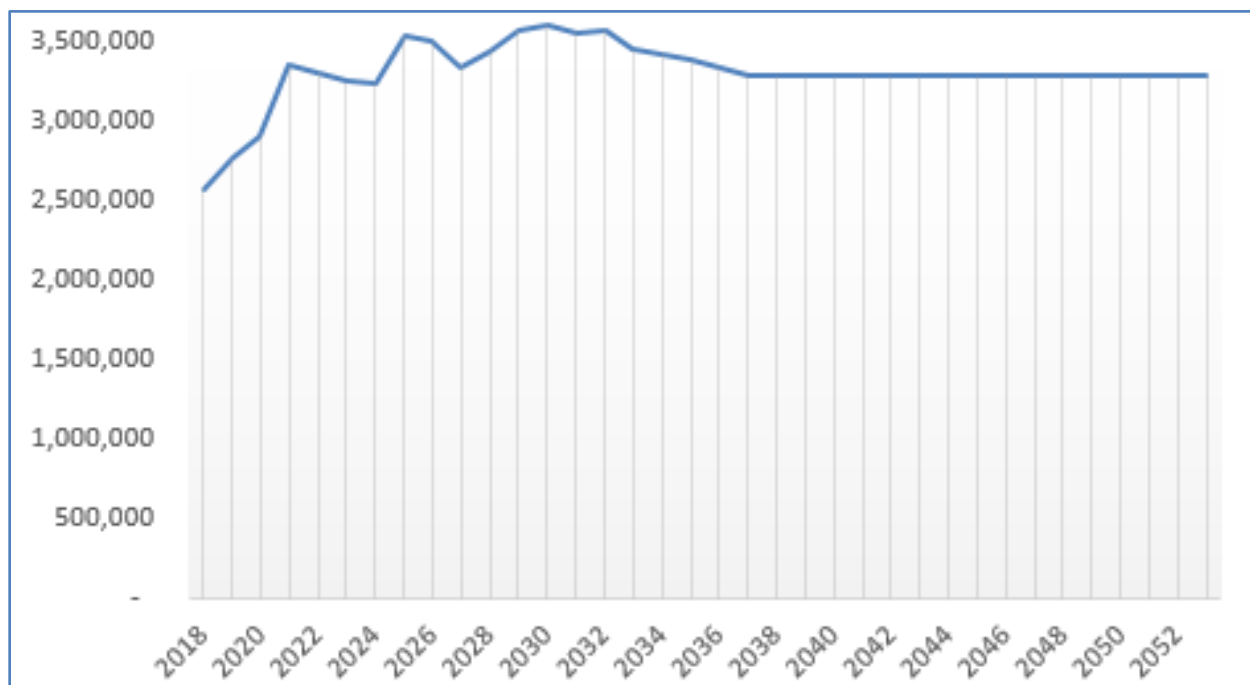


Figure 40 – MSCIP Crude Oil Tonnage Forecast (2015 – 2053)

For the period of analysis (2024 – 2073), the AEO’s petroleum-product export-growth rates forecast ranges between -2% and 6% annually. In addition to negative growth forecasted by AEO beginning in 2028, the baseline tonnage was adjusted downward to account for changes in output due to the Petro Nova project, which was projected to reach its highest level of output in the next ten years (2018-2028). The forecast was held constant after year 2039, the projected end of the Petra Nova project. It was assumed that after the end of the project, the pipeline would be repurposed, but due to the uncertainty, the forecast was capped.

2025 – The export of crude petroleum products from the Port is a new trade category. As a result, historical tonnage levels could not be used as a baseline for future growth. Current harbor users anticipate up to 15.5 million metric tons of benefitting crude exports by 2030 with channel expansion. Users estimate export volumes of 3.78 million metric tons per year without channel expansion. For this analysis, the baseline scenario assumes 3.78 million tons of crude oil will be exported in both the FWOP and FWP conditions.

Table 15 provides anticipated crude export capacity at MSC through the period of analysis. The maximum capacity given existing infrastructure is approximately 3.8 million metric tons. This volume represents approximately 7% of the national export capacity deficit and 1% of forecasted national seaborne crude exports. Based on user interviews and planned expansion at the South Peninsula, export capacity could increase fourfold to 15.5 million metric tons per year. This volume represents approximately 28% of all export volume over existing capacity and 5% of forecasted seaborne crude exports nationally.

Table 15 – MSC Maximum Export Volumes

Year	Existing Capacity Exports (Metric Tons)	Maximum Export (Metric Tons)
2030	3,782,000	15,500,000
2035	3,782,000	15,500,000
2040	3,782,000	15,500,000
2045	3,782,000	15,500,000
2050	3,782,000	15,500,000
2079	3,782,000	15,500,000

There is significant uncertainty related to future commodity throughput at the Port, especially given the lack of historical crude exports. Additional landside investment (pumping capacity and storage) is required to reach maximum export volumes. This added infrastructure is currently in the planning stages but is not guaranteed to be built in the FWOP condition. As a result, these additional crude export volumes are considered separately in the economic analysis. The study presents benefits of channel deepening based on the following crude export scenarios:

- **No crude export.** This condition assumes extension of existing conditions. No crude export market for the MSC materializes. Domestic barge operations continue as usual.
- **2019 F/EIS forecast.** This is the forecast used in the 2019 F/EIS. This forecast is used as a baseline for comparison and to communicate changes in this Economic Update. Significant changes in the crude export market have occurred since the 2019 F/EIS that necessitate an update.
- **Baseline.** This forecast uses assumptions related to the most likely volumes using current infrastructure. Additional landside infrastructure and investment is necessary to exceed this level of export.
- **Maximum Export Capacity.** This forecast assumes the maximum export volumes as anticipated by the harbor users.

Table 16 summarizes each export forecast.

Table 16 – MSC Export Forecast Scenarios

Year	No Crude Export	2018 F/EIS Forecast	Baseline	Maximum Buildout Capacity
2030	—	3,285,000	3,782,000	13,097,000
2035	—	3,285,000	3,782,000	14,939,000
2040	—	3,285,000	3,782,000	14,939,000
2045	—	3,285,000	3,782,000	14,939,000
2050	—	3,285,000	3,782,000	14,939,000
2079	—	3,285,000	3,782,000	14,939,000

The study assumes eFuels follow export trends for crude oil. Based on user interviews and Port capacity estimates, the study assumes eFuel exports will remain relatively constant from the 2030 estimated volume of 540 thousand metric tons annually.

Dry Bulk

The Port Calhoun Authority anticipates an increase in dry bulk and project cargo with new imports of Portland cement by 2024. The Port anticipates up to 400 thousand tons annual throughput by the project base year (2030), increasing to approximately 1.3 million metric tons per year of Portland cement over the long-term. The study assumes these volumes will max out around 2040. Volumes are assumed to hold constant through the end of the period of analysis.

3.2.5.3 Benefitting Tonnage Levels

2019 – Growth was capped in year 2043 and tonnage levels were held constant for chemical imports, chemical exports, and crude oil exports. Growth rates were applied to the established baseline tonnage levels to obtain benefitting tonnage levels in three different decades, 2024, 2034, and 2044 (Figure 41). This commodity forecast was held constant in the FWOP and each of the FWP scenarios.

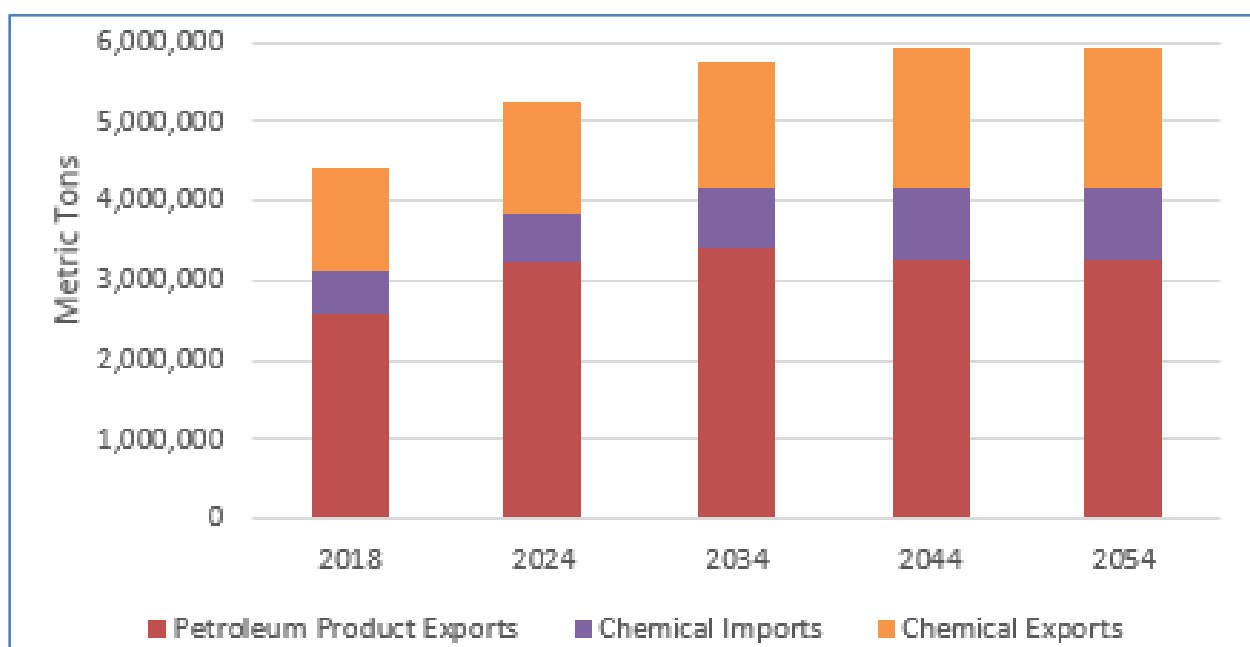


Figure 41 – MSCIP Benefitting Commodities Forecast by Decade

2025 – Figure 42 shows benefitting commodity totals for each model year. As shown, benefitting cargo volumes remain relatively constant through the period of analysis. Approximately 48% of benefitting cargo is based on new trade not occurring in the existing condition.

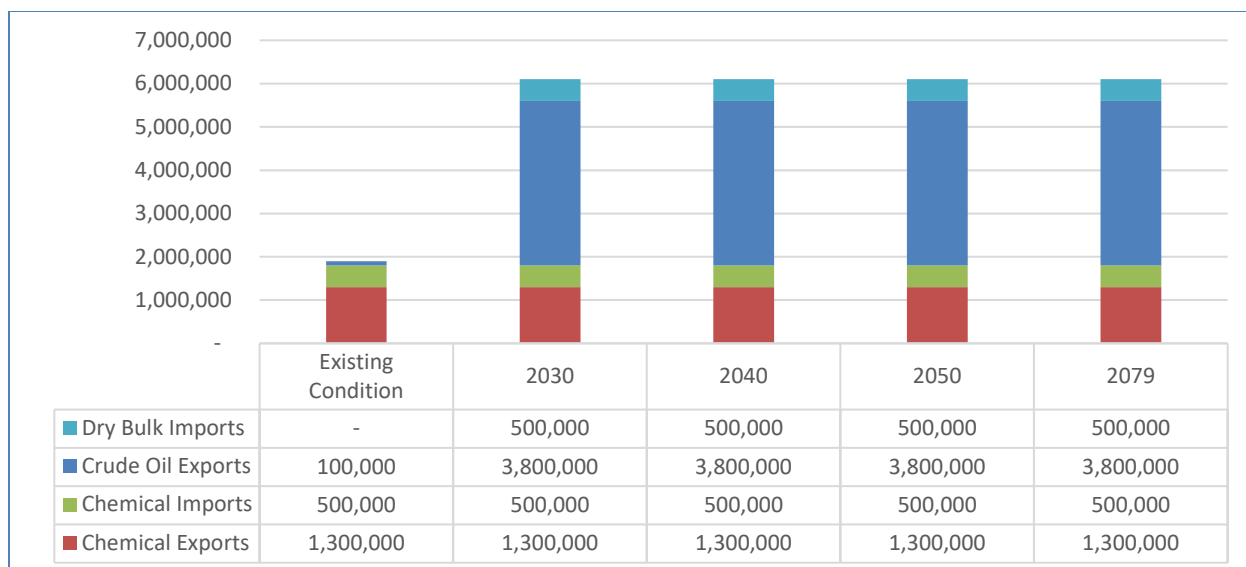


Figure 42 – Matagorda Ship Channel Benefitting Commodity Forecast by Decade

3.3 Topography, Soils, Geology, and Groundwater

3.3.1 Existing Conditions

The majority (90 percent) of the study area is in open water (Figure 3). The topography of land adjacent to the general area of the project is relatively flat and is located on the West Gulf Coastal Plain, consisting of flat lowlands to gently rolling hills and sloping to the southwest (USGS 1951, 1989a, 1989b, 1995). A bayhead delta has formed by the draining of the Lavaca-Navidad River to the north of the study area into Lavaca Bay. The bayside of the barrier islands and peninsulas, and parts of the mainland shoreline contain fringing marshes (McGowen et al. 1976). Along the bay shorelines are bluff banks, ranging from 5 to 10 ft. in elevation that form by wave erosion from prevailing southeasterly winds. The study area has been experiencing shoreline erosion, primarily from wind waves, as described by McGowen and Brewton (1975). The authors suggested approximately 8,450 acres of land of bay and Gulf shorelines were lost to natural erosion between 1856 and 1957 compared to approximately 615 acres by natural accretion.

The mapped soils on the nearest adjacent land in the project area (Calhoun, and Matagorda Counties) are mixtures of loams, clays, and sands. Calhoun County has 5 map units of prime farmland while Matagorda County has 13 map units of prime farmland and 1 unit of prime farmland, if drained (NRCS 2023).

The coastal plain along the Gulf is located within a major center of sediment deposition originating from the middle to late Jurassic period known as the Gulf Coast geosyncline. Jurassic to Pleistocene-aged sedimentary deposits thicken to more than 30,000 ft. closer to the Gulf. Due to the isolation of the regional seas and the restrictions of water flow during part of the Mesozoic Era (late Triassic to Jurassic) evaporate sediments, dominated by salt, were deposited (Wermund et al. 1989). The region was then overlain primarily by prograding sands and muds. Salt domes, interspersed throughout the layers have migrated upwards to within a few thousand feet of the land surface.

The Pleistocene-aged Beaumont Formation, estimated to be less than 1,000 ft. thick, underlies the geology of the region. This formation is composed primarily of clay, silt, sand and gravel. Overlying this formation is a layer characterized by Quaternary-aged (Recent and Holocene) Alluvium. These formations consist mainly of stream channel, point bar, natural levee, marsh, and backswamp deposits associated with former and current river channels and bayous. The Alluvium outcrops, which parallel the Texas coastline, are approximately 70 to 90 miles wide (Barnes 1975).

Bays and estuaries in the region have been partially filled with sediment originating from wave erosion of valley walls, transportation by rivers and small, and movement through tidal inlets into the bay-estuary system. Barrier island development was the result of longshore transport of river borne sediment from the Colorado-Brazos delta area to the northwest. The Matagorda Peninsula, which separated the Matagorda Bay from the Gulf, resulted from spit accretion (McGowen et al., 1976).

The sediments within the fluviatile-deltaic system consist primarily of sand, silt, and mud. An area of prodelta muds exist beyond the Colorado-Brazos delta front. Muddy sand distribution is related to hurricane wash overs, dredging activities, and reworking of relict sediments, and is not controlled by depth (McGowen and Morton 1979).

Offshore of Matagorda Bay, the width of the shoreface, the seaward extension of the barrier strandplain system, averages about 1.0 to 1.1 miles. The sediment of the shoreface transitions from primarily sand (the beach) to mud and muddy sand at the 30 ft. depth, and to predominantly mud where it merges with the continental shelf beyond the 30 ft. depth (McGowen et al. 1976). The sand-mud interface is approximately 1.8 to 2.6 miles offshore from the Matagorda Peninsula. The inner continental shelf experiences extensive bioturbation by burrowing organisms. This area also undergoes periods of considerable erosion and re-sedimentation during the hurricane season (McGowen et al. 1976).

Subsidence manifests as the sudden sinking (e.g., sink holes) or gradual downward settling of land. This can be caused by surface faults and intensified and/or accelerated by subsurface mining or the pumping of oil and/or groundwater. The localized subsidence has been shown to be lessened once groundwater, oil and gas pumping has decreased or ended altogether. Extensive groundwater withdrawal is not a major problem in the Port Lavaca area (McGowen et al., 1976). However, land subsidence on the order of 0.8 to 0.9 ft. in the Jackson County vicinity has been attributed to the extraction of oil and gas in the Port Lavaca (Holzer and Gabrysch 1982; Verbeck and Clanton, 1981).

3.3.2 No Action Alternative / FWOP

The general characteristics of terrestrial soils would not change under the No Action Alternative, as these are consequences of long-term geologic processes. Similarly, the geologic condition of the project area would not change with the No Action Alternative. The hydrogeological setting of the project area would not be expected to change in the FWOP condition, though groundwater level changes would be expected to change year to year with changes in withdrawal and drought conditions.

3.4 Water and Sediment Quality

3.4.1 Existing Conditions

3.4.1.1 Water Quality

The Texas Commission of Environmental Quality (TCEQ) has the following designation used for the waters of the system in Matagorda Bay including Lavaca, Carancahua, Keller and Tres Palacios bays: recreation use and aquatic life use (2022). All of Matagorda Bay is assigned primary contact recreation 1 use which are activities involving a significant risk of ingesting water such as swimming (TCEQ 2022). For aquatic life use, TCEQ has assigned the entire Matagorda Bay as Exceptional (E) Aquatic Life Use Subcategory and Oyster Waters (O) (waters producing edible oysters) (2022). The Aquatic Life Use Subcategory establishes a numerical criterion that is dependent on desired use, sensitivities of aquatic communities, and chemical and physical characteristics. The categories include minimal, limited, intermediate, high, and exceptional aquatic life and oyster waters. Under TCEQ procedures, the E/O designation translates to a DO criterion for saltwater of an average of 5 milligram per liter (mg/L) and a minimum of 4 mg/L. The O designation criterion for bay and gulf waters is a fecal coliform median concentration not to exceed 14 cfu/deciliter (colony forming units per deciliter, or 100 milliliters, with no more than 10 percent of all samples exceeding 43 cfu/deciliter).

The TCEQ establishes, reviews, and revises water quality standards for all surface waters within the state to comply with the Federal Clean Water Act (CWA). A list of impaired waters required by Section 303(d) must be prioritized to identify waters targeted for Total Maximum Daily Load (TMDL) standard development. The TMDL defines an environmental target by determining how much a certain pollutant must be reduced to attain and maintain the affected use designated by the State, such as use by aquatic life, and the State develops an implementation plan to mitigate pollution sources in the watershed and restore full use of the water body (TCEQ 2022). The waters within Matagorda Bay system have been identified on the 303d list for bacteria in oyster water and water for recreational uses, and depressed DO and copper in water, depending on location (TCEQ 2022).

3.4.1.2 Sediment Quality

Sediment deposition within the current channel arises due to natural processes where sediment is transported from terrestrial sources within stormwater runoff or wind. Thus, land contamination within a watershed is a major factor affecting sediment quality. In addition, water-borne contaminants can affect surface sediment after deposition.

Since USACE policy (ER 1165-2-132) states:

“Dredged material and sediments beneath navigable waters proposed for dredging qualify as HTRW only if they are within the boundaries of a site designated by the EPA or a state for a response action (either a removal action or a remedial action) under CERCLA, or if they are a part of a National Priority List (NPL) site under CERCLA.”
“Where HTRW contaminated areas or impacts cannot be avoided, response actions must be acceptable to EPA and applicable state regulatory agencies.”

thus, an evaluation of sediment quality was conducted prior to construction. The protocol, as is the case for all USACE Civil Works projects, is that the NFS is responsible to provide a clean site for the work. If any HTRW material were discovered as a result of sampling efforts, the

EPA and the PRP (Alcoa) would be notified to remove any HTRW prior to construction. No sampling of sediment can be performed during construction, thus, ensuring that the sediment quality meets the Data Quality Objectives (DQO) established for this project will occur prior to contracting. More detailed information regarding a Tier 1 Evaluation conducted in 2025 for this project is found in Appendix B-10. It should also be noted it is generally accepted that data more than 5-years old are not considered reliable, so that the new sampling and analysis of sediment data and possibly elutriate testing will be performed if this project does is not Contracted by 2028.

An evaluation of the potential to encounter HTRW that could affect sediment quality was initially conducted as part of the 2009 Final Environmental Impact Statement (2009 FEIS) for the MSC project located in Matagorda and Calhoun counties, Texas. The evaluation included the MSC, inclusive of both dredge locations and adjacent properties within a 2-mile radius of the channel. The assessment consisted of a review of recent and historic aerial photographs and a review of regulatory agency database information. This evaluation concluded in 2009 that the potential for encountering impacted material during the construction of the project is very limited.

As concluded in 2009, the current potential for encountering impacted material during the construction of the project is limited since no inland placement of dredged material is proposed. Nonetheless, potential HTRW impacts were examined in the areas surrounding the project footprint for completeness and potential effects on sediment quality. Impacts associated with regulated facilities are most likely to be encountered near the source of the contaminants. These sources include, but are not limited to, industry located in the Point Comfort area. According to a recent (2025) review of database records and research of the environmental history of the region, a conclusion similar to that found in the 2009 FEIS is reached: the industrial activity adjacent to Lavaca Bay has caused measurable impacts to the terrestrial and marine environments adjacent to this and adjacent waterways and are discussed below. For more information, see Appendix B.

The industrial activity adjacent to Lavaca Bay is extensive and primarily related to two large industrial complexes located immediately adjacent to the project at its northern end. Industrial activity at Alcoa Point Comfort Operation and Formosa has resulted in quantifiable impacts to groundwater, surface water, soil, and sediment. Corrective action has been performed at both facilities. The documented areas impacted by previous industrial activity are isolated to the Lavaca Bay adjacent to The Port. According to the regulatory agency database report, the northern extent of the project overlaps with an area defined as an NPL or Superfund site. This area has been defined as having been impacted by contaminated sediment released from the Alcoa facility. In accordance with ER 1165-2-132 and PGL No. 34, testing (sediment, water, elutriate) conducted within the project footprint has determined acceptable sediment quality including the area near the Port that are a part of the Superfund site and are described further.

A sampling campaign was conducted in 2019 (Sampling and Chemical Analysis Matagorda Ship Channel – Matagorda Peninsula to Point Comfort, Calhoun County, Texas. March 2019) to inform routine maintenance dredging operations within MSC from Matagorda Peninsula to the Port. Sixty-five locations were sampled and then composited to create twenty-two samples for analysis. While these data concluded that there was no concern with regard to the sediment quality generally, some composited samples within Lavaca Harbor measured 0.2 milligrams per kilogram (mg/kg) of mercury. Furthermore, sampling and analysis in 2021 for an unrelated project outside this project's footprint resulted in mercury concentrations above the remediation value set at 0.5 mg/kg near Lavaca Harbor. Alcoa delineated the area further and removed sediment above the remediation value.

While these actions were at locations outside the footprint of this project, further sampling was conducted to ensure sediment quality due to the close proximity to Lavaca Harbor. Hence, sampling was conducted in 2023 within Lavaca Harbor, after coordination with the US EPA Region 6 (Superfund Division), and no sediment within the project footprint contained mercury above the remediation value of 0.5 mg/kg⁴. See Figure 43 below. In addition to mercury, the sediment analysis included nearly 100 analytes representing metals, organochlorine pesticides, semi-volatiles, total, cyanide, and TOC.

Furthermore, the NFS conducted sampling and analyses in 2022 (Calhoun Port Authority; Section 404 Sampling and Chemical Analysis, Matagorda Ship Channel improvement Project – May 2022) of the project footprint. All sediment samples (22) collected throughout the MSC exhibited mercury levels below 0.048 mg/kg, well below EPA's remedial action objective of 0.5 mg/kg set for the Alcoa Site. This testing included analysis of the sediment and elutriate to determine whether the sediment poses any potential toxicity to the benthic and open water biota in and around the open water placement areas. Elutriate testing was performed which simulates both mixing at the dredge site and decant water from a placement site. Bioassays of the sediment and elutriates are required under the testing regimen to allow for placement into an existing ODMS. Mercury levels in elutriate were below the detection limit of 0.150 µg/L. The screening criteria for this analysis was the Texas Surface Water Quality Standard of 2.1 µg/L. In summary, the sediment quality testing conducted in 2023 (Figure 43), 2022, and 2019 show a low risk of encountering mercury-contaminated sediment above the remediation value of 0.5 mg/kg within the project footprint.

⁴ [Alcoa \(Point Comfort\) / Lavaca Bay Superfund Site Record of Decision - December 2001](#)



Figure 43 - 2023 Sediment sampling results for mercury (from 2023 report by BESi, Figure 2)

3.4.2 No Action Alternative / FWOP

3.4.2.1 Water Quality

The effects on dissolved oxygen (DO) concentrations from the FWOP are not entirely clear. There are conflicting study results on whether or not the placement of maintenance material affects DO (Brown and Clark, 1968; Hopkins, 1972; May 1973; Pearce, 1972; Wakeman, 1974; Windom, 1972). Temporary decreases in DO were found by May (1973) at the interface of the water and sediment at areas of mudflow, possibly due to the anaerobic nature of maintenance material.

The amount of turbidity resulting from dredging activities would be unchanged under the No Action Alternative due to the continued routine maintenance dredging and placement activities in the project area.

3.4.2.2 Sediment Quality

No changes to the quality of sediments are expected under the No Action Alternative. Sedimentation would continue naturally, and anthropogenic activities could affect sediment quality in the future. Maintenance dredging and placement would continue along with routine sediment sampling. Natural recovery through sedimentation would continue to areas with high levels of mercury concentrations in the area of the ALCOA (Point Comfort)/Lavaca Bay Superfund Site, as stated in the ROD for the ALCOA Superfund Site (US EPA 2001). For more information about ALCOA/Lavaca Bay Superfund Site, refer to 3.5 HTRW and the Appendix B-10 Tier 1 Evaluation conducted in 2025.

In accordance with the Inland Testing Manual (ITM, US EPA, 1998), a re-evaluation of Tier I data for annual or episodic dredging work should not exceed three years or the dredging cycle, whichever is longest. A Tier 1 Evaluation is essentially a comprehensive analysis of all existing and readily available information on a proposed dredging project to determine if a Tier II Evaluation is required—which is concerned solely with sediment and water chemistry by means of sampling and analysis. It should also be noted that the US EPA Region 6 and the New Orleans and Galveston USACE Districts have a Regional Implementation Agreement (RIA) stipulating that “biological and chemical data greater than 5 years old may not be adequate to conduct evaluations.” for data relevant to ocean disposal sites (US EPA 2003).

3.5 Hazardous, Toxic, Radioactive Waste

The Term "HTRW" means hazardous, toxic, and radioactive wastes, which includes any material listed as a "hazardous substance" (See 42 U.S.C. 9601(14)) regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA") (42 U.S.C 9601-9675) and any other regulated material in accordance with applicable laws and regulations.

3.5.1 Existing Conditions

The presence of potential HTRW concerns in Matagorda Bay including hazardous materials, hazardous waste, and potential contamination by current or past industrial or other activities are discussed below. Potential HTRW concerns were identified through a review of State and Federal databases cataloguing permitted facilities and activities regulated by these agencies, such as the TCEQ and the U.S. Environmental Protection Act (EPA). Engineer Regulation (ER) 1165-2-132 provides guidance for Civil Works projects regarding consideration of issues and problems associated with potential HTRW, which may be located within project boundaries or may affect or be affected by USACE Civil Works projects. HTRW includes any material listed as a “hazardous substance” under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 United States Code (U.S.C.) 9601 et seq. Potential HTRW concerns will be identified following the selection of the recommended plan. A desktop HTRW assessment (Tier 1 evaluation) has been conducted to identify the existence of, and potential for, HTRW contamination. This assessment follows the guidance provided by ER 1165-2-132 and consists of a review of recent and historical aerial photographs and a review of Federal, state, and local regulatory agency database information, and a review of historical data. See Appendix B for more detail.

The region is home to multiple port facilities and a large ALCOA refining/smelting facility. The ALCOA facility at The Port was established in 1948 and has been used as an aluminum

smelting facility and a refinery for chlorine-alkali processor. Mercury is one of the by-products of work undertaken at the ALCOA facility. The mercury was discharged into Lavaca Bay and subsequent high levels of mercury in the Bay led to fishing restrictions in 1988. The site was listed on the National Priorities List for the CERCLA in 1994. A Natural Resources Damage Assessment (NRDA) was performed at the site and restoration, and remediation work was undertaken to compensate for environmental damages (GLO et al. 2001). ALCOA entered an agreement with the EPA (EPA 2001) for the Lavaca Harbor area and recovered sediment with mercury levels exceeding 0.5 ppm. In accordance with that agreement, ALCOA responded to address locations identified within the proposed project footprint where sediment contained mercury above the action level. Prior testing of sediment, water, and elutriate conducted in 2022 concluded that there was no concern for the dredging and placement of the material. In addition, and as a result of additional recent (2023) sampling and analysis of sediments and water collected from the Lavaca Harbor area, there are no exceedances within the project footprint.

A Formosa facility at The Port was listed among the Resource Conservation and Recovery Act (RCRA) list of sites. A RCRA Facility Investigation (RFI) was deemed necessary in 1990, and the work plan was approved in 1992. The subsequent groundwater monitoring determined the migration of contaminated groundwater is under control.

TCEQ Geo-Information Service database shows 14 petroleum storage tanks in the area (1 at The Port and 13 in Port Lavaca) (Figure 44).

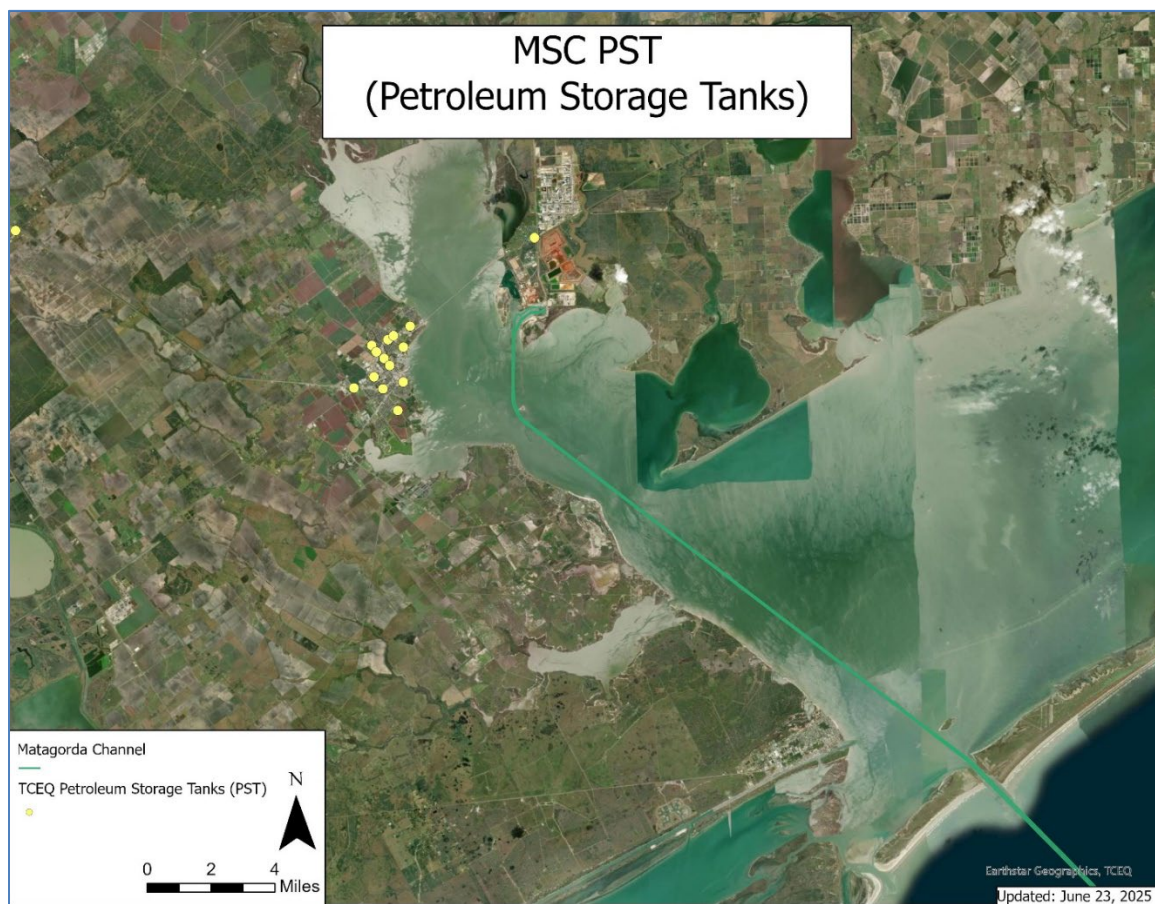


Figure 44 – Petroleum Storage Tanks near MSC

3.5.2 No Action Alternative / FWOP

The FWOP condition does not include any expected impacts to hazardous materials in the project area. Maintenance dredging and placement would continue. Increased vessel traffic, resulting from growth in existing and/or new businesses, may slightly increase the possibility of spills resulting from accidents, but is not expected to differ from recent rates.

3.6 Air quality

3.6.1 Existing Conditions

The Clean Air Act (CAA) of 1970 is the comprehensive Federal law that regulates air emissions from stationery and mobile sources. Among other things, this law authorizes the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and welfare and to regulate emissions of hazardous air pollutants. NAAQS define the maximum permissible concentrations of six pollutants, known as criteria pollutants. The criteria pollutants include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), and sulfur dioxide (SO₂). Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Areas meeting NAAQS are classified as being in "attainment" and areas persistently exceeding NAAQS, or that contribute to ambient air quality in a nearby area that fails to meet standards, are classified as a "non-attainment area (NAA)." NAA are subject to preparing and complying with air quality plans (State Implementation Plans [SIP]) containing emission reduction strategies for those areas designated. The EPA directs states to develop SIPs applicable to appropriate industrial sources in the state in order to achieve these standards. The Texas Commission on Environmental Quality (TCEQ) is responsible for facilitating the state's responsibilities for NAAQS attainment issues, air emissions permitting, and development and enforcement of air regulations and initiatives.

The TCEQ Annual Enforcement Report for FY 2023 represents the most current data available on the state's compliance with NAAQS. The report does not include information on Calhoun County, which covers roughly 1,000 square miles but only has a population of approximately 20,000. The report states that the adjacent Victoria County (about 25 northwest) is attainment for all criteria pollutants. Prevailing winds roughly split between southerly and northerly winds and are not expected to carry any potential air contaminants from the project area to areas nearing nonattainment. There are no metropolitan areas located within 50 miles of the project footprint; Corpus Christi is approximately 75 miles southwest and Houston is about 100 miles northeast of The Port. There are no major emission sources located along the waterway. Sources on the waterway are either stationary such as fossil fuel power plants located at The Port, or mobile sources including towboat engines and recreational powerboat engines or recreation area traffic.

3.6.1.1 Stationary Emissions Sources

The primary pollutants produced through non-mobile sources that occur within the MSCIP study area (Figure 3) are nitrous oxides (NO_x), SO₂, and CO. Primary stationary emission sources

along the MSCIP include power plants, oil and gas production, aluminum and plastics manufacturing, industrial sand production, and other industrial organic chemical plants. Cotton, cattle, corn, grain sorghum, fishing and shrimping are the chief agricultural products comprising primary stationary emission sources.

3.6.1.2 Mobile Emissions Sources

The primary pollutants produced through mobile emission sources are CO, NO_x, hydrocarbons, and PM. Emissions produced by ships and other marine vessels can be much lower when considering the tonnage of these transportation modes. For example, emissions from utilizing barges for transportation were compared and found to generally be much lower than those produced by to truck or rail transportation (TTI 2022). The Texas Transportation Institute evaluated the emissions produced by three modes of transportation: truck (highway), rail (train), and inland towing (barge). Depicted in Table 17 below, the impact on air quality from the use of barges through inland navigation towing is significantly less than other modes of transportation, resulting in the utilization of less fossil fuels and production and release of fewer air pollutants.

Table 17 – Fuel Efficiency and Emissions of Transportation Modes

Transportation Mode	Ton-Miles/Gallon of Fuel	Emissions (Tons-Emissions/106 Ton-Miles)
Truck	155	71.61
Rail	413	26.88
Inland Towing	576	19.27

In 2005, the inland waterways logged an estimated 274.4 billion ton-miles of activity. Given the above calculations, if this inland waterway activity occurred on the railroads an additional 2.1 million tons of emissions would have been produced, and on highways an additional 14.4 million tons (Texas Transportation Institute 2009).

3.6.2 No Action Alternative / FWOP

Under the No Action Alternative, navigation channel maintenance and depth would remain unchanged from existing actions. Impacts to air quality and any emissions of gases associated with implementing the No Action would be similar to existing impacts, which result from regular vessel and barge traffic through the MSCIP as well as emissions from O&M efforts such as maintenance dredging. Channel deepening would not change; therefore, vessel and barge traffic and tow weights would not be affected, resulting in criteria pollutant and emissions from both barge traffic and other forms of transportation remaining the same. The No Action Alternative would have negligible, long-term adverse impacts on air quality throughout the MSC.

3.7 Noise

3.7.1 Existing Conditions

3.7.1.1 Airborne Noise

Noise is a measurement of sound pressure level measured in decibels (dB). The human ear perceives sound, which is a mechanical energy, as pressure on the ear. The sound pressure level is the logarithmic ratio of that sound pressure to a reference pressure and is expressed in dB. Environmental sounds are measured with the A-weighted scale of the sound level meter. The A-weighted scale simulates the frequency response of the human ear, by giving more weight to middle frequency sound and less weight to the low and high frequency sounds. A-weighted sound levels are designated as dBA. The threshold of human hearing is defined as 0 dBA; very quiet conditions (e.g., a library) are approximately 40 dBA; levels between 50 and 70 dBA define the range of normal daily activity; levels above 70 dBA are considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA (Caltrans 2013).

Sensitive receptors are facilities or areas where excessive noise may disrupt normal activity, cause annoyance, or loss of business. These can include residential areas, religious, educational, recreational, and medical facilities, which are more sensitive to increased noise levels than areas of commercial and industrial land use. Sensitive receptors are located in the City of Port Lavaca and the communities of Port O'Connor, Magnolia Beach, Indianola, Alamo Beach, and Point Comfort. The existing sound environment of the area surrounding the project area is influenced by numerous noise generating sources, from transportation (e.g. waterways, roadways) like ships, barges, commercial fishing vessels, and sport and recreational boats or marine terminal-related (e.g. docks, cranes), or terminal activity consists of such as operation of cranes, pumps, trucks, or other equipment (e.g. loaders, forklifts). Traffic noise from numerous roadways traversing the mainland portion of the project area adjacent to the channels also influences the existing sound environment.

Background noise is the cumulation of all perceptible, but not necessarily identifiable, noise sources (such as traffic, airplanes, and environmental sounds) that create a constant ambient noise baseline. Although extremely loud noises can cause temporary or permanent damage, the primary effect of environmental noise is annoyance. The range of human hearing spans from the threshold of hearing (near 0 dBA) to exceeding the threshold of pain (120 dBA). In general, humans will notice a change of sound greater than 3 dBA. Noise levels greater than 85 dBA can cause temporary or permanent hearing loss, if exposure is prolonged.

3.7.1.2 Underwater Noise

The Calhoun Port has functioned as a deep-water port since 1965. Recreational and commercial vessel traffic, and other industrial noise continue to be present in the underwater soundscape. Several ambient noise sources are also present in Matagorda Bay. These include natural sources such as wind waves, tidal currents, fish, and mammals, and manmade sources such as the aforementioned vessel traffic, periodic dredging, and harbor construction (pile driving etc.). Tidal currents can produce hydrodynamic sounds, most significantly at very low frequencies (< 100 Hz). Vessel traffic generates sounds that can travel considerable distances, in frequencies ranging from 10 to 1000 Hz. Wind-driven waves also produce ambient sounds in the frequency range of 500 to 100,000 Hz and can be expected to constitute the main underwater sound source in the Bay.

Matagorda Bay has the typical noise characteristics of a busy port and highly used recreational water. Noise sources for commercial vessels include cranes, whistles and propulsion and auxiliary engines. Dockside noise sources include cranes, pumps, and loading and unloading equipment. Recreational vessel sound sources are predominantly outboard motors. Noise has been documented to influence fish behavior. Fish detect and respond to sound by utilizing cues to hunt for prey, avoid predators, and for social interaction. Fish produce sound when swimming, mating, or fighting and also noise associated with swimming. Given the number and ubiquity of natural and manmade sound sources, and level and frequency of vessel and construction activity, marine species are likely adapted to the current underwater soundscape, typical of a busy port.

3.7.2 No Action Alternative / FWOP

The No Action Alternative does not include widening or deepening of the existing ship channel (Table 18). However, the existing maintenance dredging and operations of the channel would continue. A hopper dredge is typically used for a portion of the maintenance dredging operations. This type of dredge houses its equipment below deck and is likely to operate at noise levels similar to that of a large tugboat.

Table 18 – Typical noise levels associated with dredging operations

Equipment	Noise Level (dBA)
Cutterhead Dredge (at 160 ft.)	79 ¹
Hopper Dredge (at 50 ft.)	87 ²
Large Tug Boat (at 50 ft.)	87 ³
Small Tug Boat	72 ³
Bulldozer (at 50 ft.)	82 ⁴
Bucket Crane (at 50 ft.)	82 ⁴
¹ Geier and Geier Consulting, 1997	² Assumed to be the same as a large tug boat.
³ Epsilon Associates, 2006	⁴ Federal Highway Administration, 2006

Permanent noise impacts are not expected under the No Action Alternative. Dredging operations occur in the channel, which is a significant distance from the shoreline and sensitive receivers. The nearest receiver, at Magnolia Beach, is approximately 3,000 ft from the channel. This distance would reduce the amount of noise output from the channel that is received at the shoreline. The existing noise levels in the project area range from 52.4 to 65.1 dBA / Day-Night Average Sound Level (Ldn). The No Action Alternative would result in short-term noise impacts during the dredging and placement activities.

3.8 Wetlands

3.8.1 Existing Conditions

Wetlands are defined by the Clean Water Act (CWA) as, “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 C.F.R. 328.3(b)). The two major categories of wetlands are tidal (subject to the ebb and flow of tide), and nontidal (freshwater).

Wetland information and quantities for this study were estimated from the U.S. Fish and Wildlife Services’ (USFWS) National Wetlands Inventory (NWI), which is based on the classification system of Cowardin et al. (1979).

Wetland condition and distribution is influenced primarily by water elevation, which fluctuates in response to daily tides, rainfall and freshwater drainage, and winds. Wetlands provide essential habitat for fish, shellfish, birds, and other wildlife. Wetlands also act as a filter for runoff and provide a buffer to coastal areas limiting storm and wave damage. Figure 45 shows the general distribution of wetlands in the vicinity of the study. Within a 1-mile radius around the entire proposed project (Figure 49), the area of analysis, three general wetland types exist: estuarine and marine deepwater, estuarine and marine wetlands, and freshwater emergent (FGDC 2013). Majority fall into the classification of estuarine and marine deepwater, approximately 62,948 acres. Estuarine and marine deepwater consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean such a bay. The substrate, or bay bottom in these habitats is continuously covered with tidal water (i.e., located below extremely low water) and has less than 30% vegetative cover. Generally speaking, this classification is open water.

Approximately 1,537 acres of estuarine and marine wetlands, or salt marsh, remain in the area of analysis. Estuarine and marine wetlands extend from the open waters of the estuary, inland to freshwater areas (salinity less than 0.5 ppt during average annual low flow) (FGDC 2013). Estuarine and marine wetlands include several distinct wetland communities such as marshes (vegetated) or tidal flats such as mud and salt (sparsely/unvegetated). Both marshes and tidal flats are periodically flooded by tidal waters either at least once daily or less often than daily depending on specific location and provide feeding grounds for coastal shorebirds, fish and invertebrates.

Marshes typically have vegetation present most of the growing season and are dominated by perennial plants. Low marshes are those areas that are regularly flooded, and high marshes are those areas found at slightly higher elevations and experience less frequent flooding. In the Matagorda Bay area, low salt marsh is typically dominated by smooth cordgrass (*Spartina alterniflora*) and common species such as saltgrass, saltwort, glasswort, and saltmarsh aster (*Symphyotrichum tenuifolium*) (White et al. 2010). High salt marshes do not include smooth cordgrass, but may include other species, such as shoregrass, annual seepweed (*Suaeda linearis*), sea ox-eye daisy (*Borrchia frutescens*), and sea-purslane (*Sesuvium portulacastrum*). In addition, the Matagorda Bay area includes marshes with scrub-shrub vegetation (woody vegetation less than 20 ft) (White et al. 2010). Common woody species in these scrub-shrub wetlands include sumpweed (*Iva frutescens*) and eastern false-willow (*Baccharis halimifolia*). Marshhay cordgrass, southern reed (*Phragmites australis*), and Gulf cordgrass are common herbaceous species in this community.

Tidal flats have less than 30% vegetation cover by area. Tidal flats can include beaches, bars, and flats. Flats may be sparsely vegetated by glasswort (*Salicornia spp.*), saltwort (*Batis maritima*), and shoregrass (*Monanthochloe littoralis*). The extent of barrier island tidal flats in the study region have decreased in areal coverage since the 1950s (White et al. 2010). Some of the loss may be due to “an accelerated rate of relative sea-level rise from the 1960s through the late 1970s.” Over time, these tidal flats have converted to estuarine marsh, seagrass, or remained as unvegetated open water.

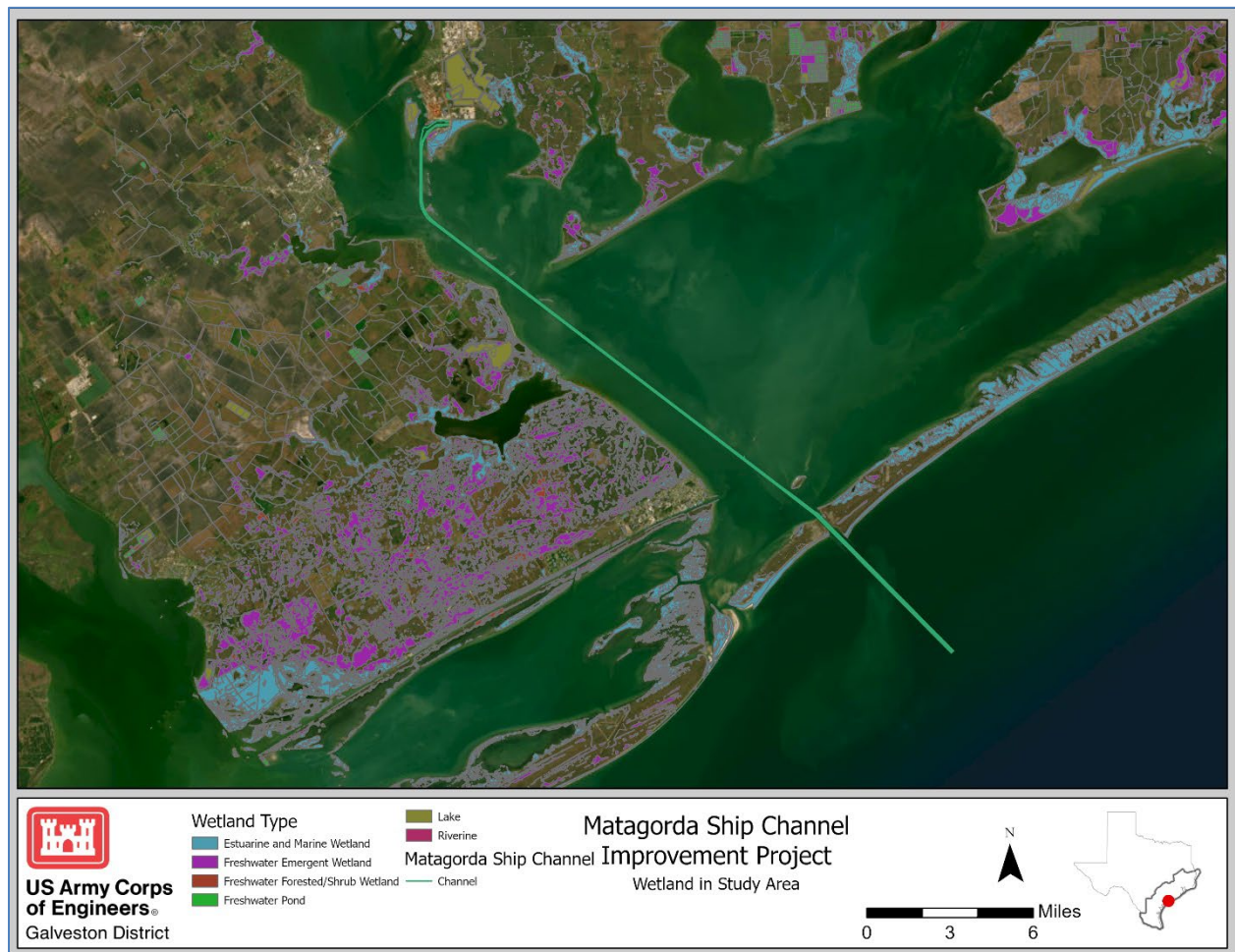


Figure 45 – Wetland types present in the Study Area

Freshwater emergent wetlands comprise approximately 543 acres and can be found along the shoreline as shown in Figure 45 (FGDC 2013). These wetlands have vegetation present most of the growing season dominated by perennial plants that are seasonally flooded (few days to weeks). Common species in the area include coastal cattail (*Typha domingensis*), California bulrush (*Schoenoplectus californicus*), southern reed, swamp smartweed (*Polygonum hydropiperoides*), Gulfcoast spikesedge (*Eleocharis cellulosa*), large spike spikerush (*Eleocharis palustris*), green flat-sedge (*Cyperus virens*), sand spikerush (*Eleocharis montevidensis*), longlobe arrowhead (*Sagittaria longiloba*), giant cut-grass (*Zizaniopsis milacea*), seashore paspalum (*Paspalum vaginatum*), three-square bulrush (*Schoenoplectus pungens*), and coastal water-hyssop (*Bacopa monnieri*).

3.8.2 No Action Alternative / FWOP

The ongoing routine maintenance dredging and placement of dredged materials for the existing MSC would continue under the No Action Alternative. Salt marsh is currently present at the following existing placement areas: PA 18/19 (approximately 53 acres), PA 17 (approximately 2.5 acres), PA 16 (approximately 8 acres), PA 14 (approximately 1 acre), and Chester Island (approximately 12 acres). Approximately 25 acres of freshwater emergent wetland is present at PA 18/19. Under the No Action Alternative, dredged materials from the MSC would continue to be placed at these locations, however with little to no adverse impacts to existing wetlands. Due to the on-going placement at PA 18/19, as the dredged material settles out from the discharge pipe over time, this has increased amount of salt marsh at this area. Past placement at PA 16 has built up and created an island (Snake Island), resulting in creation of wetlands; however, no dredged material has been placed since 2010 when approximately 700,000 cy was placed. Over time, this island has been eroding. In 2022, it was approximately 10 acres and was approximately 15 acres in 2011 shortly after the last placement. Under the No Action Alternative, future placement at PA 16 could occur within the next 50 years, resulting in potential creation of wetlands.

It is likely that rising sea levels and increased coastal storms would adversely affect salt marsh. Sea level rise would also result in long term saltwater intrusion and inundation of marsh are causing them to be permanently lost due to conversion to open water habitat.

3.9 Wildlife

3.9.1 Existing Conditions

Special status wildlife species are discussed in Section 3.11 below.

The wetlands habitat such as those found in the study area (Figure 3) are home to many species of birds including larger wading birds such as herons and egrets, as well as smaller birds like redwing black birds and sparrows. Marshes serve as nesting and foraging grounds for these and other birds. Foraging may occur at various tidal stages with birds seeking small fish and crabs, the marsh periwinkle, and other macroinvertebrates as described in Section 3.10. Along the shorelines, typical semi-rural mammals, reptiles, and amphibian species can be found such as raccoons, squirrels, coyotes, snakes, lizards, turtles, and frogs.

Matagorda Bay is located along the Central Flyway for waterfowl and is one of the most significant waterbird wintering regions in North America. The various wildlife management areas such as Powderhorn and Matagorda Island, Aransas National Wildlife Refuge, islands, and other natural areas throughout Matagorda Bay are home to numerous species of resident and migrant birds. Some common species that occur within the project area include little blue heron (*Egretta caerulea*), sanderlings (*Calidris alba*), least sandpiper (*Calidris minutilla*), great blue heron, white ibis (*Eudocimus albus*), roseate spoonbill (*Platalea ajaja*), royal tern (*Sterna maxima*), sandwich tern (*Sterna sandvicensis*), laughing gull (*Larus altrcilla*), and ring-billed gull (*Larus delawarensis*). Other bird species include a variety of raptors, songbirds, and migratory waterfowl.

The project area is within the TPWD's Coastal Survey Zone. The TPWD Midwinter Waterfowl Survey (2024) documented 4,095,826 birds in 2018, representing at least 26 species. The Coastal Zone accounted for approximately 18 percent (743,125 birds, at least 18 species) of this total. Waterfowl species expected to migrate through the project area include the blue-

winged teal (*Anas discors*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca*), Canada goose (*Branta canadensis*), and wood duck (*Aix sponsa*).

The Texas Colonial Waterbird Census (TCWC) database has documented nesting habitat in the project area for multiple species of colonial waterbirds (USFWS 2017b). Approximately 21 species of colonial-nesting waterbirds (gulls, terns, herons, egrets, spoonbills, and skimmers) occur in the Matagorda Bay estuary, feeding in wetland and bay areas and nesting during the Feb – September period, primarily on two offshore nesting islands, Chester and Lavaca Bay Spoil (Snake) Islands located with Matagorda and Lavaca Bays. The average number of breeding pairs for Lavaca Bay and western Matagorda Bay indicate a downward trend since 2001 (2001-2011 24,872 pairs and 2012-2017 20,781 pairs). Average number of species and total number of nesting pairs for these two important islands the previous five years (2013 – 2017) are as follows: Chester Island (TCWC 609-300) avg. 17,618 breeding pairs, 19 species; Lavaca Bay Spoil (63-770) (TCWC 609-121) avg. 4,172 breeding pairs, 20 species. During the 2023 survey by the Audubon Society at Chester Island, approximately 22,012 total number of nesting pairs (19 species) were observed (Audubon 2023).

3.9.2 No Action Alternative / FWOP

No direct impacts to wildlife would occur as a result of the No-Action Alternative. Continued commercial and residential development may result in loss of habitat for wildlife. On-going maintenance dredging and placement operations would result in short-term increased turbidity in the bay impacting aquatic species used as prey by coastal birds and other terrestrial wildlife species, resulting in a short-term indirect effect to those wildlife species. To minimize these effects, no dredged material would be placed between March 1 and September 1 within 1000 ft of an emergent island such as Chester Island and PA 16. In addition, accidental chemical or petroleum product spills that could occur during dredging operations would pose a potential, albeit minor, threat to the aquatic community, and thus the food source of many coastal birds in the area. Impacts from noise and human activity are unlikely to be a substantial factor, although these impacts may force some mobile species to avoid the immediate vicinity of the project and move into similar adjacent habitats. However, these effects would be short term and indirect.

Dredged material would continue to be placed at Chester Island and PA 16, minimizing rate of erosion or slightly increasing the size of the islands, depending on the quantity of material placed. This on-going placement at both Chester Island and PA 16 would continue to have a beneficial effect on nesting habitat for colonial waterbirds.

3.10 Aquatic Resource

3.10.1 Existing Conditions

Special status aquatic species such as sea turtles and marine mammals are discussed in Section 3.11 below.

The Matagorda Bay System including Lavaca Bay is one of the most extensive bay-estuary systems along the central Texas Gulf Coast. Matagorda and Lavaca Bays are highly productive and home to a diverse aquatic species and ecosystem. The open-water habitats are composed of unvegetated bottom areas, oyster reefs, and patches of submerged aquatic vegetation (SAV) such as seagrasses, supporting numerous communities of fish and benthic organisms. Phytoplankton are the primary producers in the open-bay and are fed upon by zooplankton,

fishes, and benthic organisms. Zooplankton form the basis of the food chain for larval and juvenile fish. It is expected that plankton assemblages in Matagorda Bay would be similar to those of Lavaca Bay. For aquatic resources, the area of analysis would be considered a 1-mile radius around the entire proposed recommended scale to account for potential impacts (Figure 49).

3.10.1.1 Fish

The Matagorda Bay system supports a diverse fish and shrimp population. The some of the dominant fish species inhabiting the Matagorda Bay estuary are bay anchovy (*Anchoa mitchilli*), Atlantic croaker (*Micropogonias undulatus*), white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), and spot (*Leiostomus xanthurus*) (Brown et al. 2013). These species are found throughout the Texas coast. Seasonal differences occur in abundance and biomass depending on the timing of Gulfward migrations. Anchovy are at their most abundant in the early part of the year (January – April), while croaker are more abundant in the spring and summer, followed by spot in the summer and fall. Brown shrimp reach their peak in abundance typically in May, with white shrimp abundance at their maximum in late summer and fall (Brown et al. 2013). In addition, other fish species found in the Bay include black drum (*Pogonias cromis*), southern flounder (*Paralichthys lethostigma*), striped mullet (*Mugil cephalus*), sheepshead (*Archosargus probatocephalus*), and sand seatrout (*Cynoscion arenarius*).

3.10.1.2 Benthos

The benthic (bottom-dwelling) species include macroinvertebrates, crustaceans, and shellfish found living on the bay bottom. These benthic species have an important role in the food web, and their size, abundance, and species diversity in a given area serve as a valuable indicator of the surrounding environmental conditions. Since these benthic species serve as a primary food source for larger, economically important crustaceans and fish in the area of analysis, their environment is considered Essential Fish Habitat (EFH) and is regulated under the Magnuson-Stevens Fishery Conservation and Management Act. The distribution of the benthic species within the bay is influenced by both bathymetry and sediment type (Calnan et al. 1989). Typical benthic macroinvertebrates that could be found in the Bay include snails, marine worms, and small shrimp-like crustaceans. Common snails and marine worms found in the Bay are the Eastern white slipper shell (*Crepidula plana*), the channeled barrel-bubble (*Acteocina canaliculata*), the caecum (*Caecum pulchellum*), and polychaetes (marine worms) such as *Mediomastus californiensis* and *Spiophanes bombyx*. Typical small crustaceans (amphipods) are *Pseudohaustorius spp.* and *Ampelisca abdita*. The typical bivalves include the dwarf surf clam (*Mulinia lateralis*), the concentric nut clam (*Nuculana concentrica*), and the scorched mussel (*Brachidontes exustus*). Both the blue crab (*Callinectes sapidus*) and stone crab (*Menippe adina*) are commonly found within Matagorda Bay.

3.10.1.3 Oyster Habitat

Eastern oyster habitat areas are located throughout both Lavaca and Matagorda Bays. For this project, oyster habitat is broken into several categories: historic oyster habitat, shell hash (broken oyster shells), live oyster, and hard bottom (or substrate). Most of this habitat are in subtidal or intertidal areas near passes, cuts, or the edge of marshes. Larval oysters prefer to settle on hard substrates and adult oyster shell which results in the formation of an oyster reef. However, the presence of sediment on an oyster reef may inhibit larval recruitment (Mackenzie

1983, as cited in Montagna et al. 2021). Oysters are filter feeders and can filter water up to 50 gallons of water in one day. This mass filtration of water helps to improve water clarity and, in turn, phytoplankton abundance (Lester and Gonzalez, 2001; Powell et al., 1992). Another important role oysters play is as an indicator species of pollutants and contamination. Because they are sessile, fixed in place, they tend to bioaccumulate whatever pollutant is present in the water column of the bay (Lester and Gonzalez 2001).

Eastern oysters are stimulated to spawn by rising water temperatures and other chemical cues in the spring. Oysters are broadcast spawners and release their eggs and sperm into the open water. Larval oysters spend the next two to three weeks as plankton in the water column before they settle as spat onto a hard substrate and mature into the adult form. Under ideal conditions, spat may reach 1 inch in three months, 2 inches in seven months, and 3 inches in 15 months. However, growth is variable depending upon site conditions. Generally, Texas oysters reach the legal market size of three inches in 18 to 20 months.

Oysters can survive in salinities ranging from 5 to 40 parts per thousand (ppt) but are most productive within a salinity range of 10 to 25ppt. At salinities below 5ppt oysters can survive by remaining tightly closed and would remain in that state until salinities increase or they use up all their metabolic reserves, at which point they would die. The salinity in the project area is generally within the most productive range (TPWD 2024)

Oyster habitat provide habitat for a wide range of aquatic organisms, including mollusks, barnacles, crabs, gastropods, amphipods, polychaetes, and isopods (Sheridan et al., 1989). With such a rich biodiversity the oyster habitat also attract a large number of predator species, including black drum, speckled sea trout, blue crab, and oyster drill (*Thais haemastoma*) (Lester and Gonzalez, 2001; Sheridan et al., 1989). Shore birds would also utilize oyster habitat that are exposed at low tides as resting places (Armstrong et al. 1987).

Within Lavaca Bay, there are approximately 4,260 acres of oyster habitat based on TPWD (2022) and TAMUG (2023) (Figure 46). At the time of the 2019 final F/EIS, no oyster mapping data existed for Matagorda Bay. However, since then, USACE and Calhoun Port Authority had aquatic resources surveys including oyster habitat conducted in Matagorda Bay. The TAMUG survey focused on the 2019 proposed placement areas within Matagorda Bay near Powderhorn Lake and Powderhorn Ranch Wildlife Management Area (WMA) (2023). While the 2025 aquatic survey focused on the east side of the ship channel in Matagorda Bay (Lloyd Engineering, Inc. 2025). In addition, GLO had aquatic resources surveys including oyster conducted along the shoreline of Powderhorn Ranch WMA (2023). Approximately 3,678 acres of oyster habitat are found within the surveyed area in Matagorda Bay (Figure 47) (TAMUG 2023, Lloyd Engineering, Inc. 2025, GLO 2023).

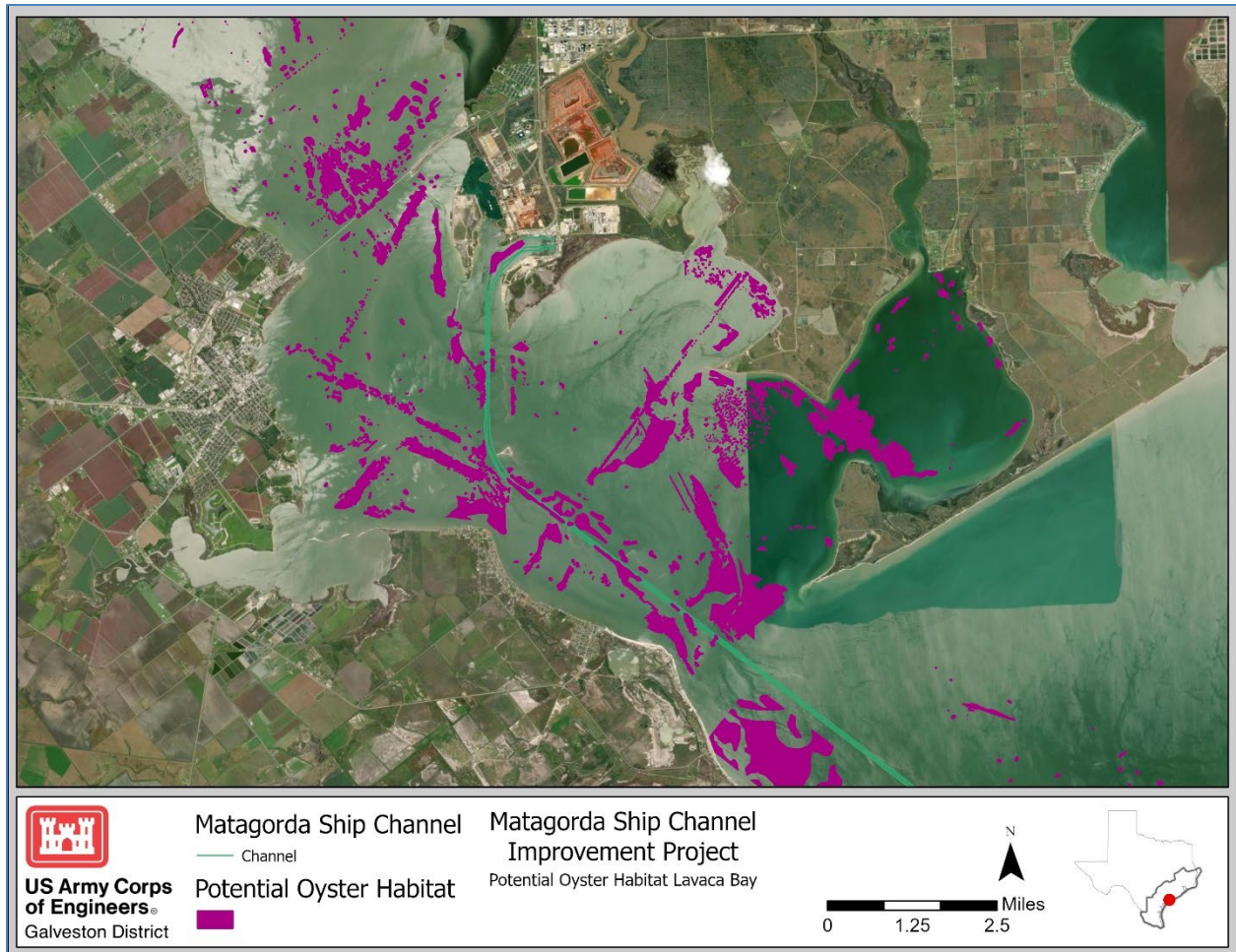


Figure 46 – Potential Oyster Habitat present in Lavaca Bay

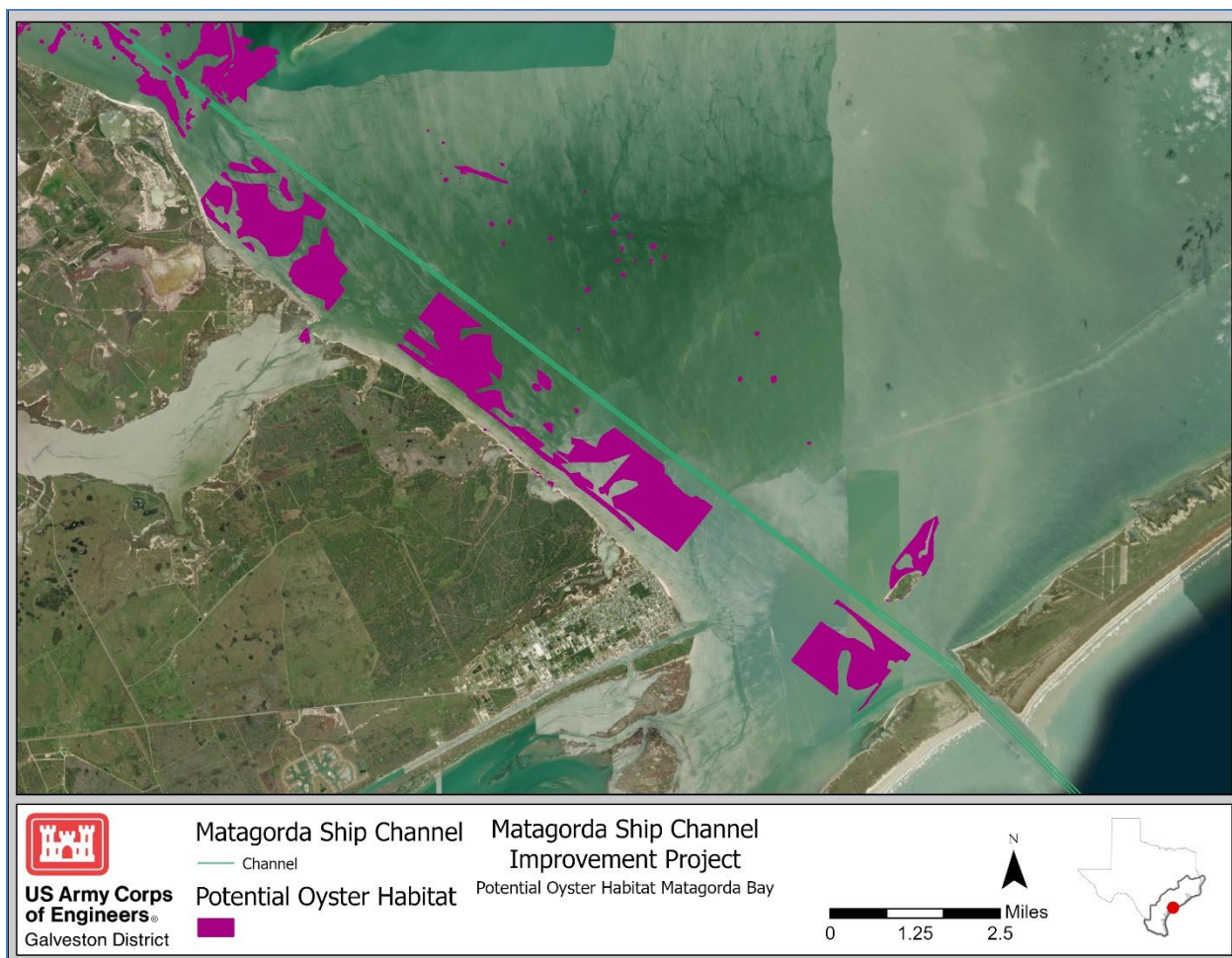


Figure 47 – Potential Oyster Habitat present in Matagorda Bay

3.10.1.4 Submerged Aquatic Vegetation

Submerged aquatic vegetation, also known as seagrass in the marine environment are found throughout Matagorda Bay system. Seagrass meadows form the basis of an intricate food web for highly productive ecosystems and provide refuge and nursery habitat for shrimp, fish, crabs, and other species. Five species of seagrass can be found along the Texas coast, including the two most common species, shoal grass (*Halodule wrightii*) and turtle grass (*Thalassia testudinum*), and three others, manatee grass (*Syringodium filiforme*), widgeon grass (*Ruppia maritima*), and star grass (*Halophila engelmannii*) (TSMP 2024).

The presence of estuarine SAV beds are highly dependent on water clarity and depth, thus tend to occur in shallow areas (generally <6 ft. water depth). Shoalgrass, widgeongrass, and turtlegrass have been documented in the Matagorda Bay system (Adair et al. 1994; Lower Colorado River Authority – San Antonio Water System 2006; TPWD 1999; White et al. 2010). Shoalgrass and widgeongrass have been mapped in Keller Bay and Carancahua Bay (Salt Lake and Redfish Lake) (Adair et al. 1994; GLO 2003). Shoalgrass was mapped along the southern shoreline of Keller Bay, in Boggy Bayou north of Port O'Connor, near the bayside marshes of the barrier island (Matagorda Peninsula) north of the MSC cut (GLO 2003) and associated with the marshes west of Pass Cavallo where turtlegrass was also noted (GLO 2003; White et al., 2010). The Seagrass Conservation Plan of Texas (TPWD 1999) lists

shoalgrass, widgeongrass, and clovergrass in the Matagorda Bay system. Approximately 1,441 acres of seagrass meadows occur within the area of analysis based on TPWD (2007), GLO (2023), Harte Research Institute (2023), and Lloyd Engineering, Inc. (2025) (Figure 48).

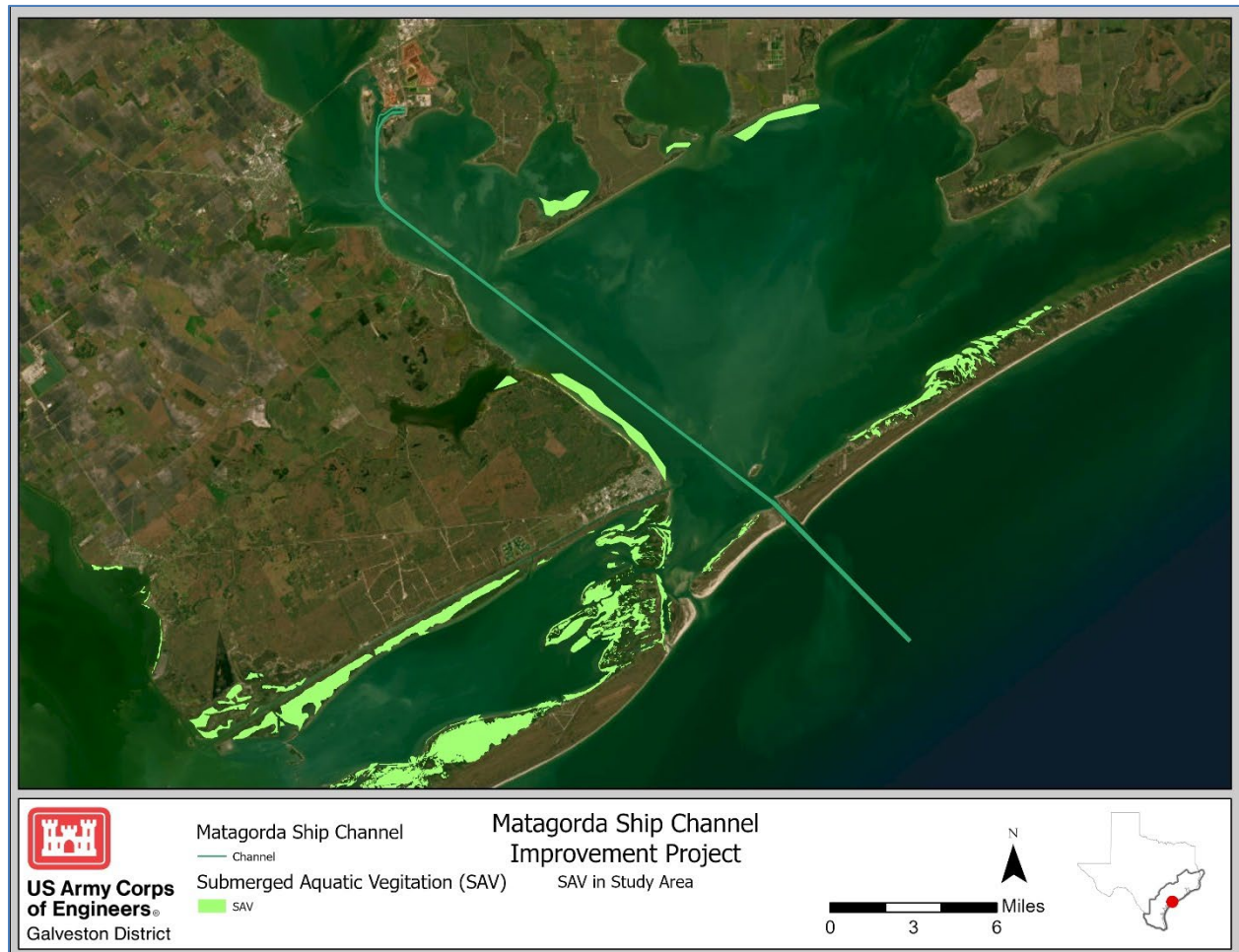


Figure 48 – Submerged Aquatic Vegetation (Seagrass) present in the Study Area

3.10.1.5 Commercial Fishery

In the Matagorda Bay system, there is commercial fishery as well as recreational fishing. Commercially caught fish species include black drum (*Pogonias cromis*), southern flounder (*Paralichthys lethostigma*), and striped mullet (*Mugil cephalus*).

The main commercially harvested shellfish species in Matagorda Bay are brown, white shrimp and blue crabs. A commercial fishery for eastern oysters (*Crassostrea virginica*) does exist in Matagorda Bay, the harvest makes up about 16% of all oysters landed in Texas by weight and value between 2007 and 2016, according to Texas A&M AgriLife Extension (2018).

3.10.2 No Action Alternative / FWOP

Under the No Action Alternative, it is expected that the fish currently utilizing the MSC as habitat would continue to utilize this habitat and no change in the basic assemblage of fish would occur. Ongoing maintenance dredging at the currently authorized depths would result in temporary impacts to the benthic substrate due to localized turbidity and associated vessel activity; however, the substrate would be expected to recover from organisms recolonizing disturbed areas from the adjacent undisturbed areas as well as through recruitment. Ongoing maintenance dredging could temporarily impact the amount of food available for foraging and may cause fish to evacuate the area temporarily during the maintenance dredging. However, the availability of food in the surrounding, undisturbed area would remain the same, and it is unlikely that any significant changes in fish populations would occur as displaced fish would likely return once dredging is completed.

Under the No Action Alternative, the on-going maintenance dredging and continued open-water placement is not expected to continue to impact oyster habitat since dredging and use of the existing placement areas have been ongoing for decades which had already affected any oyster habitat during the initial dredging and placement activities for MSC. In addition, on-going maintenance dredging of MSC near PAs 14a-16a would continue to place dredged material at those PAs which impacted oyster habitat as described in the 2017 Final Environmental Assessment Matagorda Ship Channel, Upper Reach Placement Area, Relocation Project, FONSI signed October 5, 2017.

No seagrass beds would be impacted with the continued maintenance dredging or placement since none are located in or within 1000 ft of the MSC and existing placement areas under the No Action Alternative.

Repeated maintenance dredging operations for channel maintenance may temporarily reduce the quality of commercial fisheries in the vicinity of dredging operations. This may result from decreased water quality and increased turbidity during dredging and placement operations as well as from a loss of attractiveness to game fish resulting from loss of benthic prey. Under the No Action Alternative, maintenance dredging operations would result in temporary minor effects to commercial fisheries as a result of the short-term effect to fish from the on-going maintenance dredging operation.

3.11 Special Status Species

3.11.1 Existing Conditions

“Special status species” usually refers to animals, plants, and habitat under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. §1531); Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.); and Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361–1407).

3.11.1.1 Threatened and Endangered Species

The ESA provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range and the conservation of habitats upon which they depend. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife unless otherwise authorized by the USFWS or NOAA. The term

“take” per the ESA means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Section 7 of the ESA requires that Federal agencies consult with USFWS and NOAA to ensure that their actions do not jeopardize the existence of any listed species. The ESA also designates “critical habitat” (per 50 C.F.R. parts 17 or 226) and defines those habitats that are essential for the conservation of a Federally threatened or endangered species, and that may require special management and protection.

As identified by USFWS IPaC and NMFS Section 7 Mapper, Table 19 identified fourteen Federally listed threatened, endangered, and proposed species and their designated critical habitat as potentially occurring in the project area (Calhoun and Matagorda counties, TX) (2025). Table 19 also provides species and habitat information. There are no Federally listed threatened or endangered plant species in the project area. The ESA action area defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (51 F.R. 19957) (Figure 49). This action area, also known as area of analysis, would be applicable to the other special status species. Designated critical habitat for both Piping Plover and Loggerhead sea turtle are found within the action area (Figure 50).

Table 19 – Federally listed Threatened and Endangered Species in the Study Area

Species	Agency	Federal Status	Habitat Needs
Birds			
Northern Aplomado Falcon <i>Falco femoralis septentrionalis</i>	USFWS	E	The species was once found from the Yucatan, along the Gulf Coast and into the Trans-Pecos region of Texas, southern New Mexico, and southeastern Arizona (USFWS 1990). Their decline has largely been caused by the encroachment of agriculture into their grassland habitat. Habitat is variable throughout the species range and includes palm and oak savannahs, various desert grassland associations, and open pine woodlands. There is no suitable habitat for the Northern aplomado falcon in the project area.
Piping Plover <i>Charadrius melodus</i>	USFWS	T/CH	Wintering habitat is broadly characterized as emergent tidal or wash over areas that are unvegetated to sparsely vegetated with wet to saturated soils near water. Use coastal areas on the mainland and barrier islands, with bay side habitats (bayshore tidal sand and algal flats) serving as the primary habitat unless submerged, then they transition to oceanside beaches, wash over passes, and mainland tidal mud flats. This species can be found along Texas beaches, tidal flats, mud/sand flats, dunes, and offshore islands. Critical habitat has been designated along the Texas coast, including the Matagorda Peninsula adjacent to the entrance channel. This species has been observed in the study area including the Matagorda Peninsula (Stunz et al. 2023).
Rufa Red Knot <i>Calidris canutus rufa</i>	USFWS	T/CHP	Migrating and wintering knots use sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey. There is suitable habitat within the study area.
Eastern Black Rail <i>Laterallus jamaicensis</i>	USFWS	T	Use tidally or non-tidally influenced wetlands ranging in salinity from salt to brackish to fresh. Require dense vegetation, moist soils, and areas of topographic change where molting birds can escape when areas are flooded. This species has been observed in the study area including the Matagorda Peninsula (Stunz et al. 2023).
Whooping Crane <i>Grus americana</i>	USFWS	E/CH	Winters along the Gulf Coast and breeds in Canada. On wintering grounds in Texas, they use estuarine marshes, shallow bays, and tidal flats, sometimes using nearby farms. Salt grass, saltwort, smooth cordgrass, glasswort, and sea oxeye dominate marshes, with Gulf cordgrass on the margins. Critical habitats have been designated for the Whooping crane in Calhoun County, however only designated at the Aransas National Wildlife Refuge and adjacent areas where cranes have been known to overwintering. No designated critical habitat occurs within the action area. During 2020-2022 survey, whooping cranes were observed near Oyster Lake in the northern portion of Matagorda Bay (Stunz et al. 2023)
Fish			
Giant manta ray <i>Manta birostris</i>	NMFS	T	They are filter feeders and eat large quantities of zooplankton. Giant manta rays are slow-growing, migratory animals with small, highly fragmented populations that are sparsely distributed across the world. Known to use Flower Garden Banks National Marine Sanctuary
Insects			
Monarch Butterfly <i>Danaus plexippus</i>	USFWS	PT/CHP	Mainly found in prairies, meadows, grasslands and along roadsides, across most of North America, where milkweed, their host plant, is prominent. Monarchs migrate thousands of miles between breeding grounds and overwintering areas. Texas has two principal flyways, one of which is situated along the Texas Coast. There has been unconfirmed sighting of monarchs within the Matagorda Bay system, according to Journey North website: https://maps.journeynorth.org/
Mammals			
West Indian Manatee <i>Trichechus manatus</i>	UFWS	E	Inhabit marine, brackish, and freshwater systems in coastal and riverine areas. Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They feed along grass bed margins with access to deep water channels, where they flee when threatened. The West Indian Manatee is currently rare in Texas waters. Historical records from Texas waters include Cow Bayou, Sabine Lake, Copano Bay, the Bolivar Peninsula, and the mouth of the Rio Grande

Species	Agency	Federal Status	Habitat Needs
			(Würsig 2017). One of the most recent sightings was on November 28, 2023, in Beaumont, TX on the south side of the Neches River salt water barrier (USFWS pers. comm.).
Tri Colored Bat <i>Perimyotis subflavus</i>	USFWS	PE	During the winter, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures.
Reptiles			
Green sea turtle <i>Chelonia mydas</i>	USFWS NMFS	T/CHP	Primarily found in the Gulf, and sub-adults occasionally found feeding in shallow bays and estuaries where marine sea grasses grow. They are unique among sea turtles in that they are herbivores, eating mostly seagrasses and algae. Proposed critical habitat is along the Texas Coast from Mean High Water to -65 ft (NMFS 2023). Nest on beaches but nesting not recorded from the upper coast. Green sea turtles have been observed in Matagorda Bay (Stunz et al. 2023).
Hawksbill sea turtle <i>Eretmochelys imbricata</i>	USFWS NMFS	E/CH	Prefer clear offshore waters of mainland and island shelves and are most common where coral reef formations are present. Critical habitat has been designated for this species; however, no critical habitat occurs within the action area (Figure 50). Nest on beaches but nesting not recorded from upper coast. Hawksbill sea turtles have been observed in Matagorda Bay (Stunz et al. 2023).
Kemp's Ridley sea turtle <i>Lepidochelys kempii</i>	USFWS NMFS	E/CHP	Migrates along the Texas coast and generally remains in near shore waters less than 165' deep to feed on shrimp, crab, and other invertebrates. Known nesting on Matagorda Peninsula since at least 2014 and in 2022, a confirmed nest at Matagorda Beach (TIRN 2024). Kemp's Ridley sea turtles have been observed in Matagorda Bay (Stunz et al. 2023).
Leatherback sea turtle <i>Dermochelys coriacea</i>	USFWS NMFS	E/CH	Mainly pelagic, inhabiting the upper reaches of the ocean where deep water comes to the surface (upwelling areas). Critical habitat has been designated for this species; however, no critical habitat occurs within the action area (Figure 50). Nest on beaches but nesting not recorded from upper coast.
Loggerhead sea turtle <i>Caretta caretta</i>	USFWS NMFS	T/CH	Prefer shallow inner continental shelf waters and occur only very infrequently in the bays and estuaries. Often occurs near offshore oil rig platforms, reefs, and jetties. Critical habitat has been designated for this species and occurs within the action area (Figure 50). Nests on open, sandy beaches. Confirmed nesting on Matagorda Peninsula (TIRN 2024). Loggerhead sea turtles have been observed in Matagorda Bay (Stunz et al. 2023).
T= Threatened E= Endangered P= Proposed NLAA= Not Likely to Adversely Affect LAA = Likely to Adversely Affect CH = Critical Habitat CHP = Critical Habitat Proposed			

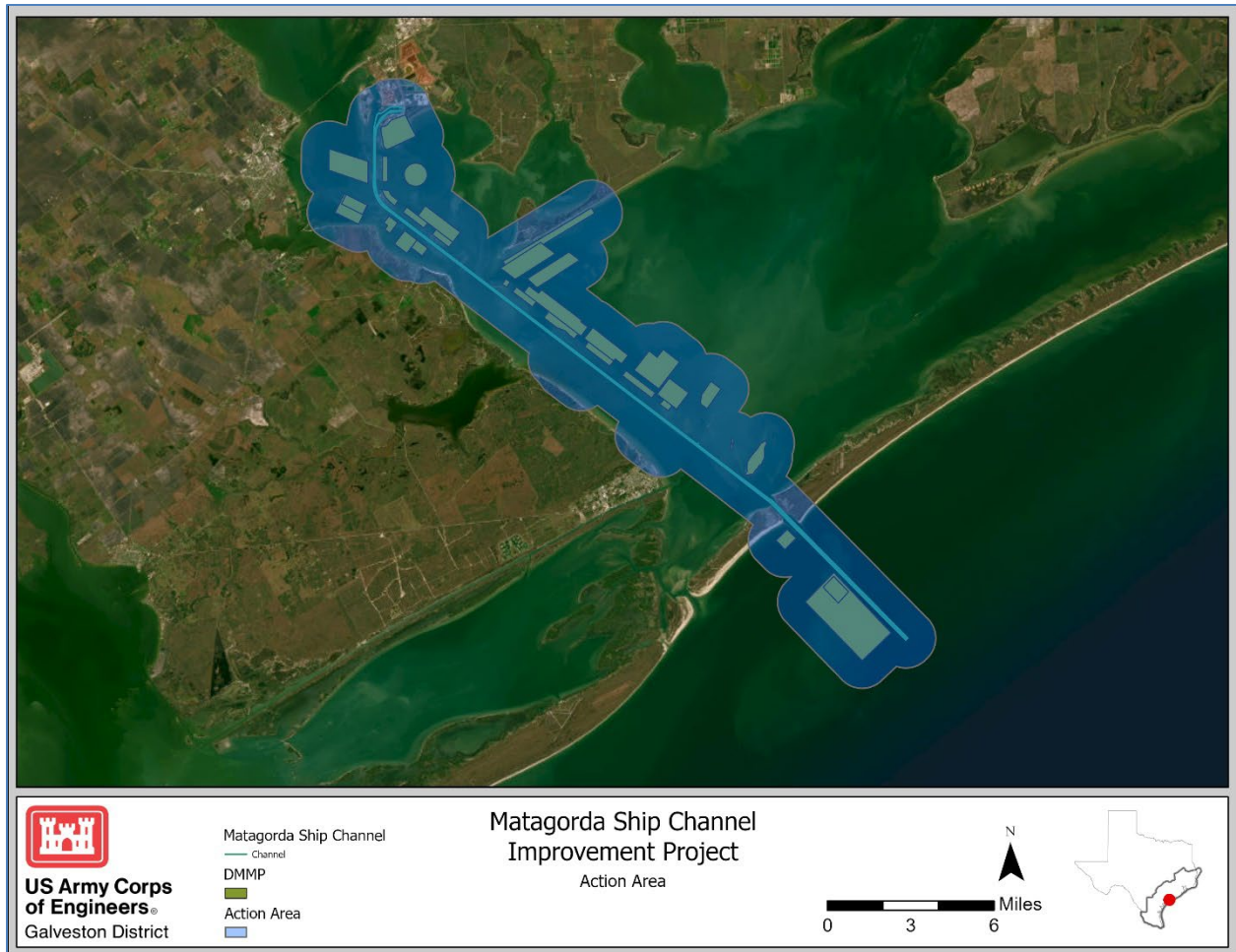


Figure 49 – MSCIP Endangered Species Act Action Area

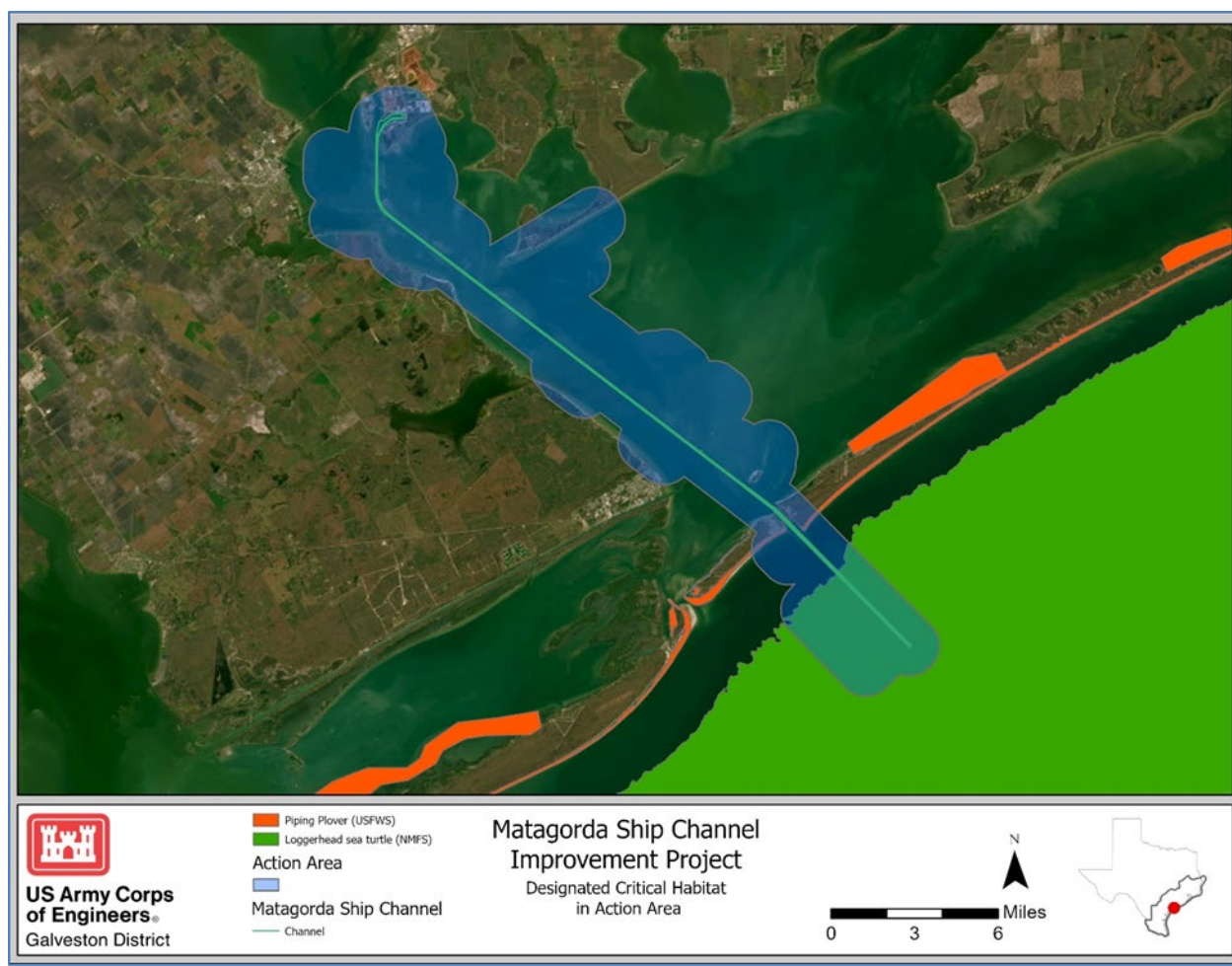


Figure 50 – Designated Critical Habitat in Action Area

3.11.1.2 Essential Fish Habitat

Congress enacted amendments to the Magnuson-Stevens Fishery Conservation and Management Act in 1996 that established procedures for identifying EFH and required interagency coordination to further the conservation of Federally managed fisheries.

EFH is defined as “those water and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH is separated into estuarine and marine components. The estuarine component is defined as “all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities); sub-tidal vegetation (seagrass and algae); and adjacent inter-tidal vegetation (marshes and mangroves).” The marine component is defined as “all marine waters and substrates (mud, sand, shell, rock, and associated biological communities) from the shoreline to the seaward limit of the Exclusive Economic Zone” (Gulf of Mexico Fisheries Management Council, 2004). Adverse effect to EFH is defined as, “any impact, which reduces quality and/or quantity of EFH...” and may include direct, indirect, site-specific, or habitat impacts, including individual, cumulative, or synergistic consequences of actions.

NMFS and the Gulf Council (formerly known as Gulf of Mexico Fisheries Management Council) have identified the project area as EFH for brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Farfantepenaeus duorarum*), white shrimp (*Litopenaeus setiferus*), red drum (*Sciaenops*

ocellatus), gray triggerfish (*Balistes capricus*), greater amberjack (*Seriola dumerili*), almaco jack (*Seriola rivoliana*), cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), gray snapper (*Lutjanus griseus*), lane snapper (*Lutjanus synagris*), Vermilion snapper (*Rhomboplites aurorubens*), red snapper (*L. campechanus*), goliath grouper (*Epinephelus itaiara*), yellowedge grouper (*Hyporthodus flavolimbatus*), yellowmouth grouper (*Mycteroperca interstitialis*), gag grouper (*Mycteroperca microlepis*), Schoolmaster (*Lutjanus apodus*), dog snapper (*Lutjanus jocu*), mahogany snapper (*Lutjanus mahogoni*), dwarf sand perch (*Diplectrum bivittatum*), sand perch (*Diplectrum formosum*), rock hind (*Epinephelus adscensionis*), red hind (*Epinephelus guttatus*), marbled grouper (*Dermatolepis inermis*), bonnethead shark (*Sphyrna tiburo*), blacktip shark (*Carcharhinus leucas*), bull shark (*Carcharhinus leucas*), finetooth shark (*Carcharhinus isodon*), lemon shark (*Negaprion brevirostris*), scalloped hammerhead shark (*Sphyrna lewini*), spinner shark (*Carcharhinus brevipinna*), and Atlantic sharpnose shark (*Rhizoprionodon terraenovae*). The categories of EFH that occur within the project area include estuarine water column, estuarine sand and mud bottoms (unvegetated estuarine benthic habitats), estuarine shell substrate (oyster reefs and shell substrate), estuarine emergent wetlands, and seagrasses. Additionally, portions of the project located in marine waters include the marine water column, unconsolidated marine water bottoms, and natural structural features.

3.11.1.3 Marine Mammals

The Marine Mammal Protection Act (MMPA) was passed in 1972. It establishes a moratorium on the taking and importation of marine mammals and marine mammal products, with certain exceptions. Consultation for the MMPA is conducted when proposed project effects would result in takes of protected marine mammal species. The only marine mammals covered under the MMPA that are expected to be regularly present in Matagorda Bay are bottlenose dolphins (*Tursiops truncatus*). The West Indian manatee, (*Trichechus manatus*), is only rarely present as a transient when they wander or are displaced from their normal range in Florida and northern Mexico. See Section above – Threatened and Endangered Species for more information regarding the West Indian manatee.

3.11.2 No Action Alternative / FWOP

3.11.2.1 Threatened and Endangered Species

Under the No Action Alternative, on-going maintenance dredging in the MSC is expected to continue with potential impacts to existing ESA-listed aquatic species such as sea turtles. Hopper dredging may result in the mortality of Kemp's ridley sea turtles. Since 2015, two green sea turtles have been lethally taken during maintenance dredging of the MSC (USACE 2025). Restriction of hopper dredging activities between December 1 and March 31, whenever possible, would reduce the likelihood of direct mortality. Sea turtle avoidance measures would continue to include an avoidance plan for hopper dredge impacts to sea turtles. This avoidance plan includes reasonable and prudent measures that have largely been incorporated in USACE regulatory and civil works projects throughout the Gulf for more than a decade. These measures include use of temporary dredging windows, when possible; intake and overflow screening; use of sea turtle deflector drag heads; observer reporting requirements; and sea turtle relocation/abundance trawling.

Ongoing placement at PA 19 has resulted in the creation of salt marsh which is a type of habitat that both Whooping Crane and Eastern Black Rail are known to use. Under the No Action Alternative, the continued use of this placement area could have beneficial effects to salt marsh creation and therefore beneficial effects to both these ESA-listed species

3.11.2.2 Essential Fish Habitat

Under the No Action Alternative, the on-going maintenance dredging and open-water placement may temporally affect EFH similar to No Action Alternative impacts described for other fish species (Section 3.10.2).

It is expected that the Matagorda Bay and tidal channels flowing into it would continue to have designated EFH, as this estuary system would continue to be important to sustaining Gulf fisheries. The fisheries would continue to be managed and protected by the existing regulations codifying the MSFCMA, and specific fisheries management plans, which would be updated and changed in response to changes in fish populations and fishing activity. Oyster reef, being an EFH, would change as described in the preceding section. Remaining tidal marsh in the study area, which is another EFH, would continue to be protected by CWA regulations, but would be subject to changes induced by RSLC and subsidence. This could result in losses if subsidence is sudden enough or shifts in the location of the marsh boundary upward as marsh plant communities and inundated areas move upward in response.

3.11.2.3 Marine Mammals

Bottlenose dolphins are highly mobile species readily able to avoid existing dredging activities and vessels. Routine maintenance dredging in the MSC would be expected to continue with little to no impacts to existing bottlenose dolphin populations.

3.12 Special Management Areas

3.12.1 Existing Conditions

Special Management Areas (SMAs) play a major role in preserving the balance between environmental conservation, cultural heritage, and socio-economic interests. A Special Management Area includes designations such as Wildlife Refuges, Wildlife Management Areas (WMA), Important Bird Sites, and Historic Locations. In the vicinity for MSC there are multiple locations that fall under this designation. Sites being considered include Aransas National Wildlife Refuge, Powderhorn WMA, Matagorda Island WMA, and Chester Island Bird Sanctuary. These sites are either state or Federally owned and managed, with some allowing public access and use.

The Aransas National Wildlife Refuge, for instance, stands as a crucial habitat for migratory birds, notably the endangered whooping crane. Similarly, the Powderhorn and Matagorda Island WMAs harbor diverse ecosystems, sustaining a wide array of plant and animal species indigenous to the region. Additionally, Powderhorn is one of the one of the largest remaining undisturbed environments for the native coastal prairie habitat in Texas. Chester Island Bird Sanctuary, fosters nesting grounds for numerous avian species, contributing significantly to regional biodiversity.

These areas collectively represent invaluable ecological sanctuaries, safeguarding endangered species, preserving unique habitats, and maintaining biodiversity within the region.

3.12.2 No Action Alternative / FWOP

The existing Special Management Areas within the designated region, including the Aransas National Wildlife Refuge, Powderhorn and Matagorda Island WMAs, and Chester Island Bird Sanctuary, would remain unchanged under the No Action Alternative. Ongoing maintenance dredged material would continue to be placed at Chester Island minimizing erosion and benefiting the colonial birds that utilize that island.

3.13 Cultural Resources

3.13.1 Existing Conditions

The proposed project area for the MSC Improvement project is located along the central Texas coast and has been occupied by humans for the last 7,500 years. 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. These dynamic conditions 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, shipwrecks and submerged resources. A preliminary assessment of the cultural resources within five miles 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. This assessment identified 113 previously recorded cultural resources including 42 archeological sites, five cemeteries, 31 historical markers, and 35 possible marine resources. There are no recorded National Register properties or State Historic Landmarks within the study area.

Within the areas of the proposed new dredging and dredged material PA construction, a study area was examined within 500' of the proposed work for existing cultural resources. All of the proposed project is located within submerged lands. There are no previously recorded cultural resources located within this study area. However, a 2006 marine archeological survey of the channel identified 39 magnetic anomalies and four associated sonar targets along the ship channel (Borgens et al. 2007). Another survey conducted in 2013 of the portions of the channel identified seven magnetic anomalies within the project area (Tuttle 2018). The USACE determined that a comprehensive resurvey of the ship channel was not necessary and the SHPO concurred with this determination.

Following the feasibility study of this project, two surveys were conducted within the project area. The first survey was conducted by Gray & Pape, Inc. (Quennoz et al. 2023) and revisited anomalies in or near the existing channel identified by Borgens et al. (2007) and Tuttle (2018) that had potential to be impacted by the project. Quennoz et al. (2023) relocated all of these anomalies (M6, M7, M8, M9, M10, M12, M18, M19, M46, M47, 142, 164, 197(M7), 217, 221, 224, and 231) and recommended that these anomalies be avoided by construction or investigated further. Additionally, this survey included the channel extension and previously mapped dredged material placement areas (NP1-7, OP1-10, Sand Engine, Chester Island, and ODMD5). It should be noted that the nomenclature for these placement areas has been recycled for the currently proposed project area such that the current NP1-7 and OP1-9 do not reflect areas from this survey. As a result of this survey, they identified 3,414 magnetometer and 133 acoustic targets. Many of these targets were clustered together, resulting in 20 targets that were recommended for avoidance or further investigation. Of these 20 targets, six, H50, H97, H114, and H107 within Chester Island and I-11 and I-22 within the Sand Engine, occur within the currently proposed project area.

The second survey was conducted by BOB Hydrographics, LLC (Gearhart 2025) of portions of the currently proposed placement areas north of the ship channel (NP1-5, OP1-4, and the Keller Bay beneficial use area). Gearhart (2025) identified 33 anomalies during this survey and recommended 16 of these anomalies for avoidance or further investigation. However, only five of these anomalies occur within the currently proposed project area. Anomalies 14 and 15 are located within NP4/5, anomalies 10 and 11 are located within NP3, and anomaly 6 is located within OP4. These five anomalies are all recommended for avoidance or further investigation.

Despite the previous investigations that have been conducted in and around the project area portions of the beneficial use areas at Chester Island and Bird Island have not been investigated for historic properties. Additionally, OP5, OP9, and portions of OP6, NP6/OP8, PA18/19, and the ODMD5 have also not been investigated for historic properties.

The primary considerations concerning cultural resources are threats from direct impacts to intact terrestrial and marine archeological sites from new construction and improvements. A portion of the study area, primarily around Point Comfort has been altered for industrial and commercial use. Additionally, shoreline areas, especially along the western shorelines of Matagorda and Lavaca Bays have suffered from erosion from coastal storms and wind and wave action.

However, based on previous investigations, there is a high probability for shipwrecks to occur anywhere in Matagorda and Lavaca Bays. Since there will be no impacts to upland areas, there is little likelihood of impacting historic buildings or structures and there are no cemeteries located within the project area.

3.13.2 No Action Alternative / FWOP

There are an estimated 113 cultural resources located within and along the MSC and the formation processes that currently affect these sites would continue into a future without the project. Undiscovered submerged cultural resources could be at risk from future maintenance dredging activities and shifting bars if these resources were to migrate into the channel. This could potentially occur if these resources are located outside of surveyed areas along channel margins and migrate into the channel due to erosion or sloughing of channels at the side slope margins, or movement from other events such as storms. These formation processes may result in partial or total loss of historic properties. During the feasibility study for this project, a Programmatic Agreement (PA) was executed between the USACE, the Texas SHPO, and the Calhoun Port Authority on March 4, 2020. This PA will expire 10 years from the date of execution but may be renewed for a second 10-year period in consultation with all signatories. The PA commits the signatories to the general processes of the National Historic Preservation Act (54 U.S.C. § 306108) (NHPA), as amended, and its implementing regulations (36 CFR 800), but also includes processes for the disposition of recovered materials and records unique to the Antiquities Code of Texas (Texas Natural Resource Code, Chapter 191). In accordance with the PA, the USACE coordinated the APE and a determination of a need for marine investigations with the Texas SHPO on October 7, 2021, and the SHPO concurred with this determination on November 11, 2021.

3.14 Recreation

3.14.1 Existing Condition

Recreational facilities are defined as those amenities that provide for relaxation, rest, exercise, activity, enjoyment, education, or opportunities for leisure and community support that enrich the quality of life. These include, but are not limited to, parks, trails, boat ramps, piers, marinas, athletic fields, playgrounds, and community centers. Recreational areas may include any type of activity in which residents or visitors may participate, such as hiking, bird watching, bike riding, boating, fishing, swimming, picnicking, playground use, or participation in sports.

The area of analysis is defined as all recreational areas and facilities within the study area boundary (Figure 3), that would be affected either directly or indirectly by proposed dredging activities and placement of dredged materials.

There are numerous recreational opportunities, many of which are water-related throughout Matagorda Bay such as beaches, boating, fishing, bird watching, and camping. Several parks, such as Matagorda Bay Nature Park and Jetty Park, offer camping, boat ramps, beaches, and swimming. In addition, recreational boating is popular in the Matagorda Bay area and there are a number of public and private marinas and boat ramps around the Bay.

As described in Section 3.6.11 Special Management Areas, there are wildlife management areas such as Powderhorn Ranch and Matagorda Island and Aransas National Wildlife Refuge. In addition, there are multiple Nature Parks in the area including Boggy Bayou Nature Park, Matagorda Bay Nature Park, and Jetty Park. All of these facilities offer bird-watching opportunities and/or nature walks to observe plants and wildlife. In addition to these special management areas, Chester Island provides habitat for over 73 nesting bird species including the brown pelican. This island provides bird watching opportunities.

Recreational fishing is also popular throughout the bay. Common fish caught are Red Drum, Spotted Seatrout, and Southern Flounder. However, there is a ban on fishing for Red Drum within the Alcoa site.

3.14.2 No Action Alternative / FWOP

Recreational uses of the Bay are well established and would not be expected to change in the future under the No Action Alternative. Fishing and boating would be expected to continue to predominate and grow with changes in the population. Bird watching may constitute a greater percentage of recreational activity in the future, as it has been a growing sector of outdoor recreation.

On-going maintenance dredging would continue to place dredged material at Chester Island preserving the island.

3.15 Socioeconomics

3.15.1 Existing Conditions

This section summarizes the conditions in the community surrounding the MSC and the Port including the four adjacent counties of Calhoun, Jackson, Victoria, and Matagorda Counties (Appendix A – Economics). These four counties will be referred to as the “Matagorda Ship Channel region” in this section (Figure 51).

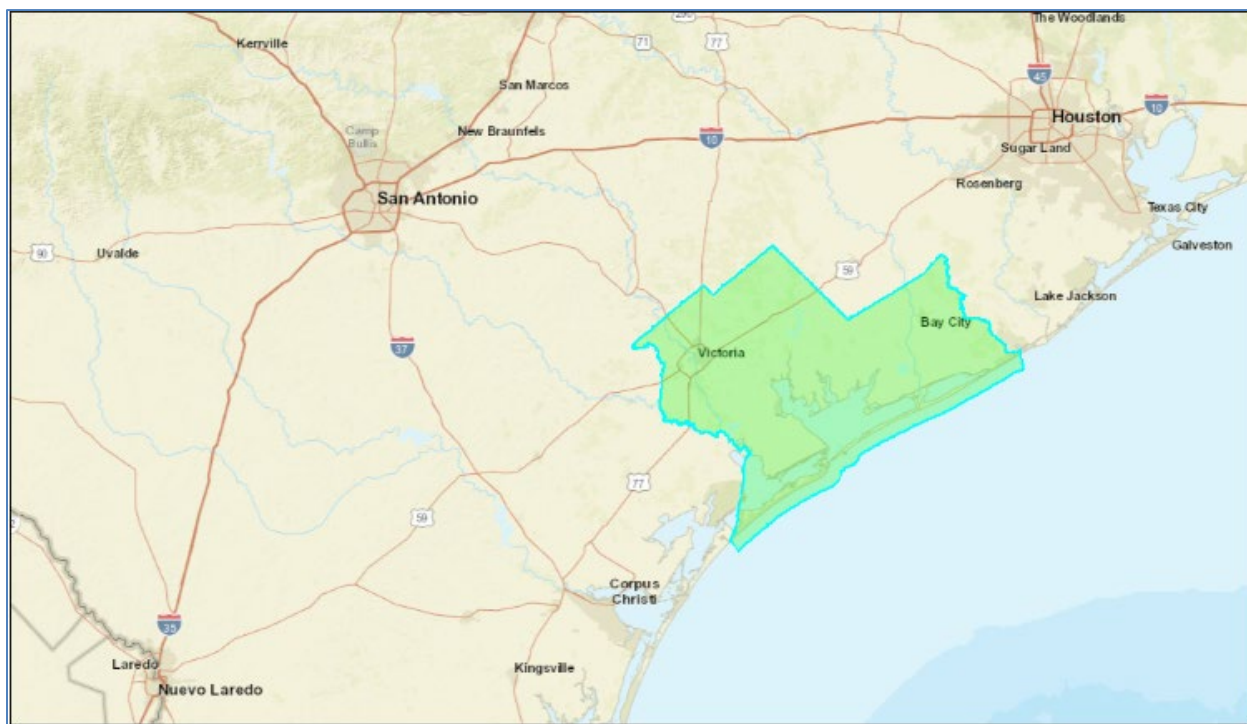


Figure 51 – Socioeconomic Area of Interest

The parameters used to describe demographics and socioeconomics include population trends, private sector employment, and wage earnings. Other social characteristics evaluated include

race composition, age distribution, and poverty. The economies of Calhoun, Victoria, Jackson, and Matagorda counties are based primarily on the petrochemical industry, commercial fishing, agriculture and livestock, construction, and mineral extraction. Tourism and recreation, including hunting, fishing, and boating also play a significant economic role.

3.15.1.1 Population

The state of Texas is ranked as the second most populous state as of the 2020 census, with 29.1 million residents (US Census Bureau 2024). Population estimates for the state of Texas and the MSC region are displayed in Table 20 below. The population estimate for the MSC region grew from 158,951 in 2010 to 162,668 in 2020. The Texas Demographic Center projects relatively stable population in the MSC Region through 2060 in comparison to statewide population growth of more than 50% over the same time period. (Texas Demographic Center 2022)

Table 20 – Population Estimates and Projections (2000, 2016, 2050, 2060)

Geographical Area	2000 Population Estimate	2010 Population Estimate	2020 Population Estimate	2060 Population Projection
Texas	20,851,820	25,145,561	29,145,505	44,391,658
Calhoun County	20,647	21,381	20,106	13,162
Jackson County	14,391	14,075	14,988	18,376
Matagorda County	37,957	36,702	36,255	31,115
Victoria County	84,088	86,793	91,319	96,168
MSC Region Total	157,083	158,951	162,668	158,821
Source: U.S. Census Bureau, Population Division (2000, 2010 Estimates); U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates (2016 Estimate); Texas Demographic Center (2060 Projections)				

3.15.1.2 Employment by Industry

The majority of the MSC region is employed in the Educational services, and health care and social assistance sector (22%), followed by Manufacturing (16%), Construction (10%), and Retail Trade (10%) (US Census Bureau 2023). The region has significantly higher concentration in manufacturing, agriculture, forestry, fishing and hunting employment than the state overall and lower professional, scientific, and management services.

3.15.1.3 Income and Poverty

The median household incomes and per capita incomes within the MSC region were generally lower than the state overall. Table 21 also summarizes the percentage of individuals and

families whose incomes were below the poverty level within the last twelve months (2023). Two of the four counties in the MSC region, Jackson and Matagorda, had a greater percentage of both families and people with incomes below the poverty level when compared to the state of Texas. Additionally, the per capita income of the region for the last 12 months of available data is estimated at \$34,372, which is 79% of the national per capita income and meets the criteria for “economically disadvantaged” outlined in Section 160 of WRDA 2020.

Table 21 – Median, Per Capita Income and Poverty Data (2023)

Geographical Area	Median Household Income	% of Families with Incomes Below Poverty Level (Last 12 months)	Per Capita Income	% of People with Incomes Below Poverty Level (Last 12 months)
United States	\$60,070	8.8%	\$43,313	12.50%
Texas	\$76,292	10.30%	\$39,775	13.70%
Calhoun County	\$71,870	6.80%	\$38,539	8.70%
Jackson County	\$61,752	11.90%	\$32,146	14.10%
Matagorda County	\$55,174	17.80%	\$30,189	21.80%
Victoria County	\$70,101	10.10%	\$35,770	13.10%
Source: U.S. Census Bureau, 2023 American Community Survey (2023 Estimate)				

3.15.1.4 Labor Force and Unemployment

Table 22 summarizes labor force and unemployment rates from the 2023 American Community Survey. The 2023 annual average unemployment rate in Texas was 2.9%. The unemployment rates in the counties surrounding the project area were consistently higher with the exception of Victoria County.

Table 22 – Labor Force, Employment and Unemployment Rates (2023 Annual Averages)

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
United States	171,742,922	164,346,993	7,395,929	4.3%
Texas	15,612,815	14,926,761	686,054	2.9%
Calhoun County	10,267	9,809	458	4.5%
Jackson County	6,519	6,160	359	5.5%

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Matagorda County	16,280	15,152	1,128	6.9%
Victoria County	43,279	41,486	1,793	2.5%
Source: Bureau of Labor Statistics, American Community Survey (2023)				

3.15.1.5 Race and Ethnicity

Table 23 displays race and ethnicity for comparative geographies. Within the MSC region, 42% of the population is White, 43% is Hispanic or Latino, 6% is Black, and 6% is Asian. By comparison, within the state of Texas, 40% of the population is White, 39% is Hispanic or Latino, 12% is Black, and 5% is Asian. In general, the MSC region demographics closely track those of the state.

Table 23 – Racial Composition by Geographical Area (2020)

Geographic Area	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race	Two or more races	Hispanic or Latino
Texas	11,584,597	3,444,712	85,425	1,561,518	27,857	113,584	886,095	11,441,717
Calhoun County	8,374	361	34	1,112	0	56	311	9,858
Jackson County	8,510	937	36	158	5	102	411	4,829
Matagorda County	15,355	3,734	99	7000	7	103	802	15,455
Victoria County	39,330	5,230	214	1,391	35	232	1,956	42,931
MSC Region Total	71,569	10,262	383	9,661	47	493	3,480	73,073
Source: U.S. Census Bureau, American Community Survey (2020 Estimate)								

3.15.1.6 Age

Table 24 shows the distribution of population by age for both the MSC region and the state of Texas. The age distribution for the MSC region closely tracks that of the State; however, the

MSC region's population is generally older. The percentage of total population 65 years old and over was 18% versus 14% for the State.

Table 24. Population by Age Group

Geographical Area	Age Group								
	<10	11 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 and over
Texas	13%	14%	14%	15%	13%	12%	10%	6%	3%
Calhoun County	13%	12%	13%	12%	11%	13%	13%	7%	6%
Jackson County	12%	15%	10%	9%	15%	13%	13%	8%	5%
Matagorda County	14%	14%	12%	14%	10%	12%	13%	9%	4%
Victoria County	13%	15%	12%	14%	12%	11%	11%	7%	4%
MSC Region	13%	14%	12%	13%	12%	11%	12%	7%	5%

Source: U.S. Census Bureau, American Community Survey 5-Year Estimates (2023 Estimate)

3.15.2 No Action Alternative / FWOP

The ongoing routine maintenance dredging and placement activities under the No Action Alternative are not anticipated to affect the distribution of these socioeconomic and demographic metrics within the study area.

3.16 Geology and Structural Setting

The MSCIP study-level geotechnical design considered all existing and available geotechnical information within USACE and the NFS to determine its relevance to the feasibility of this study. The 2021 MSC investigation was performed as part of the PED phase of MSCIP, following the completion of the 2019 MSCIP Feasibility Study Report. The major portion of the geotechnical data used for the study-level geotechnical design was obtained from the investigation conducted along the MSC in 2021 and presented in the report prepared by Tolunay-Wong Engineers, Inc. in 2022 (TWEI 2022). The TWEI 2022 report is included in the engineering appendix (Appendix F) of this report for reference. The physical and engineering characteristics of the anticipated new work materials from channel excavation, which are necessary to determine proper placement schemes in existing or proposed placement areas, are summarized in this section. This section includes various discussions regarding the available geotechnical information and investigations for the project. Based on these discussions, the appropriate design features, along with the geotechnical considerations related to the dredged material and placement areas (PAs), are described (See Appendix F for details).

Review and Inventory of Existing Subsurface Data

The 2019 study report was based on the limited geotechnical data available at the time. All previously drilled soil borings were too shallow to obtain representative samples from the proposed channel excavation zones, which range in depth from approximately 0' to -45' MLLW, as required for the MSC investigation. Despite these limitations, the available data were extrapolated to characterize the new work materials for the 2019 study-level geotechnical design.

Beginning in 2022, the study-level geotechnical design was updated to incorporate data from the 2021 MSC investigation (TWEI, 2022). This investigation was comprehensive and specifically conducted to support the PED phase of the project. Accordingly, the 2021 MSC data are considered adequate for the current geotechnical design.

The 2021 MSC investigation includes 72 channel borings with sufficient drilling depth to collect more representative soil samples within the proposed channel excavation zones (bottom elevations varying from -41 ft to -54 ft MLLW). The average center-to-center distance between channel borings was 2,000' along the approximately 29-mile-long MSC centerline.

Field investigation within Matagorda Bay, along the jetty, and within 29 miles of the Gulf included the following:

- Seventy-two channel borings (CB-1 through CB-13 and CB-18 through CB-76) Seventy-two (72) channel borings were performed from mudline to about El. -70-ft MLLW. The channel borings were drilled to obtain 3-inch-diameter Thin-Walled Tube (Shelby) Sampling of Soils (ASTM D1587) of cohesive materials as undisturbed continuous samples and Standard Penetration Test (SPT) method Sampling of Soils (ASTM D1586) of cohesionless materials as disturbed samples. Where cohesionless materials were encountered, disturbed samples were taken at approximately 5-foot depth intervals during the performance of standard penetration tests. Geotechnical laboratory tests were performed in accordance with ASTM International standards by the following USACE validated laboratories.
- Forty vibrocores (VB-1 through VB-40) Forty (40) vibrocores were performed from mudline to refusal within the Matagorda Bay within the proposed new work material placement areas. The purpose of vibrocores were to obtain sediments and soft soils near the mudline within the proposed open-water new work dredged material Placement Areas (PAs). Four shallow sediment samplings (CB-14 through CB-17)
- Four shallow sediment samplings (CB-14 through CB-17) The subject jetty is located at the perimeter of Matagorda Bay and the Gulf and is travelled by large marine cargo vessels. Therefore, CB-14, CB-15, CB-16, and CB-17 were completed as shallow sediment sampling at corresponding mud elevations using a Ponar sampler to minimize impact to the shipping lane. The grab sample mud elevations vary between -19 and -34 ft MLLW.

Sampling and Testing of Shoaled Sediments

Soil samples were collected at 76 boring locations along the channel within the MSC project limits in 2021 to characterize the potential new work material that will be placed in placement areas. The geotechnical testing laboratory testing program included determination of moisture content (ASTM D2216), particle size analysis of soils with hydrometer (ASTM D422), Atterberg limits (ASTM D4318), percentage passing the No. 200 sieve (ASTM D1140), unconfined compression (ASTM D2166), unconsolidated-undrained triaxial compression (ASTM D2850), multi-stage consolidated-undrained triaxial compression (ASTM D4767) and determination of dry unit weight (ASTM D7263) for subject project geotechnical design work (Table 25). A detailed summary of the laboratory testing is presented in the TWEI (2022) report which is included for reference as an attachment in Appendix F.

Table 25 – Atterberg Limits ASTM

Sample Number	Moisture Content (%) ASTM D-2216	Specific Gravity	Atterberg Limits ASTM D=4318			Percentage Passing No 200 Sieve (%)	Unified Soil Classification ASTM D-2487	Dry Density Calculated (pcf)	Calculated Void Ratio
Sta. 85+000	164	2.65	Liquid Limit (%) 68	Plastic Limit (%) 25	Plasticity Index (%) 43	92.7	Gray Fat Clay (CH)	30.94	4.35
Sta. 90+000	226.6	2.72	75	30	45	–	Gray Fat Clay (CH)	23.7	6.17
Sta. 118+000	268.4	2.69	82	34	48	–	Gray Fat Clay (CH)	20.42	7.22

3.16.1 Existing Quality of Dredged Material

The subsurface soil conditions of the project dictate the type of dredge that would be utilized to perform the excavation for DMMP (Appendix E – DMMP). The physical characteristics of the soil affect its placement options due to varying strength and compressibility. The subsurface soils in the turning basin and channel consist of soft clays, very stiff to hard clays, and sand. The type of dredging equipment considered depends on the type of material, the depth of the channel, the depth of access to the disposal area or PA, the amount of material, the distance to the disposal or PA, the wave-energy environment, and so forth.

Based on these considerations, three types of dredging equipment will be utilized as follows:

- Hydraulic Pipeline Dredges in Lavaca Bay including Turning Basin and Matagorda Bay Reaches;
- Hopper dredge or clamshell dredge with dump scows in portions of the Matagorda Bay Reach; and
- Hopper dredges in the Offshore Reach.

A detailed description of the types of dredging equipment can be found in EM 1110-2-5025, Dredging and Dredged Material Management.

3.16.2 FWOP Quality of Dredged Material

The FWOP condition is not likely to change in any significant way in either the geology or structural setting of the study area.

3.17 Real Estate

3.17.1 Existing USACE Interests

The following real estate interests are currently held by the USACE (Appendix D – Real Estate):

A perpetual easement and right-of-way for navigation purposes to construct, dredge, reconstruct, enlarge, replace, maintain, operate and repair a navigation channel and waterway and jetties and related facilities and dredged material – disposal areas (DAs) for the deposit of sand, silt and dredged material from the original construction and future maintenance, enlargement, reconstruction and repair of said project in, over, on, along and across tract MSCIP3 100E-1 was acquired 9 August 1967 from the Matagorda County Navigation District No. 2.

A perpetual right and easement to enter upon, dig or cut away and removed on tract MSCIP3 100E-2 in the prosecution of the work of constructing, maintaining or improving the MSCIP, or any enlargement thereof, and to maintain the portion so cut away and remove as a part of the navigable waters was acquired 7 August 1963 from Matagorda County Navigation District No. 2.

A perpetual easement to prosecute the work of constructing, maintaining or improving the MSCIP on tracts MSCIP3 100-1 and MSCIP3 100-2 was acquired 7 August 1963 from Matagorda County Navigation District No. 2.

Existing USACE interests are shown in Figure 52 below.

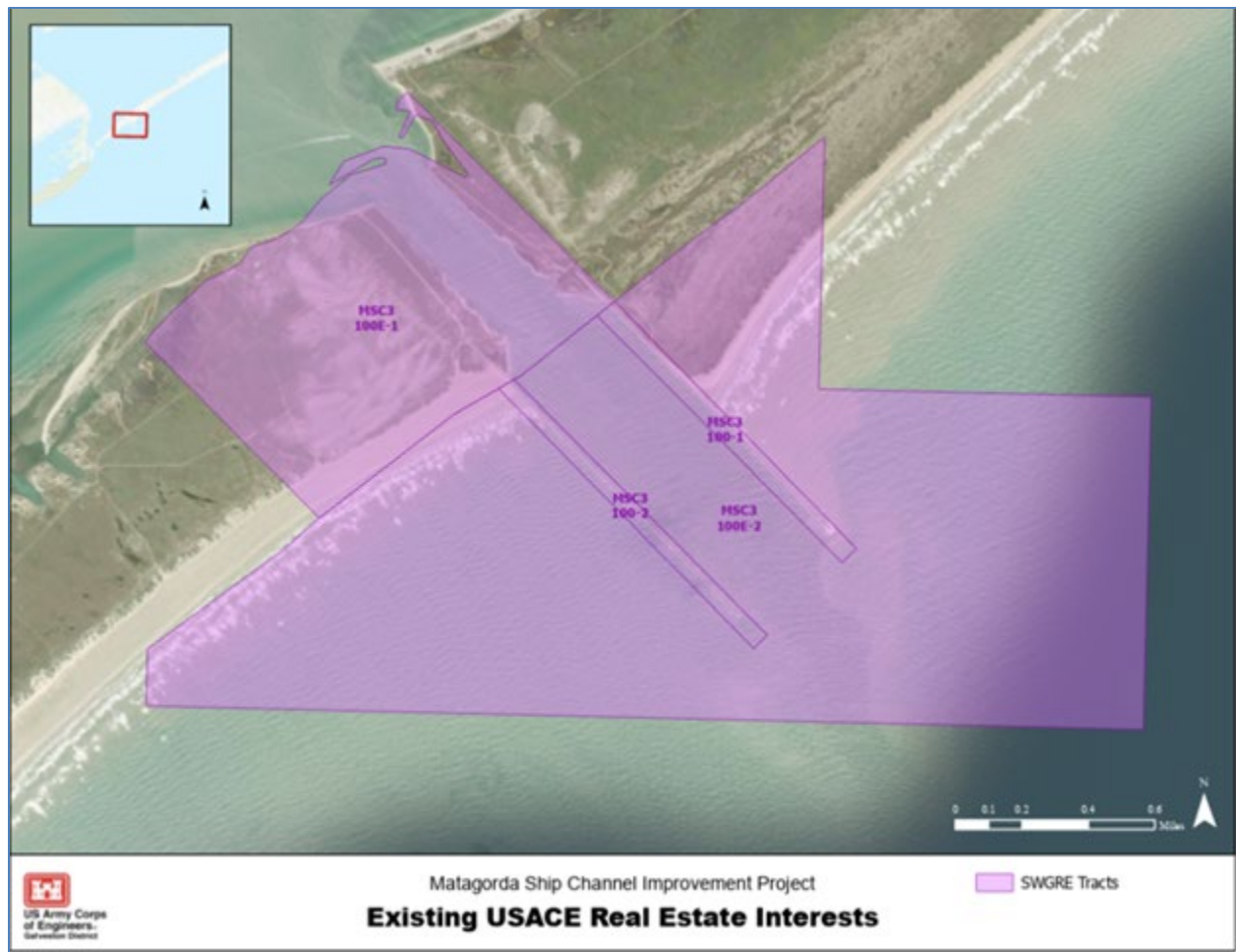


Figure 52 – USACE Existing Interests

3.17.2 Existing Placement Areas

Existing PAs utilized by USACE in the project vicinity are shown in Figure 53, Figure 54, and Figure 55 (Appendix D – Real Estate).



Figure 53 – Existing USACE Placement Areas at Entrance Channel



Figure 54 – Existing USACE Placement Areas in Matagorda Bay



Figure 55 – Existing USACE Placement Areas in Lavaca Bay

4 COMPARISON BETWEEN 2019 AND 2025

The 2019 plan formulation process can be found in Appendix G – Plan Formulation and Recommended Plan (2019).

4.1 Changes in Project Costs

This section contains the required four-column comparison (Table 26) of the estimated cost for the project being recommended, the project as authorized by Congress, the authorized project updated to current price levels, and the project last presented to Congress.

Table 26 – Changes in Project Costs

Project as Authorized by Congress	Project Last Presented to Congress	Authorized Project Escalated to October 2025 Levels	Estimated Fully Funded Cost for the Project Being Recommended
\$220,656,000	December 2020	\$281,037,000	\$689,263,000
The First Project Cost certified by MCX on 22 Mar 2019 was \$212,498,000. The amount of \$220,656,000 was authorized by Congress in Dec 2020. The CWCCIS was utilized to escalate it to October 2025 level.			

4.1.1 Project First Costs

2019 –

The F/EIS underwent a successful Cost Agency Technical Review, performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signified the products met the quality standards as prescribed in ER 1110-2-1150 and ER 1110-2-1302.

An Abbreviated Risk Analysis (ARA) developed with the participation of the PDT in October 2017, was revised in November of 2018 to consider deleted and added Features of Work. For screening of alternatives for the Authorized Plan, an average risk contingency of 37% from the ARA was applied to the direct first construction costs, as well as for PED and Construction Management (CM). Since the total project cost of the recommended plan exceeds \$40 million, a formal Cost and Schedule Risk Analysis (CSRA) was required. The CSRA was prepared by the Cost Center of Expertise in Walla Walla District, with participation from the PDT. Refined risk contingencies were developed using the risk modeling software, Crystal Ball. The resulting contingency markups of 29% were then applied to all Code of Accounts for features of work, as well as PED, and CM. However, the 25% risk contingency developed by Real Estate Section would continue to be utilized for the Lands and Damages Code of Account. A summary breakdown of the Federal, Non-Federal, and Associated Costs for the Recommended Plan is below (Table 27 and Table 28).

Costs for required port improvements, considered “Associated Costs” were generated by the NFS and reviewed appropriately by Cost Engineer. Structural Integrity totals \$30,000,000, while Berthing Improvements & Docks total \$5,996,000. Aids to Navigation, which is 100% Federally funded and paid to the USCG, total \$2,373,000. The total for Associated Costs is \$38,369,000.

Table 27 – 2019 Total First Costs Allocation (\$1K)

Table 2-1. 2018 Total First Costs Allocation (\$'000)				
WBS	Project Feature	FED (75%)	NON-FED (25%)	TOTAL
		October 2018 Price Level		
–	Construction General Navigation Features (GNF)			
01	Lands and Damages (100% Non-Fed)	\$0	\$1,554	\$1,554
02	Relocations (100% Non-Fed)	\$0	\$31,061	\$31,061
06	Fish and Wildlife: Oyster Mitigation	\$19,693	\$6,564	\$26,257
12	Navigation Ports and Harbors	\$91,121	\$30,373	\$121,494
30	Planning, Engineering, and Design	\$14,711	\$4,904	\$19,615
31	Construction Management	\$9,388	\$3,129	\$12,517
–	Total First Cost	\$134,913	\$77,585	\$212,498
12	Associated Costs	–	–	\$7,694

October 2018 Price Level

Table 28 – 2019 Total First Costs Allocation Escalated to 2025 Price Level (\$1K)

Table 2-20 2016 Total First Costs Allocation Escalated to 2025 Price Level (\$M)				
WBS	Project Feature	FED (75%)	NON-FED (25%)	TOTAL
		October 2025 Price Level		
–	GNF			
01	Lands and Damages	\$0	\$2,103	\$2,103
02	Relocations (100% Non-Fed)	\$0	\$42,026	\$42,026
06	Fish and Wildlife: Oyster Mitigation	\$26,757	\$8,919	\$35,676
12	Navigation Ports and Harbors	\$118,772	\$39,591	\$158,362
30	Planning, Engineering, and Design 11%	\$19,649	\$6,550	\$26,198
31	Construction Management 7%	\$12,504	\$4,168	\$16,672
–	Total Escalated First Cost	\$177,681	\$103,356	\$281,037
12	Associated Costs	–	–	\$10,029

October 2025 Price Level. Refer to table 9-7, 9-8, and 9-9 of the Engineering Appendix for the CWCCIS Indices used for the escalation.

Benefits were calculated using the USACE approved HarborSym model. Benefits and costs were calculated with a base year of 2024 and a 50-year period of analysis (2024-2073) using the FY19 discount rate of 2.875 percent. Construction of the recommended plan would generate total average annual benefits of \$35,858,000 with total average annual costs of \$15,886,000, producing a benefit-to-cost ratio (BCR) of 2.26 at the 2.875 percent discount rate.

Total First Costs of this project is \$212,498,000 with a Federal share of \$134,913,000, and an NFS cost share of \$77,585,000. Total First Cost for Aids to Navigation is 100% Federal with funds going to USCG for \$2,220,000.

After a quantity discrepancy in quantities was verified in 2020, new costs were developed based on the updated dredging quantities and a revised plan for the distribution of dredged materials. These updated costs are reflected in this section and compared to the previously certified 2019 costs.

2025 – (Table 29)

Account Code 01 – Lands And Damages – Since 2019, the TPCS template has been revised to reflect a new accounting structure for RE costs. Previously, all RE costs were recorded under ACCOUNT 01. Under the updated template, the Federal portion of RE costs is now allocated to ACCOUNT 30 – PED.

Account Code 02 – Relocations – The cost for this account was developed in MII v4.4.4 following the guidelines of ER 1110-2-1302 and EM 1110-2-1304. The following changes were applied:

- In 2019 16 pipelines were identified and 4 were expected to be relocated. The current 2025 plan includes 13 pipelines stated for removal and 1 pipeline designated for relocation.
- The cost for Enbridge 30" Natural Gas Pipeline (STA.91+075) Relocation was provided by NFS.

Account Code 06 – Fish & Wildlife Facilities – The cost for this account was developed in the MII v4.4.4 following the guidelines of ER 1110-2-1302 and EM 1110-2-1304. The following changes were applied:

- The acreage of the mitigation area decreased from 129 AC (2019) to 95 AC (2025).

Account Code 12 – Navigation Ports And Harbors – The cost for this account was developed in the Cost Engineering Dredge Estimating Program (CEDEP) and the MII v4.4.4 following the guidelines of ER 1110-2-1302 and EM 1110-2-1304. The following changes were applied:

- Labor rates were adjusted to current level.
- Fuel price was changed from \$3.00 (2019) to \$3.58 (2025).
- Dredging quantities increased due to the quantity discrepancy.
- The Bird Island construction was added to the project.

Account Code 18 – Cultural Resources Preservation – The cost for this account was developed in MII v4.4.4 following the guidelines of ER 1110-2-1302 and EM 1110-2-1304.

- This is a newly added feature that was not accounted for in the 2019 plan.

Account Code 30 – Engineering And Design – The cost for this account was developed using the guidelines provided in the TPCS, with the agreement of the cost engineer and the project manager.

- It has not changed since 2019. The current estimate uses the same 11% used in 2019.

Account Code 31 – Construction Management – The cost for this account was developed using the guidelines provided in the TPCS, with the agreement of the cost engineer and the project manager. The following changes were applied:

- The current estimate uses 5.5% compared to the 7% used in 2019.

Table 29 – 2025 First Costs Allocation (\$1K)

WBS	Project Feature	FED (75%)	NON-FED (25%)	TOTAL
		October 2025 Price Level		
–	Construction General Navigation Features (GNF)			
01	Lands and Damages	\$0	\$31	\$31
02	Relocations (100% Non-Fed)	\$0	\$40,168	\$40,168
06	Fish and Wildlife: Oyster Mitigation	\$38,592	\$12,864	\$51,456
12	Navigation Ports and Harbors	\$321,513	\$107,171	\$428,684
18	Cultural Resources Preservation	\$2,170	\$723	\$2,893
30	Planning, Engineering, and Design	\$47,670	\$15,890	\$63,560
31	Construction Management	\$21,582	\$7,194	\$28,776
–	Total Cost	\$431,526	\$184,041	\$615,567
12	Associated Costs	–	–	\$38,369

4.2 Changes in Cost Apportionment

Table 30 includes both Federal and non-Federal costs of the authorized project and the recommended scale. Federal appropriations requirements have not changed since the 2019 Chief's Report nor have reimbursable cost allocations.

Table 30 – 2019 vs 2025 Federal Cost Apportionment (\$1K)

WBS	Construction Item	Project First Costs		Difference	
		2019*	Oct. 2025	\$	%
Federal Costs					
01	Lands and Damages	\$0	\$0	\$0	N/A
02	Relocations	\$0	\$0	\$0	N/A
06	Fish and Wildlife: Oyster Mitigation	\$26,757	\$38,592	\$11,835	44%
12	Navigation Ports and Harbors	\$118,772	\$321,513	\$202,741	171%
18	Cultural Resources Preservation	\$0	\$2,170	\$2,170	N/A
30	Planning, Engineering, and Design	\$19,649	\$47,670	\$28,021	143%
31	Construction Management	\$12,504	\$21,582	\$9,078	73%
	SUBTOTAL FEDERAL COST	\$177,681	\$431,526	\$253,846	143%
Non-Federal Costs					
01	Lands and Damages	\$2,103	\$31	-\$2,072	-99%
02	Relocations	\$42,026	\$40,168	-\$1,858	-4%
06	Fish and Wildlife: Oyster Mitigation	\$8,919	\$12,864	\$3,945	44%
12	Navigation Ports and Harbors	\$39,591	\$107,171	\$67,580	171%
18	Cultural Resources Preservation	\$0	\$723	\$723	N/A
30	Planning, Engineering, and Design	\$6,550	\$15,890	\$9,340	143%
31	Construction Management	\$4,168	\$7,194	\$3,026	73%
SUBTOTAL NON-FEDERAL COST		\$103,356	\$184,041	\$80,685	78%
TOTAL PROJECT FIRST COST		\$281,037	\$615,567	\$334,530	119%
–	Associated Costs	\$10,029	\$38,369	\$28,340	283%
TOTAL ECONOMIC COST		\$291,066	\$653,936	\$362,870	125%

*Escalated to October 2025 Price Level
Project First Cost includes contingency

4.3 Changes in General Cost Allocations

Cost Allocations have changed since the 2019 Chief's Report (Table 31).

As a deep-draft navigation project, the NFS must bear at least 50 percent of the cost of relocations as required by WRDA Section 101(a)(4) and explained in Policy Guidance Letter

(PGL) 44. The law apportions the remaining payment responsibility to the pipeline owner. Costs borne by the NFS for utility relocations are credited toward the NFS's additional payment of 10% of the cost of the general navigation features. To the extent that the total amount eligible for credit under Section 101(a)(2) exceeds 10 percent of the total cost of the general navigation features, the NFS shall not be entitled to reimbursement.

Dredge material will be tested for contaminants and, if any are found, the NFS will be responsible for all costs of cleanup and response, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall be paid solely by the NFS without reimbursement or credit by the Government.

Table 31 – 2019 General Cost Allocations

Feature	% Federal Cost ¹	% NFS Cost ¹
GNF	90% from 0' to 20' 75% from 20' to 46' 50% for 46' and deeper	10% from 0' to 20' 25% from 20' to 46' 50% for 46' and deeper
Mitigation	75%	25%
Navigation Aids	100% USCG	0%
Operations and Maintenance		
GNF	100% except cost share 50% costs for maintenance > 50'	0% except cost share 50% costs for maintenance > 50'
1 The non-Federal sponsor shall pay an additional 10% of the costs of GNF over a period of 30 years, at an interest rate determined pursuant to Section 106 of WRDA 86. Normally, the value of LERR shall be credited toward the additional 10% payment.		

2025 – Project First Costs of Alternative A Scale -47'/-49' is \$615,567,000 with a Federal share of \$431,526,000, and a NFS cost share of \$184,041,000. Project First Cost for Aids to Navigation is 100% Federal with funds going to the USCG for \$2,373,000 (Table 32)

Table 32 - 2025 General Cost Allocations

Feature	% Federal Cost ¹	% NFS Cost ¹
General Navigation Features (GNF)	90% from 0' to 20' 75% from >20' to 55' 50% for >55'	10% from 0' to 20' 25% from >20' to 55' 50% for >55'
Mitigation	75%	25%
Navigation Aids	100% USCG	0%
Operations and Maintenance		
GNF	100% except cost share 50% costs for maintenance > 50'	0% except cost share 50% costs for maintenance > 50'
¹ The non-Federal interests for a project to which paragraph (1) applies shall pay an additional 10 percent of the cost of the general navigation features of the project in cash over a period not to exceed 30 years, at an interest rate determined pursuant to section 2216 of WRDA 2024. LERR may be credited against the additional 10 percent amount of the total construction cost for GNF.		

4.4 Changes in AAEQ Costs

The economic cost summaries (Average Annual Equivalent), including project first cost, Interest During Construction (IDC), total investment costs, Operations, Maintenance, Repair and Replacement (OMRR&R) costs, and annualized total costs are presented in Table 33 and Table 34. The OMRR&R costs presented are an estimate of the difference in existing OMRR&R costs and the with project OMRR&R costs.

Table 33 – 2019 AAEQ Cost Summary

Alt A	Project Cost	IDC	Total Investment	AAEQ Total Investment	AAEQ OMRR&R	Total AAEQ
-47'/-49'	\$220,192	\$11,019	\$231,211	\$8,774	\$7,112	\$15,886
Oct 2018 Prices, 2.875% Discount Rate (\$ in thousands)						

Table 34 – 2025 AAEQ Cost Summary

Cost	-43'/-45'	-45'/-47'	-47'/-49'
Project First Costs	\$471,248	\$538,111	\$615,567
IDC	\$42,986	\$48,626	\$55,159
Total Investment	\$552,603	\$625,106	\$709,095

Cost	-43'/-45'	-45'/-47'	-47'/-49'
AAEQ Investment Costs	\$22,508	\$25,461	\$28,882
AAEQ OMRR&R	\$4,210	\$5,823	\$7,584
Total AAEQ Costs	\$26,718	\$31,284	\$36,466
Oct 2025 prices, 3.25% Discount Rate (\$ in thousands)			

4.5 Changes in Benefits and BCR

The results of transportation cost savings benefit analysis are annualized and displayed in Table 35 and Table 36. Annualized benefits are compared with the annualized costs to calculate net benefits and select the NED Plan.

Table 35 – 2019 Benefits and BCR

Alt A	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Benefit/Cost Ratio
-47'/-49'	\$15,886	\$35,858	\$19,972	2.26
Oct 2020 Prices, 2.875% Discount Rate (\$ in thousands)				

Table 36 – 2025 Benefits and BCR

Cost/Benefit	-43'/-45'	-45'/-47'	-47'/-49'
Total AAEQ Costs	\$26,718	\$31,284	\$36,466
Total AAEQ Benefits	\$9,981	\$12,875	\$16,711
Total Net Benefits	\$(16,737)	\$(18,409)	\$(19,755)
Benefit/Cost Ratio	0.37	0.41	0.46
Oct 2025 prices, 3.25% discount rate (\$ in thousands)			

As displayed in the table above, net benefits are negative for all alternative depths. Therefore, the NED Plan is the No Action plan, because no scale of Alternative A has positive net benefits.

The Galveston District has received an NED waiver to recommend implementation of the -47'/-49' MLLW authorized depth. The waiver was not approved, nor disapproved, at the time of Policy and Legal Compliance Review of the draft Validation Report. Prior to that, Galveston District did receive permission for the draft V/SEIS to go out for public review. The Matagorda Ship Channel Improvement Project is an opportunity to deliver resilient, strategic energy infrastructure that safeguards national interests while fostering economic prosperity. The MSCIP is a forward-looking investment that ensures America's energy future remains strong, competitive, and secure.

4.6 Comprehensive Benefits Analysis

The requirements for a comprehensive benefits analysis as part of evaluating and comparing alternatives, were not in place when the 2019 F/EIS was approved. Since then, USACE has produced both ER 1105-2-103 and SACW memorandum, subject "POLICY DIRECTIVE – Comprehensive Documentation of Benefits in Decision Document" dated 5 January 2021, which require a comprehensive benefits analysis (Table 37). The PDT met to evaluate each scale of Alternative A and fill in the table. Other than the NED, RED and EQ-Mitigation accounts, the PDT felt that the different scales had little to distinguish them against each other.

Table 37 – 2025 Total Effects Summary

ACCOUNT	METRICS	FWOP	-43/-45 FEET MLLW	-45/-47 FEET MLLW	-47/-49 FEET MLLW
NED	PROJECT FIRST COST	\$-	\$471M	\$538M	\$616M
	ANNUAL COST	\$-	\$27M	\$31M	\$37M
	ANNUAL NED BENEFITS	\$-	\$10 Million	\$13 Million	\$17 Million
	ANNUAL NET BENEFITS	\$-	(\$17M)	(\$18M)	(\$20M)
	BCR	–	0.37	0.41	0.46
RED	ONE-TIME VALUE ADDED	–	\$783M	\$896M	\$1B
–	ENVIRONMENTAL TRADEOFFS	–	Smaller scale than -47/-49 ft MLLW	Smaller scale than -47/-49 ft MLLW	-Creation/continuation of habitat with proposed BU sites -Potential conversion of open water to bird island and marsh habitat, beneficial to ecological services for shorebirds at bird island and marsh creation at PA18/19; slight loss of ecological services to recreation/fisheries. -Ecological benefit with avoiding seagrass and oyster habitat near Powderhorn Ranch and minimized oyster habitat impacts in Lavaca Bay due to 2025 proposed placement sites
EQ	HABITAT	Continued O&M / No change	~95 acres oyster habitat direct impact	~95 acres oyster habitat direct impact	~95 acres oyster habitat direct impact
	T&E SPECIES	Continued O&M / No change	Potential impact to T&E Species	Potential impact to T&E Species	Potential impact to T&E Species
	CULTURAL RESOURCES	Continued O&M / No change	Potential for impacts to historic properties, requires additional surveys in PED	Potential for impacts to historic properties, requires additional surveys in PED	Potential for impacts to historic properties, requires additional surveys in PED
	AIR QUALITY	Continued O&M / No Change	Low impact to population centers	Low impact to population centers	High impact during construction; Low impact to population centers
	WATER QUALITY	Continued O&M / No Change	Temporary turbidity during construction	Temporary turbidity during construction	Temporary turbidity during construction
	NOISE	Continued O&M / No change	Increase for new work	Increase for new work	Increase for new work
	HTRW	Continued O&M / No change*	No known concerns with project*	No known concerns with project*	No known concerns with project*
	MITIGATION	Continued O&M / No change	\$40M	\$47M	\$52M
	NON-MITIGABLE ENVIRONMENTAL LOSS	Continued O&M / No change	Potential short-term loss of wildlife and vegetation	Potential short-term loss of wildlife and vegetation	Potential short-term loss of wildlife and vegetation
OSE	VESSEL TRANSIT RISKS	No change to existing	Short-term congestion; Long-term no known impact	Short-term congestion; Long-term no known impact	Short-term congestion; Long-term no known impact
	FISHERIES RESOURCE ACCESS	No change to existing	Short-term negligible loss of access; Long-term no change to existing.	Short-term negligible loss of access; Long-term no change to existing.	Short-term negligible loss of access; Long-term no change to existing.

*A portion of the project footprint is within the Alcoa Superfund site, however, there is no HTRW concern based on finding no contaminants of concern measured above remedial action levels established in the ROD.

4.7 Section 902 Analysis

Table 38 – Section 902 Analysis dated 9 October 2025 (\$ in thousands)

Project Name	MSC
Total Authorized Cost	\$220,656
Authorized Cost for Construction	\$219,042
Authorized Cost for Real Estate	\$1,614
Date of Authorized Price Level	1 Oct 2020
First Year of Expenditure	1 Oct 2020
Current Cost Estimate (@ current price level)	\$615,567
Current Cost of Construction (@ current price level)	\$615,536
Current Cost for Real Estate (@ current price level)	\$31
Current Fully Funded Cost Estimate Inflated Through Construction	\$689,263
Date of Current Price Level	1 Oct 2025
Authorized Cost, Inflated Through Construction	\$314,862
Costs of Modifications Specified by Law	\$0
20% of Authorized Cost	\$44,131
Maximum Cost Limited by Section 902	\$358,993
Costs in \$1,000s	

4.8 Changes in Design

4.8.1 Dimensions

Table 39 – 2019 Plan Dimensions

Reach	STA	Bottom Width	Project Depth	Channel Depth	AO	Side Slope
Entrance Channel Extension	-33+000 to -20+000	550'	-49'	-52'	2'	1V:10H
Entrance Channel	-20+000 to 6+000	550'	-49'	-52'	2'	1V:10H

Reach	STA	Bottom Width	Project Depth	Channel Depth	AO	Side Slope
Jetty Channel	-6+000 to 0+000	550'	-49'	-52'	2'	1V:10H
Matagorda Bay	0+000 to 75+000	550' – 300'	-47'	-49'	2'	1V:3H
Lavaca Bay and Turning Basin	75+000 to 116+223	300' to 1,200' to 1,000'	-47'	-49'	2'	1V:3H
Point Comfort Turning Basin	116+223 to 117+223	1,000'	-47'	-49'	2'	1V:3H
Point Comfort North & South Basins	117+223 to 118+502	–	-47'	-49'	2'	1V:3H

Table 40 – 2025 Plan Dimensions

Reach	STA	Bottom Width	Project Depth	Channel Depth	AO	Side Slope
Entrance Channel Extension	-26+000 to -20+000	550'	-49'	-52'	2'	1V:10H
Entrance Channel	-20+000 to -6+000	550'	-49'	-52'	2'	1V:10H
Jetty Channel	-6+000 to -0+000	550'	-49'	-52'	2'	1V:10H
Matagorda Bay	0+000 to 75+000	550' to 300'	-47'	-49'	2'	1V:3H
Lavaca Bay and Turning Basin	75+000 to 116+302	300' to 1,200' to 990'	-47'	-49' to -53'	2'	1V:3H
Point Comfort Turning Basin	116+302 to 117+405	990'	-47'	50'	2'	1V:3H
Point Comfort North & South Basins	117+405 to 118+581	990'	-47'	50'	2'	None

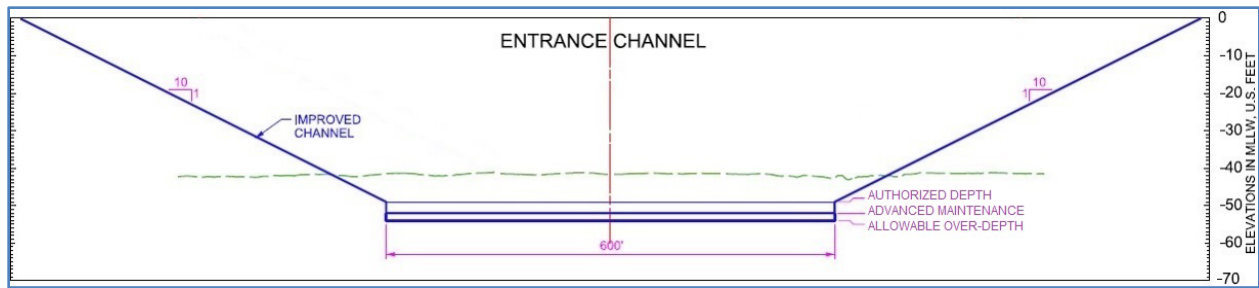


Figure 56 – 2019 Cross Section Entrance Channel

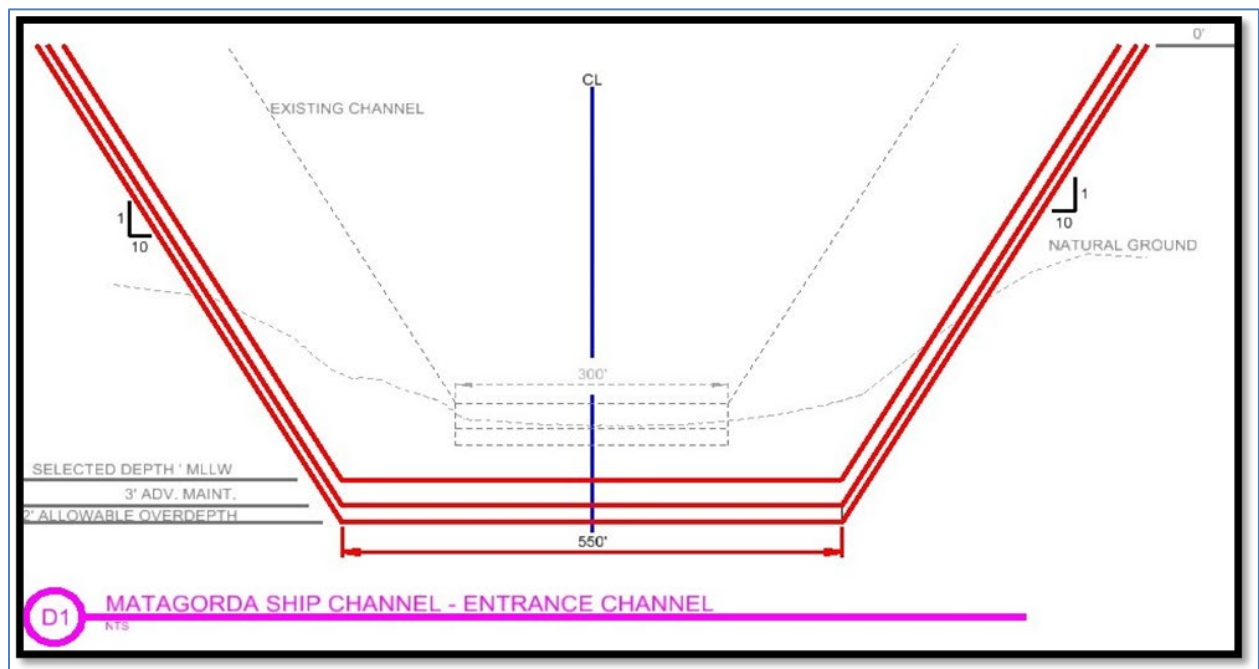


Figure 57 – 2025 Cross Section Entrance Channel

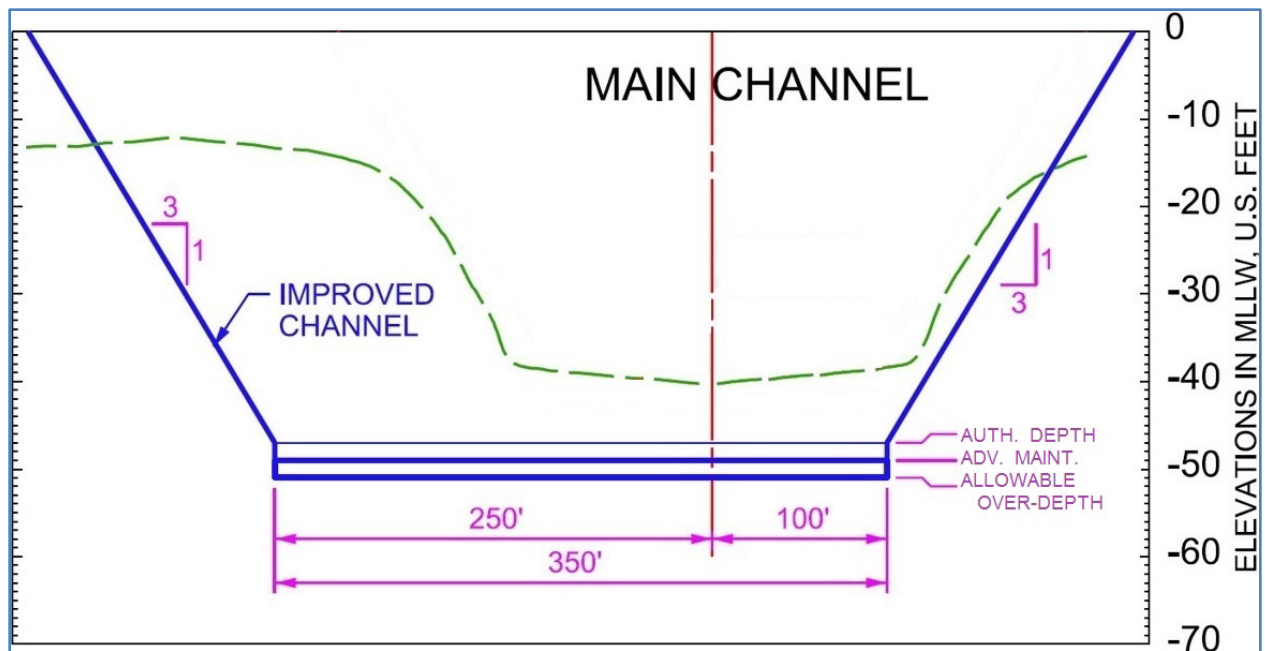


Figure 58 – 2019 Cross Section Main Channel

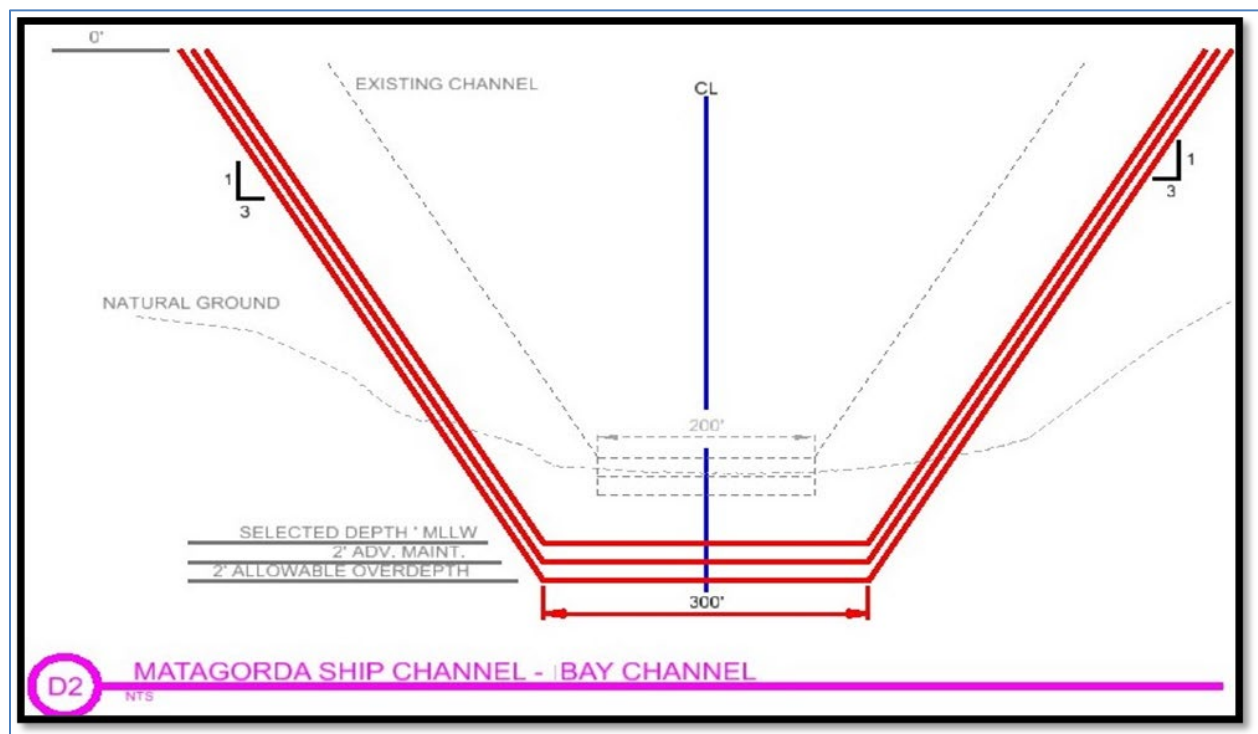


Figure 59 – 2025 Cross Section Main Channel

4.8.2 New Work Dredging

2019 – New work material volumes did not contain maintenance material. The new work volumes included Advance Maintenance as well as the recommended Allowable Over-depth.

The total amount of new work material to be dredged for the Recommended Plan was 21 mcy.

Table 41 provides the dimensions for the Recommended Plan and new work dredging, including advance maintenance and allowable over-depth.

Table 41 – 2019 DMMP New Work Volumes

Start Station	End Station	Distance Interval (ft)	Volume w/Advance Maintenance (CY)	Allowable Over-depth (CY)	Total Volume (CY)	PAs	Method
-33+000	-16+000	17,000	2,606,681	634,436	3,241,117	O5	Hopper
-16+000	-6+000	10,000	1,115,407	292,354	1,407,760	SE	Pipeline
-6+000	20+000	26,000	1,886,389	419,862	2,306,250	Chester Island	Pipeline
20+000	25+000	5,000	577,757	29,262	607,019	NP1	Pipeline
25+000	55+000	30,000	3,557,723	222,288	3,780,011	NP2	Pipeline
55+000	80+000	25,000	2,918,279	228,873	3,147,152	NP3	Pipeline
80+000	85+000	5,000	525,600	71,559	597,159	NP4	Pipeline
85+000	98+400	13,400	1,534,157	66,864	1,601,021	NP5	Pipeline
98+400	113+300	14,900	2,415,745	151,401	2,567,146	NP6	Pipeline
113+300	118+502	5,202	1,519,876	188,887	1,708,763	NP7	Pipeline
–	–	–	–	TOTAL:	20,963,397	–	–

2025 – New work dredging volumes were calculated by applying the proposed channel template to the 2023 hydrographic survey surface. The new work volume includes both advance maintenance and allowable over-depth. Non-pay material was excluded (Table 42).

Table 42 – 2025 DMMP New Work Volumes

Depth + AM + AO	Reach		Length	Volume (cy)
	STA.	STA.		
-49' + -3' + -2'	-26+000	-14+000	12,000	3,149,800
-49' + -3' + -2'	-14+000	0+000	14,000	2,022,400
-47' + -2' + -2'	0+000	20+000	20,000	2,893,200
-47' + -2' + -2'	20+000	47+000	27,000	6,929,300
-47' + -2' + -2'	47+000	72+000	25,000	6,511,400
-47' + -2' + -2'	72+000	97+000	25,000	6,427,200
-47' + -6' + -2'	97+000	101+000	4,000	1,693,300
-47' + -6' + -2'	101+000	108+000	7,000	2,893,400
-47' + -2' + -2'	108+000	118+581	17,581	6,814,500
TOTAL			151,581	39,334,500

Allowable Over-depth

2019 – An additional depth outside the required template was permitted to allow for inaccuracies in the dredging process. District commanders may dredge a maximum of two feet of Allowable Over-depth in coastal regions, and in inland navigation channels (ER 1130-2-520 Navigation and Dredging Operations and Maintenance Policies). This additional dredging allowance was referred to as Allowable Over-depth (AO). The existing channel has two feet of allowable over-depth. It was anticipated that large pipeline dredges would be utilized to construct the proposed waterway. District policy recommended two feet allowable over-depth in reaches where large dredges operate. The existing and proposed channel contained the same allowable over-depth for the entire length of the channel.

The AO for the recommended plan was the additional dredging depth outside the required template that is permitted to allow for inaccuracies in the dredging process. The existing and proposed channels contained the same allowable over-depth (two feet) for the entire length of the channel.

2025 – Allowable Over-depth is unchanged from 2019 for the existing channel and Recommended plan. The PDT discovered no reasons to modify the existing policy on dredging allowance.

Advance Maintenance

2019 – The 2019 recommended plan did not account for any changes to advance maintenance depth. The existing Matagorda Entrance and Jetty Channel have a constant three feet Advance Maintenance depth. The existing Matagorda Main Channel has a constant two feet Advance Maintenance depth. These depths were assumed to remain constant for the proposed channel.

2025 – Table 43 below summarizes the change between FWOP and FWP for dredging cycle and recommended advance maintenance depth. FWOP AM depths are anticipated to be the same as existing. Changes to the present-day maintenance dredging plan are not proposed for FWOP.

Table 43 – Proposed Advance Maintenance

Alternative A Stationing	FWP Dredge Cycle (yr)	FWP AM Depth (ft)
-26+000 to -14+000	4	3
-14+000 to 0+000	4	3
0+000 to 20+000	2	2
20+000 to 25+000	2	2
25+000 to 35+000	2	2
35+000 to 50+000	2	2
50+000 to 73+500	2	2
73+500 to 85+500	2	2
85+500 to 90+500	2	2
90+500 to 97+000	2	2
97+000 to 102+000	1	6
102+000 to 108+000	1	6
108+000 to 118+581	2	3

The analysis led to a change for station 97+000 to 118+581. Data clearly identifies this area as a shoaling issue. The proposed plan circumvents the need for frequent emergency dredging in the upper reaches of the MSC.

4.8.3 Operation and Maintenance

4.8.3.1 Projected Shoaling Rates

2019 – Average annual shoaling rate for the entire MSCIP reaches was 1,961,333 cy/yr for the 2012-2015 time period. CSAT identified significant spatial variability in shoaling rates along MSCIP reaches.

The estimated annual maintenance dredging volume was based on a CSAT modeling software that calculated the volume using: historic dredging records, total suspended sediment concentrations, hydrodynamics of the proposed channel, and the amount and location of material placed in unconfined PAs. Projected maintenance volumes per cycle for each reach of the channel were provided in Table 44. All open water PAs for maintenance material theoretically have an unlimited capacity since they are unconfined and dispersive.

Table 44 – 2019 Projected Maintenance Dredging Volumes per Cycle

Start Station	End Station	Dredge Quantities per Cycle (CY)	50 Year O&M Quantities (CY)	Placement Area	Method	Frequency (years)
-33+000	-15+000	1,433,731	17,921,632	1	Hopper	4
-15+000	-6+000	716,865	8,960,816	SE	Hopper	4
-6+000	25+000	517,783	12,944,583	Chester Island	Pipeline	2
25+000	35+000	114,520	2,863,000	OP1	Pipeline	2
35+000	45+000	114,520	2,863,000	OP2	Pipeline	2
45+000	55+000	114,520	2,863,000	OP3	Pipeline	2
55+000	65+000	114,520	2,863,000	OP4	Pipeline	2
65+000	75+000	512,052	12,801,308	OP5	Pipeline	2
75+000	85+000	518,106	12,952,653	OP6	Pipeline	2
85+000	97+446	641,766	16,044,156	OP7	Pipeline	2
97+446	110+000	642,238	16,055,948	OP8	Pipeline	2
110+000	114+000	807,781	20,194,537	OP9	Pipeline	2
114+000	118+502	988,107	24,702,678	OP10	Pipeline	2

2025 – Estimated maintenance dredging volumes are calculated by contract using HYPACK® modeling software, which supports various survey types including shallow water single beam surveys, side scan search and recovery, sub-bottom sediment profiling, advanced multibeam navigation surveys, and dredging surveys. Apart from the contract-specific volumes, anticipated FWP maintenance volumes are provided over a 50-yr timeframe by use of the shoaling analysis (Table 45).

Table 45 – 2025 Project Maintenance Dredging Volumes

Stationing	Annual Shoaling Volume (CY/yr)	Average Dredge Frequency (yr)	Total Shoaling Volume per Cycle (CY)	No. of Cycles in 50-yr Plan	Total 50-yr Shoaling Volume
-26+000 to -14+000	177,833	4	711,332	12.5	8,891,651
-14+000 to 0+000	211,656	4	846,623	12.5	10,582,791
0+000 to 20+000	253,071	2	506,142	25	12,653,556
20+000 to 25+000	201,578	2	403,156	25	10,078,891
25+000 to 35+000	246,195	2	492,389	25	12,309,726
35+000 to 50+000	459,624	2	919,248	25	22,981,190
50+000 to 73+500	628,589	2	1,257,179	25	31,429,470
73+500 to 85+500	196,108	2	392,216	25	9,805,412
85+500 to 90+500	177,918	2	355,837	25	8,895,925
90+500 to 97+000	240,120	2	480,240	25	12,006,008
97+000 to 102+000	1,176,398	1	1,176,398	50	58,819,896
102+000 to 108+000	770,974	1	770,974	50	38,548,693
108+000 to 118+581	902,138	2	1,804,275	25	45,106,879
Total Federal O&M (CY)					282,110,088

4.8.3.2 Placement Areas

2019 – Placement areas were situated to the west of the MSC to reintroduce materials intercepted by the channel to the shoreline. The project maintenance and new work materials were estimated at 21 and 154 MCY, respectively. The lack of confinement was intended to allow materials to be transported west by ambient currents and waves, providing an opportunity for long-term nourishment and reduced maintenance burden (Table 46).

2025 – The newly recommended DMMP represents several key changes to the 2019 authorized DMMP (Table 47), based on the RP, namely:

- Material will not be placed on the west side of the channel between the inlet (0+000) and Keller Bay Peninsula (84+500).
- A bird island will be constructed in Lavaca Bay in place of the 2019 open water sites (NP7/OP10).
- The existing PA 18/19 semi-confined site near the Port will be expanded.
- Placement Area 1 (2019 recommended terrestrial upland site) will not be included.
- An option for Beneficial Use at Keller Bay Peninsula will be included.

- Existing open-water PA (OWPA) O&M sites, not included in 2019, will be included in the new plan.
- An offshore sediment trap from the previous plan is discarded.

Table 46 – 2019 Placement Areas with Quantities

Applicant's Preferred Alternative		New Work (mcy)	Maintenance (mcy)
Feature Identity	Feature Description		
O5	Offshore Dispersive Site	3.2	0.0
Sand Engine	New Unconfined Area for Work and Maintenance Material	1.4	9.0
Sundown Island	Existing Unconfined Area along GIWW	2.3	12.9
NP1 to NP7	New Unconfined Area only for New Work Material	14.0	0.0
OP 1 to OP 10	New Unconfined Area only for Maintenance Material	0.0	114.2
PA 1	Existing Offshore Dispersive Site	0.0	17.9
TOTAL	New Work and Maintenance Material	21.0	154.0

Table 47 – 2025 Placement Areas with Quantities

Feature Identity	Feature Description	New Work (mcy)	Maintenance (mcy)
ODMDS	2,700-acre EPA-expanded site in deep offshore water	3.15	8.9
Sand Engine	A 165-acre open-water placement site to create a nearshore berm.	2.02	10.6
Chester Island	Existing 202-acre bird island that receives maintenance Beneficial Use	0.0	12.7
NP1 to NP6	Large NW open-water sites that vary from 240-790 acres	24.45	0.0
OP1 to OP9 & 15-A	Open-water maintenance material sites that vary from 100-715 acres	0.0	204.7
Bird Island	Large NW site to create Beneficial Use habitat, estimated to be over 300 acres constructed	9.71	0.0
PA18/19	Existing semi-confined site that is expected to grow into a 600-acre footprint	0.0	45.1
TOTAL		39.33	282

4.8.4 Aids to Navigation

2019 – It was assumed that there were existing aids to navigation that would be affected by the proposed widening plan of the MSCIP that may require relocating or removal. There may also have been a need for the installation of new aids to navigation. The USCG was responsible for installing, relocating, and removing the aids to navigation. The MSCIP would be widened on both sides of the Entrance and Jetty Channel and on the west side of the channel through Lavaca Bay and Matagorda Bay.

A current meter was planned for installation between the jetties. The NOAA maintained another current meter near Chester Island. The project planned to broadcast one or both current meter readings to ships in order to improve Aids to Navigation.

2025 – Aids to Navigation (ATONs) are the responsibility of the USCG. The MSC widening is expected to impact existing ATONs. ATONs that are to remain, be replaced, or relocated have not been strictly identified thus far. The channel toe will likely require some ATONs to be temporarily relocated or removed entirely if the USCG deems it appropriate. Coordination with the USCG will be required during PED to finalize the ATON remain, replace, relocate (RRR) plan.

4.9 Real Estate

All PAs are owned, or will be acquired, by the NFS. In the event contaminated materials are found within the dredge template, the Sponsor will be 100% responsible for investigation, removal and disposal of any HTRW involved with construction and O&M of the project in accordance with ER 1165-2-132 and PGL No. 34.

NOTE: In 2002, the NFS and Alcoa Inc. entered into a Settlement Agreement WHEREAS, if mercury is present in, or on, or under all or part of the Calhoun County Navigation District owned lands, including submerged lands, described in the Lease Agreement dated 16 June 1982, those contaminated materials will be deposited in PA ER3/D. It includes a CONTRACT FOR DREDGE DISPOSAL CAPACITY and TERM EASEMENT AND RIGHT OF WAY FOR ACCESS TO AND USE OF DREDGE ISLAND. See Volume 356, Page 681, of the Official Public Records of Calhoun County, Texas.

Navigational servitude may be exercised if necessary and approved at higher headquarters.

The NFS is required to furnish all LERRD for the proposed project. As part of the FIFR/EA completed in November 2019, a thorough review of the CPA's real estate acquisition capabilities was conducted, and it was found the CPA is highly capable of performing real estate acquisition for this project. (Appendices D – REP, Exhibit A). The CPA's authority to hold title to real estate emanates from the Special Districts Local Laws Code, Title 5 (Transportation), Subtitle A (Navigation Districts and Port Authorities), Chapter 5003 (Calhoun Port Authority) (Appendices D – REP, Exhibit B). Section 5003.101 outlines CPA powers, which include the ability to exercise the rights, powers, duties, privileges, and functions conferred by Chapter 62 of the Water Code (Appendices D – REP, Exhibit C) and cited in Exhibit A.

The CPA is well acquainted with Federal Real Estate Acquisition Regulations, including the provisions of PL 91-646. The CPA did not have to acquire real estate in the past in support of the Federal channel.

4.9.1 Relocations

2019 – During the initial planning phase, 22 pipelines were estimated to be impacted by the project. The number of pipelines was based on the July 2014 Real Estate Appendix prepared for the Calhoun Port Authority for the MSCPIP by URS Corporation.

After the recommended plan milestone meeting, additional data was reviewed including 2018 Railroad Commission of Texas data, NFS pipeline easement records, and maps of pipelines prepared by Atkins in November 2017. As a result of the updated data, it was determined that the 22 pipelines identified in 2014 was no longer accurate. Sixteen pipelines were identified in the project area: 8 in-service pipelines and 1 abandoned pipeline in Lavaca Bay, 5 in-service and 1 abandoned pipeline in Matagorda Bay, and 1 in-service pipeline crossing the Entrance Channel. This information was preliminary only and needed to be further verified in PED.

Therefore, ~16 pipelines cross the MSCIP and would need to be removed or relocated. With the exception of the ammonia and acrylonitrile pipelines operated by Ineos USA Pipelines, the pipelines carry natural gas (Table 48).

The NFS owned the submerged lands where the pipelines cross the channel. The NFS lease agreements with the pipeline companies required the pipeline owners to remove and/or relocate the lines at the owner's expense, if required for improvements to the MSCIP.

However, since this was a deep-draft navigation project, the NFS must bear at least 50 percent of the cost of relocation as required by WRDA Section 101(a)(4) and explained in Policy Guidance Letter (PGL) 44. The law apportions the remaining payment responsibility to the pipeline owner. Costs borne by the NFS for utility relocations were credited toward the NFS's additional payment of 10% of the cost of the general navigation features. To the extent that the total amount eligible for credit under Section 101(a)(2) exceeds 10 percent of the total cost of the general navigation features, the NFS was not entitled to reimbursement.

Table 48 – 2019 Pipelines that May Require Removal / Relocation

I	Approx. Channel Station	#	T4 Permit No. or P5 No.	Operator	Size	Depth	Permit No.	Miles	Status ¹
Lavaca Bay	+105+594	1	07368 / 605990	Neumin Production Company	4.5"	–	–	2.88	In Service*
	+91+330	1	04143 / 845690	Texas Eastern Trans, LP	30"	-50'	3560	3.99	In Service
	+91+330	1	05554 / 424191	Ineos USA LLC	8.63"	–	–	24.48	In Service
	+91+330	1	05569 / 424191	Ineos USA LLC	8.63"	–	–	24.47	In Service
	+82+960	4	00441 / 624246	Onyx Pipeline Company	8.63"	–	–	4.34	Abandoned
	+76+314	1	90134 / 881288	Valero Interstate Trans Co.	6.63"	–	82679	2.29	In Service
Matagorda Bay	+72+949	4	00276 / 489680	Lavaca Pipeline Company	8.63"	–	4566	16.51	In Service**
	+43+000	1	07025 / 385533	High Island Gas LLC	16"	–	6729	7.8	In Service**
	+22+472	1	06146 / 876520	Union Oil Co of CA	8.63"	–	–	8.14	Abandoned
Offshore	-18+472	1	02878 / 253368	Enterprise Products Operating LLC	24"	-65'	14794	26.21	In Service
¹ Information on Status of pipeline provided by the Railroad Commission of Texas (RRC) [*] This line has been cut, flushed, filled with bay water, and capped according to the NFS. ^{**} These lines are listed as in-service by the Railroad Commission of Texas, but as abandoned in July 2016 according to the NFS.									

2025 – Since the F/EIS was completed, the NFS went through an exhaustive effort to identify and confirm potential pipeline obstructions for the MSCIP including a review of existing documentation (CPA documents, online research, GLO resources, and Texas Railroad Commission records), ROW investigations by a sub-contracted ROW agent, a magnetometer survey conducted in September 2021, and stakeholder engagement of suspected pipeline owners. In addition to these efforts, the NFS contracted Mott MacDonald, a management, engineering, and development consultancy, to perform an in-depth analysis of the pipelines. Mott McDonald provided the “Matagorda Ship Channel (MSCIP) – Due Diligence Report,” dated January 18, 2022, reference Figure 12. This document identified 20 suspected pipelines as shown in reference Figure 13. From this effort, the NFS was able to provide the below table of pipelines with a disposition of remove, relocate or remain in place. As a result of the new information provided by these efforts, the required actions for pipeline crossings have been significantly refined from the original assumptions of the authorized plan. That authorized plan made a conservative, feasibility-level assumption that all 16 conflicting pipelines would require full relocation.

In contrast, the current analysis defines a more precise and less costly set of required actions:

- Removal: Thirteen of the pipelines that conflict with the template will require removal only.
- Relocation: One pipeline – a 30-inch Federal Energy Regulatory Commission (FERC) regulated pipeline, will require relocation.
- To Remain by Waiver: The final two conflicting pipelines will be allowed to remain in place. The CPA has deemed them exempt from USACE's clearance template requirements and will issue a formal waiver to that effect.

Further discussion of why the four pipelines marked as unknown are not included in the number of pipelines accounted for removal or relocation can be found in the Engineering Appendix of this report.

4.10 Mitigation

4.10.1 Oyster Habitat

2019 – The 2019 V/EIS disclosed impacts to approximately 129 acres of oyster reef with an offset of approximately 130 acres of oyster reef mitigation. The 2019 proposed mitigation consisted of placing layers of thickness from 6-9” crushed limestone. Comparable reef creation projects of this type in Texas would have a cost of approximately \$157,000/acre. Refer to Appendix B – Environmental Resources of the 2019 final F/EIS for the mitigation plan.

2025 – The implementation of the V/SEIS would result in the loss of approximately 94.8 acres of oyster habitat. These impacts would be offset with approximately 95 acres of oyster habitat mitigation. Similar to 2019 oyster mitigation, this proposed mitigation would consist of placing 12” layer using clean crushed limestone or concrete. Refer to Appendix B-1 – Mitigation, Monitoring, and Adaptive Management of the V/SEIS.

4.10.2 Marsh

2019 – The 2019 V/EIS described the approximately 1.5 acres of wetlands that would be impacted with a proposed upland placement site. To offset that impact approximately 2.0 acres of wetland mitigation was needed. The estimated costs for the wetland mitigation were developed from comparable wetland mitigation efforts in the Matagorda Bay region and totaled \$80,000/acre. Refer to Appendix B – Environmental Resources of the 2019 final F/EIS for the mitigation plan.

2025 – Implementation of the V/SEIS would not result in any adverse wetland impacts.

4.11 Least Environmentally Damaging Practicable Alternative

The alternatives including the No Action Alternative have been analyzed in the V/SEIS and discussed in Appendix B-3 404(b)(1) evaluation. Since all three proposed scales are expected to have the same placement areas and proposed turning basin size as described in Appendix B-3 and Appendix E of the V/SEIS, all three scales would have similar impacts and proposed oyster mitigation. Following the evaluation of the No Action Alternative and three scales, the -47 ft/-49 ft scale was selected as the preferred alternative, also known as Recommended Scale based on how well this scale met the Purpose and Need Statement and study objectives to improve the navigational efficiency of the deep-draft navigation system, and improve the operational safety, over the period of analysis (2030-2079) in the study area.

Under current USACE policy, all feasibility studies including deep draft navigation studies are required to identify the National Economic Development (NED) which would have a benefit-to-cost ratio (BCR) greater than 1.0. However, when a study does not have a BCR above 1.0, USACE may choose to move forward with the recommended plan under certain circumstances where there are other important non-monetary benefits to the Nation. BCR does not capture all considerations, rather it represents one consideration regarding benefits to the Nation. Other potential considerations could be regional economic development, life safety, environmental quality, and national objectives. None of the three proposed scales have a BCR above 1.0; however, the Recommended Scale has the highest BCR of the three scales. Even though the Recommended Scale does not have a BCR above 1.0, this proposed scale would provide important non-monetary benefit to the Nation by strengthening National security by increasing our country's ability to export energy products, including crude oil, thereby increasing our country's energy trade balance with allies and supporting defense priorities in accordance with Executive Order 14156. A NED waiver has been submitted to the Assistant Secretary of Army for Civil Works (ASA-CW) and approved by ASA-CW on March 25, 2026.

In addition, the Recommend Scale would be considered the least environmentally damaging practicable alternative under Section 404 of the CWA. Even though the proposed Recommended Scale would increase the depth and width of the ship channel the most, this scale would result in similar impacts and oyster mitigation as the other proposed scales but would meet the Purpose and Need Statement and project objectives better, and higher BCR (still below 1.0) than the other proposed scales and thus being the most practicable scale.

4.12 Objectives and Constraints Evaluation and Comparison

Table 49 - Objectives and Constraints Evaluation and Comparison

2019				
	Objective 1 - Improve the navigational efficiency of the deep-draft navigation system over the period of analysis (2024 – 2073)	Objective 2 - Improve the operational safety of the deep-draft navigation system over the period of analysis (2024 – 2073)	Constraint - Avoid the Alcoa Corporation (Alcoa) Superfund Site	
No Action	NO	NO	YES	
Alt A -47’/-49’	YES	YES	NO	
2025				
	Objective 1 - Improve the navigational efficiency of the deep-draft navigation system over the period of analysis (2030 – 2079)	Objective 2 - Improve the operational safety of the deep-draft navigation system over the period of analysis (2030 – 2079)	Objective 3 - Contribute to the Nation’s Trade, Energy and Defense goals	Constraint - Avoid Hazardous, Toxic, and Radioactive Waste (HTRW) contaminants within the Alcoa Corporation (Alcoa) Superfund Site
No Action	NO	NO	NO	YES
Alt A -43’/-45’	YES	YES	YES	YES
Alt A -45’/-47’	YES	YES	YES	YES
Alt A -47’/-49’	YES	YES	YES	YES

4.13 Summary of 2019 to 2025 Changes

Table 50 - Summary of 2019 to 2025 Changes

ITEM OR FEATURE	2019	2025	Change	% Change
Entrance Channel Extension Length	13,000'	6,000'	(7,000')	(53.8)
Entrance Channel Depth	-49'	-49'	0	0
Entrance Channel Bottom Width	550'	550'	0	0
Sediment Trap Length	1,600'	0'	(1,600')	(100.0)
Main Channel Length	118,502'	118,581'	(79')	(0.1)
Main Channel Depth	-47'	-47'	0	0
Main Channel Bottom Width	300'	300'	0	0
Turning Basin Depth	-47'	-47'	0	0
Turning Basin Bottom Width	1,200'	1,200'	0	0
Total Length in feet	151,502	144,581	(6,921)	(4.6)
New Work Dredging Quantities CY	20,963,397	39,333,500	18,370,103	87.6
O&M Quantities CY	154,030,311	282,110,088	128,079,777	83.2
Aids to Navigation	Same	Same	0	0
Pipeline Relocations	16	1	(15)	(93.8)
Mitigation Acres	—	—	—	—

ITEM OR FEATURE	2019	2025	Change	% Change
Oyster Reef Lost	129	94.8	(34.2)	(26.5)
Oyster Reef Habitat	130	95	(35)	(37)
Marsh Impacted	1.5	0	(1.5)	(100.0)
Sand Engine Acres	165	165	0	0
Project First Costs	\$281,037,000	\$615,567,000	\$334,530,000	119
Federal	\$177,681,000	\$431,526,000	\$259,545,000	143
Non-Federal	\$103,356,000	\$184,041,000	\$80,685,000	78
Associated Costs	\$10,029,000	\$38,369,000	\$22,483,000	283
AAEQ Costs	\$15,886,000	\$36,466,000	\$20,580,000	130
Total Net Benefits	\$19,972,000	(\$19,755,000)	(\$39,727,000)	(199)
BCR	2.26	0.46	(1.8)	(80)

4.14 Conclusion

The selection of Alternative Plan A at Scale -47'/-49' MLLW is again the Recommended Plan. It reflects the best information available, and current Federal policies governing Post-Authorization Change Documentation and deep-draft navigation projects. However, the Galveston District has determined that the 2025 Recommended Plan does not fall within the Chief's Discretionary Authority and that new Congressional Authorization, with updated costs, is required.

The MSCIP will strengthen national security by boosting energy exports, improving our energy trade balance with allies, and supporting defense priorities as outlined in Executive Order 14156 Declaring A National Energy Emergency. It is expected to enable the Assistant Secretary of the Army and the Secretary of Commerce to leverage their emergency authorities to facilitate the transportation, refining, and generation of domestic energy resources.

5 ENVIRONMENTAL CONSEQUENCES

This section describes what can be reasonably expected to happen in the study area. This forecast extends from the base year (the year when the proposed project is expected to be operational) to the end of the period of analysis (2030-2079).

The same resources described in the existing and FWOP conditions in Section 3 are also described for the FWP condition as the basis for comparison of effects. The FWOP condition (No Action Alternative) form the basis against which other alternative plans are measured. The No Action Alternative includes a channel depth of -38 ft / -40 ft MLLW, channel width of 200 ft / 300 ft, and existing placement areas, see Figure 11.

This section provides an evaluation of the potential environmental effects of the proposed action. The proposed preferred alternative, known as recommended scale for this report, would consist of deepening the MSC to -47 ft MLLW and widening of bottom width to 300 ft of the main channel, deepening to -49 ft MLLW and widening of bottom width to 550 ft of the entrance channel, increasing the turning basin to a 1,200 foot diameter, and the placement of the dredged material as described in the DMMP (Appendix E) and shown in Figure 65 of this report which would represent the largest scale and therefore would disclose the greatest effects associated with proposed recommended scale. The proposed advance maintenance and allowable overdepth are included as part of the deepening and widening as shown in Figure 64 and are included in the new work quantity. All three proposed scales would have same proposed width of 300 ft in the main channel, 550 ft in the entrance channel, and turning basin dimensions. The proposed channel depth of other two proposed scales (-43 ft / -45 ft and -45 ft / -47 ft MLLW) would be shallower than the recommend scale (-47 ft / -49 ft MLLW), as shown in Table 5 in Section 2.1 - 2019 and 2025 Final Array of Alternatives. It is expected that the DMMP for all three proposed scales would consist of the same proposed placement areas because the location of DMMP footprints is intended for operational efficiency and to minimize impacts. Furthermore, due to dredged material dispersion, large footprints are desired in an effort to contain sediments within the placement area boundary. However, the two proposed shallower scales would result in less dredged material being placed in placement areas. Though similar short-term construction-related effects from the two smaller scales would occur since the placement activities would be same as recommended scale. In addition, majority of permanent impacts to oyster habitat would occur due to the proposed turning basin construction, a common feature proposed for all three scales. Therefore, the two smaller scales would have similar oyster impacts as the recommended scale. During the development of the proposed DMMP, it went through several iterations in an effort to avoid and minimize impacts to oysters, seagrass and cultural resources as new survey data became available. In addition, those iterations changed to include more beneficial use sites. For more details, refer to Section 6 in Appendix E – Dredged Material Management Plan.

The following descriptors are used in the body of this chapter for consistency in describing impact intensity in relation to significance.

- **No or Negligible Impact:** The action would result in no effect, or the effect would not change the resource condition in a perceptible way. Negligible is defined as such little consequences as not to require additional consideration or mitigation.
- **Minor Impact:** The effect to the resource would be perceptible; however, the effect would not be major and unlikely to result in an overall change in resource character.
- **Moderate Impact:** The effect to the resource would be perceptible and may result in an overall change in resource character. Moderate impacts are not significant due to their

limited context (the geographic, biophysical, and social context in which the effects would occur) or intensity (the severity of the impact, in whatever context it occurs).

- **Significant Impact:** The effect to the resource would be perceptible and may be severe. The effect would likely result in an overall change in resource character. The determination of significant impact to any resource would require the completion of an EIS.

NOTE: Unless otherwise specified, information in this document is considered to be accurate for both the 2019 F/EIS and for the 2025 V/SEIS.

5.1 Summary of Environmental Consequences

Table 51 summarizes the expected effects on resources analyzed for the proposed recommended scale, as compared to the No Action Alternative. The remainder of this section discusses the evaluations that resulted in these expectations.

Table 51 – Summary of Expected Effects

Resource	No Action Alternative	Proposed Recommended Scale
Topography, soils, geology, and groundwater	Same or similar to existing condition.	Minor effects to topography and soils due to dredging activities and no impacts to geology, and groundwater
Coastal Hydrology and Hydraulics	Same or similar to existing condition. Relative sea level change and shoreline erosion would continue as projected.	Negligible effect on the currents and waves based on hydraulic modeling. Impact to salinity is expected to be minor based on modeling. Any impacts from RSLC would be the same to those described in the No Action Alternative.
Water and Sediment Quality	Same or similar to existing condition.	Short-term construction related impacts to water quality are expected resulting in a minor impact. For sediment quality no or negligible impact would result based on all relevant data.
HTRW	Same or similar to existing condition.	Short-term construction-related impacts to HTRW are expected to be no or negligible. For HTRW, no or negligible impact would result based on all relevant data.
Air Quality	Same or similar to existing condition.	Construction-related emissions would have a moderate impact for three years of the 52-month project schedule. Operational related emissions would be considered to be negligible to minor impact since Calhoun County is in attainment, and

Resource	No Action Alternative	Proposed Recommended Scale
		the project area is not near a population center.
Noise	Same or similar to existing condition.	No to negligible airborne and underwater impacts from noise in comparison to the No Action Alternative.
Wetlands	Same or similar to existing condition.	Short-term construction-related impacts to wetlands would be similar to the No Action Alternative and long-term beneficial impact with possible increase in salt marsh (up to ~ 337 acres).
Wildlife	Same or similar to existing condition. Maintenance dredging would result in short-term turbidity impacts to aquatic prey species, indirectly affecting wildlife. Continued placement at Chester Island would benefit nesting habitat for colonial waterbirds.	The initial dredging activities would be short-term, indirect resulting in minor impacts to wildlife. Proposed maintenance dredging activities would have the same impacts as those described for the No Action Alternative. Creation of the bird island, continued placement at Chester Island, and the sand engine would result in long term beneficial impacts to specifically birds.
Aquatic Resources	Same or similar to existing condition.	Similar impacts to fish and commercial fishery as described in the No Action Alternative. Minor impacts to benthos. Significant impact to oyster habitat. No impact to submerged aquatic vegetation.
Special Status Species	Same or similar to existing condition.	ESA: Moderate impacts to 4 species of sea turtles from dredging activities; minor impacts to 4 species of sea turtle from placement activities; minor impact to West Indian manatee and 3 birds from dredging and placement activities. EFH: Impacts to EFH would be considered significant, mainly due to the oyster habitat impacts. Impacts to Federally managed fish would be minor. Marine Mammals: Similar impacts as described in the No Action Alternative resulting in no to negligible impacts to marine mammals.

Resource	No Action Alternative	Proposed Recommended Scale
Special Management Areas	Same or similar to existing condition.	Minor short-term construction-related effects to Powderhorn Wildlife Management Area and Chester Island Bird Sanctuary
Cultural Resources	Same or similar to existing condition.	Potential to affect cultural resources due to direct impacts from dredging activities and dredged material placement related to construction, specifically disturbance of the gulf and bay bottoms.
Recreation	Same or similar to existing condition.	Similar impacts as described in the No Action Alternative resulting in no to negligible impacts to recreation.
Socioeconomics	Same or similar to existing condition.	Similar impact as described in the No Action Alternative resulting in no to negligible impacts to socioeconomics.

5.2 Topography, Soils, Geology, and Groundwater

The modifications to the navigation channel and proposed placement areas from the recommended scale would not impact surface topography but would have minor bathymetric changes in the vicinity of existing navigation channel and the existing and proposed placement areas. Mainland topography or drainage patterns would not be altered from the existing conditions.

Dredging to deepen and widen the MSC and associated placement of dredged material for the recommended scale would result in a minor impact to the local soils by redistributing existing bay bottom clays and sediments, causing potential increases of local shoaling rates within the MSC. Additionally, there would be no impacts or changes to geologic hazards such as faults and subsidence. Neither would the recommended scale be expected to have effects on groundwater, as there are no expected increases from associated human activity, including land excavation and water consumption. Overall, the recommended scale would have minor effects to topography and soils and no impacts to geology, and groundwater.

5.3 Coastal Hydrology and Hydraulics

5.3.1 Tides, Currents, and Water Levels

The tidal prism in the bay can be expected to increase under proposed Recommended Scale. Similarly, currents are not expected to drastically increase, though the jetty entrance is deficient and even a small increase in the flood/ebb current could be significant. A larger tidal prism, accompanied by locally magnified currents at the entrance may make navigation more challenging, but should not have measurable environmental consequences.

The recommended scale would not have any effect on freshwater inflows but would to a limited extent modify the tidal exchange of water with the Gulf. There would also be modifications to the

tidal movement of water produced by the PA features. With tidal exchange, the main constriction points for water entering and leaving the bay are the inlet at the MSC entrance and at Pass Cavallo. Hydraulic modeling suggests the deepening and widening of the MSC would have negligible effect on the currents and waves within Matagorda Bay (See Appendix F for more detail).

5.3.2 Salinity

One effect of deepening the MSC would be to allow the density current to transport a large volume of higher salinity Gulf water up the bay under certain conditions. The biggest effects are expected to occur following large freshwater inflow events when there is a strong salinity gradient from the upper to the lower bay. In this case, the deeper channel can be expected to reduce the time required for the density current to move higher salinity Gulf water to Lavaca Bay. This can be expected to increase the average salinity in the upper Matagorda and Lavaca Bays.

During dry periods when salinity levels are relatively high throughout the bay, density differences would be small, and the deeper channel would have relatively little effect.

Lin et al. conducted salinity modeling of Matagorda Bay with the proposed deepening and widening of the MSC (Lin et al. 2018). Findings from that effort revealed relatively small changes to average bay salinity. The most notable changes occurred for high-energy events (Hurricane Harvey) and were isolated to areas near the shipping channel.

Focusing on Hurricane Harvey (2017) and Rita (2005), a total of 20 different scenarios were simulated with varying water levels and riverine inflows. The 2018 study found, “In Matagorda Bay, the difference of model salinity values between PWOP and PWP, and also between FWOP and FWP, is overall small, less than 2 ppt excluding the PA areas.”

The modeling also found that the minimum salinity slightly increases in Lavaca Bay under with project conditions, the recommended scale. Under the “medium flow” and “low flow” scenarios, the salinity in Matagorda Bay is generally higher for with project. However, “high flow” conditions, such as those experienced during Harvey, lead to lower salinity in the middle and eastern Matagorda Bay for with project. Overall, the impact to salinity is expected to be minor with the proposed deepening and widening. Figure 60 illustrates the average salinity difference between Recommended Scale and No Action Alternative scenarios for Hurricane Harvey generated by CMS.

5.3.3 Relative Sea Level Change

Any impacts from RSLC would be the same to those described in the No Action Alternative and therefore in comparison to the No Action Alternative, the recommended scale would result in no impact from RSLC.

5.4 Water and Sediment Quality

5.4.1.1 Water Quality

Under the recommended scale, factors that could affect DO include the increase in both water circulation and salinity. The increased tidal activity is primarily associated with the bottleneck

removal, which is not part of this project. In general, increased water velocity would contribute to improved mixing and oxygen transport. The increase in salinity along the axis of the MSC would slightly reduce the DO saturation concentration and thus the absolute value by a similar amount. For example, a change in salinity from 20 to 21 PSU would reduce the DO saturation concentration at 25 degrees Celsius (°C) from 7.39 to 7.35 mg/L (Kraus et al. 2006). The magnitude of change is not likely to have a significant effect on the system.

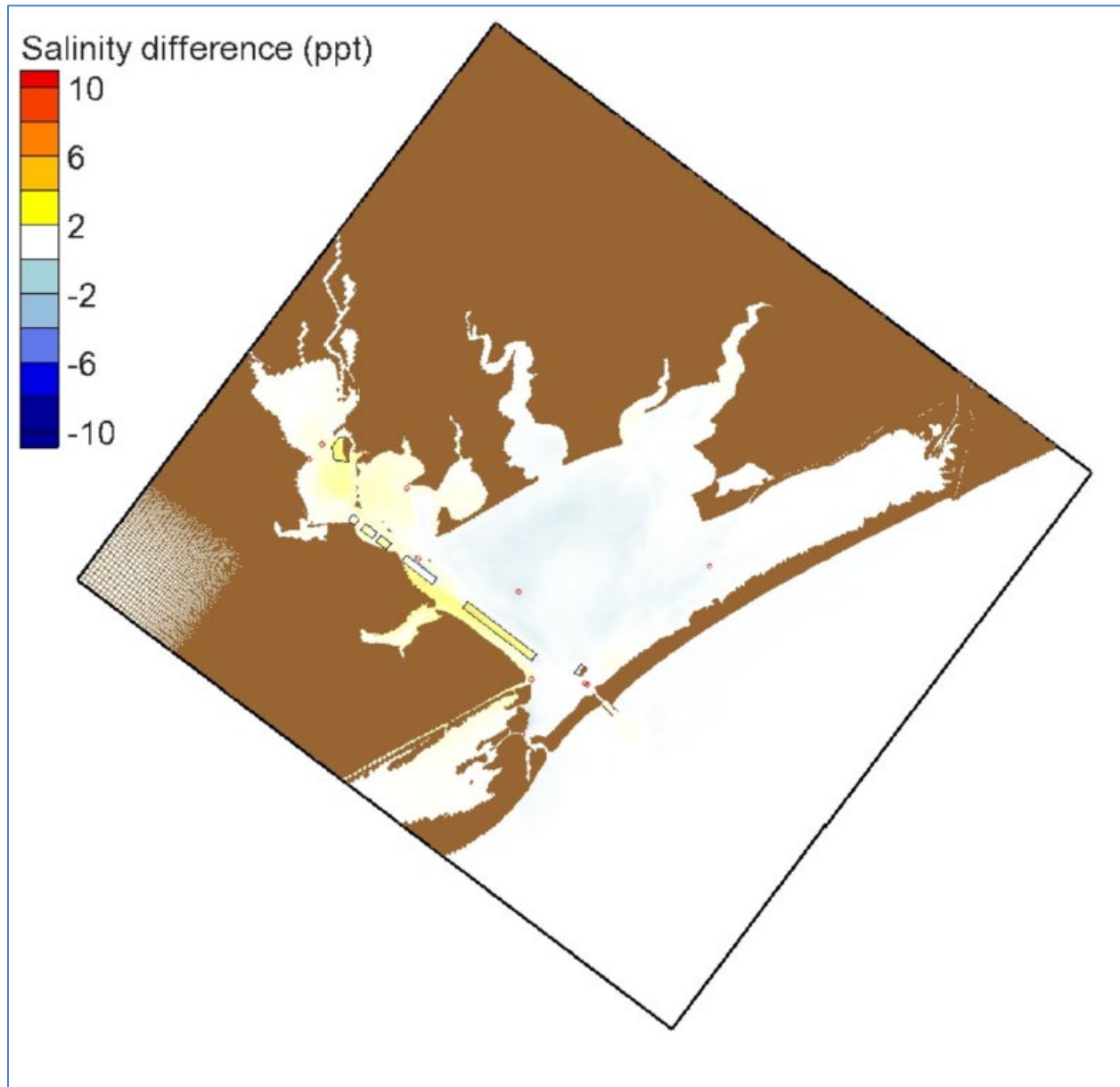


Figure 60 – Difference of Average Salinity fields from Hurricane Harvey (FWP-FWOP) Lin et al.

Although there would be more maintenance material placed in Matagorda Bay under the recommended scale, the source of the material would not change, and the method of placement would not change. Turbidity should not change in the bay since the turbidity caused by placement of dredged material is temporary and would not add significantly to the natural, wind- and-wave-generated turbidity. There is the possibility of contamination of the maintenance

material by a future spill or other event, as there is now, but deepening and widening the channel should increase safety and decrease the probability of an accidental spill. Note that the USACE routinely tests sediment before maintenance dredging, including the elutriate prepared from maintenance material, according to the ITM (EPA/USACE 1998) and the RIA (EPA/USACE, 2003) protocols to ensure that there are no causes for concern. The ITM and RIA provide guidance for testing water quality (water and elutriate) for in bay and offshore placement, respectively. Prior to maintenance dredging by means of Tier I (use of readily available information), Tier II (water chemistry information, including comparison of elutriates to TWQSS and WQC), and Tier III (bioassays and bioaccumulation testing) Evaluations have indicated no cause for concern in the past, so it is reasonable to conclude that future sediment quality would not likely change. Additionally, no significant detrimental environmental effects have been noted as a result of past maintenance dredging operations and are not expected with the recommended scale.

Open-bay placement of maintenance material would continue in Matagorda Bay, so temporary turbidity impacts there should be roughly equivalent to the No-Action Alternative. Offshore placement of construction material would cause a one-time increase in turbidity at the construction material ODMDS, and offshore placement of future maintenance material would periodically create turbidity, as it does now.

Indicator bacteria are a water quality issue in the bay system. The project would not produce any significant alterations in runoff hydrology, so there should not be any change in runoff-related bacteria levels. However, because indicator bacteria are found in sediments (Fries et al., 2006) and the project would disturb sediments as part of the dredging process, some localized and short-term increases in indicator bacteria concentrations during dredging can be expected.

A similar situation exists for mercury that may emanate from sediment. While the project would involve dredging in areas that have low mercury concentrations in the sediment that is considered acceptable to the U.S. EPA, there would be some amount of re-suspension of sediment associated with the construction dredging process. As a result, some dissolved mercury may result from the sediments during the construction phase and, if it occurs, it would be temporary and localized. However, no change in ambient aqueous mercury concentrations are expected as a result of the construction phase. In summary, overall impacts to water quality are expected to be short-term, construction related, and minor.

5.4.1.2 Sediment Quality

The Recommended Scale could result in the disturbance of bay sediments in the project area during the construction phase that increases turbidity. Activities performed as part of the Recommended Scale that may potentially disturb bay sediments include dredging, placement of dredged material to build dikes, placement of dredged material within placement areas, and building access channels for moving equipment. There is potential for a change in bay-bottom velocities due to a wider and deeper channel and the actions taken as part of the DMMP.

Bay sediments can be disturbed by placement of dredged material and from building dikes to contain the dredged material within the placement areas. There is the possibility that placement of dredged material to build the dikes would displace sediments from underneath the dikes, referred to as a mud wave. Mud waves occur when dredged material is rapidly placed on top of soft, weak sediments exceeding the sediment's bearing capacity.

In addition to turbidity, sediment quality within a portion of the project footprint that are part of a Superfund site and known to have mercury contamination has been remediated by ALCOA under a Record of Decision with the U.S. EPA. As a part of that ROD, ALCOA is responsible to

remove any sediment that is found to be above the remedial action objective of 0.5 mg/kg. The specific area is at the northern end of the project footprint around the port. The sediment quality for the entire project has been sampled and analyzed, including the area near the port, and all average mercury concentrations are below the remedial action objective established for reduction of mercury levels in open water in areas of Lavaca Bay established during the remedial investigation of the Alcoa (Point Comfort)/Lavaca Bay Superfund Site and covered by the ROD. Thus, there should be no restrictions on the use of the dredged material resulting from the construction of the Recommended Scale.

The quality of the maintenance material (sediment) is not expected to change as a result of building the Recommended Scale. While more maintenance material is estimated with the Recommended Scale, the source of the maintenance material would not change, and the method of placement would not change in Matagorda Bay. Furthermore, the Recommended Scale should increase vessel / navigation safety and decrease the probability of a future accidental release/spill. As a part of maintenance dredging, the USACE routinely tests the maintenance material (sediment) according to the ITM and RIA protocols before dredging to ensure that there are no causes for concern. Past testing of maintenance material described in Section 3 Existing Conditions involving chemical analysis, whole mud bioassays, and bioaccumulation studies has indicated no cause for concern, and this is not expected to change as a result of the Recommended Scale.

Taken together, the concerns regarding effects from the Recommended Scale on sediment quality were studied and the conclusion, based on all relevant data, would be no or negligible impacts.

5.5 Hazardous, Toxic, and Radioactive Waste

The potential for encountering impacted material during the construction of the project is limited since no inland placement of dredged material is proposed. The existing conditions surrounding the project footprint are discussed more in Section 3 and Appendix B. In addition, sediment quality testing conducted in 2023, 2022, and 2019 show a low risk of encountering contaminated sediment within the project footprint during the construction phase of the project. This project would also require (vis-à-vis contract specifications) the dredging contractor to use sediment curtains that help to contain turbidity created during dredging that would also limit migration of sediment from the dredging / placement locations. In conclusion, no or negligible impact would result based on all relevant data if the Recommended Scale is executed.

5.6 Air Quality

5.6.1 Construction Emissions

Temporary increases in air pollution would result from the operation of equipment associated with deepening of the channel, construction of the bird island placement areas, and the transport and placement of dredged material. Construction activities would be considered one-time activities, i.e., the construction activities would not continue past the date of completion. For purposes of estimating emissions, the construction activities would be projected to take roughly 52 months.

These air contaminant emissions would result from the use of marine vessels and land-based mobile sources during the construction activities. Diesel-fired engines would be used during

dredging operations, to transport materials to their designated locations, and for support of associated dredging equipment. This equipment includes primarily dredges, booster pumps, barges, tugboats, transport and supply boats, survey boats, and crew boats. Equipment such as excavators, backhoes, and front-end loaders would also be required for shallow water work. Emissions from crew vehicles are also estimated and included in the analysis. Not included in the analysis are emissions resulting from advance maintenance dredging that is already conducted on a routine basis and is exempt from the general conformity determination as stated in Table 2 of 40 C.F.R.93.153.c.2.ix. which excludes:

“Maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and disposal would be at an approved disposal site.”

(<https://www.govinfo.gov/app/details/C.F.R.-2009-title40-vol20/C.F.R.-2009-title40-vol20-sec93-153>)

Emission rates for dredging and support equipment are directly related to the horsepower rating of the engines, load factors, duration of use, and amount of material to be dredged. Diesel fuel combustion in the internal combustion engines of the vessels during dredging operations would result in emissions of CO, NO_x, particulate matter, SO₂, and volatile organic compounds. The air quality study is detailed further in Appendix B. The emissions projected from construction would have a moderate impact for three years of the 52-month project schedule.

5.6.2 Operational Air Emissions

The MSCIP does not include the construction of any stationary emission producing features, so long-term emissions would be related to the users of the MSC and Turning Basin at the Port and the periodic maintenance dredging needs that are above the current dredging operations.

Deepening the navigation channel to -47 ft MLLW/-49 ft MLLW would allow deeper draft marine vessels that carry more goods. The increased weight and deeper draft of the vessels often require engines with more horsepower, potentially burning more fuel with a potential increase in emissions. However, the newer, deep-draft vessels typically have better emissions controls, and their greater load capacity would allow for better efficiency, including fewer trips, that would result in at a minimum no net change in air quality, but likely a net decrease if the demand for goods increased.

Maintenance dredging would be completed on an as-needed basis to maintain the channel at the authorized depth. It is anticipated that maintenance dredging would be on an as needed, annual basis based on past river flows and sediment depositional patterns in the navigation channel. During maintenance dredging, the emissions described for construction emissions in Section 5.6.1 would occur, except that maintenance dredging is removing naturally recurring deposited bottom sediments that require significantly less time and horsepower to remove than new work dredging.

The MSCIP would be compliant with the Clean Air Act as the study area is in attainment for all NAAQS standards. Additionally, the MSCIP would not significantly contribute to criteria pollutant emissions that would threaten attainment status. Under the MSCIP, construction associated with new work and future maintenance dredging would have negligible, short-term impacts, while long-term operation of the channel would have negligible, long-term adverse impacts to air quality.

In summary, navigation channel maintenance under the recommended scale would be sustained using new placement areas and navigation channel depth would be increased to -47 ft MLLW in the main channel and to -49 ft MLLW in the entrance channel. Sustained

maintenance dredging and disposal would likely result in an increase in emissions compared to existing conditions. Because Calhoun County is in attainment and the project area is not near a population center, the increase in emissions would be considered a negligible to minor impact on environmental resources.

5.7 Noise

Dredging and material disposal activities are noise generating activities and can contribute to increased airborne ambient noise levels in the project area, potentially affecting nearby wildlife, nearby facilities, and other individuals near the dredge site. Sensitive receptors such as the City of Port Lavaca and the communities of Port O'Connor, Magnolia Beach, Indianola, Alamo Beach, and Point Comfort may also be impacted. A concern would be the impact on migrating birds as high levels of noise pollution can interfere with birds' ability to hear natural cues and landmarks, they rely on for navigation during migration, potentially leading to disorientation and straying off course. Additionally, elevated noise levels near nesting or resting areas can discourage birds from using these habitats, and may affect their ability to rest, forage, or breed effectively. As this project area is in the central flyway and has a bird sanctuary, short-term construction related impacts may occur.

Marine life would be directly impacted as increased underwater noise from dredging, vessel traffic, and industrial activities can disrupt marine species' behavior, potentially impacting their ability to hunt, communicate, and navigate. Noise would also directly influence fish behavior due to their ability to hear sound starting at 40 Hz. Additionally, vibrations from the sound waves could have an impact on their lateral line system, affecting their predator avoidance, mating, and social interaction, which may have ecological implications for the local marine ecosystem. Continuous or intense noise exposure might result in long-term stress or physiological effects on marine organisms, impacting their health and reproduction which would have lasting effects on the marine environment. Short-term construction related impacts may occur to marine species with the proposed dredging activity.

Once the dredging activities are completed, no impact from noise generated activities would occur for both airborne and underwater. Since the noise generating activities associated with the recommended scale would be the same type of activities as the ongoing maintenance dredging activities, the impacts would be the same to those in the No Action Alternative. Therefore, in comparison to the No Action Alternative, the recommended scale would result in a no-to-negligible airborne and underwater impacts from noise.

5.8 Wetlands

Potential impacts to salt marsh wetlands resulting from the recommended scale would be similar as the No Action Alternative described in Section 3.8.2 with the exception of the larger footprint of PA18/19 expansion for maintenance dredging. This proposed footprint would include approximately 260 acres of existing salt marsh. Placement at PA18/19 expansion would be a continuation of the existing placement at PA19 at a frequency of placement approximately every one to two years. As discussed in Section 3.8.2, on-going placement at this location would continue to maintain and most likely to create salt marsh wetlands. Placement at the proposed PA18/19 expansion would be done in the same manner as the existing placement at PA19 through pumping dredged material to specified discharge location within the footprint and the material slurry would run off over the land, increasing amount of salt marsh at this area. Short-term construction-related impacts to wetlands would be similar to the No Action Alternative, thus

resulting in no to negligible impacts. Over the 50-year project life, there is the possibility that up to approximately 337 acres of open water habitat could be converted to salt marsh with on-going placement at PA18/19 expansion resulting in a beneficial effect to salt marsh.

The proposed bird island would convert open water to approximately 350 acres of rookery and shorebird island habitat. The proposed bird island would be ecologically beneficial to shorebirds.

5.9 Wildlife

While initial dredging activities to deepen and widen the ship channel would unlikely have a direct impact on wildlife species, they could have a slightly greater indirect impact than the maintenance dredging and placement activities in the No Action Alternative. Such activities may cause temporary impacts to aquatic communities and habitats, which in turn may indirectly impact seabirds in the area by potentially reducing the availability of the food supply. The increased potential for accidental spills of petroleum products, chemicals, or other hazardous materials during the initial dredging activities, however slight, also poses a potential, although very small, threat to the aquatic community, and thus the food source of many coastal birds in the area. The noise of equipment and increased human activity during the initial dredging activities near shorelines may disturb some local wildlife, particularly coastal birds, especially during the breeding season. Such impacts, however, would be temporary. Overall, the initial dredging activities to deepen and widen the ship channel would be considered short-term, indirect resulting in minor impacts to wildlife. Impacts from proposed maintenance dredging activities would have the same impacts as those described for the No Action Alternative.

In addition, the proposed Bird Island would create up to approximately 350 acres of bird island habitat, targeting Reddish Egret and Black Skimmer nesting habitat, resulting in long-term beneficial impact. Continued placement at Chester Island and potential periodic placement at PA 16 would result in long-term beneficial effect on nesting habitat for colonial waterbirds. Placement at PA 16 would be depending upon future maintenance dredging capacity. In addition, beach renourishment southwest of ship channel entrance along the gulf side of Matagorda Peninsula and possibly as far down as Matagorda Island as a result of the proposed sand engine is expected. This potential beach renourishment could result in a beneficial effect to ground nesting habitat.

5.10 Aquatic Resources

5.10.1 Fish

Under the proposed recommended scale, fish would experience similar impacts as described above in Section 3.10.2 for the No Action Alternative.

5.10.2 Benthos

The recommended scale would alter the benthic habitat through dredging and placement activities. Similar to effects described for the No Action Alternative in Section 3.10.2, the proposed dredging to the proposed depth of -47 ft MLLW/-49 ft MLLW and future routine maintenance dredging would result in temporary impacts to the benthic substrate along the MSC due to localized turbidity and associated dredging activity. In addition, the substrate would

be expected to recover from organisms recolonizing disturbed areas from the adjacent undisturbed areas as well as through recruitment.

The proposed placement areas for both new work and O&M material would result in a loss of approximately 6,600 acres of open-bay bottom and thus affecting benthic substrate; however, the acreage involved would be a small fraction of the total available habitat within the entire system, approximately 62,948 acres. Similar to dredging, it is anticipated that the benthic communities at these proposed placement areas would recover with the exception of bird island which would permanently cover approximately 350 acres of open-bay bottom and thereby resulting in a permanent loss of the benthic community. Though this loss would represent a small portion of the overall benthic habitat. Overall, the impacts to the benthic habitat would be minor.

5.10.3 Oyster Habitat

All the acreages are based on the following data and surveys: TPWD 2022, TAMUG 2023, Lloyd Engineering, Inc. 2025, and GLO 2023. Utilizing the above-mentioned data and surveys for Lavaca and Matagorda Bays, proposed placement areas were adjusted to minimize and avoid known oyster habitat to the maximum extent possible during the development of the proposed DMMP; however not all oyster habitat was avoided. Switching the placement areas identified in the 2019 Final F/EIS in Matagorda Bay to the east side of the ship channel was the primary measure to avoid oyster habitat, specifically historic oyster habitat/shell hash (TAMUG 2023). Further avoidance was achieved by siting the proposed placement areas in east Matagorda to avoid any oyster habitat on the east side of Matagorda Bay (Lloyd Engineering, Inc. 2025). In addition, during the development of the proposed DMMP, the shape and size of proposed placement areas and bird island were adjusted to minimize potential impacts to oyster habitat especially in Lavaca Bay.

Live oysters (approximately 64 acres) and historic/shell hash (approximately 30.8 acres) are found within the proposed project footprint in Lavaca Bay, no live oysters or historic/shell hash were noted with the surveyed area of Matagorda Bay (TPWD 2022, TAMUG 2023, Lloyd Engineering, Inc. 2025, and GLO 2023). Within the project footprint, the only sand bottom is located around Chester Island, approximately 141 acres (TAMUG 2023). The oyster model has four variables, one of which is percent cultch cover and the other three related to salinity. The salinity variables did not change per type of oyster habitat, but the percent cultch cover variable would. Live oyster is assumed to have 100% cultch cover since this category would be considered the highest quality. Historic/shell hash is assumed to have 80% cultch cover because the data shows there is no live oyster, rather, has shell hash (TAMUG 2003) which is considered high quality. Hard bottom, in this case, sand would be 0% cultch cover since no live, shell hash, or other hard surfaces are not present as defined by 31 Tex. Admin. Code § 58.11 – Definitions (7) (TAMUG 2023). By using this definition, the percent cultch cover variable for sand bottom is 0% resulting in 0 AAHUs of impact and therefore, hard bottom (sand) habitat will not be included further. Impact to the oyster habitat would result in significant, long term, unavoidable impacts and therefore compensatory mitigation would be required.

As a result, approximately 94.8 acres of oyster habitat (live and historic/shell hash) would be affected by proposed dredging activities and/or covered by dredged material during the proposed recommended scale (Figure 61). Effects to oyster habitat would result in permanently covering live oyster, and historic oyster/shell hash. To offset impacts to oyster habitat, approximately 95 acres of oyster habitat would be created by constructing oyster pads using clean crushed, limestone or concrete within the box offshore of Powderhorn Wildlife

Management Area as shown in Figure 62. The draft Mitigation Plan outlining the habitat modeling and proposed mitigation can be found in Appendix B-1.

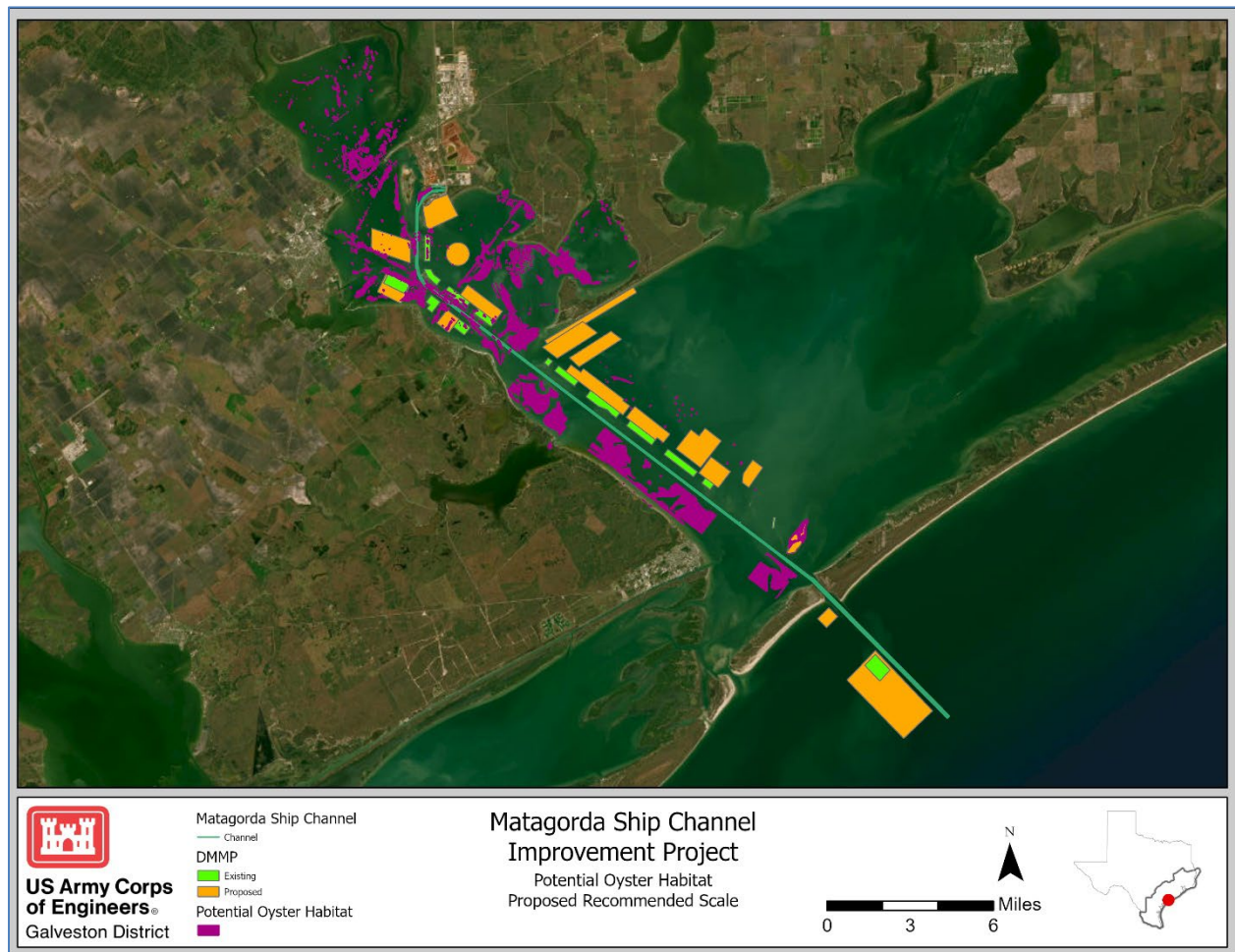


Figure 61 – Potential Oyster Habitat Impacted by the Recommended Scale

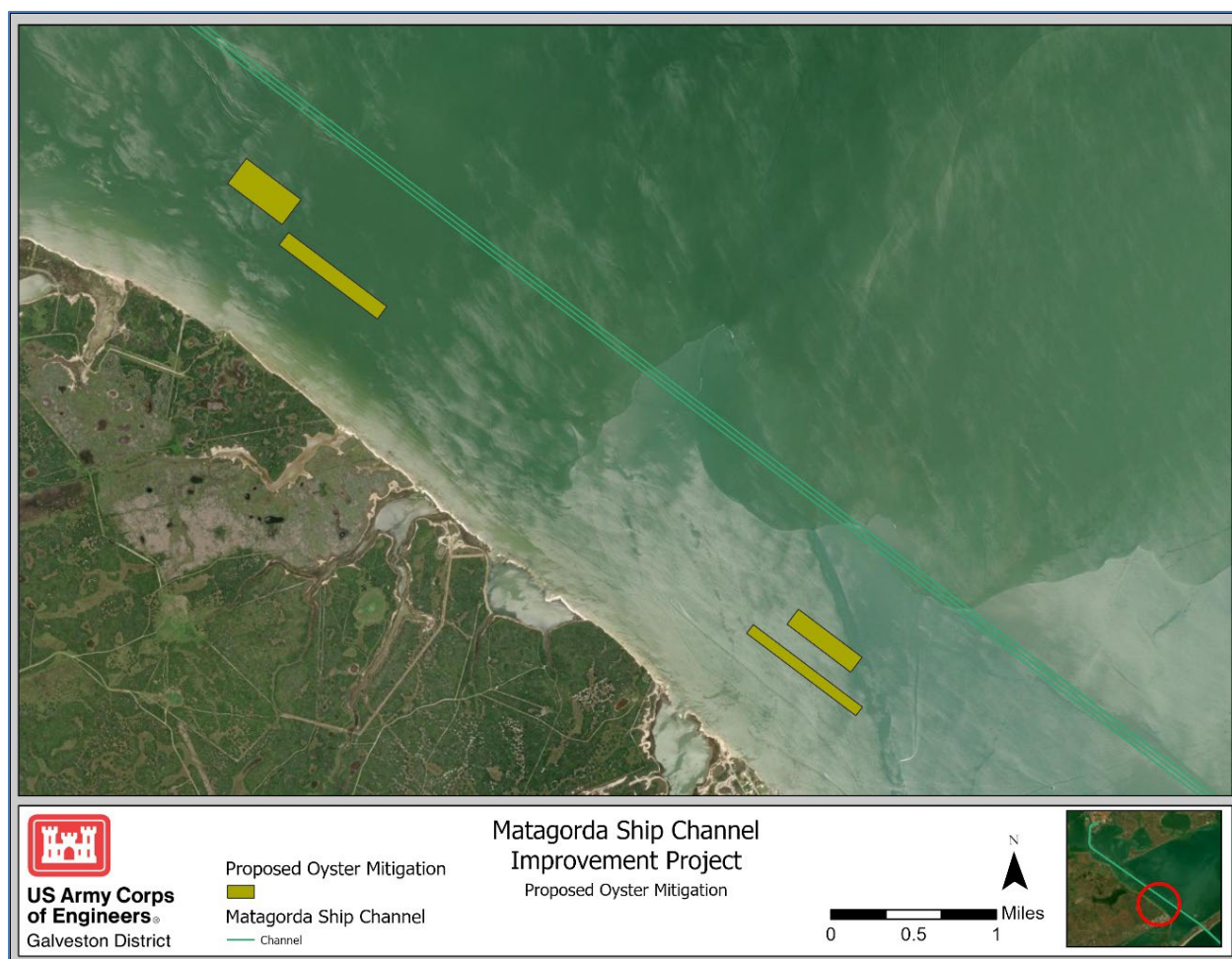


Figure 62 – Proposed Oyster Mitigation Sites

5.10.4 Submerged Aquatic Vegetation

Utilizing the TPWD (2007), GLO (2023), Harte Research Institute (2023), and Lloyd Engineering, Inc. (2025) data and surveys for Lavaca and Matagorda Bays, proposed placement areas were adjusted to avoid seagrass during the development of the proposed DMMP, primarily by switching the placement areas identified in the 2019 Final F/EIS in Matagorda Bay to the east side of the ship channel. Under the recommended scale, no effects to seagrass would occur due to no seagrass is present within the footprints of the ship channel, proposed and existing placement areas or within 1,000 ft of those footprints as shown is Figure 63.

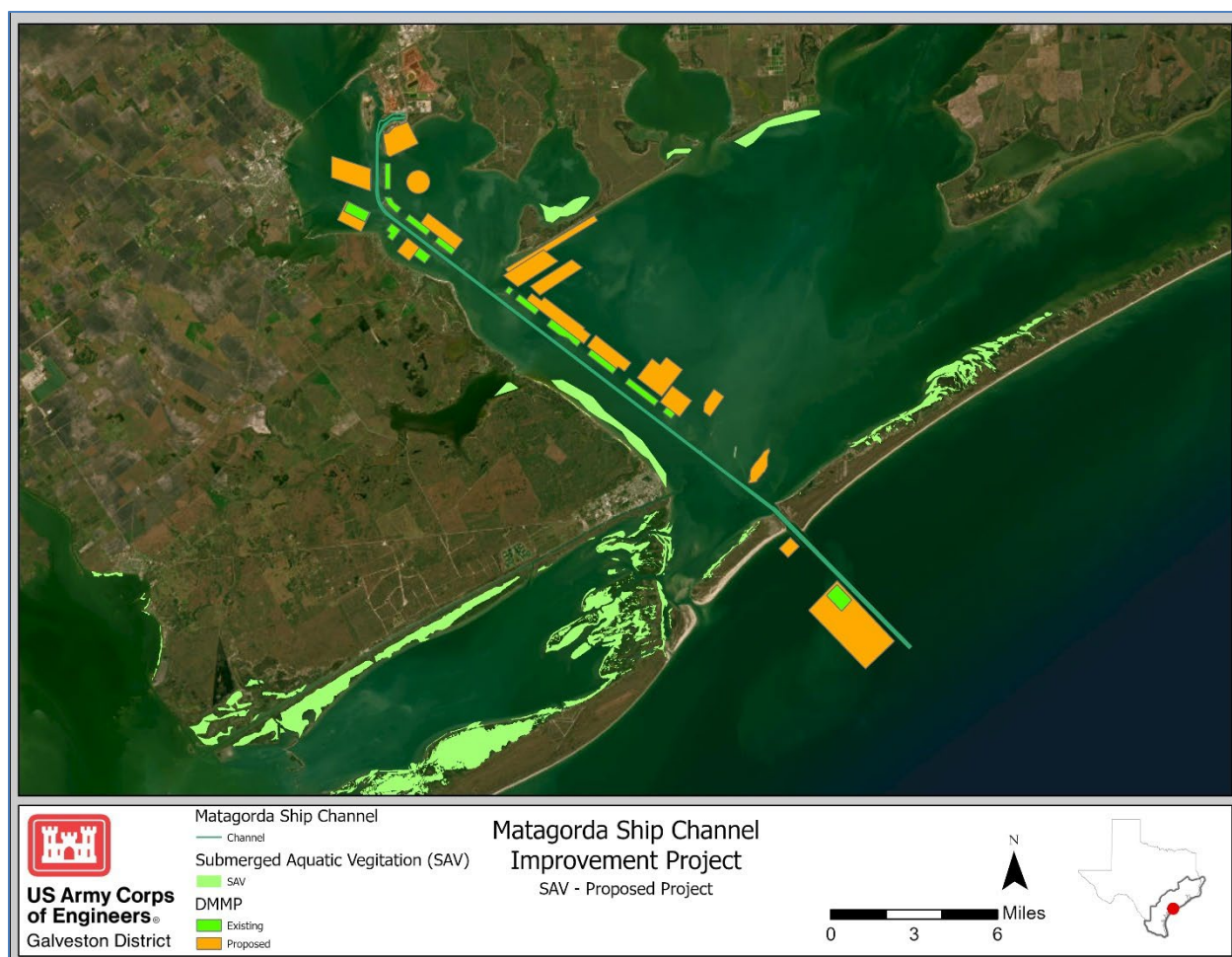


Figure 63 – Submerged Aquatic Vegetation (seagrass) in relation to the Recommended Scale

5.10.5 Commercial Fishery

With this proposed alternative, similar impacts as described in the No Action Alternative (Section 3.10.2) would be expected for the continued maintenance dredging and placement operation.

5.11 Special Status Species

5.11.1 Threatened and Endangered Species

The proposed recommended scale may affect several Federally listed endangered or threatened species. USACE has determined that the proposed recommended scale would have no effect on the following species: northern aplomado falcon, monarch butterfly, tri-colored bat, and leatherback sea turtle. USACE has determined that the proposed recommended scale may affect, but is not likely adversely affect, the following species: West Indian manatee, piping plover, red knot, whooping crane, and giant manta ray. USACE has determined that proposed dredging and placement activities is likely to adversely affect the following sea turtle species:

green, hawksbill, Kemp's ridley, and loggerhead. However, it is unlikely to jeopardize the continued survival or eventual recovery of these species. Additionally, the proposed dredging and placement activities would be similar to existing maintenance dredging and placement activities that all of these ESA-listed species, currently, experience. The recommended scale would not be likely to jeopardize/destroy or adversely modify designated critical habitat for piping plover and loggerhead sea turtles. Effect determinations for Federally listed species are listed in Table 52. ESA consultation documentation can be found in Appendix B-9.

The use of heavy machinery or equipment during dredging and placement of material for the recommended scale may disturb ESA-listed bird species by increasing noise levels near foraging and roosting habitat. Birds may be temporarily displaced from foraging, loafing, and roosting locations to other areas within or adjacent to the Action Area. It is anticipated that once the disturbance ceases, ESA-listed bird species will return to using the area. Short-term construction related impact to ESA-listed birds would be minor.

Potential effects to West Indian manatees and Giant manta rays include the risk of interaction with construction equipment from barge-mounted equipment, small boats, and the removal of dredge materials associated with dredging and placement of material, specifically on the Gulf side of the action area. These potential risks would only occur during dredging and placement activities. Since occurrence of both species in the action area would be rare and both species are mobile likely avoiding construction activities, noise, moving equipment, and placement or removal of materials during construction, any interactions with the proposed dredging and placement activities would be unlikely. Therefore, impacts to West Indian manatees and Giant manta ray would be minor.

Four ESA-listed sea turtle species: green, hawksbill, Kemp's ridley, and loggerhead may be temporarily displaced during the proposed dredging and placement activities. However, once the construction was complete, the sea turtles would not be disturbed and could return. This impact could be reduced by using the minimum amln-water work during placement of pipelines, operation of watercraft to move material or equipment, could impact sea turtles. Impacts could include temporary habitat avoidance, exposure to underwater sound, and visual disturbances, which would all cease upon completion of the proposed dredging and placement activities. In addition, turbidity and sedimentation would occur from dredging and placement activities and are anticipated to end upon completion of the construction activities, at which point, normal conditions are expected to return. Even though there is suitable nesting habitat within and adjacent to the action area, no suitable nesting habitat would directly be affected by the recommended scale because placement of dredged material would not be placed upon any beaches. Therefore, only a minor impact is expected to sea turtle on land.

The proposed recommended scale would use hydraulic cutterhead (in bay), and hopper (entrance channel) dredges. Since cutterhead dredges would be slower moving, sea turtles could avoid this type of dredge. It has been well documented that hopper dredging activities occasionally result in sea turtle entrainment and death, even with seasonal dredging windows, V-shaped turtle-deflector drag heads, and concurrent relocation trawling (NMFS 2025). Between 2015 and 2025, hopper dredging activities within the USACE, SWG resulted in 62 lethal takes of sea turtles: 19 loggerheads, 31 green turtles, and 11 Kemp's ridleys, and one unknown turtle species (USACE 2025). Since 2015, two green sea turtles have been lethally taken during maintenance dredging activities on the MSC (USACE 2025). Hopper dredging could result in mortality of sea turtles resulting in moderate impact to sea turtles. Mitigation (conservation) measures would be incorporated to avoid harassment and take of sea turtles.

Table 52 – Effect determinations for threatened and endangered wildlife species of possible occurrence in Calhoun and Matagorda Counties, Texas

Species	Agency	Federal Status	Effect Determination	Summary of Effects
Birds				
Northern Aplomado Falcon <i>Falco femoralis septentrionalis</i>	USFWS	E	No Effect	No suitable habitat in the action area; no impact.
Piping Plover <i>Charadrius melodus</i>	USFWS	T/CH	NLAA	Minor short-term effect from construction noise and placement of sand engine offshore Matagorda Island. No proposed placement would be directly occur on Matagorda Island. Though, a potential long term positive effect is based on the results of sand engine cultivating positive beach nourishment.
Rufa Red Knot <i>Calidris canutus rufa</i>	USFWS	T/CHP	NLAA	Minor short-term effect from proposed dredging and placement activities.
Eastern Black Rail <i>Laterallus jamaicensis</i>	USFWS	T	NLAA	Potential habitat effects in PA18/19 during construction expansion and placement activities; minor short-term impact. Potential long-term benefit of new marsh created as results of PA 18/19 expansion.
Whooping Crane <i>Grus americana</i>	USFWS	E/CH	NLAA	Minor short-term effect from proposed dredging and placement activities. Potential habitat effects in PA18/19 during construction expansion and placement activities. Potential long-term benefit of new marsh created as results of PA 18/19 expansion.
Fish				
Giant manta ray <i>Manta birostris</i>	NMFS	T	NLAA	Minor short-term construction-related impact due to construction activities could result in habitat avoidance, noise disturbance, collision and/or entanglement with equipment. It is highly unlikely manta rays would be present in the study area; however, they can inhabit estuarine waters. The closest known population occurs more than 100 miles southeast of the study area.
Insects				
Monarch Butterfly <i>Danaus plexippus</i>	USFWS	PT/CHP	No Effect	No suitable habitat in the action area; no impact.
Mammals				
West Indian Manatee <i>Trichechus manatus</i>	USFWS	E	NLAA	Minor short-term impacts due to construction activities could result in habitat avoidance, noise disturbance, collision and/or entanglement with equipment. It is highly unlikely manatees would be present in the study area; however, they are known to inhabit estuarine waters.
Tri Colored Bat <i>Perimyotis subflavus</i>	USFWS	PE	No Effect	No suitable habitat in the action area and no tree removal; no impact.

Species	Agency	Federal Status	Effect Determination	Summary of Effects
Reptiles				
Green sea turtle <i>Chelonia mydas</i>	USFWS NMFS	T/CHP	USFWS: NLAA NMFS: LAA	Moderate impacts due to in-water activities could result in habitat avoidance, noise & visual disturbance, entrapment and/or collision. Minor impacts are expected on nesting turtles as construction would occur in habitat unsuitable for nesting.
Hawksbill sea turtle <i>Eretmochelys imbricata</i>	USFWS NMFS	E/CH	USFWS: NLAA NMFS: LAA	Moderate impacts due to in-water activities could result in habitat avoidance, noise & visual disturbance, entrapment and/or collision. Minor impacts are expected on nesting turtles as construction would occur in habitat unsuitable for nesting.
Kemp's Ridley sea turtle <i>Lepidochelys kempii</i>	USFWS NMFS	E/CHP	USFWS: NLAA NMFS: LAA	Moderate impacts due to in-water activities could result in habitat avoidance, noise & visual disturbance, entrapment and/or collision. Minor impacts are expected on nesting turtles as construction would occur in habitat unsuitable for nesting.
Leatherback sea turtle <i>Dermochelys coriacea</i>	USFWS NMFS	E/CH	USFWS: No Effect NMFS: No Effect	No suitable habitat in the action area and outside known range; no impact.
Loggerhead sea turtle <i>Caretta caretta</i>	USFWS NMFS	T/CH	USFWS: NLAA NMFS: LAA	Moderate impacts due to in-water activities could result in habitat avoidance, noise & visual disturbance, entrapment and/or collision. Minor impacts are expected on nesting turtles as construction would occur in habitat unsuitable for nesting.
T= Threatened E= Endangered P= Proposed NLAA= Not Likely to Adversely Affect LAA = Likely to Adversely Affect CH = Critical Habitat CHP = Critical Habitat Proposed				

To minimize impacts to the above-mentioned ESA listed species, a number of avoidance and minimization action would be implemented during proposed dredging and placement activities. To minimize potential sea turtle impacts, sea turtle avoidance measures would consist use of temporal dredging windows, when possible; intake and overflow screening; use of sea turtle deflector drag heads; observer reporting requirements; and sea turtle relocation/abundance trawling, if needed. Additionally, operation of any mechanical construction equipment would stop immediately if a sea turtle were seen within 150' of operations. Any turbidity curtains and other in-water equipment would be properly secured and made with material in which sea turtles cannot become entangled

5.11.2 Essential Fish Habitat

All of the Federally managed fisheries in and near the Matagorda Bay system utilize estuarine and gulf habitat during some portion of their life cycle for spawning, food, development or protection. The recommended scale would have adverse impacts, both directly and indirectly, to EFH including oyster habitat in the project area. The recommended scale would temporarily affect EFH by distributing bottom sediments and increasing turbidity in both the marine and estuarine water column in the vicinity of the dredging activity, which can have adverse effects on finfish and shellfish species. This impact would be similar to the No Action Alternative.

Dredging would also directly affect Gulf bottom habitat. The proposed bird island would permanently cover approximately 350 acres of bay bottom as mentioned in Section 5.10.2. However, this proposed bird island most likely would provide other types of EFH habitat such as emergent marsh, increasing the amount of nursery areas, protective habitat, and food sources within the Matagorda Bay estuary. As discussed in Section 5.10.2, impact to bay bottom habitat from the proposed placement areas for both new work and O&M material would represent a small fraction of the total available habitat within the entire system.

As described in Section 5.10.3, oyster habitat would be permanently covered, representing a loss of approximately 94.8 acres of oyster habitat (Figure 61), resulting in a significant impact. To offset this impact, approximately 95 acres of oyster habitat would be created, refer to Appendix B-1 for more information regarding the mitigation.

In summary, the recommended scale would result in both temporary and permanent impacts to portions of the action area. Turbidity and sedimentation as well as barge anchoring would temporarily impact fish species and habitat during dredging and dredge material placement operations, including during both new work and O&M activities. Seafloor area occupied by the MSC would permanently increase, and seafloor bottom habitat permanently altered as dredge material is deposited in PAs. Water column habitat may be temporarily affected, and approximately 94.8 acres of oyster reef habitat permanently affected as described in Section 5.10.3. However, with implementation of the oyster reef mitigation plan (Appendix B-1) and the implementation of EFH guidelines (Section 3.4.2 of EFH Assessment in Appendix B-6-2), the recommended scale avoids, minimizes, and, where permanent adverse impacts are unavoidable, compensates for negative effects on EFH. In summary, the proposed recommended scale may adversely affect EFH; however, most of the overall proposed project effects to EFH would be temporary and/or be negligible considering the localized effect of the actions compared to the unaffected habitat available in the Matagorda Bay System with the exception of lost oyster habitat that would be offset with compensatory oyster mitigation. The EHF Assessment can be found in Appendix B-6-2.

5.11.3 Marine Mammals

The proposed recommended scale would have the same effects to marine mammals as described above in Section 3.11.2.3 for the No Action Alternative

5.12 Special Management Areas

Within the project region, four Special Management Areas (SMAs) have been identified: Aransas National Wildlife Refuge, Powderhorn WMA, Matagorda Island WMA, and Chester Island Bird Sanctuary. Only Powderhorn WMA and Chester Island Bird Sanctuary are anticipated to experience any potential impacts as a result of the proposed activities. The other two SMAs are further from the proposed dredging and placement activities and are not expected to have any effects.

Although the USACE would no longer proposing placement areas near the Powderhorn WMA, potential oyster mitigation sites have been identified near to the WMA. The construction of these mitigation sites are expected to have minor impact on the WMA. Any disturbances that may occur are projected to be temporary construction-related and not result in long term effect.

As part of erosion control efforts, the USACE would continue to place dredged material on Chester Island under the proposed recommended scale. This activity is intended to reduce shoreline erosion and maintain habitat quality. During material placement activities, the birds could be temporarily disturbed; however, this effect would be minimized with the work window during nesting season (March 1 to September 1). Overall, the proposed recommended scale would result in minor short-term construction-related effects to special management areas in the project area.

5.13 Cultural Resources

The proposed action includes deepening and widening of the existing channel, the construction of new PAs, and the expansion of existing PAs, along the margins of the channel. The area of potential effect (APE) for the proposed action consists of the footprint of all areas directly affected by deepening, widening, and dredged material placement. The APE is entirely within submerged lands owned by the state of Texas. The APE was developed in consultation with the Texas State Historic Preservation Officer (SHPO) and Native American Tribes. During the previous feasibility study, the USACE executed a Programmatic Agreement (PA) between the Texas SHPO and the Calhoun Port Authority. The Comanche Indian Tribe, the Mescalero Apache Tribe, Kiowa Indian Tribe of Oklahoma, and the Tonkawa Tribe of Indians of Oklahoma were invited to participate in the development of this PA. The PA defines the APE and outlines the process for identifying, evaluating, and mitigating historic properties within the project area.

Based on the current information for the proposed recommended scale, there is potential to affect historic properties. The recommended scale would have significant impact to cultural resources. These effects consist of direct impacts from dredging activities related to construction and impacts from dredged material placement, specifically disturbance of the gulf and bay bottoms. Although a large portion of the project area has been investigated for historic properties, several areas remain uninvestigated. Two previous investigations directly related to the project were initiated by the non-federal sponsor, the survey by Gray & Pape, Inc. (Quennoz et al. 2023) and the survey by BOB Hydrographics, LLC (Gearhart 2025) were conducted under the Antiquities Code of Texas. In accordance with the Antiquities Code of Texas, these surveys were coordinated with and permitted by the Texas Historical Commission (SHPO). The USACE

has not yet received a final draft report for the Gray & Pape, Inc. survey and the report from BOB Hydrographics, LLC has been coordinated with the SHPO under the Antiquities Code of Texas; coordination of the BOB Hydrographics, LLC report under Section 106 has not yet concluded. USACE recommends intensive cultural resources investigations to identify and evaluate any historic properties within the beneficial use areas at Chester Island and Bird Island and the uninvestigated portions of OP5, OP9, and portions of OP6, NP6/OP8, PA18/19, and the ODMDs. Additionally, the USACE recommends further investigation or avoidance of the 28 previously identified anomalies (M6, M8, M9, M10, M12, M18, M19, M46, M47, 142, 164, 197(M7), 217, 221, 224, 231, H50, H97, H114, H107, I-11, I-22, BOB-6, BOB-10, BOB-11, BOB-14, and BOB-15). The scope of these investigations would be determined in concert with the Texas SHPO and Native American Tribes and in accordance with the Programmatic Agreement for this project (Appendix B-4).

5.14 Recreation

Since maintenance dredging and placement activities would occur within the project area for the No Action Alternative and the proposed recommended scale would have similar dredging and placement activities, the proposed recommended scale is expected to have similar impacts to recreation as described in the No Action Alternative, Section 3.14.2, thus resulting in no to negligible impacts to recreation.

5.15 Socioeconomics

Socioeconomic impacts are expected to be relatively similar to the No Action Alternative because the proposed recommended scale would be similar type of dredging and placement as the ongoing maintenance dredging activities under the No Action Alternative, resulting in no to negligible impacts to socioeconomics. There are likely to be temporary positive impacts in terms of employment and regional economic activity.

5.16 Cumulative Impacts

The impact analysis for each resource above presents the effects of the No Action Alternative and the recommended scale on each resource's affected environment. The resource conditions described account for the effects to resources related to past and present actions. This Section further considers the effects of each alternative combined with reasonably foreseeable future actions and conditions for all resources.

Reasonably foreseeable future actions would include USACE's Jetty Stabilization, GIWW Reroute, and Brazos River Floodgates / CO River Locks projects and the Port expansion which would consist of expanding current facilities to increase of commodities traffic. In addition, several other future USACE projects could be implemented in the area as described in the Coastal Texas Study which would be compatible with MSCIP. Impacts due to these reasonably foreseeable future projects, along with the recommended scale, are not expected to have significant adverse effects to resources in the study area. The majority of impacts associated with these projects would be temporary, and some would result in positive impacts for the area. Existing governmental regulations, in conjunction with the goals and coordination of community planning efforts, address the issues that influence local and ecosystem-level conditions. Resources in the area are provided some protection through the coordination of the numerous stakeholder groups, local organizations, and State and Federal regulatory agencies, and

through regulations such as the Texas Coastal Management Program (TCMP), the Clean Water Act, and the Clean Air Act. This coordination and regulation of resources should prevent or minimize negative impacts that could threaten the general health and sustainability of the region.

Several of the projects included in the analysis involve dredging operations, which result in temporary impacts such as increased turbidity and air emissions and long-term impacts such as impacts to bay bottom. However, because navigation is a much more energy efficient mode of transportation, cumulatively beneficial impacts to air quality could be expected.

5.17 Any Irreversible or Irretrievable Commitments of Resources

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitments of resources. Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable period. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored because of the action (e.g., extinction of a species or the disturbance of a cultural site).

The proposed Federal action is designed to have minimal irreversible and irretrievable commitment of resources. The recommended scale would result in a minor irreversible use of fossil fuels to execute the construction of the recommended scale. While oyster habitat would be fully lost in some locations where avoidance and minimization is not practicable, this would not be considered irreversible or irretrievable because the lost oyster habitat would be offset through compensatory mitigation. All construction effects are assumed to be short-term and minor on aquatic and water quality, which would recover in a relatively short period.

5.18 Unavoidable Adverse Effects

The recommended scale would result in minor direct adverse impacts to benthos from the open bay placement of dredged material, but these impacts would be temporary. The construction of the recommended scale would result in the loss of approximately 94.8 acres of oyster habitat. These impacts would be offset with approximately 95 acres of oyster habitat mitigation within the project, resulting in no net loss of oyster habitat. No other long-term environmental impacts are expected to occur as a result of the recommended scale.

5.19 Relationship between Short-Term Uses and Long-Term Productivity

NEPA requires that an EIS consider the relationship between short-term uses of the environment and the impacts that such uses may have on the maintenance and enhancement of long-term productivity of the affected environment. This section compares the short- and long-term environmental effects of the proposed project. For the recommended scale, “short-term” refers to the temporary phase of construction and routine maintenance dredging and placement activities of the proposed project, while “long-term” refers to the 50-year period of analysis of the proposed project and beyond. Section 7 of this document evaluates the effects that could result from the alternatives. Short-term impacts caused by the proposed project would occur during and immediately after construction and would generally result in adverse effects. Many of the adverse effects would be lessened through mitigation and minimization, including

through compensation and Best Management Practices. The long-term effects to the bird habitat that would occur over the life of the project could result in net overall beneficial effects from the construction of the bird island and the continued placement at Chester Island.

6 2025 PLAN IMPLEMENTATION

6.1 General Description

The selected scale, also known as recommended scale, remains the 2019 Alternative A at scale -47'/-49'. The currently authorized depth is -47' MLLW in the main channel (0+000 to 118+581) and -49' MLLW in the entrance channel (-26+000 to 0+000). Changes to the F/EIS channel design are relatively small compared to the scope of the project and have undergone the required civil design procedures in compliance with relevant ERs.

The selected scale is feasible according to the prescribed engineering findings. Aside from engineering considerations, several uncontrollable factors may counteract the viability of the channel deepening and widening such as stiffness of the subsurface. The DMMP associated with the selected scale is detailed in Appendix E.

6.2 Dredged Material Management Plan

The proposed DMMP features a total of 17 PAs for use, including the EPA's Offshore Dredged Material Disposal Site (ODMDS). 4 PAs are utilized for both NW and O&M material, namely the ODMDS, SE, NP1/OP1, and NP6/OP8. See Figure 65 for map of proposed DMMP. While the proposed PAs are intended for all NW materials and the majority of O&M, the full plan, detailed in Appendix E – DMMP, provides maximum flexibility for Operations. Table 53 provides the list of placement areas that take precedence for O&M materials and planned NW sites.

In addition to the proposed SE and Chester Island, another proposed beneficial use placement area the USACE would continue to develop is the bird island. The proposed island would be strategically located approximately one mile west of the ship channel, in the upper part of Lavaca Bay, near the point where the channel takes a sharp northward turn as shown in Figure 65. It would be constructed in a shallow open-water zone, with an average depth of roughly -7 ft MLLW. The design and construction methods for this component would be accomplished during the PED phase of the project, taking into consideration the concerns expressed by USFWS. Information on the design details, habitat objectives, and any relevant environmental data will be shared with USFWS to complete Fish and Wildlife Coordination Act (FWCA) and Endangered Species Act (ESA) Consultations and other resource agencies.

The proposed island would be approximately 350 acres in size, with an octagonal shape to optimize stability and material containment. The island would feature high points sloping down to a perimeter crest at +6.2 ft MLLW, planted with native scrub-shrub vegetation to support Reddish Egrets. One side of the island would incorporate an approximately 150-foot-wide gently sloping beach to support Black Skimmer nesting and biodiversity. The outer slopes would be constructed with a stable 1 vertical to 5 horizontal (1V:5H) design for erosion resistance and structural integrity. Possible construction equipment may be excavators, dozers, and trucks along with dredging equipment. The wind-exposed perimeter of the island would be armored with riprap shoreline protection, providing durability against wave action and ensuring the long-term stability of the island. This feature is expected to be designed later in the PED schedule and thus implemented later in the construction schedule.

During the PED phase, USACE would perform geotechnical foundation analysis, conduct hydraulic modeling to ensure stability, finalize the shoreline protection revetment, and coordinate with environmental agencies to maximize habitat value. As stated in the Appendix F – Engineering, the following steps will be taken in PED for the Bird Island design:

- Obtain geotechnical borings at the Bird Island.
- Obtain detailed hydrographic survey data.
- Complete consultation for FWCA and ESA.
- Specific engineering steps will be taken as follows:
 - Conduct settlement/consolidation analysis; tools such as primary consolidation, secondary compression and desiccation of dredged fill allow for this.
 - Finalize site planning within prescribed footprint;
 - Determine hydraulic loads;
 - Determine the dredging locations from which sediment will be placed.

Table 53 – Overview of DMMP

Stationing	O&M Priority Site	NW Site?	O&M Acreage	NW PA Site	NW Acreage
-26+000 to -14+000	ODMDS	Yes	2,768	ODMDS	2,768
-14+000 to 0+000	Sand Engine	Yes	165	Sand Engine	165
0+000 to 20+000	Chester Island	No	202	–	–
20+000 to 25+000	OP1	Yes	238	NP1	238
25+000 to 35+000	OP2	No	410	NP2	788
35+000 to 50+000	OP3	No	495	NP3	517
50+000 to 73+500	OP4	No	714	NP4/5	689
73+500 to 85+500	OP5	No	454	–	–
85+500 to 90+500	OP6	No	215	–	–
90+500 to 97+000	PA15-A	No	102	–	–
97+000 to 102+000	OP8	Yes	459	NP6	459
102+000 to 108+000	OP9	No	708	Bird Island	346
108+000 to 118+581	PA 18/19 Exp.	No	606	–	–

6.2.1 Initial Dredging (New Work)

Hydrographic survey conducted by the Southern Area Office in August 2023 (using multibeam sonar) and a 2021 bathymetric survey completed by the NFS were used to calculate FWP new work dredging volumes (Table 54). These volumes account for advance maintenance (AM) and

allowable overdepth (AO) and represent new material identified within the project template (Appendix E – DMMP).

Table 54 – New Work Material Quantities

Stationing	NW Volume (CY)
-26+000 to -14+000	3,148,700
-14+000 to 0+000	2,022,500
0+000 to 20+000	2,893,200
20+000 to 47+000	6,929,300
47+000 to 72+000	6,511,450
72+000 to 97+000	6,427,200
97+000 to 101+000	1,693,300
101+000 to 118+581	9,707,900

Dredging scales were analyzed, each based on different channel depths. For the purpose of designing the DMMP, the -47'/-49' (RP) scale volume was used in site planning.

6.2.2 New Work Template

The new work dredge template follows USACE SWG guidance dated 08 April 2019 regarding dredging template development for studies, new work construction, and channel maintenance projects (Figure 64).

New work (NW) volumes are calculated by comparing the new work dredge template to the latest available survey surface. NW material is defined as material located outside the existing Operations & Maintenance (O&M) template and below the lowest elevation of the allowable overdepth template. Material within the existing O&M template, including allowable overdepth, is not considered part of the NW volume.

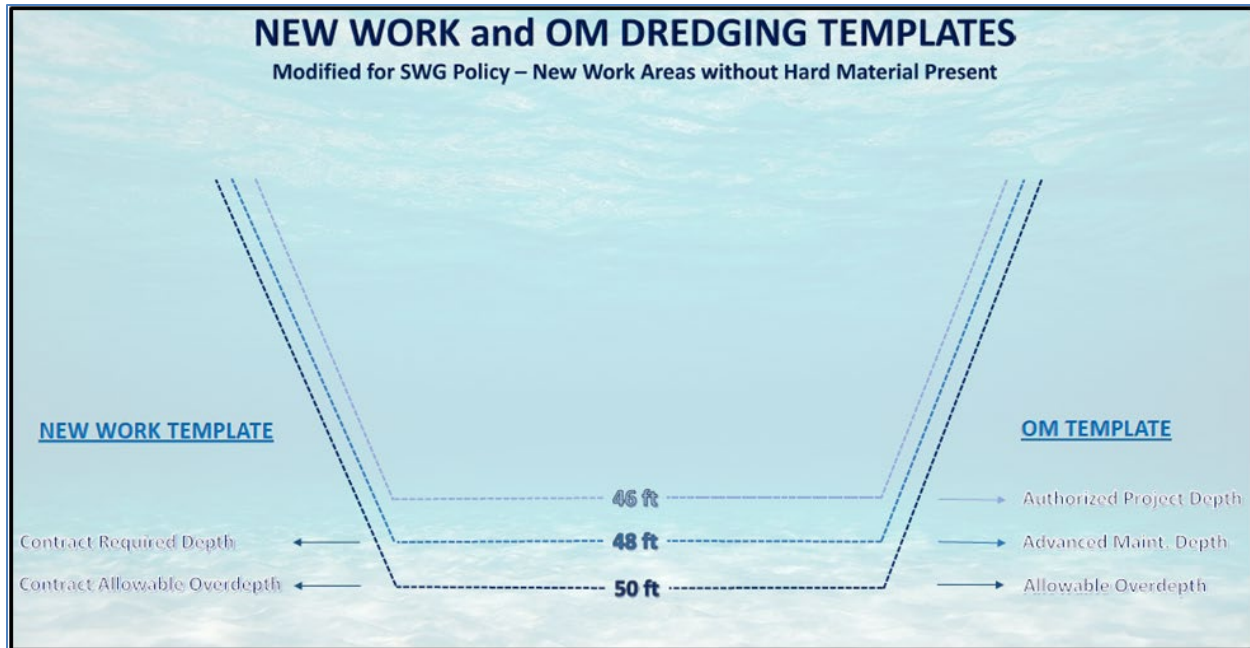


Figure 64 – Modified for SWG Policy – New Work Areas without Hard Material Present

Advance Maintenance (AM) and Allowable Overdepth (AO) areas are included as NW. Non-pay material is excluded from NW volume calculations.

6.2.3 Typical Dredging Equipment

For the MSCIP, a combination of dredge types will be required to meet the varied demands of the project. The primary types of dredge plant anticipated for use are the Hydraulic Cutter Suction Dredge and the Hydraulic Hopper Dredge, with the potential for specialized use of a Mechanical Clamshell Dredge.

The hydraulic cutter suction dredge is a stationary dredge that excavates material using a rotating cutterhead, which functions like a large, powerful drilling mechanism to break up consolidated sediments like clay and hard-packed sand. The loosened material is then drawn up through a suction pipe by a large pump and discharged directly through a floating and submerged pipeline to a designated placement area. The dredge repositions itself by pivoting on posts, called spuds, which are lowered into the bay bottom, allowing for very precise and methodical excavation of a channel or basin.

Application:

- **Construction:** Used along the in-bay channels of Matagorda and Lavaca Bays. They will remove new work materials from the channel and turning basin and pump it to create the Bird Island beneficial use feature and to fill the new work PAs NP1 – NP6.
- **Maintenance:** The primary equipment for these reaches placing materials into the designated PAs.

The hydraulic hopper dredge is a self-propelled, ocean-going vessel. It dredges material while in motion, using trailing suction pipes, known as drag arms, which are lowered to the seabed. As the vessel sails along a designated path, the drag heads at the end of the arms loosen unconsolidated material like sand and silt, which is then pumped into large bins, or "hoppers,"

within the ship's hull. Once the hoppers are full, the dredge sails under its own power to a designated disposal site, where it discharges the material either by opening doors in the bottom of its hull or by pumping the material out of the hoppers.

Application:

- Construction: Used to construct the Entrance Channel and Jetty Channel improvements. It will remove sandy new work materials and transport them offshore into the ODMDs and Sand Engine.
- Maintenance: The primary equipment for these reaches.

The clamshell dredge excavates material through direct action. A crane mounted on a barge operates a hinged bucket which is lowered to the bottom to scoop sediments. The material is then placed into scows or barges for transport to the designated PAs.

Application:

- Construction: May be used for specialized work such as debris removal, obstruction clearance or detailed excavation in restricted areas of the berthing basin.
- Maintenance: May be used for localized shoal removal near docks, terminals or other facilities where full-scale hydraulic dredges are unnecessary.

6.2.4 Beneficial Use

Per EM 1110-2-5025 Dredging and Dredged Material Management, USACE is required to include an assessment of potential beneficial uses for environmental purposes, including fish and wildlife habitat development, considered to ensure that benefits are maximized.

Section 125(a)(2)(C) of the Water Resources Development Act (WRDA) of 2020 authorizes the Secretary of War to use funds appropriated for construction or operation and maintenance of a project involving the disposal of dredged material when selecting a disposal method that is not the least cost option based on a determination that the incremental costs of the disposal method are reasonable in relation to the environmental benefits or the hurricane and storm or flood risk reduction benefits. District Commanders are to evaluate and advance all opportunities to beneficially place dredged material from a Federal navigation project, such as the MSCIP, during preparation of DMMPs.

For the V/SES, BU primarily focused on habitat creation or reintroduction of sediment supply. The MSCIP recommends several BU features (see Figure 65) that address environmental needs (Appendix E – DMMP). The addition of BU into the DMMP is a least-cost consideration that is discussed in Appendix E, specifically, “Deviations from the base plan that may be considered commonplace, such as beneficial use, are not intended to be such in the context of this study. Rather, such features, like beneficial use, are introduced firstly because they are cost-effective; consequently, they provide an advantageous opportunity for habitat creation, erosion mitigation, and recreation.”



Figure 65 – 2025 Dredged Material Management Plan Map

6.3 Mitigation

The implementation of the 2025 recommended scale would result in the loss of approximately 94.8 acres of oyster habitat. These impacts would be offset with approximately 95 acres of oyster habitat mitigation. Similar to 2019 oyster mitigation, this proposed mitigation would consist of placing 12" layer using clean crushed limestone or concrete. Refer to Appendix B-1 – Mitigation, Monitoring, and Adaptive Management of the V/SEIS.

6.4 LERRD Considerations

The MSC is an existing Federal project. The Lands, Easements, Rights-of-way, Relocations, and Disposal areas (LERRDs) required to construct, operate, and maintain the recommended alternative are identified in the Real Estate Plan (Appendix D). The non-Federal sponsor (NFS) is required to furnish all LERRD for this proposed cost-shared project.

The NFS will be responsible for removal of pipelines obstructing the channel. The SWG's policy states that existing pipelines shall have, "a minimum of 20 ft. below the authorized project depth of the channel plus a distance of 50 ft. On each side of the channel measured from the bottom edge of cut and perpendicular to the centerline". Any pipelines that are not deep enough to comply with the District's clearance requirements within the proposed channel template will have to be removed or relocated. During feasibility, 16 pipelines were identified for removal or relocation. Since feasibility, it has been determined that 13 pipelines will need to be removed, 1 will need to be relocated, and 2 will remain in place. This number will need to be verified in PED. The NFS must bear at least 50% of the cost of utility relocation for projects with an authorized depth of greater than -45' as required by WRDA Section 101(a)(4) and explained in PGL 44. The law apportions the remaining payment responsibility to the pipeline owner. Costs borne by the NFS for utility relocations are credited toward the NFS's additional payment of 10% of the cost of the general navigation features. To the extent that the total amount eligible for credit under Section 101(a) (2) exceeds 10% of the total cost of the general navigation features, the NFS shall not be entitled to reimbursement.

6.5 Institutional Requirements

6.5.1 Coast Guard Coordination

The SWG, in cooperation with the Pilots, would coordinate directly with the Coast Guard concerning the installation and modifications of aids to navigation, the regulation of lightering areas (docking and loading areas used to offload heavy cargo from larger vessels to smaller vessels and vice versa), anchorage and channels. (Appendix F – Engineering, Section 6.7)

7 COMPLIANCE WITH ENVIRONMENTAL LAWS, STATUTES, AND POLICIES

This section addresses the primary Federal environmental laws, implementing regulations, and executive orders potentially applicable to the recommended scale. The applicable environmental statutes are summarized below along with a brief description of the law, regulations, and executive orders. The status of compliance and environmental commitments identified for each to date are also included.

7.1 Federal Statutes

7.1.1 National Environmental Policy Act of 1969

NEPA (42 U.S.C. 4321 et seq.) provides a commitment that Federal agencies will consider the environmental effects of their actions. It also requires that an EIS or EA be included in every recommendation or report on proposals for legislation and other major Federal actions. The EIS or EA must provide detailed information regarding the recommended scale and alternatives, the environmental impacts of the alternatives, and potential mitigation measures. Agencies are required to demonstrate that these factors have been considered by decision-makers prior to undertaking actions.

USACE decided to prepare a SEIS due to the discrepancies in dredge material quantities identified in the 2019 Final F/EIS. Accordingly, the Assistant Secretary of the Army for Civil Works withdrew the 2020 ROD on December 5, 2022, for further consideration in light of USACE's findings in the SEIS. This SEIS (which has been integrated with USACE's Validation Report for the study) is the primary vehicle to achieve NEPA compliance for this study. Accordingly, a NOI to prepare a draft SEIS was published in the Federal Register on June 2, 2023 (88 FR 36285), and public scoping meeting was held. On August 4, 2023, an Extension of Comment Period for NOI was published extending the scoping period by 30 days due to a previously published incorrect e-mail address. The 45-day public review period (November 14 to December 29, 2025) on the draft SEIS provides disclosure of the environmental effects of the alternatives to the public. After review and consideration of agency and public comment on the draft V/SEIS, USACE has proceeded to prepare of the final V/SEIS. Following the 30-day public review of the final SEIS, USACE decision makers will sign a Record of Decision, outlining the rationale for their decision.

7.1.2 Federal Water Pollution Control Act (Clean Water Act)

The Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) is more commonly referred to as the Clean Water Act (CWA). This Act is the primary legislative vehicle for Federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States. The CWA was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. The sections of the CWA that may apply to the recommended scale are Section 401, regarding state water quality certifications that existing water quality standards would not be violated if a Federal permit that

causes discharges into navigable waters were issued; and Section 404, regarding fill material discharged into the waters of the U.S., including wetlands.

A water quality certification (WQC) dated May 8, 2019, was obtained from Texas Commission of Environmental Quality (TCEQ). Due to the proposed changes in the DMMP, USACE is coordinated with TCEQ, and it was determined that a new WQC will be needed. TCEQ provided the WQC on March 12, 2026 (Appendix B-3 – Clean Water Act).

Section 404(b)(1) of the CWA of 1972 requires that any recommended discharge of dredged or fill material into Waters of the U.S. must be evaluated using the guidelines developed by the Administrator of the EPA in conjunction with the Secretary of the Army. The 404 (b)(1) evaluation can be found in Appendix B-3 – Clean Water Act.

7.1.3 Clean Air Act

The Clean Air Act (CAA) (42 U.S.C. 7401 et seq.), amended in 1977 and 1990, was established “to protect and enhance the quality of the nation’s air resources so as to promote public health and welfare and the productive capacity of its population.” The CAA authorizes the EPA to establish the NAAQS to protect public health and the environment. The CAA establishes emission standards for stationary sources, volatile organic compound emissions, hazardous air pollutants, and vehicles and other mobile sources. The CAA also requires the states to develop implementation plans applicable to particular industrial sources.

The MSCIP would be compliant with the CAA as the study area is in attainment for all NAAQS standards. Additionally, the MSCIP would not significantly contribute to criteria pollutant emissions annually that would alter the current attainment status.

7.1.4 U.S. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act of 1934, as amended (16 U.S.C. §§ 661–667e), provides authority for USFWS and NMFS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other development project features. It requires Federal agencies that construct, license, or permit water resource development projects to consult with the USFWS, NMFS, and state resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts when waters of any stream or other body of water are “proposed . . . to be impounded, diverted . . . or . . . otherwise controlled or modified . . .” Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that describes fish and wildlife resources in a project area, potential impacts of a proposed project, and recommendations for a project.

For the 2019 F/EIS, a final CAR including recommendations was received on July 10, 2019. The 2019 CAR and USACE responses to the recommendations can be found in Appendix B – Enclosure 5 of the 2019 F/EIS. For the 2025 effort, USACE has been coordinating with USFWS with regards to FWCA. USACE requested FWCA coordination in August 2023 and again in a letter dated January 20, 2026 (refer to Appendix B-7). USFWS provided FWCA recommendations for the current proposed project, except for the Bird Island, in a letter dated March 13, 2026 (Appendix B-7). Of the ten recommendations in the March 13, 2026 letter, USACE concurs with four recommendations, partially concurs with another five recommendations, and non-concurred with one recommendation. Please refer to Appendix B-7 for the detailed responses providing USACE’s rationale of concurrence status.

7.1.5 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531–1544), amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat upon which they depend. Section 7(a)(2) of the ESA requires that Federal agencies consult with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats.

For the 2019 F/EIS, USFWS concurred on July 31, 2019 (FWS/R2/02ETTX00-2019-1-2182), with USACE's effects determination of "may affect but is not likely to adversely affect" to ESA listed species under their jurisdiction. With regards to ESA listed species under NMFS jurisdiction, through discussions with NMFS it was confirmed that the biological opinion, dated October 24, 2007 (F/SER/2006/03167) would be valid and reinitiation was not necessary at that time.

Because the Eastern Black Rail was listed in 2020 and proposed changes from the 2019 recommended scale to the 2025 recommended scale including the DMMP, USACE is reinitiating Section 7 consultation with NMFS and USFWS. USACE has been coordinating with both NMFS and USFWS throughout the development of this V/SEIS. USACE submitted the biological assessment (BA) on November 20, 2025 to both NMFS and USFWS, initiating formal and informal consultation, respectively. Effects to threatened and endangered species and critical habitat have been evaluated with respect to Section 7(a)(2) and described in Section 5.11 above and in MSCIP BA (Appendix B-9). NMFS' Biological Opinion dated April 17, 2026 was received (Appendix B-9) (NMFS Ref #: SERO-2025-03150).

USFWS, in its letter dated March 13, 2026, has provided concurrence with the proposed project except for Bird Island, which will require more coordination during the design phase. (Appendix B-9) (USFWS Ref #: 2023-I-0132767). USFWS has requested a phased review and provided a list of information needed to support its analysis of Bird Island, which will be developed during the Pre-Construction Engineering & Design (PED) phase of the project. USACE will continue to coordinate and consult with USFWS prior to the commitment of federal funds for beneficial use of dredged material at Bird Island. If the creation of Bird Island is determined to be not feasible, PA 18/19 is anticipated to have capacity for new work dredge material. If necessary, the potential option of PA 18/19 would be analyzed further during PED and any environmental compliance would be obtained at that time, if appropriate.

7.1.6 Migratory Bird Treaty Act and Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703–712), as amended, protects over 800 bird species and their habitat, and implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and Russia, for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful. The act classifies most species of birds as migratory, except for upland and non-native birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove. Executive Order 13186, dated January 10, 2001, directs Federal agencies to evaluate the effects of their actions on migratory birds, with emphasis on species of concern, and inform USFWS of potential negative effects to migratory birds.

Work windows for nesting season are currently utilized and are expected to be used for the proposed recommended scale. Another potential method of minimizing and avoiding impacts to migratory and nesting birds would be to re-sequencing construction activities to work in areas where no active nests would be present. Therefore, the proposed recommended scale is not expected to permanently impact migratory bird populations. Existing maintenance dredged material placement cycles have been conducted successfully with minimal disturbance to migratory species. Since, there would be no to negligible impacts to migratory birds, and the proposed recommended scale would follow the MBTA and Executive Order 13186

7.1.7 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361–1407) prohibits the take of marine mammals, including harassment, hunting, capturing, collecting, or killing, except through permits and authorizations under the MMPA.

The only marine mammals covered under the MMPA expected to regularly be present in Matagorda Bay are bottlenose dolphins (*Tursiops truncatus*). These are highly mobile species that would be able to readily avoid dredging activities and vessels. As avoidance of the area would be only during construction, and there is an abundance of similar habitat within the area, the proposed recommended scale would have minimal and temporary impacts, by way of disturbance, to the individuals present.

7.1.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.) requires Federal agencies to consult with NMFS on activities that may adversely affect EFH. The objective of an EFH assessment is to determine whether the proposed action(s) “may adversely affect” designated EFH for relevant commercial, Federally managed fisheries species within the proposed action area. EFH includes those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity managed by Regional Fishery Management Councils (RFMC) in a series of fish management plans.

USACE has been coordinating with NMFS throughout the development of this draft V/SEIS. USACE submitted the EFH Assessment on November 18, 2025 (Appendix B-6-2) concluding that the proposed recommended scale may adversely affect EFH; however most of the overall proposed project effects to EFH would be temporary and/or be negligible considering the localized effect of the actions compared to the unaffected habitat available in the Matagorda Bay System with the exception of lost oyster habitat that would be offset with compensatory oyster mitigation. NMFS concurred with USACE’s assessment of effects to EFH in a letter dated December 10, 2025, with no recommendations (Appendix B-6-1). Since then, the oyster modeling method has been revised to be consistent with ER 1105-2-100, Section C-1(e) and Section 906(d) of WRDA 1986, as amended. This change in method resulted in an updated amount of proposed oyster mitigation acres. This revision was communicated to all the resource agencies including NMFS in email dated February 5, 2026 (Appendix B-6-1). NMFS responded that they have no issues with the revised method; however recommended relocation of live oyster to minimize any potential temporal losses and help jump-start successful recruitment and long-term productivity in addition to the proposed mitigation in email dated February 19, 2026 (Appendix B-6-1). In response to this recommendation, USACE will relocate any impacted live oysters to the proposed oyster pads and/or another appropriate location within the project area, to the maximum extent practicable, see letter dated May 15, 2026 (Appendix B-6-1).

7.1.9 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, provides for the effective management, beneficial use, protection, and development of the resources of the nation's coastal zone. The CZMA directs Federal agencies proposing activities within or outside of the coastal zone that could affect any land or water use or natural resources of the coastal zone, to assure that those activities or projects are consistent, to the maximum extent practicable, with the approved State programs. The Texas Coastal Management Program (TCMP) is managed by Texas General Land Office (TxGLO), the State entity that participates in the Federal Coastal Zone Management Program created by the CZMA. The TCMP designates the coastal zone and coastal natural resource areas (CNRA) requiring special management in that zone, including coastal waters, waters under tidal influence, coastal wetlands, submerged lands and aquatic vegetation, dunes, coastal historic areas, and other resources.

In 2019, USACE has determined that the Federal action would be carried out in a manner that is fully consistent with the enforceable policies of the TCMP to the maximum extent practicable and received the Statement of Compliance with the TCMP from the TxGLO.

Since there are proposed changes to the DMMP, USACE has prepared a determination of consistency with the enforceable policies of the TCMP which can be found in Appendix B-5 – Coastal Zone Management Act. TxGLO concurred that proposed project is consistent with the TCMP goals and enforceable policies in letter dated February 3, 2026 (Appendix B-5). After the CZMA determination of consistency was provided to TxGLO, the proposed oyster modeling method was revised to be consistent with USACE policy which resulted in a change in mitigation acres to offset impacts. This revision was communicated to all the resource agencies including TxGLO in email dated February 5, 2026 (Appendix B-5). To date, TxGLO has not responded to that email.

7.1.10 Federal Water Project Recreation Act

In the planning of any Federal navigation, flood control, reclamation, or water resources project, the Federal Water Project Recreation Act, as amended (16 U.S.C. § 460l-12 et seq.) requires that full consideration be given to the opportunities that the project affords for outdoor recreation and fish and wildlife enhancement. The act requires planning with respect to development of recreation potential. Projects must be constructed, maintained, and operated in such a manner if recreational opportunities are consistent with the purpose of the project.

Effects to recreation analyzed for the recommended scale are described in Section 5 and therefore is compliant with this act.

7.1.11 Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) (Publ. L. 97-348) established the Coastal Barrier Resources System. CBRA prohibits all new Federal expenditures and financial assistance within the units of the System, unless, after consultation with the Secretary of Interior, the expenditures and/or assistance meets the specific exceptions of Section 6 of the CBRA. Section 6(a)(2) allows for the continued use of disposal sites for dredged maintenance material. Section 6(b) requires that an existing channel improvement be funded, in part or totally, before October 18, 1982.

The existing MSC proposed deepening and widening of the ship and entrance channel, and proposed sand engine are located with Coastal Barrier Resource System (CBRA) Units, within Unit T07 and Otherwise Protected Area (OPA) T07P of the Coastal Barrier Resources System (CBRS). Within CBRA Unit T07, dredging would occur to widen and deepen the Entrance Channel, and approximately 4.0 mcy of new work material and 10.5 mcy of maintenance material over the 50-yr project life would be placed in the proposed sand engine feature southwest of the jetties. Within OPA T07P, dredging would occur along the ship channel, and placement at Chester Island as mentioned above. No other work would occur within a CBRA unit. Because construction authority for the MSC was provided by Congress in the Rivers and Harbors Act of July 3, 1958 (PL 85-500), the 2019 and 2025 recommended scale meets the exceptions set forth in Sections 6(a)(2) and 6(b).

For the 2019 MSCIP effort, coordination with USFWS was completed on June 25, 2019. For this current effort, USACE submitted the CBRA consultation documentation demonstrating the proposed project meets the exceptions set forth in Sections 6(a)(2) and 6(b) of CBRA to USFWS on November 14, 2025. USACE received concurrence from USFWS with the exception for this project on January 27, 2026.

7.1.12 Marine Protection, Research, and Sanctuaries Act

The Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA, also known as the Ocean Dumping Act) regulates the disposition of material into the ocean and prohibits the dumping of material into the ocean that would unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities (33 U.S.C. 1401 et seq.). The MPRSA applies to all ocean waters seaward of the baseline from which the territorial sea is measured. Generally speaking, the baseline is the MLLW line (ordinary low water mark) along the coast or “closing lines” that are drawn on maps across rivers mouths and openings of bays and that are depicted on official United States Nautical Charts (i.e., National Oceanic and Atmospheric Administration (NOAA) nautical charts for a region).

The existing permitted Offshore Dredged Material Disposal Site (ODMDS) has been identified as one of the existing placement areas in the Matagorda Bay system and EPA is currently working through their process to expand the existing ODMDS to 2,768 acres. It is expected that EPA's process to expand ODMDS will be finalized prior to implementation of the proposed recommended scale. The dredged material (new work and O&M) proposed to be placed in the ODMDS is expected to meet any ODMDS requirements.

7.1.13 Rivers and Harbors Appropriation Act

Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. § 403 et seq.), commonly known as the Rivers and Harbors Act, prohibits the construction of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any navigable water without Congressional consent or approval by USACE. Section 10 regulates structures in or over any navigable water of the U.S., the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters.

Section 10 of the Act requires approval of the Chief of Engineers for excavation or fill within navigable waterways of the U. S. Even though USACE does not permit itself, USACE would be functionally analogous with the Section 10 requirements. Therefore, the V/SEIS will be provided

to the Chief of Engineers for approval of the excavation and fill with the Matagorda Bay as it relates to the recommended scale and there would be compliance with the Rivers and Harbors Act of 1899.

7.1.14 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001–3013; PL 101-601) describes the rights of Native American lineal descendants, Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, with which they can show a relationship of lineal descent or cultural affiliation. This Act applies to Federally owned lands, including Reservation lands. The undertaking does not occur on Federally or tribally owned lands.

7.1.15 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and its implementing regulations, 36 C.F.R. Part 800, provides a regulatory framework for the identification, documentation, and evaluation of historic and cultural resources that may be affected by Federal undertakings. Under the Act, Federal agencies must consider the effects of their undertakings on historic properties, including resources that are listed or are eligible for listing in the National Register of Historic Places, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertaking. Additionally, a Federal agency shall consult with any tribe that attaches religious and cultural significance to such properties. Section 110(f) of the NHPA (54 U.S.C. § 306107) requires USACE to minimize harm to all National Historic Landmarks (NHL) within the Area of Potential Effects to the maximum extent possible.

During the 2019 MSCIP feasibility phase, a Programmatic Agreement (PA) was developed and executed in 2020 and does not expire until 2030 (Appendix B-4). The PA defines the APE and process for identifying, evaluating, and mitigating historic properties and was developed in consultation with the ACHP, Texas SHPO, and Native American Tribes. Phase I investigations have been completed for a portion of the project area. Any uninvestigated portions of the project area, including cultural resources that need additional evaluation or mitigation, will be investigated prior to the completion of the Pre-construction Engineering and Design phase.

7.1.16 Comprehensive Environmental Response, Compensation and Liability Act

CERCLA, as amended (42 U.S.C. § 9601 et seq.), which was later amended by the Superfund Amendments and Reauthorization Act of 1986, sets forth regulations for cleanup of hazardous substances after improper disposal; identifies Federal response authority; and outlines responsibilities and liabilities of potentially responsible parties, who are past/present owners or operators of the site, a person who arranged disposal of hazardous substances at a site, or a person who transported hazardous substances to a site they selected for disposal. CERCLA also specifies where Superfund money can be used for site cleanup.

ER 1165-2-132 provides that, throughout project development, information relevant to the existence of HTRW-contaminated land is gathered. As part of this assessment: existing and past land uses should be evaluated; current and historical aerial photographs should be studied

and compared; records should be searched and should extend as far as records are available; long-time local residents, workers, and current property owners should be interviewed about past land uses, potential contamination, and any history of HTRW problems; and EPA, state, and local regulatory or response agencies should be consulted for license/permit actions, for any violation, enforcement, and/or litigation against property owners, and for general information about local HTRW problems such as illegal dumping and past contamination. In addition, an HTRW Documentation Report may exist to address HTRW-related construction information. Construction of Civil Works projects in HTRW-contaminated areas should be avoided where practicable USACE shall not clean up contamination for which it is not legally liable unless authorized to do so.

The Real Estate Plan for the 2019 MSCIP F/EIS identified the possible need for the non-Federal sponsor (Calhoun Port Authority) to acquire a utility/pipeline easement from the bay to an upland Placement Area (PA), P1, in the unlikely event additional capacity was determined to be needed during PED. However, the 2025 modified plan does not scope the Upland PA P1; therefore, the need for a pipeline easement is no longer anticipated and no investigations (HTRW) of real estate are warranted.

The sediment quality in the areas to be dredged have been investigated and no cause for concern is noted. The CPA has notified USACE of a legal agreement between the CPA and Alcoa, Inc. which states Alcoa will take responsibility for and dispose of contaminated dredged material. More detail on surveys of sediment quality can be found in Sections 3.4, 3.5, 5.4, and 5.5. With regard to the potential acquisition of real estate, the NFS will assume the full responsibility to investigate and dispose of material considered to be hazardous waste at their expense.

7.2 Executive Orders

7.2.1 Executive Order 11990, Protection of Wetlands

Executive Order 11990, dated May 24, 1977, requires Federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetland destruction and preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this executive order. In addition, Federal agencies shall incorporate floodplain management goals and wetlands protection considerations into their planning, regulatory, and decision-making processes.

USACE has evaluated potential effects on wetlands from the Federal action. Short-term construction-related impacts to wetlands would be similar to the No Action Alternative, thus resulting in no to negligible impacts. Over the 50-year project life, there is the possibility that up to approximately 337 acres of open water habitat could be converted to salt marsh with on-going placement at PA18/19 expansion resulting in a beneficial effect to salt marsh.

7.2.2 Executive Order 13045, Protection of Children from Environmental and Safety Risks

Executive Order 13045, dated April 23, 1997, requires each Federal agency to identify and assess environmental health and safety risks that may disproportionately affect children and ensures that policies, programs, activities, and standards address disproportionate risk to children that results from environmental health or safety risks. "Environmental health risks and

safety risks” are defined as risks to health or safety that are attributable to products or substances that the child is likely to come in contact with or ingest, such as air, food, drinking or recreational use of water, soil children may live on, and products they use or are exposed to.

Construction dredging of the recommended scale and the associated temporary ambient air and noise emissions would not have an impact that particularly targets or disproportionately affects children given the distance and general nature of the temporary impacts. Therefore, there would be no disproportionate effects on children because there are no expected environmental health or safety risks.

7.3 Environmental Commitments

7.3.1 Endangered Species Act

USACE will complete FWCA and ESA consultation with USFWS for the proposed bird island.

Conservation measures can be found in the Biological Assessment (Appendix B-9-2).

Conservation recommendation proposed by USFWS can be found in the USFWS Concurrence Letter (Appendix B-9-3) and USACE responses are in Appendix B-7.

NMFS’ Biological Opinion, dated April 17, 2026, has the following two Reasonable and Prudent Measures (RPM) and for more details, please refer to Appendix B-9-4 for the Biological Opinion.

- RPM 1: USACE must provide take reports regarding all interactions with ESA-listed species that occur during the proposed project.
 - To comply with RPM 1, USACE must report all known captures of ESA-listed species and any other takes of ESA-listed species to the NMFS Southeast Regional Office, Protected Resources Division (SERO PRD). In addition, at the conclusion of the project, the USACE must submit a summary report of capture, entanglement, stranding, and any other take of ESA-listed species to NMFS SERO PRD by email at nmfs.ser.esa.consultations@noaa.gov
- RPM 2: USACE must minimize the likelihood of injury or mortality to ESA-listed species resulting from hopper dredging and relocation trawling and subsequent handling of animals.
 - To comply with RPM 2, sea turtle avoidance measures would consist use of temporal dredging windows, when possible; intake and overflow screening; use of sea turtle deflector dragheads; observer reporting requirements; and sea turtle relocation/abundance trawling, if needed.

In addition to the RPMs, USACE will implement NMFS Conservation Recommendation #22 requiring all personnel to report giant manta ray sighting to USACE’s Operations and Dredging Endangered Species System. USACE does not plan to implement the other 21 conservation recommendations as they recommend studies and/or actions beyond the current project authority.

8 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

8.1 Cooperating Agencies

USACE asked 10 Federal and State agencies to participate as cooperating and participating agencies based on their jurisdiction by law, or their special expertise with respect to any environmental issue evaluated in this V/SEIS. The cooperating and participating agencies are as follows:

- National Marine Fisheries Service
- Environmental Protection Agency (EPA), Region 6
- U.S. Coast Guard
- Natural Resource Conservation Service
- Texas Parks and Wildlife Department
- Texas Commission of Environmental Quality
- Texas Water Development Board
- Texas Department of Transportation
- Texas General Land Office

In addition, USACE with our partner Calhoun Port Authority have been meeting routinely with these agencies above along with USFWS in interagency coordination meetings since 2023. These ongoing meetings have been an opportunity to share and discuss status updates, impact analysis, potential mitigation, and potential placement areas.

8.2 Non-Federal Views and Preferences

The Calhoun Port Authority, serving as the non-Federal sponsor, confirms its longstanding support of the Matagorda Ship Channel (MSC) Improvement Project. This project is vital for industries in the Texas Mid-Coast Region that depend on the port for domestic and global trade, and the project further supports the nation to achieve and maintain global energy dominance. The planned widening and deepening of the channel, including the addition of a turning basin, will enable larger Aframax-class tankers to safely access Point Comfort, Texas. This will improve supply chain efficiency by allowing for larger shipments, which in turn reduces transportation costs for port users.

In support of this project, the Port Authority has received the 404 authorization to finalize design and initiate construction for Phase I of the South Peninsula Development Project. This phase includes four new barge berths and three deep-draft docks with a design depth of 47 feet MLLW, engineered to handle primarily crude oil and condensate, then eventually petrochemicals. Two of the deep-draft docks are scheduled for completion by 2030 for crude, with a third to follow based on market demand for petrochemicals.

Current infrastructure development upstream is set to increase the port's initial crude export capacity up to 140,000 barrels per day. The successful completion of the channel improvement project is expected to trigger further investments by port customers and channel users to scale this capacity to 1 million barrels per day of crude oil exports.

According to S&P Global, U.S. seaborne crude oil exports are projected to reach 5.87 million barrels per day (MMB/D) by 2040, creating a potential capacity shortfall due to existing facility limitations. The MSC improvements are designed to address this shortfall by adding up to 1 million barrels per day of export capacity. The Matagorda Ship Channel offers a less-congested alternative for accommodating critical growth in Texas gulf port capacity. Once at full capacity, it is projected that 80% of the port's crude oil export volume will be shipped to European ports, with the remaining 20% directed to ports in the Caribbean and South America.

A cost-benefit sensitivity analysis indicates the transportation cost savings as a result of the MSC Improvement Project are estimated at \$181 million in benefits annually. Compared to the combined annualized costs for the channel modification (\$38.5 million) and landside infrastructure (\$20.4 million), the project could yield a benefit-cost ratio (BCR) as high as 3.1.

The project is also expected to stimulate significant regional economic development. The construction phase alone is estimated to generate an additional \$753 million in labor income, \$964 million in increased gross regional product, and 11,000 direct and indirect jobs. Furthermore, the regional economic development corporation is coordinating related projects that are projected to bring substantial new capital investment and employment opportunities to the area. The projects, when completed, would provide approximately \$25 billion in capital investments and an additional 3,600 new jobs. The additional related projects and their anticipated economic development results are not included in the current BCR assessment.

8.3 Public Involvement

8.3.1 Public Scoping

One of the first steps of an EIS or SEIS is the public scoping process. NEPA requires an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. Refer to Appendix C of the draft V/SEIS for the scoping report.

On June 2, 2023, a NOI was published in the Federal Register for a 30-day scoping period ending July 3, 2023, for the MSCIP SEIS (88 FR 36285). However, it was brought to USACE's attention that one of the email addresses provided in June 2, 2023, NOI and the June 7, 2023, scoping meeting invitation and meeting materials was incorrect. On August 4, 2023, USACE reopened the scoping period and accepted comments for an additional 30 days ended September 5, 2023, with publication of a second NOI in the Federal Register (88 FR 51787). USACE continued to accept comments received between the end of the first NOI, July 3, 2023, through end of the second NOI, September 5, 2023. In addition, public notice, press release and social media were used to announce the scoping comment period and public scoping meeting.

During the public scoping period, USACE held an in-person scoping public meeting on June 7, 2023, in Port Lavaca, TX. In addition, on June 6, 2023, USACE held an in-person stakeholder meeting to provide an overview of the MSCIP sediment sampling plan, invite comments, and answer questions. USACE also participated in the Calhoun County Commercial Fishing Advisory Group meeting on June 29, 2023.

USACE received approximately 1,768 comment submittals during the scoping period provided by members of the public, local and state governmental agencies, non-governmental organizations, and other stakeholders. The scoping comments, generally, fell into several themes, as follows:

- Plan formulation/general such as alternative development and general relevant statements about MSCIP,
- NEPA-related topics such as purpose and need statement, public involvement/outreach, and NEPA process
- Analysis of various resources such as ecological and human health, wildlife and aquatic resources coastal hydrology and hydraulics water quality
- Recommendation or support of potential placement areas including beneficial use sites

No project specific alternatives were proposed during scoping; however, project specific placement areas were proposed or noted to avoid. The potential placement areas proposed or suggested to avoid during scoping were considered during the development of the proposed DMMP.

8.3.2 Public Comment

The public comment period, during which any person or organization may comment on the draft EIS is required by CEQ regulations implementing NEPA. For this V/SEIS, the 45-day public comment period was from November 14, 2025 to December 29, 2025. The purpose of this review is to seek input on the alternatives considered, effects of the alternatives, and associated mitigation. USACE considers all comments received during the comment period. The complete list of substantive comments regarding the draft V/SEIS and responses are included in Appendix C of the V/SEIS. USACE held one public meeting on December 3, 2025, from 6 – 8 pm at the Bauer Community Center in Port Lavaca, Texas. In addition to accepting comments during the public meetings, comments were accepted via mail or electronic comment form on the study's website.

A majority of comments expressed concern regarding the sediment sampling, dredging near and within the Alcoa superfund site, and the possible effects of those activities. Multiple comments were received regarding concerns of impacts to the ecosystem and fisheries due to the dredging activities and placement of dredged material. Another theme of comments received expressed concerns about increased vessel traffic and potential effects. A number of comments had concerns raised that the benefit-to-cost ratio for the proposed Recommended Scale was negative. Appendix C – Public Involvement describes in more detail the processing of public comments, presents a master response for each general comment theme, and provides responses to substantive comments.

9 LIST OF PREPARERS

Name	Technical Specialty
Heather Briscoe	Project Management
Kathy Skalbeck	Plan Formulation
Jacob Garrett	Hydrology and Hydraulic Engineering / Engineering Lead
Caitlin Bryant	Economics – Deep Draft Navigation PCX
Walker Messer	Economics – Deep Draft Navigation PCX
Todd Nettles	Economics – Deep Draft Navigation PCX
Hannah Hadley	Environmental Resources
Justin Tirpak	Environmental Resources
John Campbell	Cultural Resources
Ratnam Tharmendira	Geotechnical Engineering
Konstantinos Kostarelos	HTRW and Air Quality
Britney Nealon	Real Estate
Nancy Young / Jacob Garrett	Engineering Lead
Jon Plymale	General Engineering
Sergey Kuznetsov	Cost Engineering
Aron Edwards	Operations
Erin Trevino	Geo-Information Services

10 DISTRICT ENGINEER'S RECOMMENDATION

This chapter contains the findings and recommendation of the SWG Commander and may serve as the basis for new additional authorization and costs.

10.1 Changes in Local Cooperation Requirements

No changes in local cooperation requirements are expected.

10.2 Recommendation

Recommendation for the proposed implementation of Section 216, Matagorda Ship Channel, Texas, FINAL Integrated Validation Report and Environmental Impact Statement (F/EIS) was reevaluated in this Validation Report and Supplemental Environmental Impact Statement (V/SEIS).

Based on current costs and benefits, none of the scales of Alternative A evaluated, result in positive net benefits and all alternatives have a Benefit to Cost Ratio of less than 1.0. Therefore, the NED Plan is the No Action alternative. However, the Matagorda Ship Channel Improvement Project is an opportunity to deliver resilient, strategic energy infrastructure that safeguards national interests while fostering economic prosperity. The MSCIP is a forward-looking investment that ensures America's energy future remains strong, competitive, and secure.

The Galveston District requested, and received, an NED waiver to recommend implementation of the -47'/-49' MLLW authorized depth. The waiver had not been approved, nor disapproved, at the time of Policy and Legal Compliance Review of the draft Validation Report. Galveston District did receive permission for the draft V/SEIS to go out for public review.

The staff of the Assistant Secretary of the Army for Civil Works (ASA(CW)) reviewed the Galveston District's memorandum requesting an exception to the requirement to recommend the National Economic Development plan and to allow the U.S. Army Corps of Engineers (USACE) to recommend a plan that does not provide positive net benefits when evaluated solely on economic outputs. The staff concluded that the total benefits associated with the MSCIP are significant enough to justify continued investment in this project. ASA(CW) signed a memorandum to this effect on 25 March 2026.

I recommend implementation of the plan identified as Alternative Plan A at Scale -47'/-49' MLLW in the Matagorda Ship Channel, Texas, Final Integrated Validation Report and Supplemental Environmental Impact Statement, in the Vicinity of the City of Point Comfort, Texas, September 2025, with such modifications thereof as is within the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers (HQUSACE). The plan includes: addition of a new 1,200' turning basin in the Lavaca Bay reach to accommodate the larger vessels; extending the entrance channel 6,000' to allow for deepening to -49 feet Mean Lower Low Water (MLLW); widening the entrance channel from 300' to 550', and the Main channel from 200' to 300'; deepening the Entrance Channel from -40' to -49', and the Main Channel from -38' to -47' MLLW; removing 13 pipelines and relocating 1 pipeline; a 165 acre sand engine as Beneficial Use of dredged material; and modifications to aids to navigation. Unavoidable environmental impacts would be fully compensated for by the creation of approximately 95 acres of oyster reef habitat. These mitigation features would be monitored for up to five years to ensure their performance. The recommended plan also includes a new Dredged Material Management Plan to address Operations and Maintenance materials for the designed life of the project to ensure project performance.

The total project first cost is estimated to be \$615,567,000 at October 2025 prices, with a Federal share of \$431,526,000 and an NFS share of \$184,041,000. Annual operation, maintenance, repair, rehabilitation, and replacement costs are estimated to be \$7,584,000 at October 2025 prices, using the Federal discount rate of 3.25%, and a period of analysis of 50 years. Total First Cost for Aids to Navigation are 100% Federal with funds going to the U.S. Coast Guard for \$2,373,000. However, the Galveston District has determined that the 2025 Recommended Plan does not fall within the Chief's Discretionary Authority and that new Congressional Authorization, with updated costs, is required.

The NFS would be the Calhoun Port Authority and has agreed to fund 35 percent of the incremental costs for the placement of dredged materials for beneficial use that exceeds the Federal standard base plan costs.

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COL David W. Dake
District Engineer &
Commander, Galveston District
US Army Corps of Engineers

Date

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12 ACRONYMS AND ABBREVIATIONS

Acronyms and Abbreviations	
~	Approximate or Approximately
°	Degree
\$	U.S. Dollars
F	Fahrenheit
‘	Foot or Feet
“	Inch or Inches
#	Number
/	Per
%	Percent
AAEQ	Average Annual Equivalent
AEO	American Energy Outlook
Alcoa	Alcoa Corporation
BA	Biological Assessment
BCR	Benefit Cost Ratio
Bpd	Barrels Per Day
CAGR	Compound Annual Growth Rate
CCSC	Corpus Christi Ship Channel
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, And Liability Act
C.F.R.	Code of Federal Regulations
cfu	Colony Forming Unit
CM	Construction Management
CNRA	Coastal Natural Resource Area

CPT	Cone Penetrometer Test
CPUE	Catch Per Unit Effort
CSAT	Corps Shoaling Analysis Tool
CZMA	Coastal Zone Management Act
dBA	A-Weighted Sound Level
DMMP	Dredged Material Management Plan
DO	Dissolved Oxygen
DWT	Dead Weight Ton
E	Exceptional Aquatic Life Use Subcategory
EIA	U.S. Department of Energy's Energy Information Administration
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EM	Engineering Manual
EO	Executive Order
EOPs	Environmental Operating Principles
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
F/EIS	2019 Feasibility Report And Environmental Impact Statement
Formosa	Formosa Plastics Corporation
ft	Foot or Feet
FWOP	Future Without Project
FWP	Future With Project
FY	Fiscal Year

GIWW	Gulf Intracoastal Waterway
GNF	General Navigation Feature
Gulf	Gulf of America
HQUSACE	Headquarters USACE
HTRW	Hazardous, Toxic, and Radioactive Waste
IDC	Interest During Construction
ITM	Inland Testing Manual
Kg	Kilogram
L	Liter
Ldn	Day-Night Average Sound Level
LNG	Liquefied Natural Gas
LNGC	LNG Carrier
LOA	Length Overall
mcy	Million Cubic Yards
mg	Milligram
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MLT	Mean Low Tide
MLLW	Mean Lower Low Water
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSC	Matagorda Ship Channel
MSCIP	Matagorda Ship Channel Improvement Project
NAAQS	National Ambient Air Quality Standards
NED	National Economic Development
NFS	Non-Federal Sponsor

NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic And Atmospheric Administration
NOI	Notice of Intent
NOx	Nitrogen Oxide
NPL	National Priority List
NRCS	Natural Resources Conservation Service
NRDA	Natural Resources Damage Assessment
NRHP	National Register of Historic Places
O	Oyster Waters
OD	Origin-Destination
ODMDS	Ocean Dredged Material Disposal Site
OM	Operations Manual
OMRR&R	Operations, Maintenance, Repair, Replacement, and Rehabilitation
OPEC	Organization of The Petroleum Exporting
OSE	Other Social Effects
PA	Placement Area
PACR	Post-Authorization Change Report
PAWSA	Ports And Waterways Safety Assessment
PCC	Port of Corpus Christi
PCO	Point Comfort Operations
PCX	Planning Center Of Expertise
PDT	Project Delivery Team
P&G	Principles And Guidelines
PIANC	Permanent International Association Of Navigation Congresses

Pilots	Matagorda Bay Pilots Association
PL	Public Law
The Port	Port of Calhoun
PPA	Preliminary Project Assessment
ppt	Parts per Thousand
PSU	Practical Salinity Unit
RCRA	Resource Conservation And Recovery Act
RED	Regional Economic Development
RFMC	Regional Fishery Management Council
RHA	Rivers and Harbor Act
RIA	Regional Implementation Agreement
ROD	Record of Decision
RRC	Railroad Commission Of Texas
RSLR	Relative Seal Level Rise
SAV	Submerged Aquatic Vegetation
SE	Sand Engine
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SO2	Sulfur Dioxide
STA	Station
State	State of Texas
SWG	Galveston District
TBP	Texas Biotic Province
TCEQ	Texas Commission on Environmental Quality
TCMP	Texas Coastal Management Program

TCOON	Texas Coastal Ocean Observation Network
TCWC	Texas Colonial Waterbird Census
TDSHS	Texas Department of State Health Services
T&E	Threatened and Endangered
THC	Texas Historical Commission
TSHA	Texas State Historical Association
TWQS	Texas Water Quality Standards
UKC	Under-Keel Clearance
ULCC	Ultra-Large Crude Containers
U.S.	United States
USACE	U.S. Army Corps Of Engineers
U.S.C.	U.S. Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish And Wildlife Service
USGS	U.S. Geological Service
V/SEIS	2025 Validation Report and Supplemental Environmental Impact Statement
VLCC	Very Large Crude Carriers
WCSC	Waterborne Commerce Statistics Center
WIS	Wave Information Studies
WMA	Wildlife Management Area
WQC	Water Quality Criteria
WRDA	Water Resources Development Act
WTS	World Trade Service

13 DEFINITIONS

Aframax Tankers – These are medium sized merchant vessels that weigh between 80,000 and 120,000 DWT and are mainly oil tankers. The name Aframax comes from the Average Freight Rate Assessment (AFRA) system. (www.marineinsight.com)

Attainment Area – An area that currently meets all the NAAQS.

Average Freight Rate Assessment (AFRA) System –

Backhaul – As it relates to the transportation of goods, it is the return trip of a commercial mode of transportation that moving cargo back over all, or part, of the same route it took to get to its current location.

Chester Island – Island to the NNE of the MSCIP Entrance Channel created with dredge material.

Break Bulk Cargo / General Cargo – These are goods that must be loaded individually, not in intermodal containers, nor can they be loaded in bulk.

Bulk Cargo – Cargo that is transported unpackaged and in large quantities. It can be either liquid, granular, or as particulates. Examples are petroleum or crude oil, grain, coal, or gravel.

Chemical Tanker – These vessels transport chemicals in various forms. (www.marineinsight.com)

Cross-Channel Currents – These are currents that travel across the channel perpendicularly, as opposed to along the channel parallel.

Entrance Channel – This is that part of the MSCIP from Gulf anchors, through the jetty channel at Matagorda Peninsula. This may also be known as the “Offshore.”

Feedstocks – This refers to any unprocessed material used to supply a manufacturing process. Feedstocks are bottleneck assets because their availability determines the ability to make products.

Fluorspar / Fluorite – This is the mineral form of calcium fluoride. It is used in the smelting process.

Heavy Lift Cargo – This generally means individual goods weighing over five long tons.

Know – A unit of speed equal to one nautical mile per hour, exactly 1.852 kilometers per hour, or ~1.15078 miles per hour.

LNG Carrier – These vessels carry Liquefied Natural Gas (LNGC). (www.marineinsight.com)

Long Ton / Imperial Ton / Displacement Ton / Weight Ton – Used in the United Kingdom and British Commonwealth Nations, it is exactly 2,240 pounds or 20 hundredweight. It is 1.12 short tons or 1.0160 metric tonnes.

Main Channel – This is that part of the MSCIP from Matagorda Peninsula to turning basin at Point Comfort.

Mean Low Tide (MLT) – The mean average of all the low tides (high low tides and low low tides) occurring over a certain period of time, usually 18.6 years (one lunar epoch). (Coastal States Organization 1997). MLT in the Galveston District was a locally defined navigation datum used for project authorization and construction. Historic projects are referenced to this datum. It has since been superseded by MLLW which is a tidal datum as described herein.

MLLW = MLT + .303'. Vertical datum conversion, MLT to MLLW per USACE Engineering Documentation Report dated July 2015.

Mean Lower Low Water (MLLW) – The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch. (NOAA)

Naphtha – This is a flammable hydrocarbon mixture. Crude oil is often called naphtha.

Nautical Mile – A unit of distance defined as 6,076', 1.1508 miles, or 1,852 meters.

Non-Attainment Area – An area that currently does not meet the NAAQS for at least one criteria pollutant.

Offshore Bar – A submarine feature that is the principle bypassing mechanism for long-shore sediment transport.

Oil Tankers – These vessels carry oil and its by-products. Oil Tanker is a generic name. (www.marineinsight.com)

Panamax Tanker – These vessels measure around 950' LOA, with a 106' beam, and with 39.5' of depth. They weight between 60,000 and 78,000 DWT. Panamax tankers were designed for the Panama Canal whose lock chambers measure somewhere around 1,050' long, by 110' wide, and 85' deep. (www.marineinsight.com)

Petrochemicals / Petroleum Distillates – These are chemical products derived from petroleum. Examples of petrochemicals are olefins and aromatics.

Short Ton / Ton – It is an American unit of weight measuring 2,000 pounds or 907.18474 kilograms.

Station (STA) – A horizontal distance in feet measured along the centerline of the channel and is used to indicate the relative location of a particular portion of the channel

Turning Basin – It is a constructed water body that is wider than the channel, or port, that allows vessels to turn and reverse their direction of travel, or to enable long narrow vessels to turn a sharp corner.

Ultra-Large Crude Carriers (ULCCs) – These vessels are considered to be cargo carrying super tanker, with a DWT ranger between 320,000 and 550,000. They are the biggest carrying tanker vessels with select areas of operations in Europe, North America, and Asia. (www.marineinsight.com)

Under-keel Clearance – This is measured by the vertical difference between the lowest protruding section of the hull, sometimes referred to as "scantling draft," and the minimum actual channel depth (including advance maintenance dredging). It cannot include vessel hull measurements above the waterline. It must be estimated from the vessel characteristics, sailing draft and trim, and channel dredging conditions relative to the authorized depth and actual depth.

Very Large Crude Carriers (VLCCs) – These are supertankers with a maximum DWT of 320,000. These sail mainly in the Mediterranean Sea, off the coasts of West Africa, and in the North Atlantic. (www.marineinsight.com)