Coastal Erosion Planning & Response Act

A REPORT TO THE 88TH LEGISLATURE

Texas General Land Office

Commissioner Dawn Buckingham, M.D.

Cover imagery, clockwise from top: Texas beach front, great blue heron in marsh, McFaddin beach nourishment construction, Spartina plugs awaiting restoration planting, erosion at Nueces Bay shoreline, CEPRA project at Causeway Rookery Island (image courtesy of CBBEP).

A MESSAGE FROM THE COMMISIONER

Honorable Members of the 88th Texas Legislature, I am pleased to submit the FY22-23 Biennial Report on the Coastal Erosion Planning and Response Act (CEPRA) Program. This report covers current CEPRA Cycle 12 projects and projects that have been completed since the preceding legislative session.

The Texas General Land Office is tasked with stewarding 367 miles of gulf shoreline, 3,300 miles of bay shoreline, 18 coastal counties, two peninsulas and six barrier islands along the Texas coast. This responsibility is one we do not take lightly. The projects showcased in this report underscore the important work the CEPRA Program does in maintaining Texas' barrier island and bay systems. These features are critical components for ensuring a strong and resilient Texas coastal ecosystem and economy.

Whether it is a natural hazard or economic fluctuation that alters how a coastal system operates, CEPRA projects help local communities and industry be more resilient to and recover from continuous coastal change. These projects act as the first line of defense from hurricanes, tropical storms, and high tides, while enhancing recreational, fishing, and hunting opportunities. CEPRA projects also ensure protection of billions of dollars in coastal infrastructure and the energy, chemical, and tourism industries.

In the spring of 2019, the 86th Legislature passed legislation that helps provide the CEPRA program with dedicated funding. The new law directs 2% of coastal counties state hotel occupancy tax revenue to be contributed to the CEPRA Program account. These funds will sustain the increasingly important positive impacts the CEPRA Program has on Texas' coast as CEPRA remains a true steward of Texas' precious coastal resources. I am constantly amazed at what was accomplished this last biennium, and I feel certain you will be, too. I look forward to our continued partnership in protecting the security and economy of the Texas coast. The CEPRA Legislative report can be found below. For additional information or to request hard copies of this report, please contact Kevin Frenzel at 512-463-2482.

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List of Acronyms

BEG
The University of Texas Bureau of Economic Geology
BMMP
Beach Monitoring and Maintenance Plan
BOEM
Bureau of Ocean Energy Management
BUDM
Beneficial Use of Dredged Materials
CBBEP
Coastal Bend Bays and Estuaries Program
CEPRA
Coastal Erosion and Planning Response Act
CMP
Coastal Management Program
FEMA
Federal Emergency Management Agency
GBF
Galveston Bay Foundation
GOMESA
Gulf of Mexico Energy Security Act
GIWW
Gulf Intracoastal Waterway
GLO
General Land Office
NFWF
National Fish and Wildlife Foundation
NGO
Non-Governmental Organization
NRC
Natural Resources Code
NRDA
Natural Resources Damage Assessment
NWR
National Wildlife Refuge
PCCA
Port of Corpus Christi Authority
RESTORE
Resources and Ecosystems Sustainability, Tourism Opportunities, and Revived Economies of the Gulf States Act of 2012
SMP
Sediment Management Plan
TCRMP
Texas Coastal Resiliency Master Plan
TPWD
Texas Parks and Wildlife Department
TNC
The Nature Conservancy
USACE
United States Army Corps of Engineers
USFWS
United States Fish and Wildlife Service
WRDA
Water Resources Development Act

Introduction

Texas has 367 miles of gulf-facing shoreline, approximately 3,300 miles of bay shoreline, and some of the highest erosion rates in the country. Coastwide, an average of four feet of land is lost each year, with some severely eroding locations losing more than 62 feet per year. To combat coastal erosion and protect the economies and natural resources of Texas' coastal communities, the Coastal Erosion Planning and Response Act (CEPRA) was enacted on September 1, 1999, during the 76th Legislative Session.

The General Land Office's (GLO) Coastal Resources Division, per Texas Natural Resource Code (NRC) 33.606, administers the CEPRA program with the goal of reducing erosion-related impacts. The program is also tasked with implementing coastal projects, remediation, planning, and monitoring the rate of shoreline movement to support erosion reduction. Under CEPRA, the GLO implements actions through collaboration and matching funds partnerships with federal, state, and local governments, navigation districts, non-profit organizations, and other potential project partners. Actions include beach nourishment, shoreline stabilization, habitat protection, dune restoration, beneficial use, erosion investigations, demonstration projects, structure relocation, and debris removal.

This report will give an overview of recently completed CEPRA projects, highlight current Cycle 12 projects, examine eroding areas of concern, discuss funding measures, and provide a calculated economic and natural resource benefit analysis that showcases how the CEPRA program provides value to the state's economy. These reporting requirements are in accordance with Texas NRC §33.608.

Critical Erosion Areas and Impacts

The GLO Rules for Management of the Beach/Dune System (31 TAC §15.2 [32]) define an eroding area as a portion of the shoreline that is experiencing a historical erosion rate of greater than two feet per year based on data published by the University of Texas Bureau of Economic Geology (BEG) (Jeffrey Paine T. , 2019).

Eighty percent of the Texas shoreline is classified as critically eroding with the rate of shoreline retreat greater than two feet per year. The distribution and extent of erosion is illustrated in Figure 1. The highest erosion rates occur along the upper and lower Texas coasts, from Matagorda County northward and southward along South Padre Island in Willacy and Cameron counties (Table 1). On average, 235 acres, or the equivalent of 178 football fields, is lost each year within the state's bays, estuaries, and navigation channels.

The Texas Natural Resources Code §33.601 defines coastal erosion as: ***"The loss of land, marshes, wetlands, beaches, or other coastal features within the coastal zone because of the actions of wind, waves, tides, storm surges, subsidence, or other forces."*** Section 33.601(4) of the Natural Resources Code defines a coastal erosion area as ***"A coastal area that is experiencing an historical erosion rate, according to the most recently published data of the BEG."***

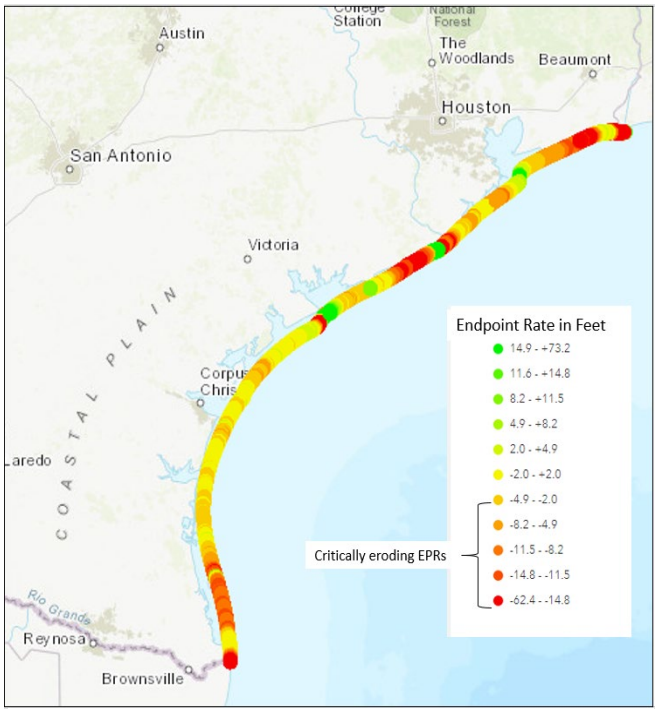

Figure 1. 1950-2019 BEG Shoreline Change Rate (Jeffrey Paine T. , 2019)

The Commissioner finds coastal erosion to be a threat to:

- Public health, safety or welfare;
- Public beach use or access;
- Traffic safety;
- Ports, roads, and industrial infrastructure;
- Public property or infrastructure;
- Private, commercial, and residential property;
- General recreation;
- Fish or wildlife habitat; and
- Any area of regional or national importance.

Miles of Eroding Shoreline on the Texas Coast*

Region	Total Coastal Miles	Total Eroding Miles	Percent Eroding Shoreline
1-Sabine Pass to Bolivar Roads (Galveston County)	59.0	47.6	80.6%
2-Bolivar Roads to San Luis Pass	29.0	13.9	48.1%
3-San Luis Pass to Old Colorado River	63.1	45.6	72.3%
4-Old Colorado River to Aransas Pass	83.7	45.3	54.1%
5-Aransas Pass to Padre Island National Seashore	27.3	11.3	41.4%
6-Padre Island National Seashore to Mansfield Cut	64.1	29.2	45.5%
7-Mansfield Cut to Rio Grande River/U.S. Border	40.8	32.1	78.6%
Total	367.0	224.9	61.3%

** As determined from average gulf shoreline erosion rates greater than 2ft/yr measured over the past 70 years by the University of Texas Bureau of Economic Geology.*

Table 1. Eroding Shoreline Along the Texas Coast

Coastal erosion causes property loss, decreases property value, and negatively impacts tourism opportunities in local communities. It also results in the loss of critical habitats, such as beaches, dunes and wetlands, that protect coastal communities from storm and hurricane impacts and long-term erosive forces. Texas, the nation's top state for water-based commerce representing over 82.8 billion in annual economic value (TCS, 2019), is also highly concerned about erosion impacts to economic resources such as the Gulf Intracoastal Waterway (GIWW), ship channels, ports,

petrochemical facilities, road infrastructure, and commercial businesses (Texas General Land Office, 2019). The CEPRA program aims to fund coastal erosion response projects that will reduce threats to natural and manmade systems and help to understand the processes of coastal erosion.

CEPRA Processes

Since CEPRA's inception, the program has administered 12 CEPRA funding cycles. Each cycle consists of a two-year period that coincides with the Legislative biennium. The current Cycle 12 funds 31 coastal erosion response projects.

The CEPRA Program administers the following types of coastal projects:

- Evaluating erosion response methods
- Engineering and design of beach nourishment and dune restoration (Figure 2)
- Habitat restoration of coastal wetlands and benthic habitats (Figure 3)
- Shoreline protection using hard and soft techniques (Figure 4)
- Structure removal assistance and debris removal (Figure 5)
- Maintaining a robust Beach Monitoring and Maintenance Program (BMMP) for engineered beaches (Figure 6)
- Scientific studies to collect data in support of the program
- Supporting projects that promote sound coastal stewardship

Figure 2. CEPRA Beach and Dune Restoration Project at McFaddin Beach

Figure 3. CEPRA Wetland Restoration Project on Galveston Island

Figure 4. CEPRA Shoreline Restoration Project at Dickinson Marsh

Figure 5. CEPRA Structure Relocation at Surfside

Figure 6. CEPRA Engineered Beach and Beach Monitoring Maintenance Program (BMMP) at Indianola Beach

CEPRA partners with other state, federal, and local governments, as well as non-profit organizations to develop and fund coastal erosion projects. Under CEPRA, beach nourishment projects require a minimum 25% partner match funding and other coastal erosion response projects require a minimum 40% partner match funding, per the Texas NRC §33.603(e). Funding appropriated within the biennium must be encumbered and spent on projects within that biennium unless funding for a particular project is given “carryover” authority by the Legislature. Historically, “carryover” authority is given to projects leading to or involving construction that are not expected to be complete within that biennium.

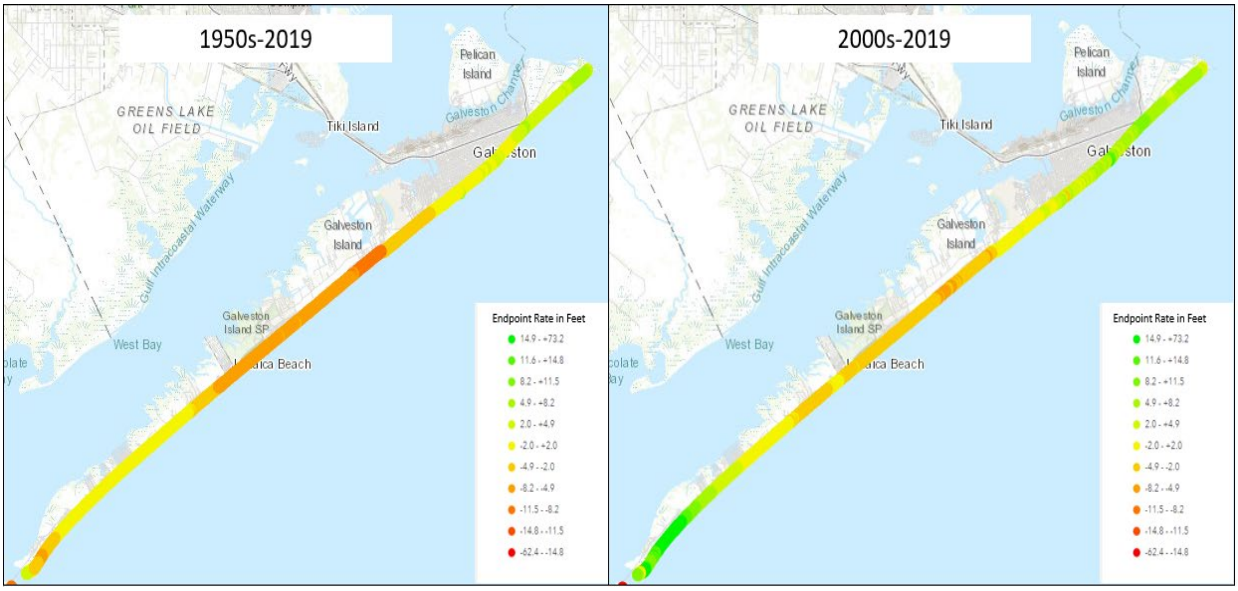

Figure 7. Shoreline Change Rates at Galveston Island (Jeffrey Paine T. , 2019)
Rates greater than two feet per year are shown in orange and red, and stable or accreting (gaining land) areas are shown in green.

CEPRA Program Case Studies

The value of the CEPRA program is evident in every successful project implemented. The CEPRA program began implementing erosion control and prevention projects on Galveston Island in 2000. Figure 7 shows long-term versus short-term shoreline change rates; the erosion rates have decreased dramatically due to beach nourishment projects implemented by partnerships between CEPRA, local entities, and the United States Army Corps of Engineers (USACE).

In the bays, CEPRA projects have restored a multitude of wetland and marsh habitats crucial for fisheries and tourism industries. In partnership with local entities, hard and soft structures have been installed along the Texas coast to protect, enhance, and restore eroded habitat areas. The benefits from increased resiliency serve to safeguard the island's ecology and economy for future generations to come.

These completed projects from previous CEPRA cycles exemplify projects with large-scale, long-lasting impacts. The Indian Point shoreline protection and McFaddin beach nourishment are typical of CEPRA projects in design and impacts. The Rollover Pass closure was a novel project for CEPRA erosion protection response actions.

Indian Point Shoreline Protection, Portland TX

A CEPRA cycle 11 project, in partnership with the Natural Resource Damage Assessment (NRDA) trustees, Coastal Bend Bays and Estuaries Program (CBBEP), City of Portland, and Port of Corpus Christi (PCCA), installed 2,560 linear feet of breakwater to protect the northeastern shoreline of Indian Point. The area is a popular fishing and recreation spot for locals; it features a bay shoreline protecting a marsh complex used by migratory birds, nesting birds, and recreators. With Cycle 12 CEPRA funds, additional breakwaters will be constructed on the southwest side of Indian Point, providing a comprehensive shoreline protection system for the beach, marsh, seagrass, lagoons, and upland habitat (Figure 8).

Figure 8. CEPRA Shoreline Protection at Indian Point Park, Portland

McFaddin Beach Nourishment, Jefferson County

The CEPRA program has undertaken several projects along the Gulf facing beach at the McFaddin National Wildlife Refuge in Jefferson County (Figure 9). Severe storms had ravaged the beach, scouring the sand away to leave only clay sediment and bluff-like outcrops. CEPRA, in partnership with NRDA Trustees, the National Fish and Wildlife Foundation (NFWF), Resources, and Ecosystems Sustainability, Tourist, Opportunities and revised Economics of the Gulf States Act (RESTORE) funding, US Fish and Wildlife Service (USFWS), Jefferson County, and McFaddin NWR, nourished a 17-mile section of beach and restored the dunes to historic heights. Bulking up the beach serves to pad the land against erosive forces and provides critical habitat. Immediately following the sand and dune placement, upwards of 500 least terns nested in the area. Prior to nourishment the beach had no active tern nesting.

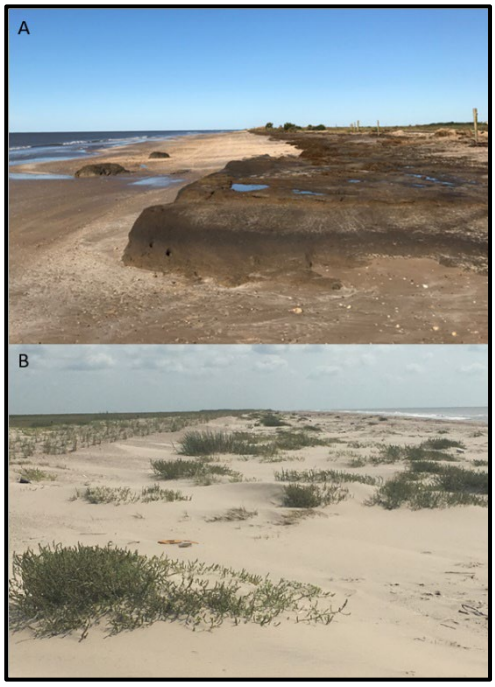

Figure 9. McFaddin Shoreline Prior to Nourishment (A) and Restored Beach with Dune Formation (B)

Rollover Pass Closure, Bolivar TX

Rollover pass, a man-made cut through Bolivar Peninsula, had exacerbated local erosion since its creation in 1955. The open pass created side effects that threatened public and private property and cost Texas and U.S. taxpayers hundreds of thousands of dollars every year. In 2011, the Texas Legislature authorized the closure of Rollover Pass. In September of 2019, the GLO began closing the pass. The closure was completed May 2020 and resulted in a new section of beach and a dune system that was tied into the existing beach and dune environment to further act in defense against storm surge (Figure 10). Closure of the pass has resulted in minimized beach erosion, elimination of excess sediment transport into the bay, and a reduction of maintenance dredging frequency for the GIWW.

Figure 10. Closure of Rollover Pass, Bolivar Peninsula

Restoration Partnerships

Due to deficits in the CEPRA program budget, CEPRA is consistently seeking to leverage funds for additional project support. Funding sources leveraged for CEPRA Cycle 12 projects include criminal and civil penalties from the Deepwater Horizon Oil Spill that have created restoration partnerships and funding opportunities with NRDA in addition to funding from the Gulf of Mexico Security Act (GOMESA), Federal Emergency Management Act (FEMA), the Department of the Interior's Bureau of Ocean Energy Management (BOEM), and the USACE. Previously, CEPRA leveraged funds from National Fish and Wildlife Foundation (NFWF), the United States Fish and Wildlife Service (USFWS), and Resources and Ecosystems Sustainability, Tourism Opportunities, and Revived Economies of the Gulf States Act of 2012 (RESTORE).

These restoration partnerships are important driving forces in nationwide habitat conservation. CEPRA is a proud ally to these restoration partners and is often trusted to implement large-scale projects. These monumental partnerships dedicated a total of $54,339,418 in funds for current Cycle 12 projects. Table 2 describes funding from each source for Cycle 12 projects. Details for each project are provided in the CEPRA Cycle 12 Project Descriptions section of this report.

FUNDING PARTNERSHIP	FUNDING AMOUNT	CEPRA PROJECT NAME
NRDA	$4,992,000	Bird Island Cove Shoreline Protection and Marsh Restoration
BOEM	$2,000,000	Region 2 and 3 Offshore Sediment Inventory Surveys and OCS Survey
FEMA	$2,665,718	Hurricane Harvey FEMA Repairs Setting a Precedent at Babe's Beach
USACE	$3,405,000	South Padre Island Beach Nourishment with Beneficial Use Dredged Material
USACE	$1,135,000	Andy Bowie & Isla Blanca Park Beach Nourishment with Beneficial Use Dredged Material

Table 2. Restoration Partnerships Funding for Cycle 12 Projects

Long Term Planning and Coordination

The CEPRA program will continue to support ongoing partnerships and initiatives including those under NRDA, NFWF, BOEM and the USACE as well as those listed in the TCRMP, Coastal Texas Study, and the Texas Sediment Management Plan. These partnerships and initiatives provide holistic goals for Texas coastal resiliency moving into the future. To meet these resiliency goals, CEPRA needs continued legislative funding and will continue to form functional partnerships that allow fund leveraging opportunities.

GOMESA Funding

Gulf of Mexico Energy Security Act (GOMESA) funds come from leasing revenues shared between the Gulf-producing states depending on the sum of the state's inverse distances from all applicable leased tracts. GOMESA Phase II caps fund sharing between all Gulf-producing states at $500 million per fiscal year through year 2055, with 50% going directly towards all states and their political subdivisions and a dedicated 10% of the total for that fiscal year as a minimum will be received by every state. This creates a great opportunity for the states and their political subdivisions impacted by oil and gas development in the Gulf of Mexico to implement much needed coastal restoration efforts.

GOMESA funds are dispersed to the GLO annually and are allocated through the Coastal Management Program (CMP) (15%), CEPRA (65%) and NRDA, NFWF and RESTORE (20%) programs. During this biennium, the CEPRA Program received $40,141,700.00 in GOMESA funding which is being used in the construction of 11 projects. CEPRA uses the GOMESA funds to complete the construction phase of projects. The 25-40% CEPRA match requirement is often a difficult stipulation for coastal communities to meet. CEPRA recognizes the importance of community involvement and the need to ensure all coastal communities can take part in restoration efforts enhancing local resiliency. To facilitate this, the CEPRA rules and guidance were amended to allow state GOMESA funds to be used as CEPRA projects' partner match for construction. This allows for project implementation in rural communities and coast wide protection of Texas resources. Use of GOMESA funding is prioritized to *Implementing Tier 1 Projects of the Texas Coastal Resiliency Master Plan (TCRMP).*

Implementing Tier 1 Projects of the Texas Coastal Resiliency Master Plan

The Texas Coastal Resiliency Master Plan (TCRMP) is the ongoing, long-term, and coastwide plan led by the GLO to protect and promote a resilient Texas coast in support of economic strength and a healthy environment for all who utilize coastal resources and infrastructure. The Plan recommends high priority 'Tier 1' projects that address and work to mitigate coastal vulnerabilities related to erosion, habitat loss, flooding, and resource impacts. CEPRA uses its GOMESA funds to implement Tier 1 TCRMP projects. Specifically, GOMESA funds are used to sponsor Qualified Project Partner match for the construction phase of the projects.

There are a total of 57 CEPRA projects that implement all or a portion of Tier 1 projects, with 19 in the current Cycle 12 funding. To continue to efficiently implement TCRMP projects, CERPA sought to receive a dedicated funding source from the 86th Texas Legislature. The 86th Legislature passed a law that directs 2% of coastal counties state hotel occupancy tax revenue to the CEPRA account as a dedicated funding source. These funds will become available to CEPRA during the 2023 biennium. Dedication of this funding source was a monumental moment for CEPRA as it represents "permanent" funding that can be consistently relied upon for future CEPRA projects and will greatly increase CEPRA's ability to implement TCRMP projects.

Coastal Texas Study

The GLO will continue to partner with the USACE on the Texas Coastal Program. The program was authorized through Water Resources Development Act (WRDA) 2022 in December 2022. The next step will be to obtain funding. The Coastal Texas Program will provide multiple lines of defense to coastal communities to reduce impacts from coastal storms through Coastal Storm Risk Management (CSRM) and Ecosystem Restoration (ER) measures. The proposed project will increase coastal resiliency by reducing impacts from storms, relative sea level rise (RSLR), erosion and associated coastal hazards. To accomplish the goals for this large-scale project, state, federal, and community funds and cooperation are needed. As this program moves forward, CEPRA funds will be used in partnerships to implement erosion response actions identified in the study.

Sediment Management Plan

Identified as a critical need in the TCRMP, the GLO commenced efforts to create a Texas Sediment Management Plan (SMP) to aid in future coastal resiliency and restoration projects. The SMP will identify sediment needs, available resources, and data gaps; create guidance to develop borrow areas; permit borrow areas and placement areas; inventory sediment resources; allocate sediment resources; monitor sediment resources, budgets, and transport; and develop or modify policy to protect and responsibly use sediment resources. The GLO will also create, modify, and coordinate on policies for sediment resources to aid coastal resiliency and restoration projects. These efforts are critical to successful and timely beach nourishment.

CEPRA Cycle 12 is building upon work done in the last cycle to help fulfill the goals of the SMP. The studies and surveys completed through the Cycle 12 '*Region 2 and Region 3 Offshore Sediment Inventory Surveys and OCS Survey*' project (#1747) will collect high-resolution geophysical data along the outer continental shelf for inventorying potential sediment resources. The project is funded through GOMESA and BOEM funding sources. Cycle 12 also funds the '*Longshore Transport Modeling*' project (#1750) that analyses hydrodynamic data to develop a sand transport model to inform the development of sediment budgets, also to be utilized in the SMP. The project is funded by CEPRA and GOMESA funding.

As the Sediment Management Plan progresses, it is anticipated that CEPRA will play a key role in gathering data and informing decisions. The CEPRA program's experience with beach nourishment, monitoring, and beach maintenance will fill knowledge gaps to achieve SMP goals. Successful implementation of the statewide SMP will reinforce healthy Texas beaches and provide a critical defense against storm surge.

Beach Nourishment and BUDM

The GLO oversees small and large-scale beach nourishment projects through partnerships with the USACE and local communities. The sediment utilized to bolster the beaches is dredged from USACE-managed navigation channels and would not be possible without continued coordination between the agencies. Nourishing the beaches provides increased tourism opportunities valued by local economies. GLO-engineered beaches are maintained through a Beach Monitoring and Maintenance Plan (BMMP) that ensures they qualify for repair when damaged during a tropical storm. FEMA reimburses repair costs up to 75% to 90% leaving CEPRA and project partners to cover the remaining non-federal cost-share. Cycle 12 funds three beach nourishment projects, located in Galveston and South Padre Island, and one BMMP monitoring project.

CEPRA Program Financial Status

The rapidly eroding Texas coastline requires constant action to protect economic and natural resources critical to coastal resiliency, economic services and coastal community quality of life. Each biennium the CEPRA program receives new applications for needed projects along the Texas coast; however, funding limitations result in worthy projects not receiving support during the biennium. The need for funding will increase greatly as coastal communities continue to undertake projects identified in the TCRMP and potentially begin projects recommended in the Coastal Texas Study. These proposed projects have been vetted for value and efficacy, with the unknown factor at this time being funding. CEPRA provides a project management avenue for implementing these much-needed projects, yet funding needs far exceed the recommended actions for protecting the Texas coast. At this time CEPRA lacks millions of dollars needed to meet coastal community's project needs.

Status of the CEPRA Account

For the 88th Legislature, $99,486,115 will be utilized to implement 31 CEPRA Cycle 12 projects and studies. Cycle 12 covers the period from September 1, 2021, to August 31, 2023; the projects will be described in detail in the upcoming report sections. The $13,898,981 of CEPRA appropriated funds were leveraged against $85,587,134 dollars in funding which includes the following sources (Table 3):

- $31,247,716 in partner match funds
- $40,141,700 in GOMESA funds
- $2,665,718 in FEMA funds
- $4,992,000 in NRDA funds
- $2,000,000 in BOEM funds
- $4,540,000 in USACE in-kind funds

Funding Cycle	Number of Projects Funded	CEPRA Funds	CEPRA Match Funding	Total Budget for Cycle
6 (FY10-11)	28	$15,907,639	$68,914,538	$84,822,177
7 (FY12-13)	26	$17,394,456	$41,972,295	$59,366,751
8 (FY14-15)	21	$17,038,734	$27,349,977	$44,388,711
9 (FY16-17)	18	$14,920,538	$11,462,267	$26,382,805
10 (FY18-19)	32	$14,271,940	$133,115,582	$147,387,522
11 (FY20-21)	31	$12,846,668	$113,080,887	$125,927,555
12 (FY22-23)	31	$13,898,981	$85,587,134	$99,486,115

Table 3. Summary of CEPRA Funding Allocations by Cycle

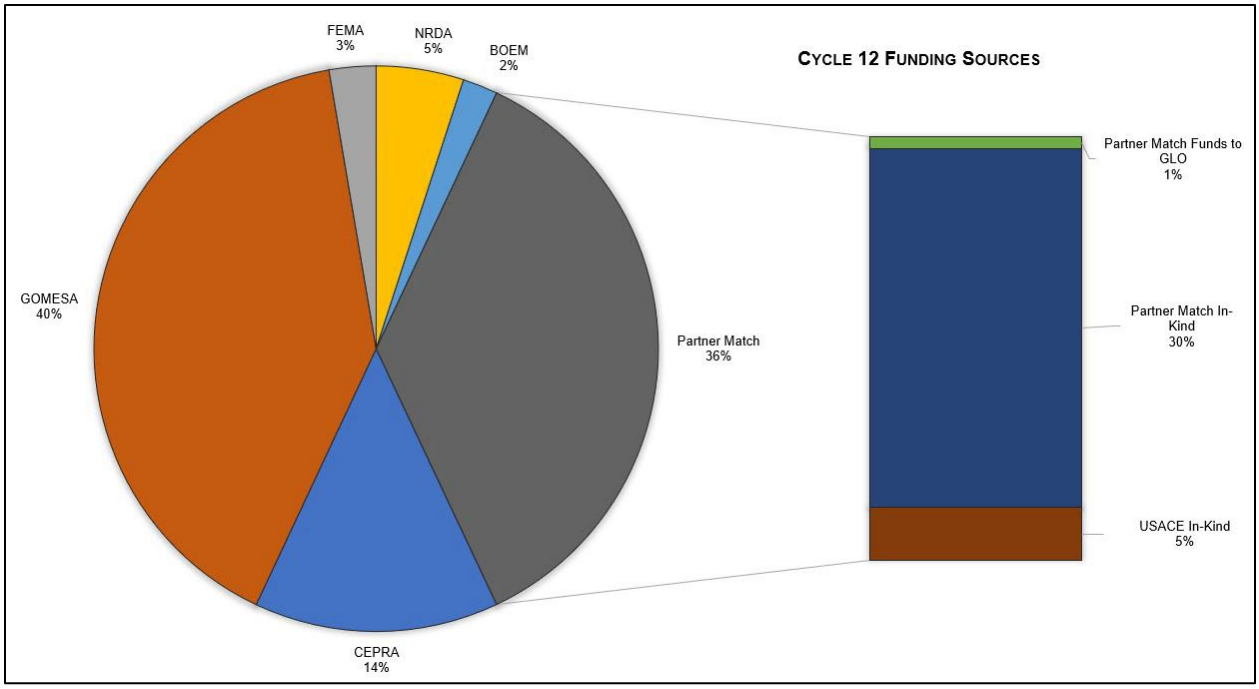

Figure 11. Funding Sources for Cycle 12

Economic and Natural Resource Benefits of the CEPRA Program

The Texas Legislature requires the GLO to report the economic and natural resource benefits derived from CEPRA construction projects every biennium, per biennium. The GLO contracted INTERA-GEC, LLC to perform the benefit-cost (B/C) analysis for six construction projects. The study reported that the state of Texas receives $3.00 in economic and financial benefits for every dollar the state invested in these projects. While the analyzed projects have CEPRA funding histories that precede Cycle 12, the study considers the project components (cost and benefits) that occurred in Cycle 12.

The following results are based on analysis of the following six construction projects, which are representative of the CEPRA program:

- #1637: Galveston Island State Park Phase 3: Cycle 10, project year 2021
- #1653: South Padre Island Beach Nourishment with BUDM: Cycle 11, project year 2021
- #1665: Corpus North Beach Harvey Repair: Cycle 10, project year 2023
- #1685: Causeway Rookery Island Phase 2: Cycle 11, project year 2022
- #1693: Babe's Beach BUDM (2021 BUDM Cycle): Cycle 11, project year 2021
- #1702: Isla Blanca Park Beach Nourishment with BUDM: Cycle 11, project year 2021

The project benefits analysis classified and estimated economic and financial benefits associated with habitat, recreation, storm surge protection, primary production, gas sequestration, pollution abatement, aesthetics, out-of-state visitor spending, and non-Texas project funding. The stream of economic benefits over time varied from project to project depending on a project's durability. The period of analysis for the various projects began in the project year and extended from two to seven years for beach restoration and twenty years for other projects.

This study adopts a Texas accounting perspective. Funding from outside Texas (i.e., federal dollars) and spending by out of state visitors represent financial benefits to the state. This perspective views project contributions normally considered a cost when viewed from a national or world perspective as a financial benefit. Costs funded by non-Texas dollars represent a financial benefit because money flows into the Texas economy. As appropriate, the findings reported here show this adjustment to reflect the Texas accounting perspective for the estimates of benefits and costs. This report serves to estimate the cost-effectiveness of the four projects listed above via benefit-cost ratios and net benefits on an individual project basis, and as a group, or "portfolio."

Table 4 presents a summary of the assessed projects. The direct and positive net benefits (benefit-to-cost ratios greater than one) from the four evaluated projects combined indicate that these projects yield high returns on investment for the state of Texas. Preserving Texas' coastal assets proves a worthy public investment strategy for Texas taxpayers and citizens.

CEPRA Project	County	Project Year[1]	Discounted Present Worth, Beginning of Project Year		Discounted Present Worth, Beginning of 2022[3]		Benefit to Cost (B/C) Ratio
			Cost[2]	Benefits	Cost	Benefits	
#1637: Galveston Island State Park Phase 3 (Cycle 10)	Galveston	2021	$575,296	$7,193,585	$602,623	$7,535,280	12.5
#1653: South Padre Island Beach Nourishment with BUDM (Cycle 11)	Cameron	2021	$1,530,000	$6,889,481	$1,602,675	$7,216,731	4.5
#1665: Corpus North Beach Harvey Repair (Cycle 10)	Nueces	2023	$141,208	$1,647,085	$141,208	$1,647,085	11.7
#1685: Causeway Rookery Island Phase 2 (Cycle 11)	Nueces	2022	$1,550,394	$615,430	$1,550,394	$615,430	0.4
#1693: Babe's Beach BUDM (2021 BUDM Cycle) (Cycle 11)	Galveston	2021	$12,000,000	$28,361,072	$12,570,000	$29,708,223	2.4
#1702: Isla Blanca Park Beach Nourishment with BUDM (Cycle 11)	Cameron	2021	$510,000	$3,814,534	$534,225	$3,995,724	7.5
				Total[4]	$17,001,125	$50,718,474	3.0

[1]Project Year represents the year benefits begin to accrue and may not represent the actual construction year.

[2]Texas portion only; dollar values reflect present worth equivalents at the beginning of Project Year.
[3]Dollar values reflect present worth equivalents at the beginning of 2022 with a 4.75% discount rate.
[4]Total B/C Ratio represents the total discounted benefits divided by the total discounted cost of all six projects combined ($50,718,474 / $17,001,125 = 3.0).

Table 4. Benefit to Cost Ratio of Six Completed CEPRA Projects

The leveraging of out-of-state and federal funding plays a substantial role in the economic benefit calculations of the projects. NFWF, USACE, FEMA, and GOMESA funds contributed to completion of projects. A discount rate of 4.75% was used in the benefit cost calculations to convert benefits and costs occurring at different points in time to comparable equivalent values ("discounted present worth") for comparison at the beginning of each project's period of analysis. In Table 4 the discounted present worth of benefits and costs is also converted to equivalent values at a common point in time, 2022. This makes the benefits and costs of the different projects comparable and additive, allowing them to be viewed as a portfolio. The discount rate chosen for this study represents a mid-range value of current and recent corporate bond rates.

CEPRA Projects Evaluated in the Economic Studies Report

The six projects described below were utilized in the Cycle 12 Economic a Studies Report (Figure 12). There were four projects completed to nourish gulf facing beaches, one rookery island project and one shoreline protection and habitat restoration project (Table 5).

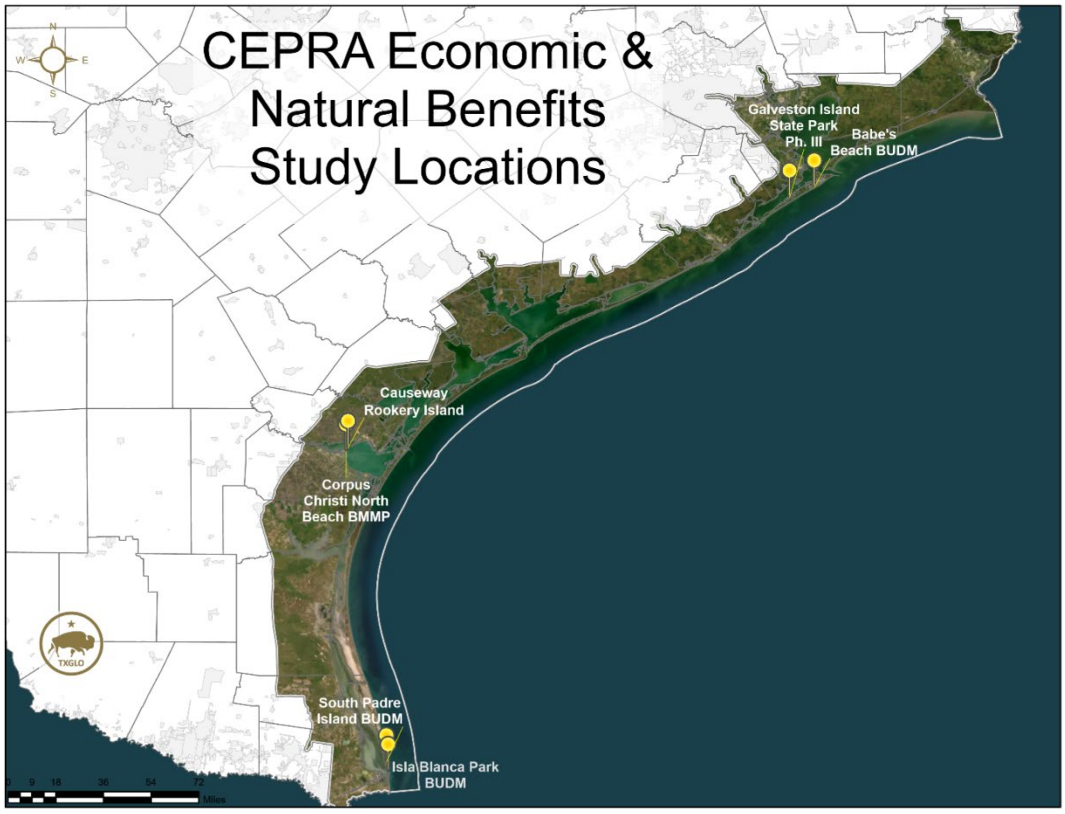

Figure 12. Map of CEPRA Projects Evaluated in Economic Studies Report

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION
1637	**Galveston Island State Park Marsh Protection, phase III**	This project added 7,550 linear feet to previously constructed breakwaters that protect Dana Cove, Oak Bayou, and Butterowe Bayou on the bay side of Galveston Island. The breakwaters protect critical marsh and seagrass habitat that provide refuge for commercially and recreationally important shellfish and finfish. Human use of the area includes kayaking, fishing, birding, camping, geocaching, and visitors from the adjacent Galveston Island State Park.
1653	**South Padre Island BUDM at CEPRA BMMP Beach**	The project conducts annual closure-depth maintenance surveys of the City's beach to determine impacts of beach nourishment on the island and the sand system, engineering and design of beach nourishment projects per FEMA requirements, coordinated BUDM placement with USACE during dredging of the Brazos Santiago Pass. This BUDM location has benefited from this symbiotic relationship with the USACE since 1997.
1665	**Corpus Christi North Beach Hurricane Harvey Repair**	The North Beach renourishment project replaced the sand lost during Hurricane Harvey, per the FEMA Project Worksheet Number 1665 obligations to renourish BMMP beach for the amount of sand lost. GLO and City of Corpus Christi covered the 10% non-federal portion of total project cost.
1685	**Causeway Rookery Island Shoreline Protection, phase II**	The project constructed 3,400 linear feet of breakwaters for shoreline protection around an ecologically significant bird rookery island.
1693	**Babe's Beach Creation with BUDM**	The nourishment project utilized beach quality dredge from a USACE channel maintenance for the placement of BUDM onto Babe's Beach. This novel project created beach where previously was only granite revetment and provides increased recreational opportunities along the Galveston seawall. The project was generally managed by the USACE-Galveston District with project partners (GLO and Galveston Park Board) covering the incremental cost to place the BUDM onshore.
1702	**Isla Blanca Park BUDM**	The nourishment project utilized beach quality dredge from the USACE maintenance of the Brownsville Ship Channel (Brazos Island Harbor) jetty and entrance channel segments. The GLO partnered with the USACE-Galveston District to facilitate beach placement of suitable dredge material on the beach. The GLO and Cameron County covered cost-sharing of the incremental (non-federal) cost for beach placement of dredge material.

Table 5. CEPRA Projects Evaluated in Economic Studies Report

CEPRA Cycle 12 Project Descriptions

This section describes CEPRA Cycle 12 projects (Table 6). The cycle approved 31 GLO and Qualified Project Partner (QPP) led projects comprised of beach nourishment, beneficial use of dredge material, shoreline protection, habitat restoration, studies, and demonstration projects (Figure 13). Cycle 12 funds total $13,898,981 with $85,587,134.40 of outside funds leveraged for a total budget of $99,486,115.40.

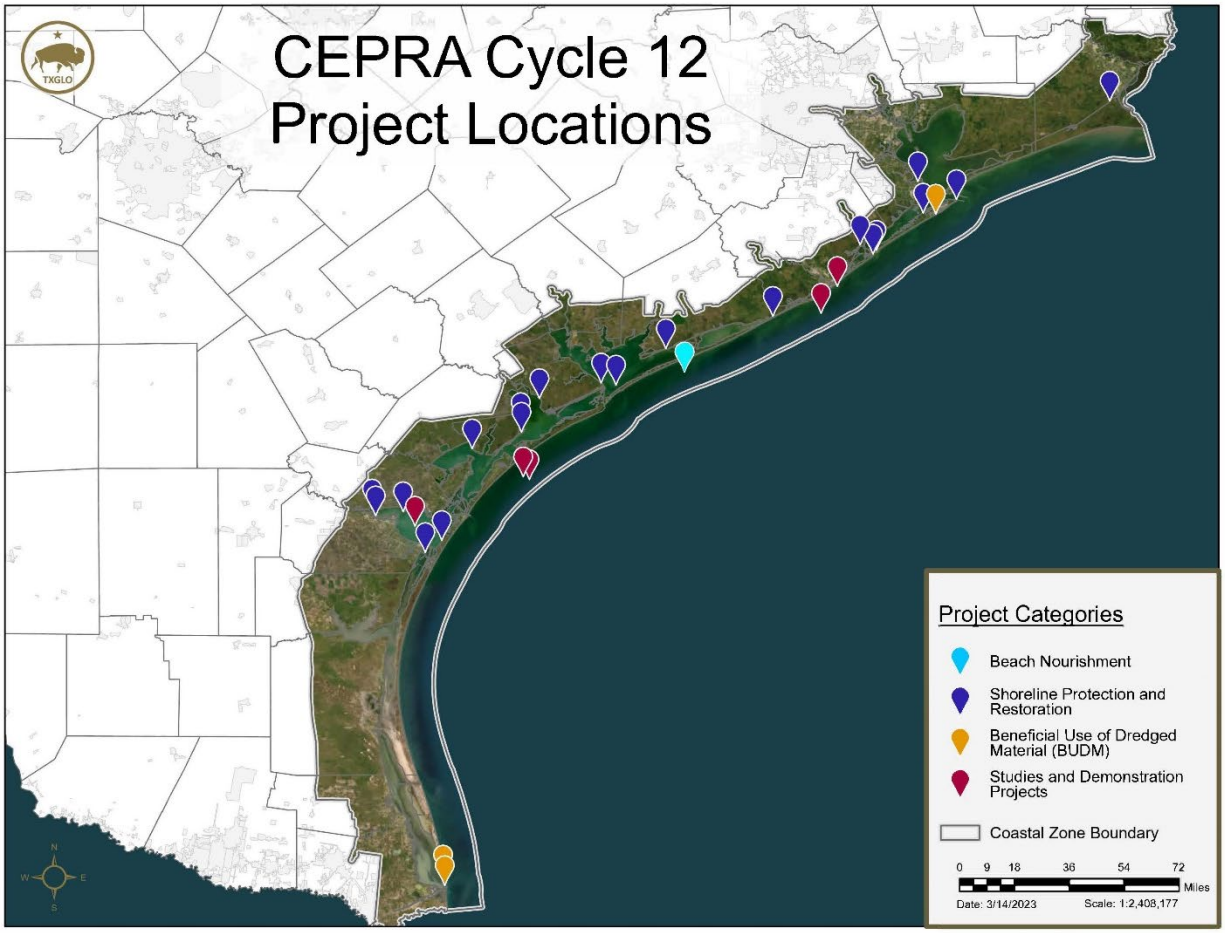

Figure 13. Location of all CEPRA Cycle 12 Projects

Beach Nourishment (BN)

Through USACE-permitted borrow sources, the GLO oversees small- and large-scale beach nourishment projects to facilitate beach and dune habitat restoration on Gulf and Bay beaches. GLO-engineered beaches are maintained through a Beach Monitoring and Maintenance Plan (BMMP) which actively ensures beaches maintain their engineered fill template above the 50% threshold to ensure reimbursement eligibility by FEMA in the event damage by tropical storm. Cycle 12 includes 1 of this type of project (Figure 14).

Beach Nourishment with BUDM

Through partnerships with local communities and the USACE, the GLO continuously seeks opportunities to utilize material dredged from USACE-managed navigation channels to beneficially use in beach and dune nourishment or marsh restoration.

BMMP maintained beaches or GLO-partnered structures qualify for repair when damaged during a tropical storm. FEMA reimburses repair costs up to 75% to 90% leaving the GLO and project partners to cover the remaining non-federal cost-share. Cycle 12 includes 3 of this type of project (Figure 14).

Shoreline Protection and Habitat Restoration

Shoreline protection projects range from “hard” structures like revetments, riprap, breakwaters, and bulkheads to green “soft” techniques like living shorelines, marsh planting, and earthen structures. Many projects combine a hard protective structure with some form of marsh restoration. Marsh and habitat restoration components may also involve restoring oyster reefs, rookery islands, wetlands, or ecosystem hydro-connectivity. Cycle 12 includes 21 of this type of project (Figure 15).

Studies or Demonstration Projects

The GLO funds various studies to assess the status of erosion on the coast, evaluate processes for erosion mitigation, and study methods for increasing coastal resiliency. Cycle 12 includes 6 of this type of project (Figure 16).

BENEFICIAL USE OF DREDGED MATERIAL (BUDM) PROJECTS (3)	
1724	*South Padre Island BN with BUDM*
1734	*Hurricane Harvey FEMA Repairs: Setting a Precedent at Babe’s Beach*
1740	*Andy Bowie & Isla Blanca Parks Beach Nourishment with BUDM*
BEACH NOURISHMENT (BN) PROJECTS (1)	
1743	*BMMP Phase 12 Monitoring, Analysis & Reporting (2022 monitoring round)*
SHORELINE PROTECTION AND HABITAT RESTORATION PROJECTS (21)	
1710	*J.D. Murphree WMA Shoreline Protection - Salt Bayou Unit*
1711	*San Bernard NWR Shoreline Protection - Sargent Unit & Cedar Lakes*
1712	*Brazoria NWR Shoreline Protection - Oyster Lake, Long Pond, & Salt Lake Marsh*
1713	*Bird Island Cove Shoreline Protection & Marsh Restoration Ph. 2*
1715	*Nueces Delta Shoreline Protection & Marsh Restoration Ph. 2*
1716	*Swan Point Shoreline Restoration Ph. 1*
1717	*Dollar Bay Shoreline Protection & Wetland Restoration Ph. 2*
1718	*Newcomb Marsh Wetland Protection & Shoreline Stabilization Project Ph.1*
1719	*West Bay Living Shorelines & Habitat Restoration*
1726	*Aransas NWR Dagger Point Shoreline Protection Ph. 2*
1727	*Aransas NWR GIWW Shoreline Protection Ph. 1*
1728	*Shoreline & Wetland Protection at the Cohn Preserve Ph. 1*
1729	*Mad Island Shoreline Protection & Ecosystem Restoration Ph. 3*
1730	*Boggy Bayou Nature Park Shoreline Protection & Restoration Ph. 2*
1731	*Treasure Island MUD San Luis Pass Revetment*
1733	*Preserving & Enhancing Beaches by Amending Federal Beach and Dune Permits*
1737	*Tern Island Protection & Restoration Ph. 2*
1739	*Indian Point Causeway Shoreline Protection Ph.2*
1741	*Nueces Bay Shoreline Protection along Fulton Corridor*

1744	*Structure Relocation, 13210 Gulf Beach Dr*
1751	*Chester Island Rookery Protection*
STUDIES AND DEMONSTRATION PROJECTS (6)	
1703	*Longshore Transport Modeling, Regions 1 & 4: GIS Services*
1723	*Brazoria County Regional Sediment Management Initiative*
1732	*Analysis of Sediment Transport in the Nueces & Corpus Christi Bays*
1746	*Region 2 and 3 Offshore Sediment Inventory Surveys & OCS Survey*
1747	*Longshore Transport Modeling, Regions 2 & 3*
1750	*CEPRA Economic Study*

Table 6. CEPRA Cycle 12 Projects by Type

Figure 14. CEPRA Cycle 12 Beach Nourishment and Beneficial Use of Dredge Material Projects by Location

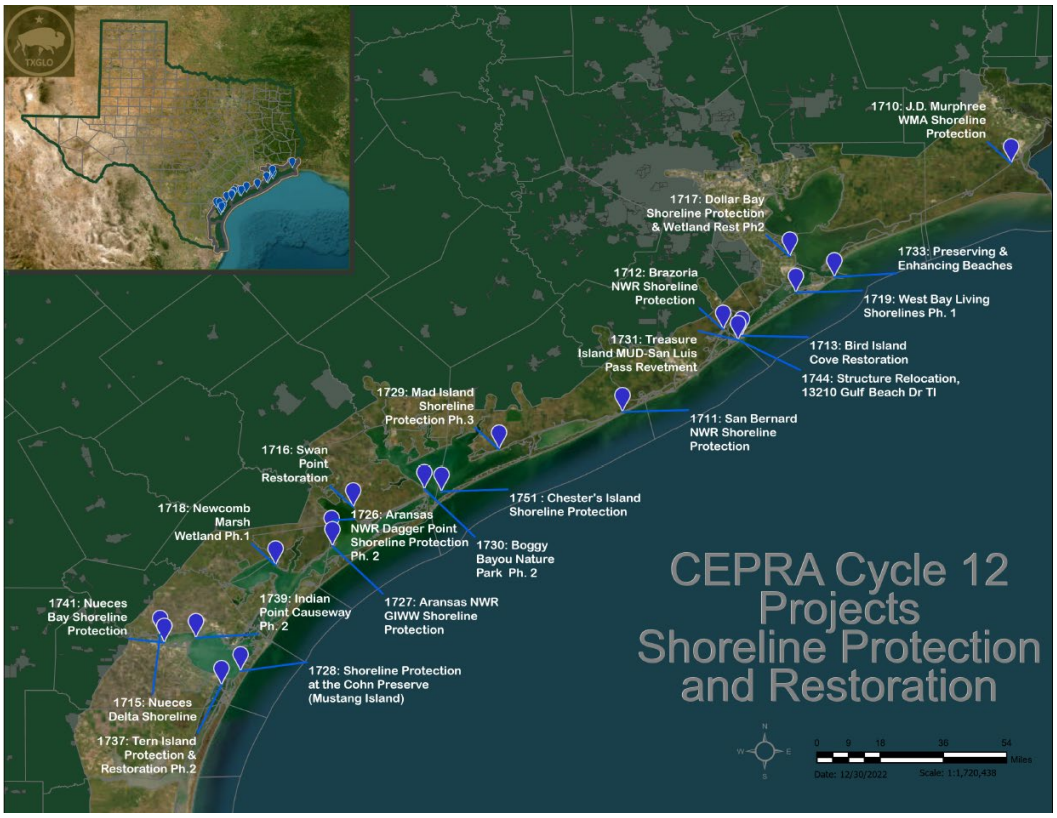

Figure 15. CEPRA Cycle 12 Shoreline Protection and Restoration Projects by Location

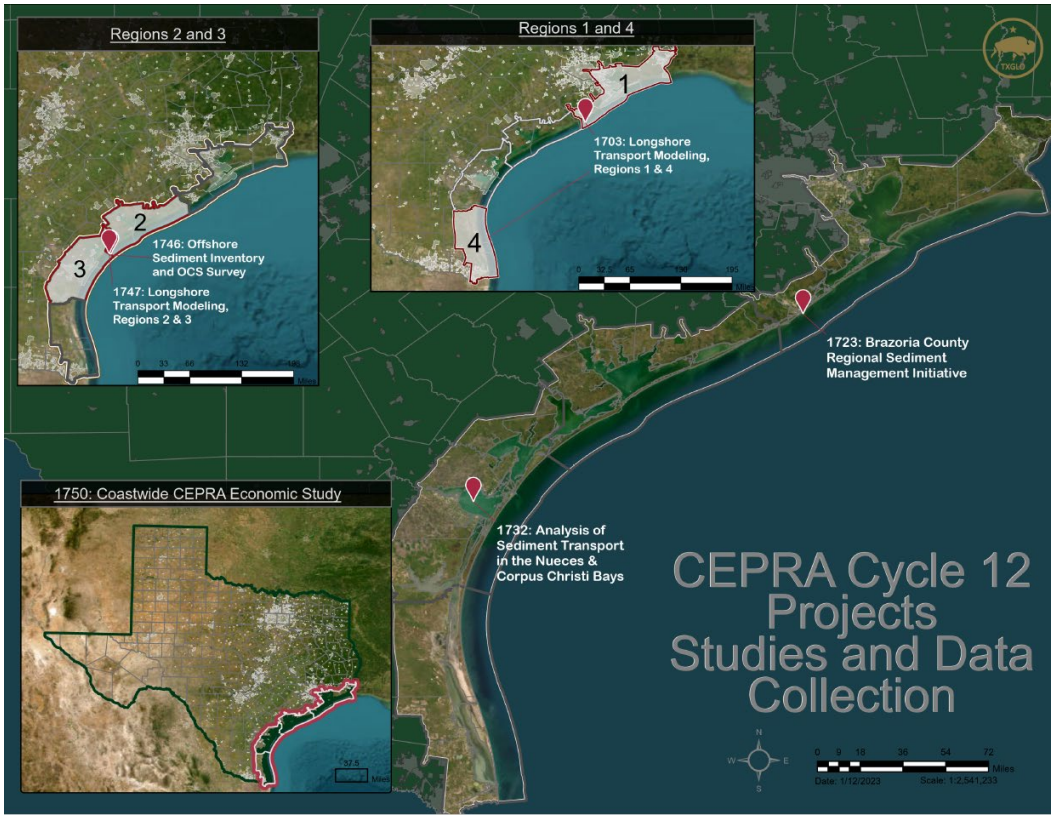

Figure 16. CEPRA Cycle 12 Studies and Data Collection Projects by Location

1703 Longshore Transport Modeling, Regions 1 and 4: GIS Services

Partner(s): Internal
Phase: Study
Budget: $51,176
Location: Regions 1 and 4
CEPRA Share: $51,176
Project Description: This project will provide supporting GIS services produced from the Longshore Sediment Transport Study Regions 1 & 4 results. These data services will be hosted on existing GLO online public domain GIS mapping applications to support sediment management activities.

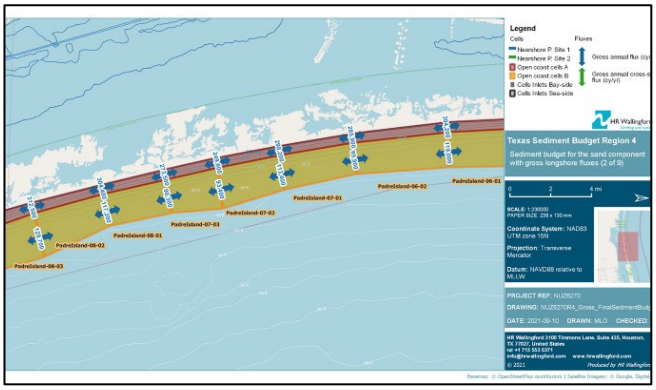

Figure 17. Example GIS Output for Gross Annual Flux of Sediment Resources, Padre Island

1710 J.D. Murphree WMA Shoreline Protection – Salt Bayou Unit

Partner(s): Ducks Unlimited, Inc.
Phase: Construction
Budget: $1,000,000
Location: Jefferson County
CEPRA Share: $500,000
Project Description: The project will construct approximately 0.5 miles of rock breakwater where severe shoreline loss is occurring along the northern boundary of the Salt Bayou Unit adjacent to the GIWW. The breakwater will reduce wave energy, prevent shoreline erosion, promote the accretion of sediment, enhance marsh vegetation growth, and provide habitat for oysters and other marine organisms.

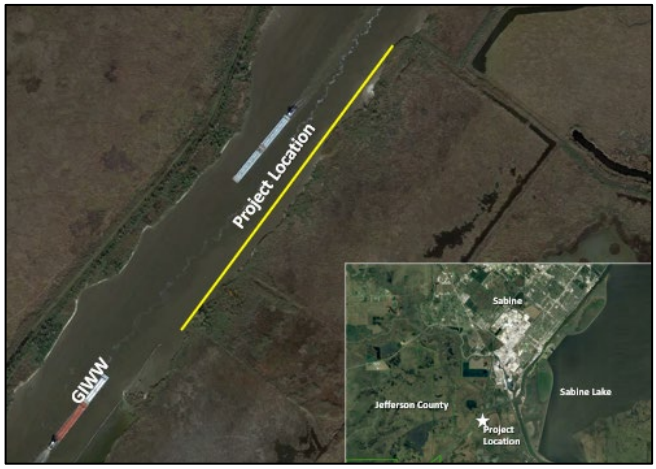

Figure 18. Salt Bayou Unit of J.D. Murphree WMA on eastern shore of GIWW

1711 San Bernard NWR Shoreline Protection – Sargent Unit and Cedar Lakes
Partner(s): Ducks Unlimited, Inc.
Phase: Permitting, final engineering and design, construction
Budget: $5,005,000
Location: Brazoria and Matagorda Counties
CEPRA Share: $5,000
GOMESA Share: $3,400,000
Project Description: This Texas Coastal Resiliency Master Plan Tier 1 project will construct breakwaters at seven critically eroding areas along the GIWW shoreline of the San Bernard NWR. The breakwater will reduce wave energy, prevent shoreline erosion, promote the accretion of sediment and growth of marsh vegetation, and provide habitat for oysters and other marine organisms.

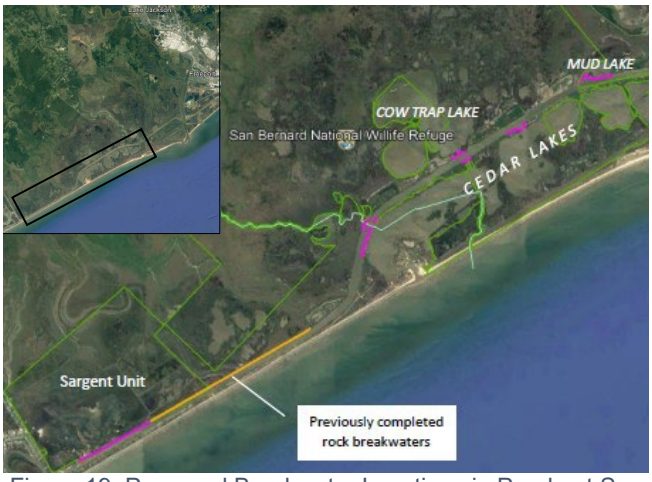

Figure 19. Proposed Breakwater Locations in Purple at San Bernard NWR

1712 Brazoria NWR Shoreline Protection – Oyster Lake, Long Pond, Salt Lake Marsh
Partner(s): Ducks Unlimited, Inc.
Phase: Permitting, construction
Budget: $10,005,000
Location: Brazoria County
CEPRA Share: $5,000
GOMESA Share: $6,500,000
Project Description: This Texas Coastal Resiliency Mater Plan Tier 1 project will construct breakwater segments along the GIWW shoreline in critically eroding areas of the Brazoria NWR. The breakwaters will reduce wave energy, prevent shoreline erosion, promote the accretion of sediment and growth of marsh vegetation, and provide habitat for oysters and other marine organisms.

Figure 20. Proposed Breakwater Locations at Brazoria NWR

1713 Bird Island Cove Shore Protection and Marsh Restoration, Phase II

Partner(s): TPWD
Phase: Final engineering and design, construction
Budget: $6,492,000
Location: Galveston County
CEPRA Share: $1,500,000
NRDA Share: $4,992,000
Project Description: This project funds the final engineering design and construction of 8,550 linear feet of rock breakwater to protect estuarine marsh on the bay side of Galveston Island.

Figure 21. Bird Island Cove, Galveston

1715 Nueces Delta Shoreline Protection and Restoration, Phase II

Partner(s): Coastal Bend Bays & Estuaries Program
Phase: Construction
Budget: $4,005,000
Location: San Patricio County
CEPRA Share: $5,000
GOMESA Share: $1,290,925
Project Description: The project will construct up to 4,000 feet of rock breakwater on the eroding delta shoreline to protect the Nueces Delta marsh complex.

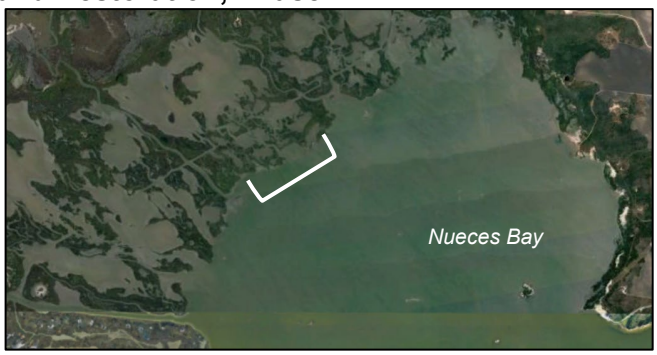

Figure 22. Proposed Breakwater Locations at Nueces Delta Shoreline

1716 Swan Point Shoreline Restoration, Phase I

Partner(s): Calhoun County
Phase: Initial engineering and design
Budget: $246,940
Location: Calhoun County
CEPRA Share: $148,164
Project Description: The project will restore natural habitat, protect public infrastructure, and improve boating access to San Antonio Bay through beneficial use of dredge material. Phase I objectives will include data collection, feasibility study, alternatives analysis, coordination with resource agencies, and initial design.

Figure 23. Swan Point Shoreline Restoration Project Area

1717 Dollar Bay Shoreline Protection & Wetland Restoration, Phase II
Partner(s): Galveston Bay Foundation
Phase: Construction
Budget: $2,838,500
Location: Galveston County
CEPRA Share: $53,500
GOMESA Share: $2,785,000
Project Description: The project will construct up to 3,500 linear feet of nearshore breakwaters to protect marsh shorelines in Dollar Bay. Vegetative plantings will be put landward of the breakwaters to provide habitat and buffer erosion.


Figure 24. Proposed Breakwaters in Green in Dollar Bay

1718 Newcomb Marsh Wetland Protection & Shoreline Stabilization, Phase I
Partner(s): Texas Parks and Wildlife Department
Phase: Initial engineering and design
Budget: $250,000
Location: Aransas County
CEPRA Share: $150,000
Project Description: This project is for initial engineering and design to protect approximately 2.5 miles of shoreline and 280 acres of estuarine marsh habitat at Newcomb Marsh, in Copano Bay. The area is known wintering habitat for the federally endangered Wood Buffalo-Aransas population of Whooping Cranes.


Figure 25. Newcomb Marsh facing Copano Bay

1719 West Bay Living Shorelines & Habitat Restoration
Partner(s): Galveston Bay Foundation
Phase: Initial engineering and design
Budget: $135,000
Location: Galveston County
CEPRA Share: $80,000
Project Description: The project funds initial engineering and design to install an erosion response structure up to 5,000 feet in length at Sweetwater Preserve and an additional structure up to 3,000 feet in length along Maggie's Cove.

Figure 26. Locations of Maggie's Cove (north) and Sweetwater Preserve (south), West Galveston Bay

1723 Brazoria County Regional Sediment Management Initiative
Partner(s): Brazoria County
Phase: Study
Budget: $400,000
Location: Brazoria County
CEPRA Share: $120,000
Project Description:
This pilot study uses a bedload collector to evaluate sediment bypassing as a sediment source as a component of the USACE's Planning Assistance to States agreement with Brazoria County, development of a sediment management plan.

Figure 27. Study Area Located Near San Luis Pass, Galveston

1724 South Padre Island BN with BUDM
Partner(s): City of South Padre Island
Phase: Construction
Budget: $5,405,000
Location: Cameron County
CEPRA Share: $200,000,000
USACE Share: $3,405,000
Project Description: This beach nourishment project will place beneficial use dredged material (BUDM) to widen an eroding area of beach. Up to 415,500 cubic yards of beach quality sand will be used.

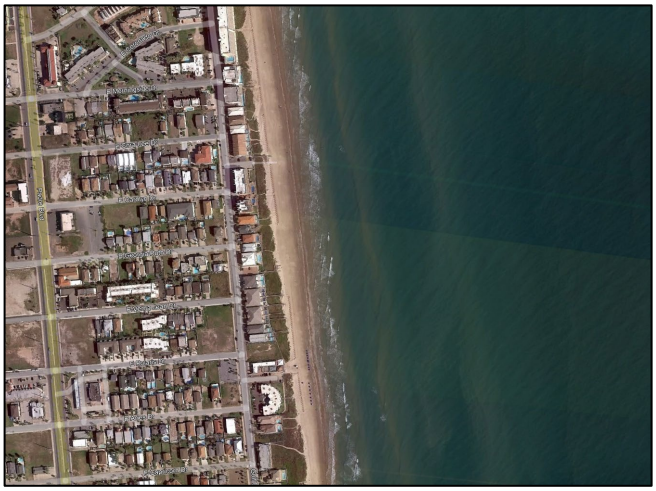
Figure 28. Beach Nourishment Site, South Padre Island

1726 Aransas National Wildlife Refuge Dagger Point Shoreline Protection, Phase II
Partner(s): Coastal Bend Bays & Estuaries Program
Phase: Final engineering and design, construction
Budget: $26,705,000
Location: Aransas County
CEPRA Share: $5,000
GOMESA Share: $7,287,800
Project Description: The project will complete final design and construction of breakwaters to protect the eastern Aransas NWR shoreline. Dagger Point will also be restored utilizing erosion control structures and fill.

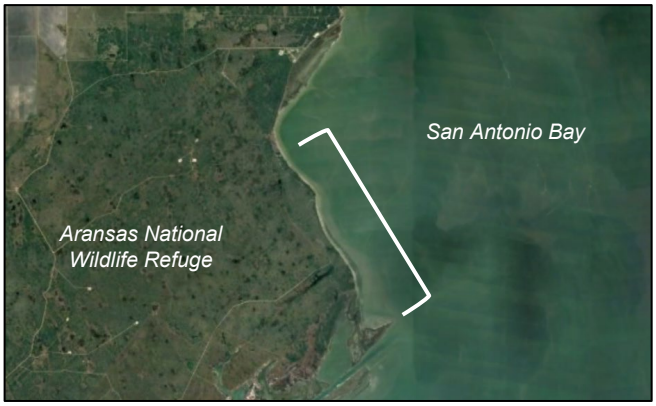

Figure 29. ANWR Eastern Shoreline including Dagger Point

1727 Aransas National Wildlife Refuge Gulf Intracoastal Waterway (GIWW) Shoreline Protection phase I
Partner(s): Coastal Bend Bays & Estuaries Program (CBBEP)
Phase: Initial engineering and design, permitting
Budget: $332,000
Location: Aransas County
CEPRA Share: $199,200
Project Description: The project will fund the initial design, engineering, and permitting for a series of breakwaters along the refuge's GIWW shoreline.

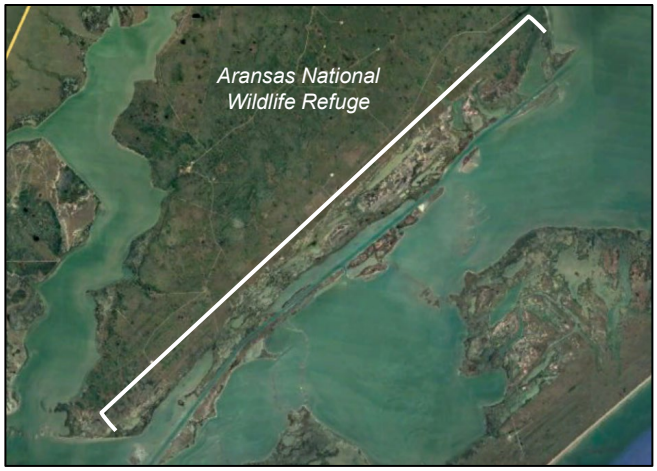

Figure 30. ANWR GIWW Shoreline

1728 Shoreline and Wetland Protection at Cohn Preserve, Phase I
Partner(s): The Nature Conservancy
Phase: Initial engineering and design, permitting
Budget: $280,500
Location: Nueces County
CEPRA Share: $168,300
Project Description: The project will fund the initial design, engineering, and permitting for a shoreline protection structure at the Cohn Preserve shoreline.

Figure 31. The Nature Conservancy Cohn Property Shoreline on Mustang Island

1729 Mad Island Shoreline Protection & Ecosystem Restoration, Phase III
Partner(s): The Nature Conservancy
Phase: Construction
Budget: $6,697,475
Location: Matagorda County
CEPRA Share: $112,500
GOMESA Share: $6,509,975
Project Description: Funding for this Phase III project will complete engineering and construct approximately 10,340 ft feet of breakwater to provide shoreline protection adjacent to the Gulf Intracoastal Waterway.

Figure 32. Mad Island Shoreline Protection Project Area in Green

1730 Boggy Bayou Nature Park Shoreline Protection and Restoration, Phase II
Partner(s): Calhoun County
Phase: Initial engineering and design, permitting
Budget: $385,000
Location: Calhoun County
CEPRA Share: $231,000
Project Description: The project will fund the initial design, engineering, and permitting for shoreline protection structures spanning the mouth and adjacent shorelines at Boggy Bayou.

Figure 33. Boggy Bayou Shoreline and Breach

1731 Treasure Island MUD San Luis Pass Revetment
Partner(s): Treasure Island MUD
Phase: Construction
Budget: $1,000,000
Location: Brazoria
CEPRA Share: $600,000
Project Description: This project will construct a subterraneous stone revetment shoreline protection structure to connect the existing stone revetment, terminating near the southeastern extent of Gulf Beach Drive, into the CR257 bridge abutment. The revetment will be approximately 1,300 ft long and excavated sand and BUDM from Treasure Island MUD's on-site dredge material placement area will be constructed over or behind the revetment to enhance dune habitat.

Figure 34. Revetment Location at San Luis Pass

1732 Analysis of Sediment Transport in Nueces and Corpus Christi Bays
Partner(s): Texas A&M University Kingsville, University of Texas Marine Science Institute
Phase: Study
Budget: $313,601
Location: Kleberg, Nueces, San Patricio Counties
CEPRA Share: $188,060
Project Description: This study will analyze and model sediment transport in Corpus Christi and Nueces Bays to provide a base model for use by regional stakeholders to evaluate the sediment distribution areas and rates of sediment loss from erosion in response to different events and development scenarios.

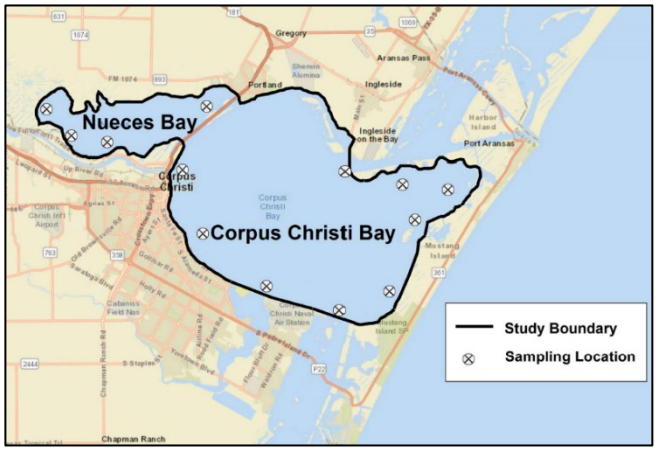

Figure 35. Study area in Nueces and Corpus Christi Bays

1733 Preserving & Enhancing Beaches by Amending Federal Beach and Dune Permits
Partner(s): The Park Board of Trustees of the City of Galveston
Phase: Regulatory
Budget: $300,000
Location: Coastwide
CEPRA Share: $225,000
Project Description: The project will amend two USACE permits for beach nourishment and dune restoration on Galveston Island.


Figure 36. Texas Beach with Dune

1734 Hurricane Harvey FEMA Repairs Setting a Precedent at Babe's Beach
Partner(s): The Park Board of Trustees of the City of Galveston
Phase: Final engineering and design, construction
Budget: $2,961,908
Location: Galveston County
CEPRA Share: $296,190
Project Description: The Project is to place beach quality sand on Babe's Beach under the FEMA PW held by The Park Board of Trustees of the City of Galveston. Doing so will set a precedent for future FEMA projects at Babe's Beach.

Figure 37. Babe's Beach Nourishment Location

1737 Tern Island Protection & Restoration, Phase II

Partner(s): Coastal Bays Bends and Estuaries Program (CBBEP)
Phase: Construction
Budget: $2,686,000
Location: Nueces County
CEPRA Share: $165,000
GOMESA Share: $2,411,000
Project Description: This project will complete final design, permitting, and construction for 1,300 linear feet of breakwater protection around the island's perimeter and use fill to enhance the island. The 1.5-acre island is an important rookery island in Corpus Christi Bay.

Figure 38. Tern Island Aerial Imagery, Corpus Christi Bay

1739 Indian Point Causeway Shoreline Protection, Phase II

Partner(s): Port of Corpus Christi Authority
Phase: Construction
Budget: $4,662,000
Location: San Patricio County
CEPRA Share: $5,000
GOMESA Share: $4,657,000
Project Description: The project will construct 1,500 linear feet of breakwaters for shoreline protection on the southwest side of Indian Point and restore approximately 670 square feet of sandy beach.

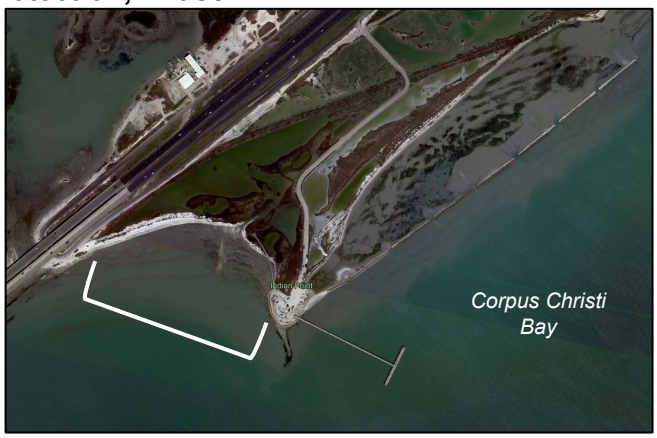

Figure 39. Project Location at Indian Point

1740 Andy Bowie & Isla Blanca Park Beach Nourishment with BUDM
Partner(s): Cameron County
Phase: Construction
Budget: $1,935,000
Location: Cameron County
CEPRA Share: $600,000
USACE Share: $1,135,000
Project Description: The project utilizes beneficial use to nourish two county park beaches on South Padre Island. The dredge material is associated with maintenance of dredging the Brownsville Ship Channel jetty and entrance channel segments.

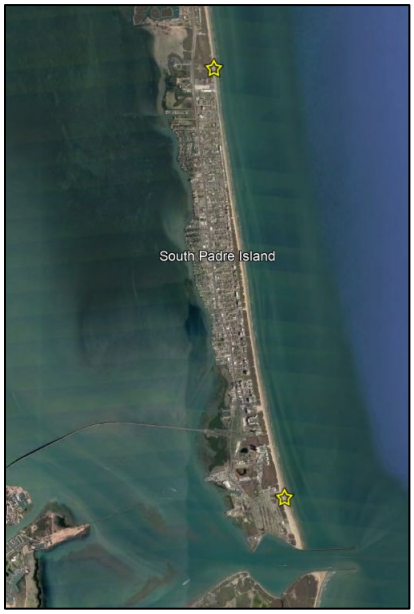

Figure 40. Andy Bowie Park (north) and Isla Blanca Park (south) Nourishment Locations

1741 Nueces Bay Shoreline Protection Fulton Corridor
Partner(s): Port of Corpus Christi Authority
Phase: Construction
Budget: $3,400,000
Location: Nueces County
CEPRA Share: $2,000,000
Project Description: The project will protect the Fulton Corridor shoreline in Nueces Bay by building erosion protection structures along up to 16,300 linear feet of shoreline.

Figure 41. Fulton Corridor Shoreline

1743 BMMP Phase 12 Monitoring, Analysis & Reporting (2022 Monitoring Round)
Partner(s): Internal
Phase: Study
Budget: $715,035
Location: Coast wide
CEPRA Share: $715,035
Project Description: BMMP surveys are conducted yearly at 12 engineered beaches during each CEPRA cycle to measure sand loss and gain at each site. The GLO established the BMMP in 2010 following guidance issued by FEMA requiring a BMMP as a prerequisite for funding eligibility under the Public Assistance (PA) program for the mitigation of damages to engineered beaches impacted by federally declared disasters.

Figure 42. BMMP Project Study Areas

1744 Structure Relocation 13210 Gulf Beach Dr
Partner(s): Internal
Phase: Construction
Budget: $125,000
Location: Brazoria County
CEPRA Share: $125,000
Project Description: The project will relocate structure away from public beach area and remove associated debris.


Figure 43. Location of House to be Relocated

1746 Region 2 and 3 Offshore Sediment Inventory Surveys & OCS survey
Partner(s): BOEM
Phase: Study
Budget: $4,000,000
Location: Matagorda, Calhoun, Aransas, Nueces, Kleberg Counties
GOMESA Share: $2,000,000
BOEM Share: $2,000,000
Project Description: The project will collect high-resolution geophysical data along the central region of the federally owned Outer Continental Shelf and offshore state-owned submerged lands in Coastal Resiliency Master Plan Regions 2 and 3. Data will be processed, interpreted, reported, and integrated into GIS deliverables for potential sediment resources.

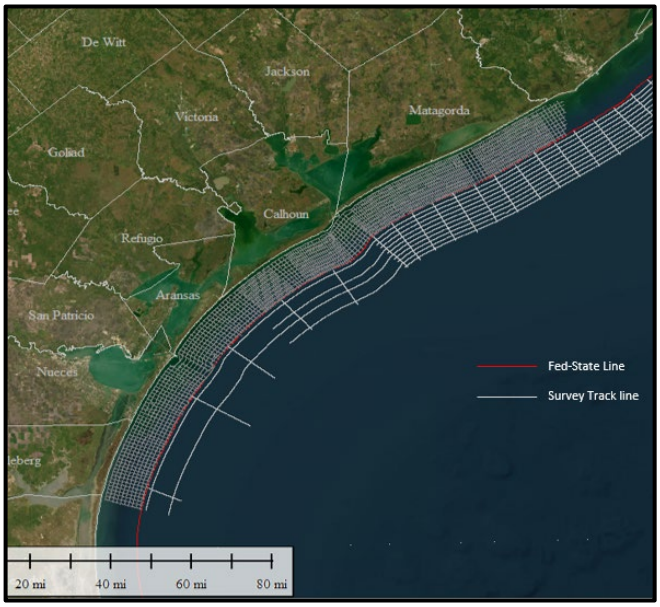

Figure 44. Data Collection Regions for Surveys

1747 Longshore Transport Modeling, Regions 2 and 3
Partner(s): Internal
Phase: Study
Budget: $2,400,000
Location: Matagorda, Jackson, Victoria, Calhoun, Refugio, Aransas, San Patricio, Nueces and Kleberg counties
CEPRA Share: $1,600,000
GOMESA Share: $800,000
Project Description: This study analyzes existing hydrodynamic information and develops a sand transport model for the entire Texas coast. The model will identify the sand transport pathways, sand transport rates, and define the littoral cells and associated sediment budget along Texas Gulf facing beaches. Regions 2 and 3 are the focus of this project; Regions 1 and 4 were completed under the previous CEPRA cycle.

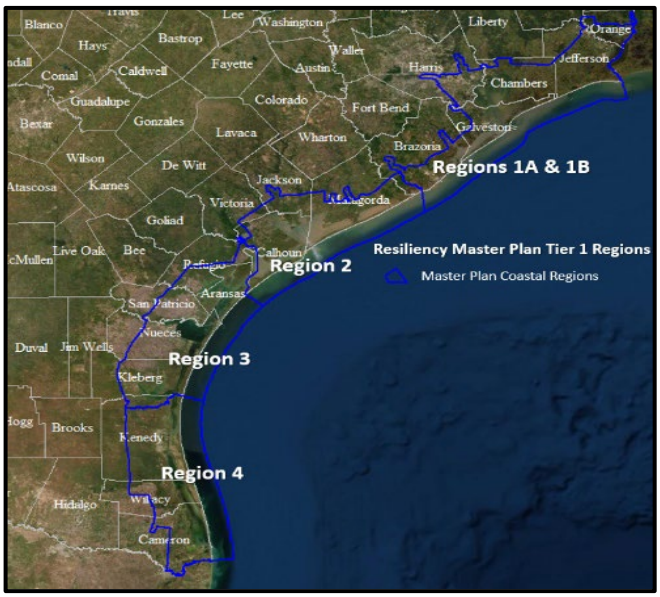

Figure 45. Study Regions for Longshore Transport Modeling

1750 CEPRA Economic Study
Partner(s): Internal
Phase: Study
Budget: $139,830
Location: Coastwide
CEPRA Share: $139,830
Project Description: The Texas Natural Resources code directs the CEPRA Program to supply the Texas Legislature with an assessment of program efficacy. Recently completed CEPRA projects are assessed to determine what amount of return is made on every dollar spent on CEPRA projects.

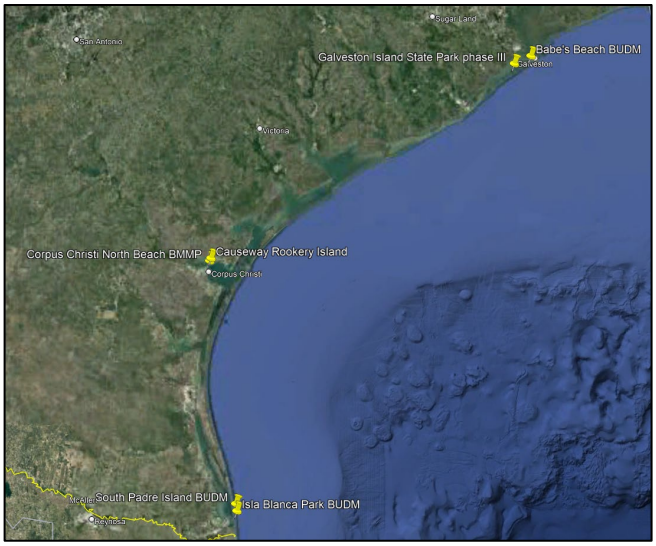

Figure 46. Project Locations for CEPRA Economic Study

1751 Chester Island Rookery Protection
Partner(s): NRDA Region-wide Texas Implementation Group, USACE, Calhoun Port Authority
Phase: Initial design
Budget: $2,500,000
Location: Calhoun County
CEPRA Share: $5,000
GOMESA Share: $2,500,000
This project will stabilize and protect Chester's Island bird rookery in Matagorda Bay. Beneficial Use sediment will be sourced from the Matagorda Ship Channel Deepening Project, led by the USACE and Calhoun Port Authority. The BU will increase the rookery footprint from 72 acres to 200-400+ acres. The beneficial use placement will be solely paid for by the USACE project. The GLO's project goal is to complete a protective shoreline structure up to 17,000 linear feet to protect the expanded island.

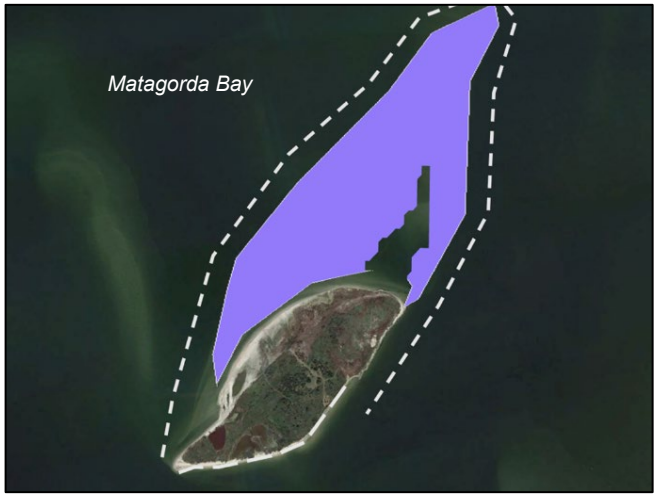

Figure 47. Chester's Island Dredge Placement (purple) and Shoreline Protection Structures (white lines)

Moving Forward

The CEPRA program clearly provides invaluable benefits to Texas residents and ecosystems through successful implementation of beach nourishment, shoreline protection, habitat restoration, and associated studies. Texas relies on water-based commerce and commercial resources. These resources are at risk from erosive forces, and CEPRA's role in protecting land and infrastructure is critical to support economic and ecosystem services. For 12 cycles,

CEPRA has implemented vital projects along the Texas coastline and will continue to do so through ongoing funding and partnerships.

Works Cited

Jeffrey Paine, T. C. (2021). *Texas Gulf Shoreline Movement and Beach-Foredune Elevations and Volumes to 2019.* Retrieved from The Texas Shoreline Change Project: https://www.beg.utexas.edu/research/programs/coastal/the-texas-shoreline-change-project

Texas General Land Office, U.S. Army Corps of Engineers. (2021). *Coastal Texas Protection and Restoration Feasibility Study Final Report.* Retrieved from https://coastalstudy.texas.gov/index.html

Texas General Land Office. (2019). *Texas Coastal Resiliency Master Plan.* Retrieved from https://www.glo.texas.gov/coast/coastal-management/coastal-resiliency/index.html