

PROJECT #2401 CBBEP Coastal Bird Program

Performing Organization: Coastal Bend Bays & Estuaries Program

Total Project Cost: \$158,285

Bays Plan, 2nd Ed. Actions: CB 1.1, CB 2.1, HLR 1.1, HLR 1.2

Background:

Coastal birds are important components of estuarine ecosystems and serve as indicators of ecosystem health. In addition, recreational bird viewing is a significant and growing component of ecotourism, a major facet of the local economy. The 2010 Environmental Indicators Report prepared by CBBEP documented the declining populations of many colonial waterbird species in Texas, with some species experiencing a 90% reduction in breeding pairs since the 1960's. CBBEP recently released the 2020 Environmental Indicators Report, which pointed out that a few species of colonial waterbirds have shown nesting pair recovery levels but many are still declining. An ever-increasing body of research continually provides evidence of the importance of the Texas coast to many non-breeding coastal bird species, several of which are also experiencing population declines.

This project will build on the efforts of the CBBEP Colonial Waterbird projects from previous years through the continued implementation and improvement of specific management actions from the CBBEP Colonial Waterbird Rookery Island Management Plan. This plan outlines habitat management actions such as planting and establishing native shrubs, removing exotic/invasive vegetation, building artificial nest platforms, and removing nest predators as needed throughout the year. All habitat management actions such as planting native vegetation and removing exotic/invasive vegetation will be completed by February 1, as this is the beginning of the waterbird nesting season. Predator management will be conducted as needed throughout the year.

Additionally, these efforts will extend to activities that support the conservation of non-breeding coastal bird species and their habitat. This project will provide assistance to other partners, where appropriate, in efforts to assess changes in populations, current wintering and migratory movements, and important areas of habitat for non-breeding coastal species. The timeline for these efforts will depend on the seasonality of the non-breeding species, but will begin September 1, and be completed by June 15.

Years of experience working with coastal bird species in the Coastal Bend makes the CBBEP uniquely qualified to provide expertise and assistance to partners and stakeholders working to conserve coastal birds. The CBBEP will assist resource agencies, universities, and other stakeholders in joint efforts to monitor changes in coastal bird populations at a large scale. These monitoring efforts will take place primarily in December and May and provide information that helps direct waterbird management priorities for CBBEP for the coming years. In addition, the CBBEP will meet with partners and stakeholders throughout the year to provide updated information on coastal bird species ecology and management in the Coastal Bend area.

Public outreach is also a key component of this project, with the objectives of minimizing anthropogenic impacts to rookeries, educating the public, and promoting stewardship of waterbird resources. This will be accomplished through on-site signage at rookery islands, public presentations and events, and other forms of public communications, such as the distribution of flyers, updates on social media, interviews with local news outlets, and regular engagement of volunteers. Public outreach efforts will take place throughout the year.

Project Objectives:

The objectives of this project include: (1) continue restoring waterbird populations through management of nesting sites, including habitat enhancement, protection, predator control, and reduction of anthropogenic impacts; (2) develop and implement public education and outreach programs that promote awareness and stewardship of coastal birds and their habitats, (3) assist partners in efforts to observe and monitor changes in coastal bird populations; and (4) provide resource agencies, researchers, and other stakeholders with expertise on coastal bird ecology, habitats, and conservation needs including assistance in tagging migratory birds for tracking.

PROJECT #2402 Delta Discovery

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$188,655
Bays Plan, 2nd Ed. Actions: DD 1.1, DD 1.2, DD 1.3, DD 2.1

Background:

Delta Discovery's mission is to connect Coastal Bend communities with opportunities and resources that plant the seeds of conservation for protecting our bays & estuaries. The educational program cost consists of the following: (1) field trips for students, (2) teacher workshops, and (3) community programs, such as Delta Discovery Days, Nature Story Times, and Home School Days.

Field trips: Many of the students that are being exposed to scientific concepts for the first time have never spent much time outdoors. CBBEP Environmental Educators provide field trip opportunities for teachers and students to visit the Nueces Delta Preserve. The cross-curricular trip may be organized by the teacher, with assistance from the Environmental Educator, to create an educational TEKS-aligned agenda for outdoor education. This program sees thousands of students per school-year. The goal is to plant seeds of appreciation and passion for a new generation of naturalists, biologists, and nature lovers to protect and preserve the Coastal Bend through educating school children about preserving our environment and protecting our animal and plant life.

Teacher Workshops: CBBEP Environmental Educators will facilitate a minimum of four workshops throughout the school year. These free workshops will address local environmental science topics and will align to the TEKS objectives, and participating teachers will receive SBEC credits. The workshops focus on equipping teachers with the skills, curriculum, support and materials to strengthen science teaching as it relates to the environment resources of the Coastal Bend. Hands-on learning in the field will be correlated to classroom instruction. The funding provides all fees for partnering, curriculum, and substitute teachers in order for these workshops to occur on weekdays.

Delta Discovery Days: The CBBEP will host a minimum of five Delta Discovery Days. These hands-on "family picnic days" provide multi-generational audiences time and guidance to discover, connect, and learn about the estuary in their back yard. Families bring a sack lunch and the CBBEP Education Staff facilitate interactive learning activities that model nature-play strategies throughout half-day program. Delta Discovery Days serve two purposes: (1) encourage students attending Nueces Delta Preserve field trips to return with their families to demonstrate what they have learned and (2) welcome new audiences -- families and members of the community -- to the Nueces Delta Preserve for a day of nature-based learning.

Nature Story Time: CBBEP will host a minimum of ten Nature Story Times. These early learner programs introduce children, ages 2-5, to nature and the joys of reading through stories, crafts, and outdoor play. Children and their "grown-ups" will build a sense of place and connection as they explore the estuary and its inhabitants

Home School Days: The CBBEP will host a minimum of three Home School Days to meet the needs and interest of home school families seeking field experiences. Home School Day programming will provide home school families and their students an opportunity to connect their classroom science/environmental curriculum to the natural world of the Coastal Bend using both place-based and discovery education. CBBEP Education Staff and partners will facilitate a series of hands-on activities that support select program themes and the engagement of mixed age student audiences.

Nueces Delta Preserve Upkeep: Upkeep of the Nueces Delta Preserve consists of electricity, trash and water costs, phone and internet costs, temporary assistance for field trip days and staff mileage.

Project Objectives:

The objective of this project is to provide educational field trip opportunities for K-12 students and also to aid teachers in increasing their knowledge, skills, and resources available to effectively teach science to students in local schools.

PROJECT #2403 National Spill Control School 40-hour Oil Spill Response Courses

Performing Organization: National Spill Control School at Texas A&M University - Corpus Christi
Total Project Cost: \$91,718
Bays Plan, 2nd Ed. Actions: MC 2.1, MC2.2

Background:

The purpose of this project is to provide oil and hazardous material response training for dredge, vessel, and terminal operators in the coastal bend of Texas. The importance of such training cannot be overstated. Rapid response is necessary to protect sensitive bay and estuary habitats. The actions taken by the first observer's vessel or organization is the best way to minimize migration into and contamination of the nearby marine environment. This can only be accomplished if spill site operators are trained for safe and effective immediate response. Terminals often wait 1-2 hours and vessels up to 6 hours to initiate a response with contracted oil spill response organizations (OSROs), often because they do not currently have personnel onsite with safety or response training.

This project builds on previous work completed by the National Spill Control School (NSCS) over the last 45 years. The NSCS was established at TAMUCC in 1977 through an effort of the Port of Corpus Christi and the Corpus Christi Area Oil Spill Control Association. The NSCS has offered a variety of Oil and Hazardous Material spill response courses for a fee to companies, agencies, and individuals. In 1990 NSCS was identified in the Oil Pollution Act (OPA-90) (33 USCA, Sec. 2761.c.2.D) as an advisory and consulting body for the National Response Team. Today the NSCS conducts training, oil spill research, drills, and exercises across the globe.

Many of the NSCS courses are customized for the specific audience. In this case the audience will include vessel operators and terminal operators in and near the Texas coastal bend with special attention to the shipping lanes and adjacent habitats in and around Corpus Christi Bay. With project funds, the NSCS will create courses that focus on the essential elements of:

- HAZWOPER for Oil Spill Responders as identified in OSHA Pub. 3172
- IMO Level 2
- Building upon existing NSCS courses such as 40-hour Marine Oil Spill Response Certification and Oil Spill Response Strategies & Tactics

The NSCS proposes to conduct dedicated 40-hour courses up to 4 times per year with up to 20 attendees in each course under this proposal. Courses will include safety and oil spill response basics in a classroom setting and hands on spill response exercises with boats in Corpus Christi Bay or surrounding waters.

Project Objectives:

The objective of this project is to provide oil and hazardous material response training for dredge, vessel, and terminal operators in the Coastal Bend of Texas. The NSCS will conduct 40-hour courses up to 4 times per year with up to 20 attendees in each course under this proposal. Courses will include safety and oil spill response basics in a classroom setting and hands spill response exercises with boats in Corpus Christi Bay or surrounding waters.

PROJECT #2404 Monitoring Success of Dredge Material Placement at the Nueces Delta

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$142,769
Bays Plan, 2nd Ed. Actions: HLR 1.2, D 1.1, D 1.2

Background:

The U.S. Army Corps of Engineers (USACE) is proposing beneficial placement of dredged material from the Corpus Christi Ship Channel Deepening and Widening Project within Nueces Bay and the Nueces Delta Preserve. New work dredged material would be hydraulically pumped overland to the identified areas and strategically placed in marsh areas that have subsided to become open water in an effort to raise the substrate elevation sufficiently to allow and encourage the reestablishment of the marsh vegetation. Material would also be beneficially used as sacrificial erosion protection on either side of the 3,600-foot breakwater structures being constructed by CBBEP near the Nueces Delta shoreline. The project would include the proposed construction by the USACE of 2,000 additional feet of breakwater to extend the CBBEP project and provide additional protection with beneficially used sacrificial material.

CBBEP has been coordinating with the USACE and other agencies to ensure that the project will meet the goals of (1) restoring marsh habitat that has been lost due to ongoing wind and wave erosion along the bay shoreline and (2) restoring marsh that has been lost within the Nueces Delta marsh complex due to subsidence, reductions in sediment supply, and breaching of the shoreline. USACE is hopeful to begin the dredge placement project during the winter of 2023/2024. Funds will be utilized by CBBEP to work with a contractor on the pre- and post-monitoring of the dredge placement project, as well as the development of an adaptive management plan that would assist CBBEP in their long-term management efforts associated with the project (e.g., placement of maintenance material, vegetation planting, invasive species control). It is anticipated that monitoring will involve both (1) elevation monitoring (i.e., pre-construction elevation survey; geotech; settlement plates; site monitoring during material placement; post-construction elevation survey) and (2) vegetation monitoring (i.e., post-construction species composition and percent cover in 1-m plots, as well as height of dominant species).

Deliverables for this project will include pre/post construction elevation survey, installation and monitoring of settlement plates, site monitoring during material placement, post-construction species composition and percent cover, as well as height of dominant species. Deliverables also include a QAPP, semi-annual progress reports, adaptive management plan, draft final report, and final report.

Project Objectives:

The objectives for this project are (1) to conduct pre/post elevation and vegetation surveys related to an upcoming dredge placement project at the Nueces Delta Preserve and (2) to develop an adaptive management plan that will assist CBBEP in their long-term management efforts associated with the dredge placement project.

PROJECT #2405 Baffin Bay Water Quality Monitoring

Performing Organization: Harte Research Institute at Texas A&M University – Corpus Christi
Total Project Cost: \$50,000
Bays Plan, 2nd Ed. Actions: WSQ 2.1, WSQ 2.2

Background:

The purpose of this project is to help continue a water quality monitoring program in Baffin Bay that will gather water samples and identify potential sources of water quality degradation in the system. Baffin Bay is undergoing significant eutrophication, as exemplified by a long-term increase in nitrogen and phosphorus loads and chlorophyll-a concentrations that have exceeded state criteria for nearly the past decade. Additional symptoms include blooms of potential harmful algal species (*A. lagunensis*, *Pyrodinium bahamense*), episodic hypoxia, and fish kills.

In response to concerns over water quality changes in Baffin Bay, Texas A&M University-Corpus Christi (TAMUCC) initiated a spatially-temporally intensive water quality monitoring program to: (1) generate data for construction of nutrient budgets and to identify potential sources of nutrient/organic matter loadings that are contributing to water quality degradation in the system, and (2) characterize the ecosystem response to fish kills and loading events, including from episodic storm events.

As part of the ongoing water quality monitoring program, as well as a TAMUCC Ph.D. student project, samples will be collected at six sites from Baffin Bay on a monthly basis, as well as at higher frequencies in response to episodic storm events or fish kills. Two of the sites overlap with TCEQ quarterly monitoring stations, allowing for comparison with longer-term trends within Baffin Bay. At each site, vertical profiles will be performed, and discrete surface samples collected. Additionally, a YSI Ecomapper Autonomous Underwater Vehicle (AUV), equipped with water quality sensors (temperature, salinity, D.O., pH, chlorophyll fluorescence) may be deployed to identify water quality “hot spots” and to characterize environmental conditions pre- and post-storm.

Project Objectives:

The objective of this project is to support a water quality monitoring program through TAMUCC and collect monthly data, and rain event data, to identify nutrient concentrations and loading throughout the bay system.

PROJECT #2406 Outdoor Classrooms

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$21,000
Bays Plan, 2nd Ed. Actions: DD 1.1, DD 1.2, DD 1.3, DD 2.1

Background:

Research suggests that children who play and learn in nature are healthier, happier, and perform better in school. However, children have become increasingly disconnected from nature. This disconnect has led to physical and emotional health problems and a sense of isolation. Additionally, there are not enough safe outdoor spaces close to home for most Texas children, especially those from disadvantaged families.

CBBEP created its environmental education program, called Delta Discovery, to help address this “nature-deficit” and connect classrooms and families to nature. Delta Discovery has an outstanding track record for environmental education in the Coastal Bend. Every year we provide field trips to thousands of students, train teachers on how to connect classrooms to outdoor experiences and provide opportunities for families to experience nature. Delta Discovery operates primarily at the Nueces Delta Preserve, a 10,500-acre property that is comprised of diverse habitats, including wetlands and prairies.

However, teachers and principals at local schools are finding it more and more difficult to move students off campus to outside learning opportunities (i.e., field trips) like those offered by CBBEP at the Nueces Delta Preserve. Buses are expensive and finding personnel to supervise, as well as scheduling, has become challenging. Field trips at the middle school and junior high level are almost non-existent.

One way to solve this problem is to bring learning opportunities to schools in the form of outdoor classrooms. An outdoor classroom is defined as an outdoor area on a school campus that is set aside for student investigation and learning. Outdoor classrooms directly support US Fish and Wildlife Service’s Schoolyard Habitat Program that is designed to connect students with the outdoors, restore wildlife habitat on urban school grounds, and inspire the next generation of environmental leaders.

Components of outdoor classrooms are varied but often include benches or picnic tables adjacent to a study or natural area where students can gain field experience and spend time outdoors. While every outdoor classroom contains its own unique design elements, CBBEP will strive to ensure that they all observe the following key elements: ecologically sound, benefit wildlife and people, integrated into curriculum, designed to encourage long-term stewardship. Schools will be encouraged to follow the process described in the USFWS Schoolyard Habitat Project Guide for the development of outdoor classrooms, and CBBEP staff will be available to assist them with this process.

Project Objectives:

CBBEP will contract with local schools and other education partners (e.g., parks and recreation department, public library) to install three outdoor classrooms in the coming fiscal year.

PROJECT #2407 ARK Oil Spill Facility Needs

Performing Organization: Amos Rehabilitation Keep at the University of Texas Marine Science Institute
Total Project Cost: \$80,000
Bays Plan, 2nd Ed. Actions: MC 2.1, HLR 2.2

Background:

The purpose of this project is to update and refurbish the Oiled Wildlife Facility (OWF) located at the Amos Rehabilitation Keep (ARK). This project will improve oil spill response readiness and the ability to treat wildlife impacted by oil spills. The OWF was built in 2011 for the cleaning and rehabilitation of oiled wildlife. Due to the harsh marine environment, the facility has deteriorated and corroded. The ARK is currently in the process of repairing the exterior sheet metal, roof, support structures, and lighting throughout the facility. This will be completed by the end of 2022. However, there is still more to be completed to have a functional oiled wildlife treatment facility.

This project will also assist with much needed supplies and equipment to make the space more efficient and purposeful. Existing pea gravel will be replaced with a concrete pad in one section of the large open-air space. This pad is going to allow for better space utilization and for the installation of shelving for storage of oil spill supplies, tables, and a fridge and chest freezer for sample storage. Also, on the list to be purchased is a stainless-steel cage bank that can be used for oiled bird rehabilitation. The interior of the oiled wildlife rehabilitation room will also receive a redesign and replacement of corroded furniture. A specialized stainless steel wet table for oiled wildlife examinations and cleaning is going to be installed with an overhead examination light. The current sink will be replaced or repaired with new sink faucets and sprayers as the current ones are corroded and non-functional. A new ventilation fan will be purchased and installed for human and animal safety.

Project Objectives:

The purpose of this project is to update and refurbish the Oiled Wildlife Facility (OWF) located at the Amos Rehabilitation Keep (ARK). Project funds will be used to:

- Replace existing pea gravel with a concrete pad.
- Purchase a stainless-steel cage bank that can be used for oiled bird rehabilitation.
- Purchase and install a stainless-steel wet table.
- Purchase supplies such as overhead exam lighting, sink replacement parts, vent fans, shelving, and a refrigerator.

PROJECT #2408 Community Outreach Partnerships

Performing Organization: Coastal Bend Bays Foundation
Total Project Cost: \$30,000
Bays Plan, 2nd Ed. Actions: PEO 1.1, PEO 1.2, PEO 1.4, PEO 1.5

Background:

As stated in the Coastal Bend Bays Plan, 2nd Ed., CBBEP is constantly working to promote public and private partnerships to help achieve its educational goals. The CBBEP partnership with the Coastal Bend Bays Foundation (CBBF) addresses our educational goals set forth in the Bays Plan, 2nd Ed. One of the benefits of the partnership between the CBBEP and CBBF is addressing the need for continued dialogue between competing user groups and the need for an engaging public forum to allow for individual input in the public policy debate. The Bays Plan, 2nd Ed. calls for continued involvement from CBBF, as the region prepares itself for ever-increasing number of people wanting to make use of the bays and estuaries. Minimizing conflict through informed discussion will help achieve the overall objective of ensuring the public's safety, health and enjoyment of our bays and estuaries. This project will result in increase in the community's awareness of local environmental issues through Earth Day, forums and an awards banquet. An estimated 12,000 people are expected to attend these events.

Project Objectives:

1. Organize, coordinate, and host turnkey operation of Earth Day festival.
2. Organize, coordinate, and host CBBF Conservation and Environmental Stewardship Annual Awards Banquet.
3. Host Coastal Issues Forums to increase communication between resource managers, users, and the general public.
4. Organize and coordinate bay-resource/related workshops with CBBEP's approval.
5. Continue to seek matching and/or leveraging funds.

PROJECT #2409 CBBEP Land Conservation and Stewardship

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$313,180
Bays Plan, 2nd Ed. Actions: LCS 1.1, LCS 1.2

Background:

CBBEP is owner and steward of conservation properties located across South Texas, primarily located within Aransas, Nueces, San Patricio, Refugio, and Cameron Counties. Included in the list of conserved properties is the CBBEP Nueces Delta Preserve which is located just outside of Odem, Texas and is the focal point of the CBBEP Land Conservation Program. The CBBEP Nueces Delta Preserve encompasses over 11,000 acres of the Nueces River Delta and is in both San Patricio and Nueces Counties. The Nueces Delta Preserve was purchased with the intent of preserving natural habitat, species, and function of the Nueces River Delta. This property is also home to the CBBEP Environmental Education Program known as "Delta Discovery." CBBEP has taken the successful model of the Nueces Delta Preserve and has focused on preserving contiguous acres of habitat in Refugio County's Mission River Delta, Aransas County's Lamar Peninsula, and Nueces County's Mustang Island.

The proposed project funds will be used to help support CBBEP's land ownership obligations and some routine maintenance associated with land ownership. Maintenance activities include, but are not limited to, habitat management activities, road and culvert repairs, maintenance and operation of CBBEP facilities, equipment repairs purchases and maintenance, development and enhancement of public access sites, and the payment of property taxes. Past project accomplishments have included, perimeter fencing, herbicide applications for brush control, development and implementation of prescribed burn program, road reconstruction, installation of solar water wells, and wetland enhancement and creation.

Project Objectives:

The primary project goal is to promote the stewardship of coastal resources through the implementation of responsible and sustainable adaptive management techniques on CBBEP properties. Specific objectives include:

1. Provide ongoing maintenance and management of properties owned by CBBEP.
2. Implement prescribed burns, herbicide, and mechanical treatments to suppress woody vegetation encroachment on program owned lands.
3. Replace sections of perimeter fence.
4. Support and assist organizations in land conservation efforts.

PROJECT #2410 Oso Bay/Oso Creek Watershed Model & Outreach and Education

Performing Organization: Texas A&M University – Corpus Christi
Total Project Cost: \$13,271
Bays Plan, 2nd Ed. Actions: WSQ 1.1, PEO 1.1, PEO 1.2, PEO 1.3, PEO 1.4

Background:

The Oso Bay/Oso Creek watershed drains an area of approximately 255 square miles and is located in the northern-most portion of the Nueces-Rio Grande Coastal Basin. Oso Bay is an enclosed, shallow body of water situated along the southern shore of Corpus Christi Bay, with a surface area of approximately seven square miles. Oso Bay receives much of the storm water runoff from the City of Corpus Christi as well as the cooling water from the Barney Davis Power Plant. The housing developments around the bay range from large, multiacre tracts, to neighborhoods with many houses per acre, to apartment complexes.

Stakeholders identified a number of human activities as potential contributors to water quality problems in the Oso Bay/Oso Creek watershed. A lack of natural resource awareness, a depreciated value for clean streams coupled with a deficit in the understanding of human activities that contribute to nonpoint pollution underlie the existing water quality impairments. Refrigerators, tires, dead animals, and household garbage dumped at public road crossings testify to this awareness problem. The proposed public education and outreach project results from recommendations made by stakeholders during the I-Plan development process and is included as a measure within the Implementation Plan.

The goal of this four-year project is to create an education and outreach program that cultivates personal responsibility for water quality and polluting behaviors in the Oso Bay/Oso Creek Watershed. This program will connect urban and rural communities of the Oso Bay/Oso Creek Watershed by educating the public about urban waters, the effects of polluting behavior, and the impacts land use transitions have on water quality. Community awareness of the existing water quality bacteria issues in Oso Creek and Oso Bay will promote community engagement to protect and improve water quality that will in turn improve public health and revitalize watershed communities. The education and outreach will connect communities with their watershed by using a plastic, custom relief model of the Oso Bay/Oso Creek Watershed. The model will promote personal responsibility in revitalizing and restoring Oso Bay and Oso Creek by helping stakeholders visualize their “place” within the watershed and better understand pollutant pathways and the role they can play in reducing pollutant loads. These models have been used in other watersheds and have proven to be a powerful tool for educating communities about the ways runoff pollutants affect public health and the environment. The plastic watershed model will be used at every elementary school located within the Oso Bay/Oso Creek Watershed to reinforce 5th grade Texas Essential Knowledge and Skills and cultivate their understanding of the watershed in which they live. Bilingual outreach materials (e.g., PSA, news stories, posters, fact sheets, etc.) will also be developed to support the education and outreach efforts described above and provide the public with information regarding trash and flooding, septic issues, and keeping our creek and drainage areas clean.

Project Objectives:

This four-year project will implement measures outlined in the draft Oso Bay/Oso Creek TMDL Implementation Plan. Funds will be used to construct a custom, plastic relief model of the Oso Bay/Oso Creek watershed and use that model for education and outreach efforts in local schools and underserved communities located within the watershed. Bilingual outreach materials will also be developed to support education activities in the watershed. The funds listed above will be used to support the fourth-year of this multi-year project.

PROJECT #2411 Nueces Delta Environmental Monitoring

Performing Organization: Conrad Blucher Institute at Texas A&M University – Corpus Christi
Total Project Cost: \$47,243
Bays Plan, 2nd Ed. Actions: FW 1.1, FW 1.2, FW 1.3, FW 1.4

Background:

Normally, a river flows through a delta area prior to making its confluence with its receiving water body. The Nueces River is different in that it flows into Nueces Bay at a point along the south shore of the bay, 2.5 to 3 miles from the delta-bay interface, completely bypassing the delta. Only during times of severe flooding, causing over-banking of the river, or locally heavy rain, did much freshwater make it into the delta proper.

To provide more frequent freshwater diversions during normal flow conditions, the City of Corpus Christi built the Rincon Bayou pipeline and pump station to divert up to the first 3,000 acre-feet of passthroughs per month from above the saltwater barrier dam directly into the upper Rincon Bayou.

The purpose of this project is to continue maintaining monitoring equipment in and around the Nueces Delta to observe freshwater inflows downstream of the Rincon Bayou diversion pipeline so that spatial and temporal environmental effects can be calculated as well as the amount of freshwater needed to manage a healthier estuary. This project will be conducted by the Conrad Blucher Institute (CBI) at Texas A&M University-Corpus Christi. CBI will monitor and maintain one (1) real-time meteorological station in the Nueces Delta, one (1) permanent real-time salinity station in the Nueces Delta, and one (1) real-time tide gauge station in Nueces Bay.

Project Objectives:

Maintain real-time water quality, tide gauge, and meteorological monitoring stations in the Nueces Delta and Bay to measure the effects of Rincon Pipeline freshwater inflows.

PROJECT #2412 Hans and Pat Suter Wildlife Refuge Enhancements, Phase I

Performing Organization: City of Corpus Christi
Total Project Cost: \$350,000
Bays Plan, 2nd Ed. Actions: TR 2.1, TR 3.1

Background:

This project will greatly improve access to Hans & Pat Suter Wildlife Refuge, a popular park and wildlife viewing location within the City of Corpus Christi Parks & Recreation system. This site has historically been popular with birdwatchers, local conservation groups, and the community. However, the Refuge is in disrepair and needs improvements soon to remain accessible for public use. The last major improvements were completed in 2010. If the issues are not addressed, use will continue and damage to the resource will occur because of foot traffic in undesignated areas that may not be safe. The proposed project will allow the City of Corpus Christi Parks and Recreation Department to make improvements or replacements to the trails, boardwalks, and several other amenities. The City is also seeking to repair a shoreline erosion issue on the south side of the site. The City is currently investing approximately \$50,000 per year in materials and labor to provide needed upgrades on a small scale, but this project will allow for larger scale work to make the space more accessible and use materials that are more resilient for the future.

The full project scope includes the following components: (1) conversion of trails from asphalt to ADA-compliant concrete trails, (2) protection and restoration of eroding shoreline, (3) addition of ADA picnic tables and benches, (4) replacement of boardwalk materials, and (5) rebuilding of viewing structures. This is a large-scale project that will require multiple phases for full implementation.

Project Objectives:

The primary project objective includes implementation of the first phase of enhancements at Hans and Pat Suter Wildlife Refuge. Specific objectives for Phase I include:

1. Conversion of trails from asphalt to ADA-compliant concrete trails.
2. Protection and restoration of eroding shoreline.
3. Engineering and design work related to boardwalk and viewing structure replacements (future phase will be needed cover construction costs for this objective).

PROJECT #2413 Packery Channel Oak Motte Sanctuary Improvements

Performing Organization: Audubon Outdoor Club of Corpus Christi
Total Project Cost: \$17,500
Bays Plan, 2nd Ed. Actions: TR 2.1, TR 2.1, TR 3.1, HLR 1.1, LCS 1.1

Background:

The Packery Channel Oak Motte Sanctuary is the only significant remaining stand of coastal live oak trees along the 113 miles stretch of Padre Island coastal lands, this sanctuary provides a critical stopover for neotropical migrants. Ensuring public access is critically important to maintaining the ecotourism economies of the coastal communities in the region. However, the need to provide public access must be balanced with the need to conserve and protect this unique live oak coastal habitat from anthropogenic impacts such as littering, dumping, wildlife disturbance, and habitat conversion. As the Coastal Bend continues to grow and tourism increases, the pressure to provide public access is becoming an increasing issue. The Audubon Outdoor Club's (AOC) goal for this project is to establish well-planned and well-managed access to the Packery Channel Oak Motte Sanctuary so it may be enjoyed by the public and continue to serve as a functioning and intact habitat located on North Padre Island.

Project Objectives:

1. Make repairs to and weather seal the current ADA accessible boardwalk - the original boardwalk was initially constructed in 2007 and requires renovation to ensure the continued safety of visitors and to maintain the structural integrity of the boardwalk.
2. Develop a half-mile loop trail from the newly acquired half-acre lot off Avenida De San Nico street - this will allow access to the eastern section of the Sanctuary property that until the recent land purchase had been landlocked.
3. Enhance habitat adjacent to the boardwalk - this area has become overgrown with an accumulation of dead grass and vegetation. It is currently inaccessible to ground feeding birds and wildlife.

PROJECT #2414 CBBEP Public Outreach Events and Activities

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$44,250
Bays Plan, 2nd Ed. Actions: PEO 1.1, PEO 1.2, PEO 1.3, PEO 1.4, PEO 1.5, TR 1.1

Background:

One of the most important goals of the Coastal Bend Bays Plan is to educate citizens about the ecology of the bay system, its many environmental and economic values, and how an individual can make a positive difference to ensure its long-term health. To accomplish this, the Public Education and Outreach Action Plan is designed to raise the public's environmental awareness, foster community stewardship of bay resources; and increase individual involvement in bay resource management issues. Helping residents and visitors understand the complex issues concerning bay resource management is a priority. CBBEP utilizes a public opinion survey to gauge the effectiveness of our education and outreach efforts. In addition to understanding how the bay system functions, it is important that citizens develop a sound appreciation for the significant value and economic impact derived from the renewable resources of the bays. CBBEP is constantly working to promote public/private partnerships as stated in the Coastal Bend Bays Plan to help achieve its educational goals.

Project Objectives:

CBBEP will raise awareness of environmental issues by connecting with the Coastal Bend public through our websites and social media channels, as well as at community events and festivals. We will spread the CBBEP brand through promotional and educational materials, such as posters, reusable bags, and other items. We expect to reach thousands of people at various community events.

To accomplish its public education and outreach goal, CBBEP will:

1. Participate in community events and festivals,
2. Produce or purchase educational and promotional materials,
3. Maintain a website(s) and active social media channels (i.e., Facebook, Instagram),
4. Develop and provide electronic updates,
5. Participate in outreach opportunities, such as clean up events.

PROJECT #2415 Aransas Woods & Lamar Burton Freshwater Wetlands Cattail Reduction

Performing Organization: Aransas First Land Trust
Total Project Cost: \$13,000
Bays Plan, 2nd Ed. Actions: PEO 1.1, PEO 1.2, PEO 1.3, PEO 1.4, PEO 1.5, TR 1.1

Background:

This project will support the continued development and improvement of the Aransas Woods and Lamar Burton Wetlands for public access, education, and habitat enhancements. Implementation of cattail management will enhance viewing of the diverse vegetation and wildlife at these two Aransas County preserves. Both people and wildlife living in and visiting Aransas County will greatly benefit from the habitat management effort.

The Aransas Woods site is a 122-acre preserve owned by the Texas Department of Transportation, City of Rockport, and Aransas First, and managed by Aransas First since 2002 as Coastal Birding Trail Site #47. This site contains about 22 acres of wetland on two large depressions, each more than half covered with cattails, and two smaller wetland depressions off the entrance and front viewing platform that are almost totally covered. The reduced viewshed impacts what can be seen from an observation deck or nature trails that are located on the north side of the preserve.

The Lamar Burton Wetland Sanctuary has almost 60 acres of wetlands, In 2022, public access enhancements that were added to the site through previous funding from CBBEP. There are four contiguous shallow freshwater pools that collect rainwater from surrounding properties. This runoff water seeps and drains to the estuarine marsh of Newcomb Bend which is owned by Texas Parks & Wildlife Department and CBBEP. Similar to the Aransas Woods site, there is a need to manage the growth of the cattails in these ponds. As part of this habitat restoration effort, Ducks Unlimited has committed funds to the project through one of their habitat management programs.

Project Objectives:

1. Aerial application of approved aquatic use herbicide to identified stands of cattails.
2. Manipulation of dead cattails post herbicide treatment.

PROJECT #2416 Up2U Litter Bag Partnership and Dumpster Service at PINS

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$10,000
Bays Plan, 2nd Ed. Actions: BD 1.1, PEO 1.1, PEO 1.3

Background:

The purpose of the project is to continue and expand a partnership between Padre Island National Seashore (PINS) and the Up2U Litter Prevention Campaign. Specifically, this project will purchase 24,000 Up2U litter bags for distribution at PINS and provide dumpsters at Bird Island Basin Boat Ramp. Up2U litter bags are the cornerstone of the Up2U litter prevention campaign, a 5-year year litter prevention campaign that will distribute 150,000 bags (30,000 / year) through distribution partners in the Coastal Bend. The litter bags serve as a tool for trash removal, prevention, and outreach; however, the program is in its third year and is already distributing 30,000 bags per year through partners and cannot provide the volume of bags that could be utilized at PINS. Annual visitation to the park averaged 618,849 per year from 2016 to 2020, with an average of 65,795 visitors camping overnight each year in developed campgrounds or on the beach. Last year the park distributed 12,000 Up2U litter bags to visitors and it would be a great benefit to increase the number of bags to 24,000. Not only are the yellow mesh bags preferred over traditional trash bags because of their ease of use in our environment, but 24,000 bags would provide for very welcome additional capacity to supply visitors with bags so they can pack out more than they pack in.

Additionally, CBBEP is proposing to use \$10,000 to work with PINS resource managers to place a roll off dumpster at the Bird Island Basin Boat Ramp during the peak summer boating season. This service would be provided from June-August or until funding is exhausted. CBBEP had previously provided dumpsters to assist in the removal of debris following Hurricane Hanna. These dumpsters were heavily utilized by the thousands of boaters that launch at the Bird Island Basin.

NOTE: The City of Corpus Christi is providing \$10,000 directly to the Nueces River Authority to facilitate the purchase of the bags that will be used at PINS. Therefore, the funding for this component of the project is not included in the CBBEP Annual Work Plan. The \$10,000 included in the Work Plan will be utilized for the dumpster at the Bird Island Basin Boat Ramp.

Project Objectives:

1. Provide litter bags to visitors of PINS to facilitate removal of trash and harmful debris from the environment, reducing the amount of debris reaching our waterways.
2. Distribute information and outreach materials for targeted audiences. The Up2U litter bag is not only a mechanism for trash removal and prevention, but also outreach through the messaging on the bag itself.
3. Provide a dumpster at the Bird Island Basin Boat Ramp during peak summer boating season.
4. Promote public participation in stewardship activities by promoting responsible use of the PIN's habitats.

PROJECT #2417 Held-Moran Sanctuary Accessibility Improvement and Trail Development, Phase II

Performing Organization: Coastal Bend Bays & Estuaries Program

Total Project Cost: \$50,000

Bays Plan, 2nd Ed. Actions: TR 2.1, TR 3.1, HLR 1.1

Background:

The Held-Moran Sanctuary is a 92-acre nature sanctuary located within the City of Corpus Christi that is owned and managed by the Audubon Outdoor Club of Corpus Christi (AOC). The Sanctuary is composed of seasonal ponds, live oak mottes, sweet bay, and other native trees and scrubs that support a diversity of wildlife, including numerous migratory birds and other native animals, such as deer and javelinas. The Sanctuary is managed by the AOC, with careful attention to the removal of litter, cultivation of native plants, restoration efforts to enhance natural water features, and establishment of habitat ideally suited to migratory birds.

Ensuring public access is critically important to maintaining the ecotourism economies of the coastal communities in the region. However, the need to provide public access must be balanced with the need to conserve and protect this unique live oak coastal habitat from user impacts such as litter/debris, wildlife disturbance, and habitat alteration as explained above. As the Coastal Bend continues to grow and tourism increases, the pressure to provide public access is becoming an increasing issue. Our goal is to have well-planned and well-managed access to our sanctuary so we can curtail resource damage, while providing for the growing numbers of visitors.

This project will build upon a previous project from CBBEP FY22/23 BIL Workplan (Held-Moran Sanctuary Accessibility Improvement and Trail Development, Phase I), that provided public access improvements including an ADA compliant parking area, bollard and cable repair, and a short section of ADA compliant trail. This project will expand on those improvements and install additional ADA complaint trail, interpretive signs, and limit damage to the environmentally sensitive live oak forest from misuse and ensure the safety of surrounding residential buildings by providing a fire break on the southwest boundary.

Project Objectives:

To improve accessibility to Held-Moran Sanctuary by installing additional ADA compliant trail, interpretive signage, and establishing a fire break on the southwest boundary.

PROJECT #2418 Waldron Park Pond Improvements

Performing Organization: City of Corpus Christi
Total Project Cost: \$5,000
Bays Plan, 2nd Ed. Actions: TR 2.1

Background:

This project will allow for upgrades and rebuilding of the access pier at Waldron Park. Waldron Park is located in Flour Bluff and hosts Waldron Pond, a historically popular spot for fishing and Kid Fish events. There is a current structure that allows access over the water, but it is in need of updates and repairs. In the past year, the Flour Bluff Citizens Council has worked to host park cleanups, including a workday involved in removing trash and debris from the pond. The City of Corpus Christi Parks & Recreation Department is asking for support in purchasing new lumber to rebuild this structure so that historic use can be returned to the park/pond. This neighborhood park will allow those who may not be able to travel to further locations access to our coastal resources, and a possible space to learn angling, bird watching, and other recreational pursuits. All labor will be provided by the Parks & Recreation department staff.

Project Objectives:

The objective for the proposed project is to restore public access to Waldron Pond by purchase materials and rebuilding the access pier.

PROJECT #2419 Advancing Oyster Reef Restoration in the Mesquite Bay Complex

Performing Organization: Harte Research Institute at Texas A&M University – Corpus Christi
Total Project Cost: \$128,796
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2, HLR 2.2, HLR 2.3, HLR 2.4

Background:

Oyster reefs in the Mesquite Bay Complex are historically productive and ecologically important, but have suffered substantial degradation in recent years, likely due to the effects of Hurricane Harvey in 2017 and disproportionately high commercial harvest pressure (i.e., dredging; TPWD data). Oyster reefs in the Mesquite Bay Complex support the adjacent Aransas National Wildlife Refuge (ANWR) by mitigating marsh and terrestrial habitat loss (including essential Whooping Crane habitat) from persistent shoreline erosion, and supporting colonial waterbird and shorebird populations (including American Oystercatcher, a Texas Comprehensive Wildlife Conservation Strategy Priority Species) that are directly associated with the reefs. The community importance of Mesquite Bay Reefs is evidenced by the large number of conservation groups (e.g., Coastal Conservation Association, FlatsWorthy) who have raised concerns about the degradation of these reefs.

In November 2022, the Texas Parks and Wildlife Commission approved new regulations to prohibit oyster harvest in Carlos, Mesquite, and Ayres Bays (Mesquite Bay complex). In response to this action, there has been strong interest from multiple stakeholder groups to rebuild oyster reefs in the system. To this end, the objectives of the project include: (1) Completing a coastal boundary survey and archaeological survey (contracted services) for up to 50 acres of potential oyster reef restoration areas; these surveys are required elements for permit applications to the Texas General Land Office (Surface Lease) and the U.S. Army Corps of Engineers (Nationwide Permit 27). (2) Conducting targeted oyster population monitoring to characterize oyster populations in potential restoration areas. (3) Working with project partners to share project data and develop permit applications for up to 50 acres of oyster reef restoration in the Mesquite Bay complex.

The project builds upon previous work and complements ongoing efforts among many groups (Mission Aransas NERR, TPWD, FlatsWorthy) to advance oyster reef restoration within the Mesquite Bay Complex. HRI and CBBEP recently completed a project to evaluate oyster reef changes and current conditions in the Mesquite Bay complex, and those results will be used in permit development. The Mission-Aransas NERR and FlatsWorthy will support the project efforts by hosting two stakeholder workshops to share information on oyster reef restoration projects and successes and prioritize areas for oyster reef restoration within this system. TPWD will provide technical guidance and support for desktop characterizations of the priority areas. Taken together, these efforts will advance the goal of restoring reefs throughout Mesquite Bay.

Project Objectives:

The objective of the project is to advance oyster reef restoration in the Mesquite Bay Complex through (1) completion of a coastal boundary survey and archaeological survey (contracted services) for up to 50 acres of potential oyster reef restoration areas; (2) targeted oyster population monitoring to characterize oyster populations in potential restoration areas; and (3) working with project partners to share project data and develop permit applications for up to 50 acres of oyster reef restoration in the Mesquite Bay complex.

PROJECT #2420 Bayside Wetland Resilience on Mustang Island - Phase I

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$100,000
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2, CR 1.1, CR 1.2

Background:

The primary goal of the project is to preserve existing and enhance degraded wetlands on Mustang Island while making the island more resilient to wetland habitat loss in the long term by addressing chronic geomorphological concerns. The final strategies and proposed solutions for long-term restoration would be identified through a literature review, preliminary engineering, and modeling.

Mustang Island is one of Texas's Gulf barrier islands, extending roughly 18 miles in length from Port Aransas on the north to Packery Channel on the south. The loss of coastal wetlands on Mustang Island is thought to be the product of underlying issues related to the geologic formation of the island and includes coastal storm impacts and sea level rise. Tidal flats along Corpus Christi Bay have been transitioning to salt marshes, and now the marshes are beginning to erode. It is unlikely that a purely structural solution, such as breakwaters, are sustainable as primary mitigation actions because alone they cannot adequately address the underlying problems across the island. Rather, it is expected that a study is needed to determine the geological, geomorphic, and anthropogenic features or processes that could be preventing adequate sediment stabilization (e.g., soil formations, subsidence, or manmade structures impeding sediment transport). The results would inform the long-term management of the island and could include recommended solutions like sediment budgeting and beneficial use of dredged material to support shoreline stabilization and wetland restoration.

Mustang Island has substantial wetland and tidal flat systems present on the bayside of the island that are the primary features to be protected by this project. These wetlands support habitats for numerous species of recreationally and commercially important fish, including red drum, blue crabs, brown shrimp, southern flounder, and speckled trout. They also provide habitat for numerous birds, such as piping plovers, peregrine falcons, and reddish egrets. Despite the primary focus area being the wetland complexes, the study would consider the entire island complex, including human communities, as a beneficial recipient of any resulting projects.

Project Objectives:

1. Performing a literature review of existing studies and surveys to determine the area(s) of greatest need and opportunities for long-term restoration benefits.
2. Collecting and reviewing existing modeling, and conducting additional modeling as needed, to identify potential preferred strategies to address the area(s) of need
3. Preliminary engineering for the preferred strategies identified in the analysis
4. Inventory of potential sediment sources and future dredging cycles, collaborating with regional sediment management initiatives
5. Update and review a sediment transport model(s) to determine the most viable restoration strategies and project recommendations for the long-term management of Mustang Island.
6. Produce a resilience plan for the island that presents projects and strategies in a phased and strategic vision that can be adopted by island stakeholders.

PROJECT #2421 Relative Sea Level Rise and Habitat Assessment in the Nueces Delta

Performing Organization: University of Texas Marine Science Institute
Total Project Cost: \$6,915
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.3, HLR 2.4, CR 1.1

Background:

The project will help determine the impacts of sea level rise on marsh habitats in the Nueces Delta Preserve by gathering data on both vegetative communities and elevation change. Funding for the proposed project will be used (1) to continue a long-term marsh vegetation monitoring program in the Nueces Delta and (2) to supplement the existing marsh monitoring program with elevation data by monitoring Surface Elevation Tables (SETs) and marker horizons (MHs) that were deployed in spring 2017 with funding from CBBEP. This project will provide CBBEP and resource agencies with the information they need for planning for sea level rise in the future. More specifically, the results of this project can be used to help answer questions related to the management and protection of the Nueces Delta Preserve, which is owned by the CBBEP.

This scope includes the monitoring of Surface Elevation Tables (SETs) and marker horizons (MH) at two sites (near stations 270 and 450) on the Mitigation Channel and Rincon Bayou, respectively. Measurements are collected twice annually (fall and spring) at each station (total of 6 SETs and 24 MH). Using the elevation data gathered from SETs and MHs, we can compile a more complete picture of habitat changes due to relative sea level rise within the Nueces Delta. This project builds upon other efforts along the Texas coast to continuously maintain and monitor SETs and MHs, including those deployed at five locations in 2012 in the Mission-Aransas Estuary.

SETs and MHs help researchers acquire the fundamental data and information needed to understand the effects of changing local sea level and inundation patterns on the response of vegetative communities. Knowledge about other factors such as changes in vegetative communities, precipitation, temperature, water chemistry, and invasive species is helpful in segregating the impacts of changing land and water levels from other environmental influences. Previous, on-going, and planned research projects in the Nueces Delta will be invaluable in identifying the key indicators that are environmentally important and will complement the data gathered through this proposed project.

The SET and MH data greatly complement the long-term vegetation monitoring program that has been maintained and monitored by UTMSI for many years in the Nueces Delta. Measurements of vegetation transects have been made continuously for over 20 years and have included: percent cover, species composition, sediment ammonium, pore water salinity, and sediment moisture. By placing SETs and MHs in close proximity to these transects, researchers will have a much more complete picture of habitat changes due to relative sea level rise, inundation changes, and planned mitigation measures designed to slow the erosion of the deltaic habitat. The project includes funds to allow UTMSI to continue monitoring vegetation transects at both sites on a quarterly basis within the Nueces Delta.

Project Objectives:

1. Continuation of a long-term marsh vegetation monitoring program at the Nueces Delta.
2. Supplement the existing marsh monitoring program with elevation data by monitoring SETs and MHs.

PROJECT #2422 Flour Bluff Wetlands Invasive Species Control

Performing Organization: TBD
Total Project Cost: \$80,000
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 2.6

Background:

The restoration site at the Flour Bluff Independent School District (FBISD) includes a saltwater pond (approximately 10 acres), a freshwater pond (approximately 1.5 acres), and uplands (approximately 40 acres). Currently, the extremely aggressive non-native Brazilian pepper trees have overtaken approximately 30 acres of native plant communities at the site. Guinea grass is also present but to a lesser extent. FBISD has identified the need to restore and enhance their highly used educational wetland. The project would not only benefit students' outdoor education but also contribute to the overall improvement of wildlife habitat along the Laguna Madre. FBISD's wetland is adjacent to the City-owned Duncan Pond and the TPWD-managed Redhead Pond Wildlife Management Area (RHPWMA), both conservation areas. The restoration will be conducted in coordination with community partners that include Texas Master Naturalists, Friends of Redhead Pond & Environmental Stewardship Association (FRP), Flour Bluff Citizens Council, and Department of the Navy.

The goals of the project are to remove and control invasive Brazilian pepper trees and guinea grass that are present on site in various densities and allow regrowth of native plants. Friends of Redhead Pond are currently managing Brazilian pepper trees and guinea grass growth at RHPWMA, and similar methods will be employed at the FBISD wetlands. The reduction in both Brazilian pepper trees and guinea grass at this location will help reduce seed sources for other habitat areas along Laguna Shores. Also, the project will serve as an excellent education demonstration project that the students at FBISD, at all grade levels, will be able to not only observe but actively participate in conservation. Although students will not be participating in removal and herbicide treatments that will be necessary to control the invasives, they will be able to monitor progress, learn to identify native plants as they re-establish, and observe changes in wildlife usage as the habitat is restored.

Project Objectives:

The objective of this project is to perform habitat restoration activities, specifically, removal of invasive plant species, to improve the diversity of native plants and wildlife populations at the FBISD wetlands.

PROJECT #2423 Gulf Coast Conservation Initiative

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: TBD
Bays Plan, 2nd Ed. Actions: LCS 1.1, LCS 1.2

Background:

The Gulf Coast Conservation Initiative (GCCCI)'s purpose is to protect, enhance, and/or restore habitat for Whooping Cranes, northern Aplomado falcons, Attwater's prairie chickens, Sprague's pipit and associated migratory bird species. The Aplomado Falcon, Attwater's Prairie Chicken, and Whooping Crane are endangered species that occur in coastal Texas, and whose ranges overlap to varying degrees with one another, as well as with many migratory birds which have experienced long-term, broad-scale declines across much of their ranges. These species can neither recover nor be sustained unless habitat sufficient to support viable populations is conserved. Habitat for these species has been degraded by the production of food and fiber and is being lost to development and rising sea-levels. Protecting, enhancing, and restoring habitat for these species from development will in this area reduce or avoid impacts from recreational uses, protect and preserve functional sensitive natural habitat types, preserve open space, and restore degraded habitats in the GCCCI priority area. Since 2002, CBBEP has worked to acquire either fee simple title or conservation easements for more than 12,000 acres of freshwater marsh, forested wetlands, mudflats, riparian corridors, and native upland habitat for conservation management. CBBEP has coordinated with U.S. Fish & Wildlife Service, Natural Resources Conservation Services, and The Nature Conservancy to develop and implement management plans and restoration actions throughout this protected habitat. CBBEP has also coordinated and worked with other property owners (such as Aransas National Wildlife Refuge, Texas Parks and Wildlife Department, City of Corpus Christi, South Texas Botanical Gardens and Nature Center, and private property owners) to develop and implement restoration actions on their property. CBBEP will coordinate with USFWS, Grazing Lands Coalition, TNC, USDA-NRCS, and other conservation organizations to identify and implement restoration actions that benefit a minimum of 500 acres of habitat for Aplomado Falcons, Attwater's Prairie Chickens, and/or Whooping Cranes, as well as associated focal migratory birds' habitats. For projects on private lands CBBEP or a designated project partner will develop written 10-year long agreements with landowners.

Project Objectives:

1. Identify and implement restoration actions that benefit habitat for Aplomado Falcons, Attwater's Prairie Chickens, and Whooping Cranes.
2. Establish cooperative agreements with partnering landowners.

PROJECT #2424 CBBEP Coastal Bird Program – Laguna Madre Initiative

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$100,000
Bays Plan, 2nd Ed. Actions: CB 1.1, CB 2.1, HLR 1.1, HLR 2.1

Background:

The Laguna Madre is one of the most important coastal wetland complexes for birds in the Western Hemisphere. Much of the value of this system for birds is based on the diversity of tidal flats and seagrass beds spread over a very large geography, extending from the Corpus Christi area down to Tamaulipas, Mexico.

Historically, the Coastal Bird Program has focused our management and monitoring efforts primarily on the mid-coast of Texas. However, bird populations span across program boundaries, and we recognized that expansion to the Lower Laguna Madre was needed to properly manage local waterbird populations. The Laguna Madre is used by the avian community as a contiguous ecological system and should be managed as such.

Thanks to the continued generosity of the Kleberg Foundation, the Coastal Bird Program has employed a full-time biologist in the Lower Laguna Madre who has, with the help of volunteers, implemented management actions at waterbird rookeries - installing protective signs, removing exotic vegetation, planting native shrubs, and eliminating nest predators. Staff has also focused on community engagement and coordinating volunteers. Consistent, annual efforts are vital in properly managing rookery islands. It takes several seasons of intense management to improve island habitat. Therefore, on-going investment in the Laguna Madre Initiative is needed to continue the habitat improvement and protection that is already underway.

In addition to rookery islands, other habitats found in the Laguna Madre support astounding numbers of migrating and wintering shorebirds. Millions of birds, many that migrate over 10,000 miles a year, make use of the beaches and tidal flats of the Laguna Madre. Advances in avian tracking systems are allowing us to learn more about these species and how important the Texas coast is to the migratory flyway. We have expanded our conservation and research efforts to include migratory shorebirds which depend on the Texas coast for portions of their life cycles.

Funding from the Kleberg Foundation and others has allowed us to effectively operate on the lower Texas coast and cultivate a network of local volunteers and partners. Continued investment in this program will allow us to build upon these partnerships, create new collaborative opportunities, and boost our volunteer and support base in the lower Laguna Madre, drawing us closer to our goal of a continuous, integrated, collaborative coastal bird conservation effort throughout the bi-national Laguna Madre system.

Project Objectives:

1. Improve colonial nesting waterbird populations in the Lower Laguna Madre by addressing proximate causes of nest failure such as predation, lack of suitable nesting substrate, and human disturbance.
2. Implement monitoring efforts on shorebird populations to identify potential conservation actions.
3. Engage volunteers and communities in coastal bird conservation efforts through the coastal portion of the Rio Grande Valley.

PROJECT #2425 Use of Historical Data to Assess Climate Change Effects: Nueces Delta

Performing Organization: University of Texas Marine Science Institute
Total Project Cost: \$53,841
Bays Plan, 2nd Ed. Actions: CR 1.1, CR 1.2, CR 2.1, FW 1.1, HLR 1.1

Background:

This study is focused on (1) gathering and synthesizing the multitudes of long-term data from the Nueces Delta to characterize drivers of marsh ecological condition and (2) expanding data collection at previously established vegetation monitoring transects. This approach will allow us to both identify relevant datasets and contribute to the continued generation and management of critical data in the Nueces Delta. We will use this information to quantify shifts in vegetation cover, erosion-induced loss of habitat, and changes in carbon exchange due to climate change.

Specific tasks include:

1. Synthesize long-term ecological, physiochemical, and meteorological data to understand drivers of marsh condition: Presently, there is an abundance of data from several sources on the Nueces Delta and Rincon Bayou. These data include observations and measurements of meteorology and climate, water quality, and vegetation, as well as corresponding reports and publications. A significant portion of these data are either not yet publicly available or are difficult to navigate and access. If these data are not compiled into a centralized database or repository, they will likely be lost. We will identify, synthesize, and organize these datasets into a detailed database with associated metadata and DOI. We intend to publish this data using the NOAA National Centers for Environmental Information (NCEI) data management site. In publishing, we will vastly increase accessibility for researchers and managers.
2. Expand sampling and data collection at previously established vegetation monitoring transects: Vegetation and water quality surveys have been occurring in the Nueces Delta since 1995. The magnitude and longevity of these datasets makes them extremely valuable for assessing change in vegetation patterns over time. With drought and sea level rise threatening marshes in the Nueces Delta, these measurements will allow us to understand historical changes in marsh health and predict future responses to climate change. This expansion of sampling is timely and particularly complementary to the long-term data synthesis described in Task 1 as well as the CBBEP-funded Nueces Delta relative sea level rise and dredge material placement efforts.

Project Objectives:

The overall objective of this project is to quantify the impacts of climatic drivers, namely drought and sea level rise, on the health of the Nueces Delta marsh to build understanding of coastal resilience.

PROJECT #2426 Plastic Pollution Impacts on Bird Populations

Performing Organization: Amos Rehabilitation Keep at the University of Texas Marine Science Institute
Total Project Cost: \$85,000
Bays Plan, 2nd Ed. Actions: HLR 2.2

Background:

While there have been several studies quantifying the abundance of plastic in our marine environment, there have been no studies to date looking at ingestion of plastic by birds in coastal environments along the northwestern Gulf of Mexico (GOM). Texas accumulates ten times more marine debris than other areas of the GOM. Due to the overwhelming amount of plastic in the northwestern GOM, we hypothesize that avian marine species have been impacted.

This project will utilize the carcasses of a wide array of marine associated bird species from the Amos Rehabilitation Keep (ARK) that either died before reaching the facility or died within 24 hours of arrival. In 2021, the ARK handled 635 migratory bird patients, comprising 99 species - 238 either died before reaching the facility or died within 24 hours of arrival. Such a short time span ensures that the food from the gastrointestinal tract would represent what the bird has eaten from natural environments. The gastrointestinal tract from each carcass would be evaluated to determine the types and abundances of plastics in the sample using microscopy Fourier transform infrared spectroscopy or pyrolysis gas chromatography mass spectrometry at UTMSI.

This project aims to evaluate the health of each bird by performing necropsies with veterinarian health assessments. Through these necropsies, data will be gathered to examine the connection of plastic ingestion with the overall health of each bird. Plastic ingestion in avian species is known to cause chronic debilitation along with other issues. In 2021, 30% of the birds that either died before reaching the facility or died within 24h of arrival were in a debilitated state. The information from these necropsies could provide valuable insight into the causes for this debilitation. Depending on the results of this study, this project could be expanded to include chemical analysis of muscle tissue to assess contamination levels from plastic ingestion, such as polybrominated diphenyl ethers (PBDEs) and polychlorinated biphenyls (PCBs).

Project Objectives:

This project will quantify the abundance of plastic pollution ingested by marine associated birds from the northwestern Gulf of Mexico to better inform resource management decision-making and improve education and outreach efforts related to plastic pollution.

PROJECT #2427 Survey of Water Rights Availability for Texas Mid-Coast Estuaries

Performing Organization: San Antonio Bay Partnership
Total Project Cost: \$20,000
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 2.1, HLR 2.4, FW 1.2, FW 1.4

Background:

Freshwater inflows are the lifeblood of the coastal ecosystems, and the ecological impacts of increased freshwater diversions for human/industrial use and decreasing streamflows due to increasingly severe droughts and climate change have the potential to severely impact the health and productivity of Texas Mid-Coast estuaries, and some endangered species depending on these estuaries. While there is a State-wide regional water planning program (the SB1 Regional Water Planning Program) for meeting the human uses of freshwater, and there has been a State-wide planning program to identify in-stream flow and estuary inflow needs (the SB3 E-Flows Program), there are no current programs functioning in Texas to provide water at the scale necessary to sustain/enhance in-stream and estuarine ecosystems.

One mechanism to address this problem is the development and use of water markets to provide sources of water -- both surface water and ground water -- for in-stream flows and freshwater inflows through buyer-seller transactions. These water markets for E-flows have been implemented in numerous western states and a few E-flow transactions have recently taken place in Texas (one such project has just delivered several hundred acre-feet of freshwater to the Guadalupe Delta Wildlife Management Area on San Antonio Bay, and similar water deliveries are planned for at least the next two years).

This project would identify and evaluate the potential for using these kinds of E-flow transactions for B&E inflows by looking at the potential availability of both surface water and ground water rights, the legal and regulatory issues which might be involved in the use of these water rights, and the potential cost of implementing water market transactions for E-flows -- particularly B&E inflows. This project follows up on work recently initiated under the Texas Water Trade organization's "Texas Water Market Makers" program, which involves the International Crane Foundation, is using water markets to provide water for "targeted" B&E inflow events. In this project, Texas Water Trade purchased 200 acre-feet of "firm" Guadalupe River water to be used to provide "focused" freshwater inflows to marshes within the Guadalupe Delta Wildlife Management Area. Game cameras have been deployed to monitor wildlife use in the areas where the freshwater is being delivered.

Project Objectives:

This project will evaluate new options and strategies for protecting/enhancing freshwater inflows to the bays and estuaries along the Texas Mid-Coast.

PROJECT #2428 OSSF Assistance Program, Phase II

Performing Organization: Nueces River Authority
Total Project Cost: \$244,502
Bays Plan, 2nd Ed. Actions: NPS 1.3

Background:

On-site Sewage Facilities (OSSFs) are used to treat wastewater where centralized Wastewater Treatment Facilities (WWTFs) are not available. Conventional systems use a septic tank and gravity-fed drain field that separates solids from wastewater prior to its distribution into the soil where treatment occurs. However, in many coastal watersheds, the soils are considered very limited, which means conventional septic tank systems are not suitable for the proper treatment of household wastewater. In these areas, advanced treatment systems, most commonly aerobic treatment units, are suitable alternative options for treatment. While advanced treatment systems are highly effective, operation and maintenance needs for these systems are rigorous compared to conventional septic systems. Limited awareness and lack of maintenance can lead to system failures.

Unlike pollution from industrial and sewage treatment plants, nonpoint source (NPS) pollution comes from many diffuse sources. Rain events create runoff which picks up human-made and/or natural pollutants and transports them into water bodies. Failing or non-existent OSSFs can produce significant bacteria and nutrient loading into the watershed in the form of NPS pollution.

Factors contributing to OSSF failure include improper system design or selection, improper operation and maintenance, and lack of financial resources for proper maintenance. There are numerous areas within the Coastal Bend where poorly functioning OSSFs are believed to be contributing bacteria and nutrients to receiving waterbodies. Many of these OSSFs were installed before regulations existed and may not have been designed for full-time dwelling occupancy. A program that offers pump-out and inspection followed by repair or replacement where needed, at no cost to the owner, is a proven way to address this problem. This strategy is especially important when working in underserved communities with limited resources.

Areas around the lower Nueces River, Nueces River Tidal segment, and several Colonias located within the Baffin Bay and Oso creek watersheds are believed to be contributing bacteria and nutrients to their waterbodies from poorly functioning On-Site Sewer Facilities (OSSFs). Many of these OSSFs were installed before regulations existed and were not properly designed. A program that offers pump-out and inspection followed by repair or replacement where needed, at no cost to the owner, is a proven way to address this problem. This strategy is essential when working in underserved communities. The proposed project would continue and expand on the impacts of the FY22/FY23 OSSF Assistance Program.

Project Objectives:

Address nutrient and bacteria problems in targeted watersheds by inspecting, repairing, and/or replacing eleven (11) OSSFs that are failing or non-existent, focusing on underserved communities with limited resources.

PROJECT #2429 Nueces River Tidal - Nutrient Bioassays

Performing Organization: Harte Research Institute at Texas A&M University – Corpus Christi
Total Project Cost: \$45,731
Bays Plan, 2nd Ed. Actions: WSQ 1.1, WSQ 2.1, PEO 1.1

Background:

Recent water quality concerns along the tidal segment of the Nueces River have shown the need for preliminary data collection to guide future management decisions. Algal blooms have become a common, recurrent water quality issue in this segment due to excess nutrient loadings. Fish kills linked to low dissolved oxygen events associated with these algal blooms within the tidal segment of the Nueces River have raised concerns about water quality degradation and excessive nutrient loading. The purpose of this study is to determine which nutrient (nitrogen, phosphorus, or both) is responsible for algal growth on the tidal segment of the Nueces River. Information gained from this study will be combined with information from historical data reviews and new field sampling to guide resource managers towards addressing the most relevant nutrient in future load reduction decisions, as each nutrient may have different sources.

To determine which nutrient is controlling algal growth, nutrient bioassays will be conducted on a seasonal/quarterly basis from one site (co-located with the known "hot spot" for algae enrichment) in the Nueces River Tidal segment. Ambient water will be collected at the sampling site and four treatments will be conducted in triplicate: a control treatment, a nitrogen addition treatment, a phosphorus addition treatment, and addition of both nutrients. Nutrients will be added at growth-saturating levels. Algal growth will be tracked over a 48-hour period to determine which nutrient(s) are responsible for triggering growth.

Project Objectives:

Establish a water sampling site in the tidal segment of the Nueces River to be used in a bioassay study to determine which nutrient(s) is driving excessive algal growth in this section of river.

PROJECT #2430 Long-Term Seagrass Monitoring in Corpus Christy Bay, Upper Laguna Madre, and Baffin Bay

Performing Organization: University of Texas Marine Science Institute

Total Project Cost: \$43,170

Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.3, HLR 2.4, CR 1.1, PEO 1.1

Background:

The overarching goal of this work is to continue the landscape approach to long-term seagrass monitoring to evaluate status and trends in Texas coastal seagrass populations with particular focus on Baffin Bay (BB), Corpus Christi Bay (CCB), and Upper Laguna Madre (ULM). A hierarchical strategy for seagrass monitoring outlined by Neckles et al. (2011) will be adopted to establish the quantitative relationships between physical and biotic parameters that ultimately control seagrass condition, distribution, persistence, and overall health. The approach proposed here follows a broad template adopted by several federal and state agencies across the country, but which is uniquely designed for Texas. The program is focused on “Tier-2” monitoring the includes a regional rapid assessment program using fixed stations sampled annually from a shallow-draft vessel and nutrient constituent analysis of leaf tissue.

For FY 2024, this research will continue to monitor long-term health of Texas seagrass in BB, CCB, and ULM in combination with leveraged funds from two other partners. This long-term program contributes to a broader Tier-2 state-wide effort to assess seagrass condition and distribution that began in 2011. The program strongly complements a long-term commitment by both the Mission-Aransas National Estuarine Research Reserve (Mission-Aransas NERR) for sampling in Redfish and Aransas Bays and the National Park Service for Tier-2 sampling in the ULM (Padre Island National Seashore only).

Data collected since 2011 is posted on the dedicated website (see <http://www.texasseagrass.org/>) and serves as an invaluable database of existing seagrass resources available for various local, state, and national groups. This project contributes to our understanding of the quantitative relationships between physical and biotic parameters that ultimately control seagrass condition, distribution, and persistence.

Project Objectives:

Monitor seagrass/water quality in Baffin Bay, Corpus Christi Bay, and Upper Laguna Madre to support the Texas Seagrass Monitoring Program and possible creation of water quality criteria for seagrass beds.

PROJECT #2431 Occurrence, Distribution, and Composition of Microplastics in Bays and Estuaries of the Texas Coastal Bend

Performing Organization: University of Texas Marine Science Institute
Total Project Cost: \$130,678
Bays Plan, 2nd Ed. Actions: WSQ 1.1

Background:

The purpose of this project is to conduct a baseline assessment of microplastics throughout the waters of the Texas Coastal Bend and target select sampling sites during storm events. Included in this project is an education component to teach students about plastics in the environment by expanding and distributing K-12 Teacher Nurdle Kits to area students. Project activities and preliminary results will also complement microplastic outreach and educational programming in the Coastal Bend, currently being conducted by the University of Texas Marine Science Institute (UTMSI), by providing participants in the Summer Science Program with real world context for program curriculum.

With the dramatic increase in the production of plastics and poor management of the plastics debris, microplastics are becoming a serious ecological and economic problem in marine environments. This problem is expected to get worse with the increasing plastics production in the future. Knowing the distribution and composition of microplastics in the marine environments, therefore, is of vital importance if we are to predict the seriousness of this environmental issue and implement appropriate policy for management. Expectedly, plastic pollution may endanger the health of coastal ecosystems with the continuous input of microplastics to bays and estuaries in the Coastal Bend, yet there is little data. To gain baseline data, we will collect and analyze microplastics in waters of Copano Bay, Aransas Bay, Corpus Christi Bay, Nueces Bay, Upper Laguna Madre, and Baffin Bay quarterly, including some opportunistic sampling at the Cole Park and Brawner Parkway stormwater outfalls immediately after flooding events.

Specifically, we will identify the size and polymer types of plastics in these waters, which will offer insights into the potential pollution sources. We will also evaluate the seasonality of plastic abundance and polymer types. These baseline data will help policy makers evaluate the source and degree of the plastics contamination and the potential ecological impact and make appropriate action or policies to maintain healthy estuarine ecosystems.

Project Objectives:

Conduct a baseline assessment of microplastics in the coastal water of the Texas Coastal Bend to determine the size, abundance, and polymer types of these plastics. Support the expansion and distribution of Teacher Nurdle Kits to area K-12 schools. Project activities and results will also be used to provide participants of the UTMSI Summer Science Program with real word context for program curriculum.

PROJECT #2432 Outreach to Wastewater Treatment Plants in Refugio and San Patricio Counties

Performing Organization: Nueces River Authority

Total Project Cost: \$48,954

Bays Plan, 2nd Ed. Actions: WSQ 1.1

Background:

There has been substantial growth in Refugio and San Patricio counties in the last several decades leading to an increased strain on existing wastewater treatment facilities, which can lead to water quality issues in surrounding water bodies. Building off the success of the Baffin Bay Wastewater Treatment Plant (WWTP) Outreach, the Nueces River Authority (NRA) will implement an outreach program for municipal wastewater treatment plants in Refugio and San Patricio Counties. These WWTP discharges ultimately end up in Aransas Bay, Copano Bay, Corpus Christi Bay, Nueces Bay, and Redfish Bay. This outreach effort will be a critical step towards maintaining environmental integrity in the waterways of Refugio and San Patricio Counties, and the bays of the Texas Coastal Bend.

The Nueces River Authority will work to form relationships with the current elected officials and WWTP operators to provide free assessments of WWTPs on a voluntary basis to identify and address infrastructure needs in both wastewater collection and treatment systems. Within Refugio County there are five (5) WWTP including Austwell, Bayside, Refugio, Tivoli, and Woodsboro. For San Patricio County, there eleven (11) operational WWTP including Aransas Pass, Gregory, Ingleside, Mathis, Odem, Portland, Edroy, Sinton, St. Paul, Taft, and Lake Corpus Christi State Park.

Project Objectives:

Provide outreach to local municipalities within Refugio and San Patricio Counties and their WWTP operators to assess the current condition of existing infrastructure and to provide guidance towards improving these facilities to reduce threats to water quality in local waterways.

PROJECT #2433 Nutrient Sampling in Petronila Creek

Performing Organization: Nueces River Authority
Total Project Cost: \$54,657
Bays Plan, 2nd Ed. Actions: WSQ 1.1, WSQ 2.1, WSQ 3.1

Background:

Petronila Creek is a tributary to Baffin Bay. The health of Baffin Bay has been of great concern to scientists and concerned citizens due to fish kills, water quality issues, and food web changes in the bay. The Baffin Bay Stakeholder Group, formed in 2012, is composed of scientists from Harte Research Institute (HRI) at Texas A&M University-CC, Coastal Bend Bays and Estuaries Program, USDA-NRCS, Texas State Soil & Water Conservation Board, Texas Water Resources Institute, Texas Commission on Environmental Quality, Texas Sea Grant, Texas General Land Office, Nueces River Authority, and a host of concerned citizens, including commercial and recreational fishermen, ranchers, and business owners. This group has begun an effort to develop a watershed protection plan for Baffin Bay.

Scientists at HRI have determined that the primary cause of water quality issues in Baffin Bay is excessive nutrients in the bay. The purpose of this project is to conduct monthly water quality monitoring for nutrients in Petronila Creek and its tributaries. The Nueces River Authority (NRA) currently collects chloride, sulfate, and total dissolved solids (TDS) samples monthly at one main stem site and 10 tributary sites. Two additional main stem sites are monitored quarterly for NRA's Clean Rivers Program (CRP), so monthly data is collected in the non-CRP sampling months. This sampling will be conducted to support the Petronila Creek Implementation Plan (I-Plan). Funding for this project will be used to add nutrient sample analysis (nitrate, nitrite, total Kjeldahl nitrogen, total dissolved Kjeldahl nitrogen, ammonia, total phosphorus, chlorophyll-a, and pheophytin) to this monitoring. These data will be used to help fill the data gaps with respect to identifying all possible sources of the nutrients to Baffin Bay.

Project Objectives:

Collect monthly water samples at sites in Petronila Creek and its tributaries to quantify nutrient concentrations within these water bodies and help identify sources of nutrient loading into Baffin Bay.

PROJECT #2434 Assessing Shorebird Habitat Needs and Opportunities in Texas

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$456,999
Bays Plan, 2nd Ed. Actions: CB 2.1

Background:

In the Western Hemisphere, shorebird populations continue to decline. CBBEP will address these declines through a new initiative titled Assessing Shorebird Habitat Needs and Opportunities in Texas. Through this initiative, we will implement a monitoring framework to assess the extent to which freshwater wetland habitat delivery programs benefit shorebirds, assess the usage of early successional post-fire landscapes by migratory shorebirds, manage and monitor wetlands and grasslands of the Nueces Delta using deliberate best management practices (BMPs) to enhance shorebird use, and develop and deliver outreach on how management practices benefit shorebirds.

Alarming declines in shorebird populations across the Western Hemisphere have been well documented. As a result, shorebird conservation plans at the state, federal, and international flyway levels all include recommended actions to curtail the declines. While some threats are localized, most occur at the landscape level, with insufficient habitat quantity and quality ubiquitously cited as the primary cause. Shorebird species vary considerably in their habitat, diet, and migratory needs, and thus they respond differently when there are changes in the environment – especially their habitat.

Many organizations, agencies, and partnerships have developed various shorebird habitat conservation objectives, BMPs (e.g., seasonal flooding and sequential drawdowns, shallow discing), and financial incentives (e.g., Gulf Coast Joint Venture’s Landowner Incentives Program) for “producers” (i.e., agricultural, livestock). However, despite best intentions, a lack of consistent monitoring has made it challenging to know whether these management strategies are having an impact, both within Texas and beyond. We propose to bridge the gap between shorebird conservation intentions and implementation by developing a new initiative within our established CBBEP Coastal Bird Program. The program partners extensively with federal and state agency programs, academic institutions, and other NGOs on projects on migratory birds that span from the Arctic to South America. The Assessing Shorebird Habitat Needs and Opportunities in Texas Initiative will build on our long-established relationships with those partners and entities such as the Knobloch Family Foundation, National Wildlife Refuges (Aransas, Texas Mid-Coast Complex), Gulf Coast Joint Venture and Oaks & Prairies Joint Venture; Ducks Unlimited (DU); Texas Parks & Wildlife Department (TPWD); Texas R.I.C.E.; Prescribed Burn Associations (South Texas PBA, Coastal Bend PBA); and USDA NRCS. Staff working on the Initiative will work to integrate shorebird habitat management objectives into upcoming projects on a range of public and private lands through targeted outreach and engagement (including conservation properties as well as agricultural/ranch lands), and provide comprehensive monitoring to assess shorebird utilization, focusing on shallow-water wetlands and coastal grasslands following prescribed fires. We will utilize our own Nueces Delta Preserve and work opportunistically with other willing land managers.

Project Objectives:

1. Assess the extent to which freshwater wetland habitat delivery programs benefit shorebirds through the implementation of a monitoring framework.
2. Assess usage of early successional post-fire landscapes by migratory shorebirds.
3. Manage and monitor wetlands and grasslands of the Nueces Delta using deliberate BMPs to enhance shorebird use.
4. Develop and deliver outreach on how management practices benefit shorebirds.

PROJECT #2435 Ocean Acidification Monitoring in Aransas Ship Channel

Performing Organization: Texas A&M University – Corpus Christi
Total Project Cost: \$63,656
Bays Plan, 2nd Ed. Actions: WSQ 2.2, WSQ 3.1, CR 1.1

Background:

Ocean acidification is reflected by the decrease in pH caused by the uptake of atmospheric carbon dioxide (CO₂). Atmospheric CO₂ levels have been increasing steadily since the industrial revolution. As of now, approximately 30% of anthropogenically produced CO₂ since the industrial revolution has been absorbed by the world's oceans (Friedlingstein et al., 2022). As CO₂ dissolves into the ocean, carbonic acid is formed and leads to increase of hydrogen ion concentration (or a decline in pH). Changing the chemistry of the ocean has many adverse effects on marine organisms. Examples of some of the organisms that could or have been negatively impacted are oysters, shrimps, corals, sea urchins, some plankton species, and even fish species (Andersson and Gledhill, 2013; Waldbusser et al., 2015). For many organisms, an environment with decreasing pH hinders them from producing and maintaining their carbonate shells/skeletons (Spalding et al., 2017) or causes developmental delays (Timmins-Schiffman et al., 2013). This is an important issue because the decline of these organisms would have many cascading effects, such as changing marine food web structure, decreasing shellfish fishery production, and decreasing coral reef production.

Prior research revealed an overall decline in both pH and alkalinity (i.e., acidification) in almost all estuaries (including estuaries and coastal bays) in the State of Texas (northwestern Gulf of Mexico) (Hu et al., 2015). This study is based on a long-term dataset that has been collected by the Texas Commission on Environmental Quality. Among these estuaries, those in southern Texas, subject to semi-arid conditions, experience the highest decline in alkalinity and pH, including the Mission-Aransas Estuary (comprised of Copano, Aransas and Mesquite Bays).

To further study the acidification phenomenon in estuarine settings, this project will resume monitoring high temporal resolution pH and partial pressure of carbon dioxide (pCO₂) using two in situ sensors. These high-resolution data will allow researchers to examine both the short-term (daily to monthly) variations and long-term (interannual) changes in water carbonate systems in the Aransas Ship Channel, which connects estuarine water with the northwestern Gulf of Mexico.

Project Objectives:

Conduct high frequency monitoring of pH and pCO₂ in the Aransas Ship Channel using two (2) in situ sensors. Additional water samples will be analyzed for total alkalinity and dissolved inorganic carbon.

PROJECT #2436 Characterizing Water Quality in the Nueces River Tidal Segment

Performing Organization: Center for Coastal Studies at Texas A&M University – Corpus Christi
Total Project Cost: \$44,481
Bays Plan, 2nd Ed. Actions: WSQ 1.1, WSQ 2.1, PEO 1.1

Background:

Fish kills within the tidal segment of the Nueces River have raised concerns about water quality degradation. Previous research to investigate these fish kills linked mortality to low dissolved oxygen events related to algal blooms, which had been triggered by high nutrient loadings. These issues were noted in the 2022 TCEQ Texas Integrated Report. Possible sources of excess nutrient loadings include permitted point source discharges, runoff from urban and rural non-point sources, OSSF, groundwater discharges, and others. Additional stressors may include water management and engineered structures impeding flow and prolonging residence time of constituents in the tidal segment.

The purpose of the study is to characterize water quality at a higher spatial resolution than is presently done, especially for bacteria and nutrients, to develop management strategies to improve water quality in the tidal segment of the Nueces River. The study area will focus on nutrient concentrations in the TCEQ- designated Nueces River Tidal Segment (2101), extending from the river's confluence with Nueces Bay in Nueces County, to Calallen Dam, 1.1 mi upstream of US 77/IH 37, in Nueces/San Patricio County. To characterize water quality, surface water samples will be collected monthly from five sites. Samples will be analyzed for nutrient concentration, chlorophyll-a, and bacteria levels.

The study is intended to be a first step towards improving water quality in the stressed segment of the Nueces River, as identified in the 2022 TCEQ Integrated Report. Findings of the study will aid decision makers and stakeholders in developing strategies to improve water quality. The project will also identify future data needs. Data will be used to quantify total constituent loadings and identify possible transport pathways, sources, and fates. Results will also support efforts to protect recreational water quality through studies on waterborne health issues, including pathogens.

Project Objectives:

Establish five (5) sampling sites within the tidal segment of the Nueces River to be sampled monthly and analyzed for nutrients, chlorophyll a, and bacterial abundance.

PROJECT #2437 Baffin Bay Water Resource Stewardship Education Program

Performing Organization: Nueces River Authority
Total Project Cost: \$30,849
Bays Plan, 2nd Ed. Actions: PEO 1.1, WSQ 1.1, NPS 1.5, BD 1.1

Background:

The health of Baffin Bay has been of great concern to scientists and concerned citizens due to fish kills, water quality problems, and food web changes in the bay. Researchers at the Harte Research Institute (HRI) at Texas A&M University-Corpus Christi have determined that the primary causes of the water quality concerns are due to excessive nutrients in the bay. The Baffin Bay Stakeholder Group (BBSG), formed in 2012, is composed of scientists from Harte Research Institute (HRI) at Texas A&M University-Corpus Christi, Coastal Bend Bays and Estuaries Program (CBBEP), USDA-NRCS, Texas State Soil & Water Conservation Board, Texas Water Resources Institute, Texas Commission on Environmental Quality (TCEQ), Texas Sea Grant, Texas General Land Office, Nueces River Authority (NRA), and a host of concerned citizens, including commercial and recreational fishermen, ranchers, and business owners. Public outreach and engagement, informing stakeholders and members of the public about non-point source pollution, their place in the watershed, and measures they can undertake to help address pollution issues, was identified as a priority by the BBSG. Additionally, watershed education and outreach efforts were identified components needed for the successful implementation of the San Fernando and Petronila Creeks Watershed Protection Plan, approved by EPA in 2022.

This Project will deliver resource stewardship education programming to approximately 1,100 5th-grade students at sixteen public schools in the Baffin Bay Watershed during the 2023/2024 school year, utilizing the Baffin Bay relief model developed in FY2023. This project will increase public understanding and stewardship of coastal bend resources, improve water quality, reduce debris reaching the bay, and improve the quality of stormwater runoff. The classroom education program uses a scaled relief model of the Baffin Bay Basin, TEKS aligned science curriculum, and other hands-on activities to show students how pollutants enter and contaminate rivers, bays, and aquifers and how everyone can help protect and conserve water resources. Students are also encouraged to become personally responsible for keeping our water clean through the Up2U water conservation and litter prevention campaign. The curriculum reinforces 5th-grade Texas Essential Knowledge and Skills and cultivates student understanding of our water resources, including watersheds and river basins. These hands-on lessons help students see where their water comes from and where it goes. Participants can identify where they live on the model and see how their activities impact the health of the water resources in their watershed and beyond.

Project Objectives:

Deliver one year of watershed educational programming to over 1,000 5th grade students residing within the Baffin Bay Basin.

PROJECT #2438 Green Stormwater Infrastructure Demonstration Project – Rockport, TX

Performing Organization: Texas State University
Total Project Cost: \$54,858
Bays Plan, 2nd Ed. Actions: NPS 1.1, NPS 1.4, NPS 1.5, WSQ 1.1

Background:

The Clean Coast Texas Collaborative is a program of the Texas General Land Office, which is administered by The Meadows Center for Water and the Environment at Texas State University. The Clean Coast Texas Collaborative is a primary initiative of the Texas Coastal Nonpoint Source Program and began implementation in January 2021. The Collaborative is a dynamic team of experienced engineers, scientists, planners, and educators who work to provide capacity and incentives to coastal communities that lack the expertise and/or resources to successfully implement Coastal NPS priority projects. The Collaborative supports environmental outreach and education, comprehensive planning, local/regional policy development, green stormwater infrastructure projects, floodplain management, on-site sewage facility maintenance, and funding strategies to support the adoption of Texas Coastal Nonpoint Source Program priorities.

The Collaborative currently has a Memorandum of Agreement with the City of Rockport that includes the construction of several types of green stormwater infrastructure (e.g., rain gardens, rainwater harvesting, permeable pavers) throughout Rockport. With support from Coastal Bend Bays & Estuaries Program, Texas State University will enhance the green stormwater infrastructure project being constructed at Memorial Park, to include bioretention and parking lot retrofits to reduce pollutant loading and stormwater impacts.

Project Objectives:

Enhance a green stormwater infrastructure project at Memorial Park in Rockport Texas, to include bioretention and permeable paver parking lot retro fits.

PROJECT #2439 Protection and Restoration of a Bird Nesting Island in Aransas Bay

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$3,949,789
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2, CB 1.1

Background:

Increased vessel traffic, rising sea levels, and impacts from storm surge have led to significant erosion of almost all remaining rookery islands in the Aransas Bay System, and in most cases the islands are no longer able to support nesting birds. The 2020 Environmental Indicators Report produced by CBBEP classified the Aransas Bay System as having poor nesting habitat for colonial waterbirds and identified this system as a priority area for island protection and restoration efforts. The urgency to provide additional rookery habitats was elevated even further after Hurricane Harvey struck the Coastal Bend in 2017. This Category 4 hurricane resulted in major erosion of every rookery island in the Aransas Bay system.

Deadman Island presents a good option for rookery island restoration in the Aransas Bay System. Historically, the Island has provided nesting habitat for colonial waterbirds like pelicans and egrets, and it has been especially important for ground-nesting birds like skimmers and terns. Despite its relatively small size, it has historically been an extremely important rookery island and represents some of the last remaining rookery island habitat within this system. With projected sea level rise and increasing human development further limiting available nesting habitat in this region, this island will likely become an even more critical nesting site in the near future.

Deadman Island is located in Aransas Bay, near Rockport, TX. The Island is part of the historical Long Reef that extends off the west side of San Jose Island. San Jose Island protects Deadman Island from waves of the Gulf of Mexico, but the Island is exposed to long fetches, up to 10 miles, in all directions. In addition, because of the location relative to the Gulf Intracoastal Waterway, the island is exposed to boat and barge wakes. When combined with rising sea levels and storm surges from recent hurricanes, these factors have led to significant erosion of the Island. Now, Deadman Island can no longer support colonial nesting waterbirds.

The goal of this project is to increase the amount of nesting habitat available for colonial waterbirds within the Coastal Bend by protecting and restoring a three-acre bird nesting island in Aransas Bay. The protection of Deadman Island from ongoing erosion and future sea level rise will help conserve this important rookery, making it more resilient to future threats. Although it is considered a secondary outcome of the project, the proposed breakwater structure will also allow for the recruitment and growth of oyster larvae, a threatened habitat. Development of an oyster reef complex will have the added outcome of creating complex fish habitat for numerous recreationally and commercially important species.

Project Objectives:

1. Complete final engineering and design and bid document development for Deadman Island.
2. Complete bidding process for protection and restoration of Deadman Island.
3. Construct chosen restoration and protection alternative at Deadman Island.
4. Conduct post-restoration monitoring to determine usage of restored island by colonial waterbirds.

PROJECT #2440 Texas Parks & Wildlife Department Sanctuary Program

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$1,028,775
Bays Plan, 2nd Ed. Actions: HLR 1.1, CB 1.2

Background:

The loss of wetlands associated with the Gulf Coast of Texas has been well-documented. For many decades, rice agriculture has proven to be a surrogate for many breeding, staging, and wintering migratory birds in Texas. However, recent declines in rice agriculture in Texas, combined with the loss of historical wetlands, have created a deficiency of freshwater wetlands along the Gulf Coast of Texas, especially in the Mid Coast region. Texas Parks and Wildlife Department (TPWD) will work with CBBEP and other partners to establish flooded agricultural fields, primarily recent or fallowed agricultural fields, during the last summer through early spring period to provide shallow water for migratory, staging, and wintering migratory birds, mostly shorebirds and waterfowl.

CBBEP and TPWD will work with voluntary landowners or public lands, when available, that will flood their agricultural fields with existing water deliveries (through water reclamation authorities or existing irrigation wells). In addition, these areas will not be hunted to minimize disturbance and minimize individual energy budgets of migratory birds. Previous exercise with the Gulf Coast Joint Venture has identified many areas in the Mid Coast region which lack large areas of freshwater that are not disturbed during the waterfowl hunting season. This project aims to assist in reversing the decline in body condition of waterfowl, wintering waterfowl abundance, and increase non-coastal wetlands that may be used by migrating or wintering wading and shorebirds.

Project Objectives:

1. Directly restore, enhance, create or manage 700 acres by providing flooded habitats in strategic locations along the Gulf Coast of Texas that serve as refugia for waterfowl, shorebirds, sandhill cranes, and wading birds.
2. Provide or secure six (6) landowner agreements with private landowners and/or public land managers that have access to delivered water or irrigation pumps to flood 60 – 140-acre fields to shallow depths from 6-18” of water at a minimum from Nov 1 – Mar 31.

PROJECT #2441 Up2U PLUS Disposal Fees

Performing Organization: Coastal Bend Council of Governments
Total Project Cost: \$80,000
Bays Plan, 2nd Ed. Actions: BD 1.1, PEO 1.1, PEO 1.3

Background:

Illegal dumping is not just an unsightly and costly problem in the Texas Coastal Bend region, it can pollute our coastal waters and cause serious health hazards. To combat illegal dumping and protect water quality, the Coastal Bend Bays & Estuaries Program (CBBEP) has partnered with the Nueces River Authority (NRA) and Coastal Bend Council of Governments (CBCOG) to develop a three-year public awareness campaign called Up2U PLUS, where the plus sign stands for the plus-sized trash items dumped in public places. At the core of the Up2U PLUS campaign are numerous Community Clean Ups and Free Bulk Waste Collection events throughout the Coastal Bend region through 2024.

The goal of Up2U PLUS is to keep bulk trash from reaching our waterways. Dumped materials not only cover plants and feeding areas that wildlife depends on, but many items can also release chemicals into the air, ground, and water as they sit exposed to the elements. Removing these harmful materials from our watershed and taking steps to prevent dumping in the future will benefit our Coastal Bend with cleaner water, healthier habitats, and a more aware and engaged public.

This 3-year program began in 2022 with funding from the EPA through their Trash Free Waters Program and has already been implemented in Bishop, Riviera, Mathis, Banquette, St. Paul, Tradewinds, Bayside, and Austwell. Disposal fees were included in the Trash Free Waters grant, but due to the rising cost of disposal and the popularity of the program, we are having to empty the dumpsters more often than we anticipated as the communities fill them up. This project will provide for additional disposal fees associated with dumpster events.

Project Objectives:

To provide disposal fees associated with dumpster events for the Up2U Plus Program.

PROJECT #2442 Rincon Reef Breakwater - Cultural Resources Survey

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$32,525
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2

Background:

North Beach is a historic shoreline at the intersection of Corpus Christi and Nueces Bays in the Texas Coastal Bend. As the largest beach in Corpus Christi, it has been a popular and affordable tourist destination for over a century, and home to the Texas State Aquarium and USS Lexington WWII aircraft carrier since the 1990s. The USS Lexington is a National Historic Landmark and the longest service aircraft/pilot training ship in the U.S. Navy, and sees over 300,000 visitors annually.

North Beach was once protected by the Rincon Oyster Reef, but the reef was slowly destroyed through a combination of natural and anthropogenic causes. The Texas General Land Office (TGLO) estimates that 80% of Texas' shorelines are eroding at an average rate of four feet per year, and this beach falls within the upper range of that estimate. Currently, North Beach experiences chronic erosion; emergent wetlands and seagrass meadows cannot re-establish, and the beach has required renourishment five times since 1978.

To reduce erosion and eliminate the need for future renourishment, a multi-phase project consisting of a breakwater and five breakwater islands is needed. Project planning has been ongoing for almost four years, with significant community involvement during project development. The breakwater and islands will reduce wave energy from storms and boat traffic in the Corpus Christi Ship Channel, which will ultimately reduce erosion around the USS Lexington and decrease the need for repeated beach renourishment of the North Beach shoreline. The breakwater island also serves as a stand-alone project in the significantly larger restoration effort by creating diverse habitat elements (i.e., marsh and seagrass habitat within the breakwater island) and allowing for oyster spat settlement in a bay where substrate is limited. The alternative analysis and 30% engineering and design are complete, and a permit application will be submitted in summer 2023. A cultural resources survey is needed to complete the permitting process.

Project Objectives:

Complete a cultural resource survey and the permitting process for a large-scale protection and restoration project at North Beach.

PROJECT #2443 Blue-water/Brown-water Symposium

Performing Organization: Mission-Aransas Reserve at the University of Texas Marine Science Institute
Total Project Cost: \$4,500
Bays Plan, 2nd Ed. Actions: MC 1.4

Background:

Corpus Christi and the surrounding communities are experiencing dramatic economic growth due to the oil and gas industry. The Port of Corpus Christi has been dubbed “the energy Port of the Americas” because the Port is the leader in U.S. crude oil exports. Strategically located on the western Gulf of Mexico, the Port is a major gateway to both international and domestic maritime commerce. To meet the future demands of the export industry, the Corpus Christi Ship Channel (CCSC) is undergoing a widening and deepening (47 to 54 feet) project to permit larger ships to access the Port. Other proposed infrastructure projects like the additional deepening (54 to 81 feet) of the CCSC from the Port Aransas jetties to Harbor Island, Harbor Island Terminal and Bluewater Deepwater Port as well as existing facilities like Moda Midstream, South Texas Gateway, Lydia Ann Channel Moorings, City of Port Aransas Marina, and the Port Aransas Ferry will increase the transit volume of ships utilizing the CCSC.

Since the CCSC is used by ships entering from the Gulf of Mexico (Blue-water) as well as ships/barges using the Gulf Intracoastal Waterway (GIWW, Brown-water) it is essential for coordination between the groups to ensure safe navigation of all vessels. A symposium between the blue-water and brown-water groups typically occurs once a year. However, due to Covid-19 disruptions, the 2020 and 2021 symposiums were canceled. With the help of CBBEP funding in 2022, the Symposium was held once again in August 2022. The August 2022 Symposium proved to be a successful event and stressed the need for yearly discussions between the two groups.

With the proposed CCSC changes and the local industrial expansion, a meeting between groups is in the best interests of the shipping industry and the local communities. The symposium offers new Deputy Pilots with under two-years of training the opportunity to gain information and experience from more experienced staff. Past symposiums have provided discussion and real-life examples of recent ship/barge contact, CCSC hot spots or chokepoints, communication standards, infrastructure development (barge shelves & wider channel), and open discussion on concerns or suggestions.

Project Objectives:

The objective of this project is to help facilitate a dialogue and build relationships between the professionals who work on the waters of Corpus Christi and to address waterways issues with the aim of improving communications, trust, safety, and general knowledge among blue- and brown-water operators. The project will accomplish this objective by providing (1) site to host the free, one-day Blue-water/Brown-water Symposium, (2) facilitator fees, and (3) lunch for all attendees.

PROJECT #2444 Packery Flats Habitat & Public Access Enhancements

Performing Organization: Coastal Bend Bays & Estuaries Program
Total Project Cost: \$36,000
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2, TR 1.2

Background:

Nestled on the backside of Mustang Island adjacent to Packery Channel, Packery Flats Coastal Habitat is a well-known gem with lots to offer in terms of public access to coastal areas. The 1,000-acre protected area boasts extensive intertidal habitats that are heavily utilized by fish and wildlife and has many features that are appealing to passive recreation. Previous enhancement efforts by the Coastal Bend Bays & Estuaries Program (CBBEP) resulted in debris and trash cleanups, interpretive signage, and a bollard and cable system to delineate the roadside and parking area boundaries. The current bollard system was initially installed in the early 2000's and repairs were made in 2014; however, increased usage of the area over time has led to its deterioration. A recent increase in the popularity of the Packery Flats Coastal Habitat area has prompted CBBEP to prioritize additional improvements.

CBBEP will use CMP Cycle 27 funds to replace missing and damaged portions of the vehicular barrier (bollards), install signage, and perform minor repairs to two parking areas and one public access trail. CBBEP will replace the cable from the vehicle barrier with additional bollards and replace the damaged bollards. CBBEP will use a natural aggregate road base material to repair the Packery Flats Trail, the Packery Flats Parking Lot, and Kate's Hole Access & Parking Lot found within the Packery Flats Coastal Habitat area. CBBEP will also develop and install signage reminding users to keep vehicles out of sensitive habitat areas and to be good stewards of the area by not littering and "pack out what you pack in."

This project will provide greater ease of parking for an outing to Packery Flats Coastal Habitat. The restoration/enhancement of the access trail will aid in the ease of accessing coastal flats for recreational fishing, bird watching, and nature viewing. Overall, this project will provide enhanced access to coastal areas along with adding features that will protect the sensitive habitat areas found within the Packery Flats Coastal Habitat.

Project Objectives:

1. Perform assessment of existing bollard and cable line along HWY 361.
2. Remove and replace damaged, missing, or deteriorated bollards..
3. Add material to existing parking areas and Packery Flats Trail to address potholes and any erosion.
4. Install educational and instructional signage.

PROJECT #2445 Oso Bay/Oso Creek Watershed Outreach & Education - Classroom Visits

Performing Organization: Nueces River Authority
Total Project Cost: \$15,000
Bays Plan, 2nd Ed. Actions: PEO 1.1, WSQ 1.1, NPS 1.5, BD 1.1

Background:

In FY2022 and FY2023, the Nueces River Authority (NRA), with support from CBBEP, delivered a watershed education program to 5th grade students in the Oso Bay/Oso Creek watershed. With the success of this program and continued demand from area schools, the NRA successfully secured external funding to continue and expand this program to 5 school districts in the Coastal Bend in FY2024. As a result, all 5th graders attending public school in the Oso watershed and Corpus Christi area will receive this watershed programming in FY2024. To successfully reach all 5th grade students in the Corpus Christi region and Oso watershed, this project will deliver the watershed education program to eighteen private and charter schools in the Coastal Bend.

This project will increase public understanding and stewardship of coastal bend resources, improve water quality, reduce debris reaching the bay, and improve the quality of stormwater runoff. The classroom education program uses a scaled relief model of the Oso or Nueces Basin – as applicable, TEKS aligned science curriculum, and other hands-on activities to show students how pollutants enter and contaminate rivers, bays, and aquifers and how everyone can help protect and conserve water resources. Students are also encouraged to become personally responsible for keeping our water clean through the Up2U water conservation and litter prevention campaign. The curriculum reinforces 5th-grade Texas Essential Knowledge and Skills and cultivates student understanding of our water resources, including watersheds and river basins. These hands-on lessons help students see where their water comes from and where it goes. Participants can identify where they live on the model and see how their activities impact the health of the water resources in their watershed and beyond.

Project Objectives:

Deliver watershed education curriculum using previously developed watershed models to 5th grade students at 18 private and charter schools in the Coastal Bend.

PROJECT #2446 Landowner Outreach in the Baffin Bay Watershed – Phase II

Performing Organization: Harte Research Institute at Texas A&M University – Corpus Christi
Total Project Cost: \$7,000
Bays Plan, 2nd Ed. Actions: FW 1.1, WSQ 1.1, PEO 1.1, NPS 1.5

Background:

Baffin Bay is undergoing significant eutrophication, as exemplified by a long-term increase in nitrogen and phosphorus loads and chlorophyll-a concentrations that have exceeded state criteria for nearly the past decade. As a result, prolonged harmful algal blooms, episodic periods of hypoxia, and fish kills have become more frequent over the past several decades. Two of the creeks that flow into Baffin Bay, Petronila and San Fernando Creeks, have documented water quality impairments and preliminary data suggests that the third tributary, Los Olmos Creek, is also experiencing degraded water quality.

To begin to address these concerns and improve the quality of water flowing from the watershed into Baffin Bay, stakeholders developed the Petronila and San Fernando Creek Watershed Protection Plan (WPP). This plan identifies a variety of measures and best management practices (BMPs) to be employed on a voluntary basis which will help improve the water quality in the watershed. Additionally, CBBEP and the Harte Research Institute at Texas A&M University – Corpus Christi, with the support of the Texas by Nature Conservation Wrangler Program, have developed the Bringing Baffin Back initiative to help bring further attention and resources to the watershed.

However, there is a continued need to inform private landowners in the watershed of the issues facing Baffin Bay, what is being done, and what they can do to help. Additionally, resources, contact information for resource managers need to be consolidated and shared with those landowners to assist those willing to implement BMPs on their land and to identify restoration opportunities. As part of this project, four rounds of mailers will be sent to landowners in the Baffin Bay watershed to inform residents of ongoing initiatives and opportunities, promote management measures identified in the WPP, and promote participation in the Baffin Bay Stakeholder Group.

Project Objectives:

Distribute informational mailers to residents in the Baffin Bay watershed to support and promote management measures identified in the San Fernando and Petronila Creek Watershed Protection Plan, share resources and contacts for the implementation of those management measures, and promote involvement in the Baffin Bay Stakeholder Group.

PROJECT #2447 OSSF Assistance Program – Refugio County

Performing Organization: Nueces River Authority
Total Project Cost: \$157,871
Bays Plan, 2nd Ed. Actions: NPS 1.3

Background:

On-site Sewage Facilities (OSSFs) are used to treat wastewater where centralized Wastewater Treatment Facilities (WWTFs) are not available. Conventional systems use a septic tank and gravity-fed drain field that separates solids from wastewater prior to its distribution into the soil where treatment occurs. However, in many coastal watersheds, the soils are considered very limited, which means conventional septic tank systems are not suitable for the proper treatment of household wastewater. In these areas, advanced treatment systems, most commonly aerobic treatment units, are suitable alternative options for treatment. While advanced treatment systems are highly effective, operation and maintenance needs for these systems are rigorous compared to conventional septic systems. Limited awareness and lack of maintenance can lead to system failures.

Unlike pollution from industrial and sewage treatment plants, nonpoint source (NPS) pollution comes from many diffuse sources. Rain events create runoff which picks up human-made and/or natural pollutants and transports them into water bodies. Failing or non-existent OSSFs can produce significant bacteria and nutrient loading into the watershed in the form of NPS pollution.

Factors contributing to OSSF failure include improper system design or selection, improper operation and maintenance, and lack of financial resources for proper maintenance. There are numerous areas within the Coastal Bend where poorly functioning OSSFs are believed to be contributing bacteria and nutrients to receiving waterbodies. Many of these OSSFs were installed before regulations existed and may not have been designed for full-time dwelling occupancy. A program that offers pump-out and inspection followed by repair or replacement where needed, at no cost to the owner, is a proven way to address this problem. This strategy is especially important when working in underserved communities with limited resources.

Areas of Refugio County are believed to be contributing bacteria and nutrients to their waterbodies from poorly functioning On-Site Sewer Facilities (OSSFs). Many of these OSSFs were installed before regulations existed and were not properly designed. A program that offers pump-out and inspection followed by repair or replacement where needed, at no cost to the owner, is a proven way to address this problem. This strategy is essential when working in underserved communities.

Project Objectives:

Address nutrient and bacteria problems in targeted watersheds by inspecting, repairing, and/or replacing up to eight (8) OSSFs in Refugio County that are failing or non-existent, focusing on underserved communities with limited resources.

PROJECT #2448 Newcomb Marsh Shoreline Protection - Phase II

Performing Organization: Texas Parks & Wildlife Department
Total Project Cost: \$43,000
Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 1.2

Background:

TPWD and several conservation partners, including CBBEP, own and manage properties on the eastern shore of Copano Bay in an area known as Newcomb Point. Estuarine emergent marsh and adjacent uplands in this area are known wintering habitat for the federally-endangered Whooping Crane, which has led to this area being prioritized for conservation by numerous partners. Estuarine emergent marsh at Newcomb Point also provides high quality nursery and foraging habitat for fish and other wildlife, many of which are commercially and recreationally important.

Erosion and marsh habitat loss in the Newcomb Point area have increased lately. Since 1995, an estimated 50 to 120 feet of shoreline have eroded and an unquantified, but significant number of acres of marsh, have been converted to open water. This is likely due to a combination of factors, including dredging and removal of oysters immediately offshore, reduced sediment availability in the Copano Bay system, subsidence from drought and mineral extraction, sea level rise, and most recently Hurricane Harvey which passed directly over this site.

A comparison of aerial imagery from 1995 to 2020 indicates that in some areas, in particular the south shore of Newcomb Point, as much as 50-75% of the emergent marsh has been converted to open water. Analysis of aerial imagery before and after Hurricane Harvey indicates that an estimated 20-30 feet of shoreline erosion occurred from January 2017 to January 2020, and shoreline breaches into the marsh increased from four to twelve. Numerous breaches into the marsh allow greater wave energy and currents into the area accelerating marsh loss. At the current rate, it is conceivable that the shoreline on the south shore will completely break down within the next five years resulting in complete loss of the point and numerous acres of marsh habitat.

TPWD is proposing to install a living shoreline or structure that would protect the eroding shoreline and approximately 280 acres of marsh habitat at Newcomb Point. The project will be conducted in multiple phases. Phase I is currently underway and includes alternatives analysis, engineering, design, and permitting for structural and non- structural methods for conservation and restoration of the shoreline and marsh habitat. This project will provide funds towards Phase II which includes final design of the living shoreline or structure.

Project Objectives:

The objective of this project is to continue efforts to conserve and restore the shoreline, emergent marsh, and associated nearshore and upland habitat, and wildlife dependent upon this habitat at Newcomb Marsh in Copano Bay.

PROJECT #2449 CBBEP Coastal Bird Program – General Support

Performing Organization: Coastal Bend Bays & Estuaries Program

Total Project Cost: \$40,000

Bays Plan, 2nd Ed. Actions: CB 1.1, CB 1.2

Background:

The Coastal Bird Program at the Coastal Bend Bays & Estuaries Program is working to conserve coastal birds and their habitats on the Texas coast by identifying and addressing conservation needs through on-the-ground management, monitoring, research, and education/outreach. Prompted by declines in heron, egret, pelican, and other colonial waterbird populations, the Program was originally conceived to halt these declines and restore waterbird populations. Through partnerships with agencies, universities, conservation organizations, and a network of citizen scientists and volunteers, the Coastal Bird Program has expanded its work to include a wider array of coastal bird species and habitats, opening up new opportunities for collaboration and funding and building capacity to contribute to coastal bird conservation.

Project Objectives:

Contributions from Conoco Phillips will be used to support the ongoing work of CBBEP's Coastal Bird Program.

PROJECT #2450 Matagorda Island Invasive Species Control

Performing Organization: Coastal Bend Bays & Estuaries Program

Total Project Cost: \$20,000

Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 2.6

Background:

CBBEP has an established history of partnering with the United States Fish and Wildlife Service to enhance habitats on both private and public lands. In this project CBBEP will enter into a contractual agreement for the treatment and removal of invasive species at the Aransas National Wildlife Refuge (ANWR). Efforts will focus on the treatment of Chinese tallow, salt cedar, and bamboo on Matagorda Island. CBBEP staff will coordinate with ANWR staff to identify the targeted locations for the aerial treatment. Outcomes of the project include an increase in the quality and function of habitat that is no longer being impaired by non-native invasive species. The project will also strengthen and expand the existing partnership established between CBBEP and ANWR for habitat management efforts.

Project Objectives:

The objective of the project is to work in collaboration with ANWR to control invasive vegetation on Matagorda Island through aerial application of herbicide.

PROJECT #2451 Matagorda Island Gulf Shoreline Erosion and Pass Cavallo Exchange Restoration

Performing Organization: Coastal Bend Bays & Estuaries Program

Total Project Cost: \$20,000

Bays Plan, 2nd Ed. Actions: HLR 1.1, HLR 2.6

Background:

Aransas National Wildlife Refuge (ANWR) staff have identified a range of issues on ANWR's federal lands, including approximately 10 miles of Gulf shoreline erosion. The Matagorda Island Gulf Shoreline Erosion and Pass Cavallo Exchange Restoration project includes the development of engineering and design solutions for shoreline stabilization to address accelerating erosion of Gulf beach and dune habitat. Stabilizing the shoreline and dune system has great potential to attenuate storm surge and damaging waves that would otherwise continue degrading the shoreline. Preventing erosion of the shoreline and dunes can improve habitat, maintain recreational opportunities, and protect the mainland shoreline and communities.

CBBEP will collaborate closely with ANWR staff to complete the proposed project. The project will consist of a feasibility study, alternatives analysis, preliminary engineering, budget estimation, and permitting work for shoreline stabilization of the Gulf Shorelines of Matagorda Island and the J-Hook area near Pass Cavallo. The project will require coordination with other partners and agencies that have interests in the ANWR and adjacent land and waters. CBBEP will contract with an engineering firm to complete the items listed above. A qualified engineering firm will be selected from CBBEP's list of pre-qualified engineering firms.

Project Objectives:

1. Contract with a qualified engineering firm to develop engineering and design solutions for a 10-mile stretch of eroding Gulf Beach shoreline and dune habitat on Matagorda Island.
2. Contract with a qualified engineering firm to develop engineering and design solutions for the severe erosion occurring in the "J Hook" area of Matagorda Island, near Pass Cavallo.