Living on the Edge
Protecting Our Bays and Estuaries

Coastal Bend Bays & Estuaries Program

FY 2008 Comprehensive Annual Work Plan

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COASTAL BEND BAYS & ESTUARIES PROGRAM

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I. Introduction

History

In its 1987 reauthorization of the Water Quality Act, the U.S. Congress established the National Estuary Program (NEP) to promote long-term planning and management of nationally significant estuaries threatened by pollution, development, or overuse. The Administrator of the Environmental Protection Agency (EPA) was given authority to convene Management Conferences and to award Federal financial assistance grants to approved state programs for the purpose of developing and implementing a CCMP. The Act defines criteria by which Management Conferees are charged with balancing the conflicting uses in target estuaries, while restoring or maintaining their natural character.

The Coastal Bend Bays & Estuaries Program (formerly the Corpus Christi Bay National Estuary Program) was formally established in October 1992 with committee meetings beginning in late 1993. The CBBEP was one of the first NEPs to use a streamlined approach to the development of a CCMP. The goal of the CBBEP to complete a Preliminary CCMP within 12 to 18 months (from 09/01/94) and a Final CCMP in approximately four years (by September 1998) was achieved.

A State-EPA Management Conference Agreement detailing this and other specific outputs of the four-year program was signed in May 1994 by the Regional Administrator of the EPA and the Chairman of the State-lead agency for the Program, the Texas Natural Resource Conservation Commission (now the Texas Commission on Environmental Quality - TCEQ). The Program Office had been established as a program of the TNRCC since December 1993. In 1999, CBBEP became a non-profit organization to lead implementation.

CBBEP Operations

The project area encompasses the estuarine environment of 75 miles of the south-central Texas coastline, and includes the 12 counties of the region known as the Texas Coastal Bend. This 514 square mile area of water includes all bays, estuaries, and bayous in the Copano, Aransas, Corpus Christi, Nueces, Baffin, and upper Laguna Madre bay systems, which together represent three of the seven major Texas estuaries.

The Priority Issues for the CBBEP are:

- Alteration of Freshwater Inflow into Bays and Estuaries
- Condition of Living Resources
- Loss of Wetlands and Estuarine Habitats
- Degradation of Water Quality
- Altered Estuarine Circulation
- Bay Debris
- Selected Public Health Issues

The *Coastal Bend Bays Plan* has been developed to address each of these priority issues under the following categories of action plans: Human Uses; Maritime Commerce and Dredging; Habitat and Living Resources; Water and Sediment Quality; Freshwater Resources; and Public Education and Outreach. The projects selected for implementation reflect a combination of priority and readiness or feasibility for implementation. Implementing Partners for other actions

of the *Bays Plan* will likewise be called upon to begin and continue to implement their own portions of the *Plan*. The role of Program staff is multi-faceted, but will include at a minimum the following tasks: (1) acquire, manage, and disperse funds to implement the *Bays Plan*; (2) develop and implement partnership projects with local governments, state and federal agencies, and private organizations; (3) monitor, track, and report on implementation performance by implementing partners, and work to maintain implementation commitments; and (4) coordinate the environmental monitoring and assessment of Plan implementation effectiveness.

Work Plan Development

The FY 2008 Comprehensive Work Plan will allow the CBBEP to continue the implementation of the *Coastal Bend Bays Plan.* This Work Plan describes implementation projects and administrative support that will be undertaken pending approval and receipt of funds by the funding entities.

All data and information produced under the auspices of the CBBEP will adhere to standardized formats and be made publicly accessible. A public participation strategy, refined under the 'public education and outreach' chapter of the *Bays Plan*, will continue to guide public participation efforts in Comprehensive Conservation and Management Plan (CCMP) implementation. The list of Priority Issues, refined through public input and characterization projects will continue to serve as the focus for implementation.

II. Starting Date

The starting date for this FY 2008 Comprehensive Work Plan will be September 1, 2007.

III. Federal and State Program Coordinators and Project Officers

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IV. Accomplishments To Date

The CBBEP achieved its primary goal for FY 2008, which was to continue the successful initiation and completion of projects developed to implement the *Coastal Bend Bays Plan*. The Program and its partners achieved programmatic progress on 94 percent of CCMP actions. Action-specific environmental progress directly attributed to CBBEP activities has resulted in thousands of acres of restored or protected habitat. The Program's success in leveraging funds for CBBEP projects has also been noteworthy. Broad support for the Program's activities is evidenced by the range of contributors, including local governments, industries, NGOs and state and federal agencies. The CBBEP Estuary Council has not made any changes in the priorities as listed in the CCMP.

All project deliverables identified during the FY 1999 through FY 2004 implementation years have been completed. FY 2005 through FY 2006 projects are expected to be complete by August 31, 2008. FY 2007 projects are expected to be completed by August 31, 2009.

The Estuary Council committees have undergone restructuring to better focus on particular subject areas. The new structure includes five distinct implementation teams. These teams continue to identify, initiate and select project ideas for inclusion in the Program work plans. The teams are: Habitat & Living Resources, Human Uses Team; Maritime Commerce and Dredging Team; Water & Sediment Quality Team; and Environmental Education & Outreach Team. The Bays Plan Coordination Team, consisting of all the chairs of the Implementation Teams and key members of the Bays Council, coordinates the annual work plan recommendations to the CBBEP Bays Council, and reviews and proposes update recommendations to the *Bays Plan.*

In FY 2007 the CBBEP initiated numerous projects funded by various state, federal and local support. The following brief discussion highlights several of these projects.

Learning on the Edge (LOTE) - CBBEP hosted another successful year of the *Coastal Bend Environmental Science: Learning on the Edge (LOTE)* project. Last year, a grant provided by the Coastal Bend community Foundation facilitated the initial *LOTE* establishment and partnership with the Coastal Bend Wildlife Photo Contest, Texas A&M University – Corpus Christi, and the Texas State Aquarium. *LOTE* provides local educators with a greater understanding of the environmental treasures in the Coastal Bend region. In FY 2007, 30 elementary teachers from 15 area schools attended one of the week-long summer teacher academies held during the first two weeks of June.

Port Aransas Nature Preserve – A $6.35 million effort is being undertaken by CBBEP and its partners to protect the Port Aransas Nature Preserve from severe erosion. According to a Bureau of Economic Geology report prepared for the Texas General Land Office (GLO), erosion in this area claims approximately 17 feet of land per year. This project utilizes erosion control structures adjacent to the Corpus Christi Ship Channel near Piper Channel to insure the long-term protection of the area. Dedicated funds were secured from each of the CBBEP partners: $2.9 million from National Oceanic and Atmospheric Administration (NOAA), $2 million from GLO, $1.2 million from Airport and Channel Corporation and $250 thousand from the City of Port Aransas and Cheniere Energy. Overall, more than 1,000 acres of wetlands and associated upland habitat will be protected from severe erosion.

Colonial Waterbird / Avian Resources Project –CBBEP's Colonial Waterbird project has been ongoing in the Coastal Bend for the last seven years to halt or reverse declines in water-

bird populations. The main focus of the effort is on improving and managing bird nesting habitats, considered a critical limiting factor in their recovery. During non-breeding seasons (roughly September through February), project staff work to improve habitat on islands by manipulating existing vegetation and planting hardy native brush species which will provide good nesting structure in the future. One conspicuous and effective component in the area is the nesting platforms that have been installed on islands in Nueces Bay, Upper Laguna Madre, Aransas Bay, and Salt Lake near Rockport. These structures have been successful in attracting nesting Great Blue Herons. Observations revealed that platform use and nesting success is very high. Once native vegetation has grown and can provide suitable nesting structure, the platforms may be removed.

V. Goals for FY 2008

The overarching goal for FY 2008 is to continue the successful implementation of the *Coastal Bend Bays Plan.* The CBBEP is continuing to focus on core Clean Water Act Priorities with funds under the management of the CBBEP.

This year the CBBEP is proposing to focus funding in five priority areas: protection and restoration of wetlands and associated wildlife habitat, working with teachers to provide locally based environmental science curriculum, colonial waterbird habitat management, continuation of our ongoing public education and outreach efforts.

Wetland protection and restoration will be addressed by a project working on the loss of wetlands along the Matagorda Island shoreline and by a project to control invasive species along the Matagorda Island levees.

The CBBEP will continue its efforts to protect and restore colonial waterbird populations through our efforts to actively manage nesting habitat for species of concern. These efforts include vegetation and substrate management, predator control – including fire ants, coyotes, raccoons, etc, and the placement of nesting platforms for species such as Great Blue Heron and Reddish Egret.

The continued implementation of our public outreach and education strategy through an assortment of projects including the C*oastal Bend Environment Science: Learning on the Edge* project and the development of the Seagrass Protection Media Campaign.

Further development and refinement of Environmental Indicators will be a priority goal for CBBEP staff and Implementation Teams.

VI. Implementation of Projects

Project activities for FY 2008 have been selected for their contribution towards implementation of the *Coastal Bend Bays Plan*. Twenty-six projects will be implemented in FY 2008. A comprehensive list of projects outlining project numbers, titles, action items, performing party(s), and budget can be found in Table 1: FY 2008 Comprehensive Annual Work Plan Outline.

VII. Project Deliverables/Schedule

Specific project deliverables and schedules for completion are to be negotiated with the sub-contractor of the project and will be included in the scope of work of the project contract. The

project contract and any amendments will be subject to review by funding entities and are incorporated into this annual work plan by reference.

Project #0801 Little Bay Seagrass Pilot Project

Performing Organization: **City of Rockport**
Total Project Funding: **$12,732**
CBBEP Bays Plan Actions: **HLR-1, HLR-2**

The purpose of this project is to develop and implement a low cost seagrass coverage pilot project in Little Bay in order to identify the cause of a significant reduction in seagrass within the bay.

The City of Rockport and residents have been concerned over the past several years about the significant decline of seagrasses found in Little Bay, which is a small enclosed bay near downtown Rockport. In 1959, Little Bay was dredged for a development known as Key Allegro. Dredging confined the natural circulation to the bay by creating a road/beach between Aransas Bay and Little Bay where a natural flow through for high tides previously existed. Since the confining of Little Bay in the 1950's, there has been more commercial and residential areas being developed, the area has seen an increase in drainage projects, and in the past few years there have been abnormal weather patterns such as long droughts followed by heavy rains, and hot temperatures which may have stressed the bay causing the loss of seagrasses.

Reviews of aerial photography from the 1950's to early 2007 reveal a fluctuation in seagrass coverage has occurred, from dense in some years to almost non-existent in others. It is anticipated that by creating a seagrass pilot project that analysis both physical and chemical aspects of the seagrass in Little Bay, that the source of the loss of seagrass can be established and hopefully avoided in the future.

Seagrass test plots will be planted by a contractor specialized in this field and pre and post monitoring will be performed by a separate party. CBBEP will be partnering with the City of Rockport and funding the planting portion of the project, while another partner will be contributing funds to the pre and post monitoring.

Project Objective:

In partnership with the City of Rockport and TPWD, create ten to twelve 10'x10' test plots around Little Bay to help speed up seagrass recovery and identify any potential problems inhibiting seagrass growth.

Project #0802 Matagorda Island Marsh Restoration (Implementation)

Performing Organization: **Aransas National Wildlife Refuge**
Total Project Funding: **$250,000**
CBBEP Bays Plan Actions: **HLR-2**

Recently, the Coastal Bend Bays and Estuaries Program began work to assist in restoring large areas of coastal salt marsh on the southern end of Matagorda Island. Matagorda Island encompasses 56,668 acres, is 38 miles long and is located approximately six miles off the Texas central coast between the cities of Port O'Connor and Fulton. Matagorda Island has historically been used as a bombing range and for beef cattle production. Currently most of the Island makes up Matagorda Island National Wildlife Refuge. However, the Texas General Land Office owns much of the intertidal marsh on the southwestern side of the island adjacent to Mesquite Bay.

Habitats found on Matagorda Island include gulf beach and low dunes on the eastern shoreline, coastal prairie with freshwater emergent marshes in the interior, and an estimated 15,000 acres of intertidal estuarine emergent marshes on the southwestern boundary. In the 1950's large portions of the estuarine marsh were sectioned off with constructed levees so that they could be drained for cattle production. The area remained in this condition until the late 1970's when several dozens culverts where installed to restore natural hydrology to the sectioned off marsh areas. Since that time, many of these culverts have collapsed or have become clogged so that tidal exchange in the marsh has been restricted or eliminated.

Over the past two years numerous partners including the U.S. Fish and Wildlife Service Coastal Program, Aransas NWR, Friends of Aransas and Matagorda Island National Wildlife Texas Parks and Wildlife Department, Fish America, Tivoli ISD and others have undertaken restoration actions to replace or install culverts in areas of obvious constrictions. In the FY 2007 The Coastal Bend Bays and Estuaries Program allocated $100,000.00 to the Matagorda Marsh Restoration Project for engineering a management plan that will help guide the restoration effort in an efficient and effective manner. The first phase of this adaptive management plan will be completed by the end of Summer 2008.

Project Objective:

This project will restore 2,000+ acres of coastal marsh and adjacent habitat by implementing restoration actions at multiple sites throughout Matagorda Island's Western Marsh. Identified priority sites include Darkwater Levee, Triple Culvert, Mullet Pass, and Inner Levee. Additional sites will be identified by the above-mentioned adaptive management plan.

Project #0803 CBBEP Colonial Waterbird Management Project

Performing Organization: **CBBEP**
Total Project Funding: **$175,000**
CBBEP Bays Plan Actions: **HLR-1, HLR-4**

The Living Resources Characterization Report prepared for the Estuary Program documented the declining populations of certain colonial waterbird populations. Some species of colonial waterbird have experience a 90% reduction in breeding pairs since the 1960's. Colonial waterbird populations are indicators of the overall health of the estuary. Bird watching, especially viewing colonial waterbirds, is an important and growing component of ecotourism and the local economy.

Building on the efforts of the CBBEP Colonial Waterbird projects in previous years, this project will continue the implementation of specific management actions of the CBBEP Colonial Waterbird Rookery Island Management Plan. Management actions will include efforts to reduce human-disturbance, nesting substrate management, vegetation management to enhance rookery island habitat, and predator control where necessary. Outreach will continue to be a crucial component in achieving project objectives.

Project Objectives:

1. Continue efforts on enhancement and construction of nesting habitat.
2. Continue to promote public programs to protect colonial waterbirds.
3. Monitoring of Colonial Waterbird populations.
4. Install signage to reduce impacts of human disturbance on waterbird colonies.
5. Management of predator control efforts.

Project #0804 Coastal Bend Environmental Science: *Learning on the Edge*

Performing Organization: **CBBEP**
Total Project Funding: **$93,500**
CBBEP Bays Plan Actions: **BTR-1, PEO-2, PEO-3, PEO-5**

The CBBEP's Environmental Education & Outreach Implementation Team (EEOIT) identified challenges that teachers face with the Texas Education Agency (TEA) and Texas Essential Knowledge and Skills (TEKS) state requirements, communicating directly with teachers, and how elementary teachers are disadvantaged compared to high school teachers. The team understands how vital an Environmental Educator is and needed to assist teachers in the CBBEP's 12-county area.

Coastal Bend Environmental Science: Learning on the Edge (LOTE) will continue to work on the following goals:

Summer Teacher Workshops
The CBBEP will deliver a locally based environmental science curriculum to area teachers by integrating some of the Program's well-regarded science education programs. Teachers will learn the curriculum in an interactive manner, designed to go beyond what conventional textbooks and TEKS currently provide, so that they can see the actual presentation of the material with real students. Grades 3-5 will be targeted to support preparation for the state-mandated TEKS assessment in Grade 5.

In-classroom Curriculum Instruction during the School Year
This project will address the gap that exists between the delivery and implementation of new curriculum by teachers. Follow-up visits to assist teachers further with implementation of the curriculum in their classrooms would be conducted throughout the school year by the Environmental Educator. Coordinated field trips to area sites will provide hands-on experiences in the local environment. Education partners will coordinate with the Educator to provide in-class curriculum instruction and implementation.

2007 Summer Teacher Academy Follow-up
The Environmental Educator will schedule follow-up visits throughout the school year to help team-teach with the teachers who completed the 2007 Summer Teacher Academy.

Project Objective:

Teachers in the community will have increased knowledge, skills and resources to more effectively teach science in local schools as measured by teacher reported implementation of new techniques in classrooms.

Project #0805 CBBEP Habitat Protection Media Campaign

Performing Organization: **CBBEP**
Total Project Funding: **$35,000**
CBBEP Bays Plan Actions: **PEO-1, PEO-2, PEO-3, PEO-5, BTR-1**

Public outreach continues to be a key element of the CBBEP to educate Coastal Bend residents about the importance of bays and estuaries to their communities. The CBBEP will utilize local, and regional media, which includes television, radio, print, and websites, to implement the goals of the CBBEP Public Outreach Strategy.

The priority issues for this media campaign as identified in the *Coastal Bend Bays Plan* are:
- Seagrass Protection Campaign
- Altered Freshwater Inflow Into Bays and Estuaries
- Non-point Source Pollution
- Loss of Wetlands and Estuarine Habitats
- Degradation of Water Quality
- Condition of Living Resources
- Altered Estuarine Circulation
- Public Health Issues

Some or all of the priority issues listed above will be considered for public outreach through media.

Project Objective:

To use the media to provide the public with the environmental science knowledge to make sound decisions regarding the effective management of bay resources and to promote environmental stewardship through increasing awareness of the resources and the issues regarding their use.

Project #0806 Kritters 4 Kids

Performing Organization: **Coastal Bend Wildlife Photo Contest**
Total Project Funding: **$21,000**
CBBEP Bays Plan Actions: **PEO-3, PEO-5, HLR-2, HLR-4, HLR-7**

Over the past two years, the Coastal Bend Wildlife Photo Contest has successfully received funding to provide *Kritters 4 Kids (K4K)* in over 100 schools across the Coastal Bend. *K4K* is underwritten by conscientious charitable organizations, like the CBBEP, who find value in educating school children about preserving our environment and protecting our animals and plant life. *K4K's* 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.

Kritters 4 Kids combines the Wildlife in Focus photography books with a specially designed science curriculum guide to educate school children and teachers across South Texas about the local ecology. The science program explores and enlightens youth about the diversity of South Texas and the importance of conserving and protecting wildlife and habitat. This unique program educates our children, many of whom have seldom been to Corpus Christi Bay, by showing them the vastness and variety of wildlife and habitat in the Coastal Bend.

Kritters 4 Kids provides a set of 25 books for the classroom and a curricula resource guide for the teachers to be used in the classroom. Participating elementary and middle schools selected will be in the CBBEP's 12-county area. *K4K* meets the Texas Essential Knowledge and Skills Guidelines (TEKS) and has been developed by a teacher, for teachers. The program is taught by the science or biology teacher in grade levels K-5 and Grades 6-8 using two separate curriculum guides.

Students will be pre- and post- tested on basic land and wildlife concepts. Teachers will also be evaluated. At mid-semester, the Coastal Bend Wildlife Habitat Education Program will follow up with each teacher to assess the progress of the program and to see if any additional training or resources are needed.

New this year, is a full day of science coordinated programs utilizing local environmental education resources called "Science Day". This program has been established to bring the "field trip" experience to the schools at no cost to them. The CBWPC has coordinated three Science Day Pilot Programs which are resulting in requests from other schools.

Project Objectives:

1. Select 10 target schools within the CBBEP area.
2. 250 books and 10 curriculum guides will be delivered to CBBEP selected schools.
3. Follow-up visits after the book deliveries to the 10 selected schools.
4. Conduct 2 teacher training sessions and provide the 10 schools with workshop materials.
5. Conduct 2 Science Days at selected schools.
6. Continue to seek matching funds.

Project: #0807 Invasive Species Control - Matagorda Island Levees

Performing Organization: **Aransas National Wildlife Refuge**
Total Project Funding: **$34,000**
CBBEP Bays Plan Actions: **HLR-2**

Matagorda Island is composed of several habitat types such as Gulf beach and low dunes on the eastern shoreline, coastal prairie with freshwater emergent marshes in the interior, and an estimated 15,000 acres of intertidal estuarine emergent marshes on the western boundary. In the 1960's large sections of the 15,000 acres estuarine marsh were sectioned off with constructed levees, drained and put into cattle production. These levees not only enabled the marsh to be drained, they also provided the means for several species of invasive grasses and shrubs to spread deep into the marsh. To this day these levees continue to function as vectors for the spread of invasive plants. Impacts associated with the spread of invasive plants within the marsh include: (I) critical habitat loss of the federally endangered whooping crane and federally threatened piping plover, (2) negative shifts in flora composition from a native salt marsh community to a stands of invasive grasses and shrubs, (3) increased predation on status species as a result of artificially dense hiding and perching sites.

Invasive grass or brush species encountered within the treatment zone will be mapped and treated according to species, location, and density. Targeted grass species invading the western marsh include King Ranch bluestem, Johnson grass, and coastal Bermuda grass. King Ranch bluestem and Johnson grass can be aggressive invaders; however within the western marsh salt water inundation limits them to the levees. Unfortunately, coastal Bermuda grass is much better adapted to salt water inundation and has spread from the levees into the marsh. Coastal Bermuda grass is classified as a major threat to the overall ecological health of the western marsh on Matagorda Island.

Project Objectives:

1. Reclaim and treat 207.5 acres through the eradication of invasive plants within the treatment area, and
2. Reduce predator pressure on the endangered whooping crane and the threatened piping plover.

Project #0808 Keepers of the Coast

Performing Organization: **Texas State Aquarium**
Total Project Funding: **$10,000**
CBBEP Bays Plan Actions: **PEO-3, PEO-5**

The Texas State Aquarium's *Keepers of the Coast* was developed to address Action Items included in the *Coastal Bend Bays Plan* and needs identified in elementary science instruction. Traditionally, the average elementary classroom received very little science instruction. In 2003, the Texas Education Agency implemented a first-ever elementary science test, administered at Grade 5. The changes in the standards increase the need for science and math skills for educators at the elementary level. The need for sustained instruction across grade levels is intensified by the new middle school science test which will be administered in Spring 2008

KOTC was developed as a multi-component, multi-grade level program to offer sustained, targeted instruction for area schools. It was successfully implemented in FY2001 and originally targeted grades 3, 5, 6, and 8. Concepts introduced in lower grades form the foundation of the program, and are progressively built upon as students advance into middle school (properties of water, water conservation, wetlands, watersheds, water quality). KOTC now involves all students in grades 3-8.

KOTC emphasizes the connection among inland environments, coastal waters, and the Gulf of Mexico. Participating districts are distributed across the CBBEP project area and include coastal and inland communities: Alice, Aransas Pass, Benavides, Ingleside, and Woodsboro. School campuses that participate are required to take action to ensure the sustainability of local resources, wetlands, watersheds, and waterways.

KOTC has five main components:

1. Teacher workshops that focus on area watershed and coastal resources.
2. A teacher resource guide that includes background information on water, wetlands, watersheds, and coastal resources; classroom and field activities; support materials for outreach and field trip programs; documentation of support of state education standards; and resources for community projects.
3. Outreach programs that were developed to address CBBEP priority issues.
4. Field trips that include programs that reinforce outreach programs.
5. Community packets that include information from local, state, and federal resources on schoolyard habitats, water use monitoring, water quality monitoring, and habitat cleanups. Continued participation in KOTC is contingent on a school's successful implementation of a community project.

Project Objectives:

1. Conduct teacher training for a minimum of 20 teachers.
2. Provide resource guide to teachers.
3. Conduct outreach for grades 3-8 in five districts (~1,700 students).
4. Conduct field trip programs for grades 3-8 (~1,500 students).
5. Continue to seek matching funds.

Project #0809 CBBEP/Coastal Bend Bays Foundation Community Outreach Partnership

Performing Organization: **Coastal Bend Bays Foundation**
Total Project Funding: **$44,000**
CBBEP Bays Plan Actions: **PEO-1, PEO-2, PEO-3, PEO-4, PEO-5**

The CBBEP is constantly working to promote public/private partnerships as stated in the *Coastal Bend Bays Plan* to help achieve its educational goals. One of the benefits of the partnership between the CBBEP and Coastal Bend Bays Foundation (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 into the public policy debate. The *Bays Plan* calls for continued involvement from CBBF, as the region prepares itself for ever-increasing numbers 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.

The CBBEP will work closely with the CBBF on the project objectives outlined below but will not be limited to only those listed. The environmental education and outreach activities will include: monthly Coastal Issues Forums, bay-resource/related workshops, the Adopt-A-Beach program, the continuation of the Earth Day celebration held in April, and the coordination of the annual CBBF Conservation and Environmental Stewardship Awards. The CBBEP will be acknowledged as one of the major funding partners at the various events and activities.

CBBEP is the most important funding partner for CBBF programs. The CBBF is a public interest organization (non-profit 501(c)(3)) dedicated to the conservation of freshwater and coastal natural resources through communication, advocacy, research and education.

Project Objectives:

1. Host, organize and coordinate turnkey operation of Earth Day festival.
2. Host, organize and coordinate turnkey operation of Adventure Bay at Bayfest.
3. Host, organize and coordinate CBBF Conservation and Environmental Stewardship Annual Awards Banquet.
4. Conduct monthly Coastal Issues Forums to increase communication between resource managers, users and general public.
5. Organize and coordinate Adopt-A-Beach beach clean ups.
6. Organize and coordinate bay-resource/related workshops with CBBEP's approval.
7. Continue to seek matching funds.

Project #0810 Teaching Environmental Science I & II

Performing Organization: **Texas A&M University-Corpus Christi**
Total Project Funding: **$20,000**
CBBEP Bays Plan Actions: **PEO-3**

The Texas Commission on Environmental Quality developed the Teaching Environmental Science (TES) courses to provide balanced information and to promote partnerships among teachers, governmental agencies, businesses, and community organizations. These partnerships serve schools so that students are prepared to take their place as citizens committed to environmental protection, using critical thinking skills in environmental decision-making and career opportunities.

The TES courses at Texas A&M University-Corpus Christi (TAMU-CC) have been taught each summer to area educators since 1994. The courses are a combination of field trips to area industry; interesting lectures by speakers both in industry and government and from environmental groups; field trips to the natural habitats of the Coastal Bend; and scientific testing of environmental factors.

Materials will be ordered for teachers to continue the activities learned in the TES courses with their classes. For TES I teachers we will order discovery scopes and aerators, purchased for earlier grade students to investigate the world around them. For the TES II teachers, water test kits for pH, nitrates, nitrites, dissolved oxygen, and salinity will be purchased and demonstrated in the field. Simple hydrometers will be ordered for TES II teachers and used in the field alongside refractometers. Binoculars, GPS units, and compasses will be provided to both the TES I & II teachers. Both of these will be integrated into the courses and teachers will be seen using them while in the field.

Courses will be taught collaboratively by a faculty member at TAMU-CC and a Master Teacher from area schools. In past years, TES I was taught by Dr. Denise Hill and Master Teacher, Cliff Strain. TES II was taught by Dr. Margaret Bolick, and Master Teacher, Glennis Cunningham. Captain Jay Tarkington, with the Center for Coastal Studies, is an essential supporter, adviser, and presenter for the courses. Teachers will experience a variety of outdoor scientific and educational activities in the vicinity of Corpus Christi, Flour Bluff, Padre Island, and Rockport. Wetland scientist and Captain Jay Tarkington will host the teachers aboard the *Wetland Explorer* where they will see marine, bird, and freshwater habitats. The teachers will paddle kayaks through areas in Rockport and on the north side of Corpus Christi Bay.

Project Objectives:

1. Provide materials and resources for the educators in TES I and II.
2. Recruit and select educators for the course.
3. Provide written materials for each course participant.
4. Teach the class according to the curriculum.
5. Continue to seek matching funds.

Project #0811 Wetland Explorer: Coastal Marsh Discovery Program

Performing Organization: **Center for Coastal Studies - TAMU-CC**
Total Project Funding: **$7,500**
CBBEP Bays Plan Actions: **PEO-1, PEO-3, PEO-5**

The Wetland Explorer Program is designed to give participants an extensive insight into our local coastal marshes by providing them a "hands-on" approach to environmental education. All participants will have a better understanding of the values and functions of local wetlands and the importance they play in our local ecology and economy.

To compliment other programs offered by the Aquatic Education Program at the Center for Coastal Studies Texas A&M University-Corpus Christi, a new "on the water" component has been added. Through a grant from the Ed Rachal Foundation, a 36-foot shallow-water research vessel has been procured, renovated, custom-outfitted, and re-commissioned for this unique endeavor. Providing safe and stable transportation for up to 30 individuals, the R/V Wetland Explorer, a United States Coast Guard-inspected vessel, allows participants an opportunity to venture into our bays and estuaries to observe and learn about the abundance of natural habitats not currently accessible from the classroom. Over 3,000 individuals have been aboard the Explorer and benefited from the material presented.

After having the specific group meet at the dock, a typical trip begins with a short geography lesson to orient the participants to their location along the coast. Particular attention is given to nearby freshwater inputs and their relation to the bays and Gulf of Mexico. Throughout the trip, a trained wetland biologist points out various birds and other species of interest found among the cordgrass and mangrove habitats. The *R/V Wetland Explorer* is easily beached and allows the group to disembark to explore the many small islands found within the bay system. While on the island, the group participates in various activities including seining, water chemistry, and benthic organism identification. Kayak's stored on top of the *R/V Explorer* allow the participants to explore further and see first hand a functioning wetland environment.

In addition, participants will get an overview of the following:

- In-depth discussions on all five species of "Texas seagrasses" that will be observed and identified.
- While on the various islands, participants will be encouraged to take part in an ongoing bay debris removal and education program.
- Participants will observe and examine various creatures from the bay bottom that are brought to the surface by a small otter trawl.

Project Objectives:

1. Provide and organize 10 Wetland Explorer Trips selected by the CBBEP.
2. Distribute pre- and post- tests to participants.
3. Provide travel stipends for school buses.
4. Additional trips can be arranged and customized as directed by the CBBEP.
5. Continue to seek matching funds.

Project #0812 Whitney Lake Marsh Action Plan

Performing Organization: **CBBEP & Keep Ingleside Beautiful**
Total Project Funding: **$8,000**
CBBEP Bays Plan Actions: **BTR-2, PEO-3**

Whitney Lake is a 35 acre constructed wetland which serves as both a storm water detention area and fresh water marsh. The area is characterized by freshwater pothole wetlands and Live Oak-Red Bay woodland habitat typical of the Ingleside Peninsula and Live Oak Ridge area.

The first couple of years after construction (2003) Whitney Lake remained mostly dry and on occasion only would hold water in the deeper channel sections. Adjustments made to the spillway helped the project retain water. This winter Whitney Lake has reached an ideal capacity and has been functioning as designed.

With Whitney Lake located within the City of Ingleside, there is great potential for the natural area to serve as a recreational area for nature enthusiasts and an educational tool for area schools.

Currently Whitney Lake lacks certain amenities keeping it from being a first-rate park. There is an immediate need for:

- Entrance signage
- Directional signage from main roads
- Educational kiosk
- Educational signage about storm water BMP
- Seating at the end of existing board walks
- Trash receptacles
- A viewing blind

Project Objectives:

1. Improve park with above specified needs.
2. Promote park through the Ingleside Chamber of Commerce
3. Designation of park on the *Great Texas Coastal Birding Trail*.

Project #0813 Kayak Ramp – Philip Dimitt Municipal Fishing Pier

Performing Organization: **CBBEP & City of Corpus Christi**
Total Project Funding: **$10,000**
CBBEP Bays Plan Actions: **BTR-2**

Philip Dimitt Municipal Fishing Pier Park in Flour Bluff, located on the upper Laguna Madre, is increasingly being used as an access site for area kayakers. Currently, kayakers have to traverse a rip rap shoreline at the entrance to the park to access the bay.

The project goal is to create an improved launching site for kayak and other users at the site that is currently being used under less than favorable conditions. The benefits to the community would be to define an access site within the boundary of a city owned park and improve overall use and esthetics of the park. A secondary benefit would be to use this site as a prototype for any similar projects that may come up in the future.

Additionally, this could also be the first phase of an overall improvement plan for the park which could include a nature trail.

Project Objectives:

1. Delineate launching site through use of bollards.
2. Remove existing rip rap and improve area with use of fill sand.
3. Create dedicated parking site.
4. Rip rap can be moved to adjacent city owned drainage ditch for shoreline stabilization.
5. Install interpretative signage at the pier and kayak launch site.
6. Provide a picnic table with shade at the kayak launch.

Project #0814 Debris Management at Public Access Sites

Performing Organization: **CBBEP**
Total Project Funding: **$3,600**
CBBEP Bays Plan Actions: **BD-1**

Bay debris poses public health risks and reduces the aesthetic appeal of the bay system. It can degrade habitats, snare aquatic and wildlife species. These impacts result in costs: to the shrimper who tears his net by hanging up on debris; to the windsurfer who steps on a broken bottle; to the tourist industry when hotel rooms are unfilled because potential visitors would rather visit cleaner beaches; and to agencies and organizations who devote thousands of hours to cleaning the beaches along the bays.

Debris clean-up along the shoreline is a continual challenge along the Texas Coastal Areas. Every year, numerous clean-up events are coordinated and hundreds of tons of debris are collected and disposed. During certain periods of the year, heavy visitation by tourists results in overflowing garbage receptacles causing debris to be spread over large areas. Additionally, frustrated beach goers leave debris behind, not willing to transport it with them to their lodging site. Since prevention is generally more cost-effective than clean-up, CBBEP will approach this issue by strategically placing large garbage receptacles in areas of high use to prevent debris from being mismanaged and wind up along the bay shorelines.

Project implementation will occur during the three most critical weekends of 2008 (Memorial Day, Fourth of July, and Labor Day).

Project Objectives:

To reduce the amount of debris along coastal roadsides and shorelines by the placement of large garbage receptacles at three strategic locations:

- Lighthouse Lakes Kayak Park
- Packery Channel / Zahn Road
- Clem's and Billing's Marina

Project #0815 Mollie Beattie Habitat Community Access Improvements

Performing Organizations: **GLO, USFWS, CBBEP**
Total Funding: **$50,000**
CBBEP Bays Plan Actions: **BTR-2, HLR-1**

The Mollie Beattie Habitat Community was created in 1996 through a Memorandum of Understanding between The General Land Office (GLO) and the United States Fish and Wildlife Service (USFWS). The Habitat Community encumbers approximately 1,000 acres of Permanent School Fund land within State Tracts 59 and 60, north of Packery Channel and west of Highway 361 which contain a significant amount of intertidal habitat that is extensively used by a variety of shorebirds, wading birds, and other species, including the endangered piping plover. A management team consisting of members from GLO, USFWS, TPWD, and National Audubon Society was created to assist in the management of this area.

Currently, an on-going issue at Molly Beattie Habitat Community has been the inappropriate vehicular access to sensitive habitat at the site. Although two parking lots were established for people to park their vehicles and enjoy the area by foot, vehicles often drive into the site causing irrevocable damage to the habitat. With the opening of Packery Channel and the increase use of local bays, the importance of maintaining this unique habitat while still providing public access is a top priority.

Evaluate existing structures and perform improvements by:

- Replacing the existing damaged bollards and cable.
- Add additional bollards in low elevation areas where vehicles enter the habitat site at low tide.
- Add new bollards and cable at the Northwest corner of the site (extending to the old well pad) to prevent vehicles from entering the site.
- Create additional educational signage.
- Construct shade structures along Packery Channel.

Project Objectives:

1. Manage vehicular traffic within the habitat site.
2. Provide an area for public access to the bay for fisherman and birders.
3. Protect the area for wildlife, including endangered species, such as the piping plover.
4. Maintain the area in a clean and safe condition.

Project #0816 Oso Creek Bacteria Contamination Investigation

Performing Organizations: **Texas A&M University-Corpus Christi**
Total Project Funding: **$100,000**
CBBEP Bays Plan Actions: **WSQ-1, WSQ-3, WSQ-5**

In previous studies it has been determined that much of the bacteria (enterococci) loading in Oso Creek occurs in the upper sections of Oso Creek. Sources of contamination are not obvious, nor currently known. Most of the surrounding land is rural farm and ranch land, although there are scattered residences and colonias in the watershed. There are eight known permitted wastewater and storm water outfalls into Oso Creek. Agricultural runoff after rainfall has also been shown to contain high numbers of enterococci, but whether these are from wildlife, birds, humans, or re-growth from enterococci in soils or water in Oso Creek, or from groundwater discharged into the creek is unknown.

This project will investigate the possible sources of enterococci found in sections of Oso Creek under primarily dry weather flow conditions and to provide a report for resource managers to utilize in efforts to restore Oso Creek to appropriate water quality standard(s). Through a separate project, bacteriological data from rainfall runoff events will continue as part of an ongoing Agriculture runoff project. Additional dry weather sampling stations within Oso Creek and its tributaries will be identified. An initial task will be to access and observe the entire length of Oso Creek, above Oso Bay, and identify discharges and inflows to the creek. Sampling will include collection of a sample for bacteriological analysis (Enterococcus) of un-permitted discharges or inflows as well as a bacteriological upstream and downstream sample of all discharges into Oso Creek. After all known and newly identified discharges are initially sampled, a GPS coordinate of their location will be recorded, as well as photo identification of the discharge and a upstream and downstream photographic view of Oso Creek will also be made. In addition to photos, field comments and observations of the stream physiology (i.e. cross section) and flow conditions of Oso Creek will be conducted. This data will be included in the study report. Following the initial field identification of the discharges or inflows to Oso Creek, follow up dry weather sampling will be repeated at the areas where high bacteria counts were observed to attempt to identify source of bacteria. Additionally, if deemed necessary, sampling for bacterial analysis will be conducted up to 10 times at the closest road crossing on Oso Creek downstream of each of the found dry weather discharges or inflows. All bacteriological and data collection will meet appropriate holding times for sample preservation and QAPP protocol.

Project Objectives:

The objective of this project is to determine source(s) of enterococci in Oso Creek, identify un-permitted discharges and/or inflows to Oso Creek and to document dry weather bacteriological conditions in the creek through a report that documents data collected, analysis/synthesis of the data and the results of the study in a manor that assists in the TMDL development process and implementation phases for Oso Creek TMDL and to ultimately help restore the creek to appropriate water quality standard(s).

Project #0817 Hypoxia Characterization in Corpus Christi Bay

Performing Organizations: **Harte Research Institute - TAMU-CC**
Total Project Funding: **$30,000**
CBBEP Bays Plan Actions: **WSQ-1, WSQ-3, WSQ-5**

Hypoxia (low dissolved oxygen concentration) is known to occur in the southeast corner of Corpus Christi Bay each summer. It is now nearly certain that the hypoxia has a greater extent spatially and temporally than previously thought and that it is caused by stratification of hyper saline water that moves from either Laguna Madre or Oso Bay into the southeastern corner of Corpus Christi Bay.

Since 1994, monitoring has been confined to July and August. This was expanded to June in 2005 and 2006 and it is now apparent that hypoxia is just as prevalent in early June and late August as in July, thus we do not know when it starts or when it stops. Since 1999, the aerial extent was thought to be limited; extending only as far west as the entrance to Laguna Madre. Based on current sampling outside this area, we now know that it extends west to at least Ward Island. It is now clear that we have underestimated the spatial and temporal extent because of the limited sampling scope in the past, which must be expanded.

While it has been confirmed that stratification stills plays an important role in the onset of hypoxia, the role of nutrients from ground water sources or Oso Bay has not yet been explored as a causal mechanism of hypoxia in Corpus Christi Bay. In contrast, opening Packery Channel may alleviate the occurrence of hypoxia by introducing cooler and less salty water from the Gulf of Mexico to Corpus Christi Bay or by increasing circulation and mixing in the southeastern corner of the bay. However, no information exists on the water quality exported from Oso Bay, Packery Channel, or Laguna Madre.

In the summer of 2006, several fish kills were reported due to low dissolved oxygen conditions near Packery Channel, raising concern by the general public and resource managers about this issue. Since Oso Bay is currently impaired for low dissolved oxygen, the nutrient data could be useful in future TMDL in the area. One possible outcome of this project is that water quality standards might have to be reappraised. This project is aimed at expanding the monitoring program that has been going on since 1994 to ensure the spatial and temporal extent of hypoxia are understood and the role that nutrients play.

Project Objectives:

To characterize hypoxia in Corpus Christi Bay:

1. Collect water quality hydrographic data to characterize the spatial and temporal extent of hypoxia.
2. Collect water quality nutrient data related to the occurrence of hypoxia.
3. To distinguish between nutrient-driven and circulation-driven changes in dissolved oxygen concentrations.

Project #0818 Observations Data Model: Nueces Delta Freshwater Inflows

Performing Organizations: **Harte Research Institute - TAMU-CC**
Total Project Funding: **$40,000**
CBBEP Bays Plan Actions: **WSQ-4, HLR-1, FW-1**

Restoration of Rincon Bayou and marsh in the Nueces Delta began in 1994 with construction of a channel to divert fresh water into the marsh. The channel was filled-in in 2000 but reopened in 2001. In 2007, a pipeline will begin to deliver water directly into Rincon Bayou from the Calallen Impoundment. Extensive monitoring of the Rincon Bayou area has taken place, first funded by the Bureau of Reclamation, and more recently funded by the City of Corpus Christi. The purpose of the freshwater inflow diversions has been to restore marsh function and is part of an overall strategy to manage environmental flows from the Nueces River water system. The Nueces Delta is one of only three places in Texas where the water rights permit and State orders require environmental flows, making this an important public issue.

After 15 years of study and management, the Nueces Delta experience presents the best template on how freshwater inflows can be studied and managed in other parts of the state, and more broadly, the nation. Recently, the Coastal Bend Bay & Estuary Program (CBBEP) has embarked on a strategy to acquire wetlands in the Nueces Delta to further enhance restoration and protection of the marsh.

The current need is to determine if, and how, the diversions have restored marsh structure and function, how best to operate the diversions, and what the environmental benefits have been. This will fulfill an existing need of decision-makers as to how best to operate the water system. However, the first step would be to integrate the disparate types of data collected. Data is currently housed at the University of Texas (UT) and Texas A&M University-Corpus Christi (TAMUCC). The purpose of the current project would be to ensure data is in a format that can be used for integrated analyses.

Project Objectives:

1. To create an observations data model (ODM) for Rincon Bayou.
2. To train and help users load data into the model.
3. To create a map-based web service that allows integrating data for analysis and visualization.

Project: #0819 Evaluation of Baffin Bays Arroyos as Critical Fish Habitat

Performing Organization: **TAMU-K & UTMSI**
Total Project Funding: **$45,000**
CBBEP Bays Plan Actions: **HLR-4**

Ephemeral streams are characteristic components of South Texas estuaries, especially in the Laguna Madre. These ephemeral streams, or arroyos, typically have low flow rates and high salinity but occasionally are flooded by rain events. Black drum and other fisheries species make extensive use of these arroyos during these flood events. This project will investigate the roll these streams play in the life history of these locally important finfishes and compare the use by black drum (as a model species) of previously ephemeral arroyos in the region that are now "flowing" streams due to the regular input of municipal wastewater.

Project Objectives:

1. Compare selected finfish species utilization of pristine arroyos with urbanized arroyos, particularly those receiving municipal effluent outflows
2. Compare seasonal reproductive status of black drum found in the open region of upper Baffin Bay, in "created" streams (i.e. those receiving municipal effluent), and ephemeral streams.
3. Determine feasibility of developing "fish ladders" at small dams to provide escape routes for stranded fishes follow flood events.

Project: #0820 Oso Watershed – Failing On-Site Septic Facilities (Year 2)

Performing Organization: **Nueces County**
Total Project Funding: **$84,000**
CBBEP Bays Plan Actions: **WSQ-1, WSQ-3, NPS-3**

Oso Creek and Oso Bay are on the State's 303(d) List of Impaired Waters for failing to meet the contact recreation use criteria due to high values of *Enterococcus* bacteria in the waters of Oso Creek and Oso Bay. Certain areas in the Oso Creek/Bay watershed are served by single home privately owned on-site sewage facilities (OSSFs). In many cases these systems have failed. Consequently, because sewage is not properly managed, bacteria is evident is the runoff from these areas. In an effort to reduce bacteria entering the Oso Creek watershed, this project seeks to install properly OSSFs where none exist, replace malfunctioning OSSFs where needed, or decommission nonessential OSSFs at individual home sites in the Oso Creek watershed. The objective of this project is to improve water quality in the Oso Creek and Oso Bay, and their watersheds, by reducing the amount of *Enterococcus* bacteria entering the Oso Creek and Oso Bay from discharge and storm water runoff from OSSFs.

This is a multi year effort and is on its second year. During the first year, a plan that included a needs assessment and prioritization of failing OSSFs was developed and a first tier of OSSFs were upgraded and/or replaced. This year's goal is to review the plan and repair and/or replace additional OSSFs.

Project Objectives:

To reduce bacteria entering Oso Creek originating for improperly functions on-site sewerage facilities in the watershed through assistance to low income private home owners in the form of replacement/repair of their malfunctioning or non-existent on-site sewage system.

1. Identification and prioritization of malfunctioning OSSFs in the Oso Watershed that meet the criteria of this project for repairs or replacement.
2. Work with Nueces County in the Oso Creek watershed to assist homeowners that meet the criteria to install properly functioning on-site sewage facilities where none exist, replace malfunctioning where needed or decommission nonessential facilities where other treatment options have become available.
3. Confer and collaborate with the Texas Commission on Environmental Quality - Total Maximum Daily Loads Team with implementing a TMDL solution.

Project: # 0821 Response of the Nueces Estuarine Marsh System to Freshwater Inflow – An Integrative Data Synthesis (Part I)

Performing Organization: **Harte Research Institute - TAMU-CC**
Total Project Funding: **$25,000**
CBBEP Bays Plan Actions: **FW-1, FW-3, FW-4**

The Nueces estuarine marsh system is the southern-most marsh system in the western Gulf of Mexico, covering some 5,700 ha of salt marsh, mud flats, tidal channels, and open water. It lies in a semi-arid climate and has experienced reduced freshwater inflows since at least 1940. In October 2001, the City of Corpus Christi (City) elected to continue freshwater diversions through the Nueces River Overflow Channel (NOC), which was initially created as the primary diversion channel in a demonstration project funded by the Bureau of Reclamation (BOR) from October 1994 through December 1999. The BOR concluded that freshwater additions to the upper reaches of the Nueces Marsh had positive impacts including decreased soil and water column salinity, improved habitat quality and availability, and increased productivity of some estuarine species (Bureau of Reclamation, 2000). Following closure of the channel in September 2000, the City re-opened the channel to a depth of 0.3 m above mean sea level (MSL) in October 2001 to increase freshwater inflows into Rincon Bayou, the natural headwater of the estuary. Future diversion plans include installation of a pipeline that can deliver up to 3.7×10^6 m^3 mo^{-1} (3,000 acre-ft mo^{-1}) from Calallen Pool to Rincon Bayou, scheduled for spring 2007.

To further understand the impacts of these freshwater diversions, the City has undertaken a long-term monitoring program. Monitoring is required under the Texas Commission on Environmental Quality (TCEQ) operating rule for the Nueces Estuary adopted 4 April 2001. Specifically, the rule requires the City to "implement an on-going monitoring and assessment program designed to facilitate an adaptive management program for freshwater inflows into the Nueces Estuary." Monitoring objectives include detecting changes in water column chemical and hydrological characteristics, phytoplankton biomass, emergent vegetation composition and distribution, soil characteristics, benthic, epifaunal, and nektonic macrofauna at several study stations along Rincon Bayou and the Nueces River. Monitoring at many of these stations began during the BOR Demonstration Project and has continued almost uninterrupted for nearly 17 years.

Project Objectives:

1. Develop and organize a geo-database to enable dynamic web-based access to data and facilitate spatial and temporal analysis.
2. Write a synthesis report based on analysis conducted using the new database.

Project: #0822 Mustang and N. Padre Island Geo-hazard Analysis

Performing Organization: **Harte Research Institute - TAMU-CC**
Total Project Funding: **$100,000**
CBBEP Bays Plan Actions: **HLR-1, HLR-2**

The purpose of this project is to consider the geologic processes and hazards affecting development on Mustang and Padre Islands and how development may alter those processes. The information gathered from this analysis may be used in recommendations on how organizations might mitigate negative impacts of future development.

Mustang and Padre Islands formed through the interaction of processes such as waves, tides, storms, plant colonization, and sea-level change which concentrated sediment making up the islands as we know them today. These same processes, plus human activities, continue to cause changes on the islands. In order to be prepared for these geologic changes a review of past data needs to be analyzed.

Topography from LiDAR, recent and historical aerial photography, wetlands maps, geo-environment maps, historical shoreline positions, and model projections of future shoreline and wetland changes will be combined and analyzed to create a hybrid map of geological hazards. The results of this investigation will be a Geo-hazards Map which shows areas on the islands that vary in their susceptibility to, and function for, mitigating the effects of geological processes. These processes include sea-level rise, land subsidence, erosion, and storm-surge flooding and washover.

The overall goal of this project is to provide information to improve how we live with these ongoing geological processes.

Project Objective:

Create a Geo-hazards Map of Mustang and Padre Islands that shows areas of susceptibility from the effects of geological processes such as sea-level rise, land subsidence, erosion, and storm-surge flooding for use for planning by local governments.

Project #0823 Sunset Lake Master Plan

Performing Organization: **City of Portland**
Total Funding: **$7,500**
CBBEP Bays Plan Actions: **BTR-2**

Sunset Lake Park is an excavated saltwater lake surrounded by saltwater marsh and wind tidal flats. The area is identified on the Texas Coastal Birding Trail and the lake, ponds, and flats are used by many species of birds. Sunset Lake Park has also incorporated a hike and bike trail throughout the park that has rest areas along with viewing platforms.

Recent population growth in and around the City of Portland has sparked great interest in the park. The City of Portland needs to develop a master plan for Sunset Lake Park. Principals that will guide the development of the plan include:

- Keeping consistency with existing park Conservation Easements and Park Management Guidelines.
- Responsive to Community needs and interests.
- Maximize the use of available funds and grants.
- Provide a phased approach to implementing park improvements.
- Incorporate compatible Regional, State, and Federal Park, Public Access, and Coastal Natural Resource Planning Goals and Objectives.

Project Objective:

1. Develop a Master Plan for future implementation of Park improvement projects.

Project #0824 Tow Vehicle (multi-use) and Passenger Trailer for use at the Nueces Delta Preserve

Performing Organization: **CBBEP**
Total Project Funding: **$40,000**
CBBEP Bays Plan Actions: **PEO-3**

The 5,000 acre CBBEP Nueces Delta Preserve is a great location for field trips by educators and students alike. One of the challenges of the NDP is the need to move fairly large groups of people (20 – 25), to different habitat areas within the NDP. The use of smaller vehicles and rented vans result in the groups being divided between multiple vehicles which diminishes the field trip experience since the main guide can only be in one vehicle.

Funds allocated for this effort would go towards the purchase of a tow vehicle capable of safely pulling an open air passenger trailer such as a hayride trailer with actual seats, shade canopy, and safety rails.

Project #0825 Nueces Delta Preserve Educational Materials – *Mud Between the Toes* Initiative

Performing Organization: **CBBEP**
Total Project Funding: **$30,000**
CBBEP Bays Plan Actions: **PEO-3**

The Nueces Delta Preserve (NDP) is a dynamic ecosystem of highly productive wetlands, open water, islands, prairie, and river and bay shorelines. The river frontage is a vital riparian habitat. The brackish wetlands are home to shrimp, crabs, juvenile fish and birds. The uplands are brimming with native vegetation – a birthplace to a variety of wildlife. Moreover, one of the most important components of the NDP is the Rincon Channel. This is the primary channel for freshwater inflows to nourish the delta complex.

The CBBEP is committed to continuing the implementation of the *Bays Plan* for Public Education and Outreach. Providing the NDP as an essential resource for environmental science and outdoor education helps to achieve the objective of increasing the knowledge of and accessibility to our resources in the Coastal Bend.

Because of its unique characteristics and features, the NDP is a well suited venue for ecological education. The diversity in habitats and species allow the learners to gain vast knowledge in systems. For more than four years, the CBBEP and other organizations have evaluated the potential for the NDP to be used as a learning, living laboratory. Currently, the CBBEP's *Learning on the Edge (LOTE)* Project utilizes the Preserve as a field classroom for elementary teachers learning about the local ecology. The results of each experience proved to be extremely rewarding. A compilation of educational materials for both field and classroom (pre-field and post-field) are needed to enhance the learning experience.

Project Objectives:

1. Compile/adapt educational materials and activities focused specifically on the NDP for use in the field or classroom by teachers, students, informal educators and community groups. These materials will address specific learning requirements needed to help students pass the TAKS test for their grade level.
2. Coordinate with other educational organizations to insure a consistent message is being presented.
3. Make sure educational activities at the NDP are fun and inspiring.

Project #0826 CBBEP Property Management (Nueces Delta, Oso, etc.)

Performing Organization: **CBBEP**
Total Project Funding: **$25,000**
CBBEP Bays Plan Actions: **HLR-1**

The CBBEP is responsible for several properties including over 5,000 acres along the Nueces River along the delta and approximately 70 acres along the Oso Bay. The CBBEP Nueces Delta Preserve is located 3 miles from the City of Odem and 20 miles from downtown Corpus Christi. The CBBEP Nueces Delta Preserve consists of approximately 5,400 acres in San Patricio and Nueces Counties that are owned and managed by the CBBEP as a conservation site for the purpose preserving natural habitat, function and species diversity in the Nueces River delta. The preserve is rich in diversity that can be characterized by Tamaulipan thorn scrub, grasslands, lomas, freshwater wetlands, riverine riparian habitat, brackish wetlands, coastal wetlands mud flats and shoreline. The CBBEP's secondary goal for the preserve is for the property to be used for a variety of educational and research opportunities.

The funds provided by the project support the necessary management and routine maintenance of the properties, including but not limited to road maintenance; fencing maintenance: gates; brush control, habitat and predator management (as appropriate necessary) and property taxes.

Project Objective:

Provide for the ongoing maintenance and management of the Nueces Delta Preserve and other CBBEP Properties.

Project: #0827 Response of the Nueces Estuarine Marsh System to Freshwater Inflow – An Integrative Data Synthesis (Part 2)

Performing Organization: **UTMSI**
Total Project Funding: **$25,000**
CBBEP Bays Plan Actions: **FW-1, FW-3, FW-4**

The Nueces estuarine marsh system is the southern-most marsh system in the western Gulf of Mexico, covering some 5,700 ha of salt marsh, mud flats, tidal channels, and open water. It lies in a semi-arid climate and has experienced reduced freshwater inflows since at least 1940. In October 2001, the City of Corpus Christi (City) elected to continue freshwater diversions through the Nueces River Overflow Channel (NOC), which was initially created as the primary diversion channel in a demonstration project funded by the Bureau of Reclamation (BOR) from October 1994 through December 1999. The BOR concluded that freshwater additions to the upper reaches of the Nueces Marsh had positive impacts including decreased soil and water column salinity, improved habitat quality and availability, and increased productivity of some estuarine species (Bureau of Reclamation, 2000). Following closure of the channel in September 2000, the City re-opened the channel to a depth of 0.3 m above mean sea level (MSL) in October 2001 to increase freshwater inflows into Rincon Bayou, the natural headwater of the estuary. Future diversion plans include installation of a pipeline that can deliver up to 3.7×10^6 m^3 mo^{-1} (3,000 acre-ft mo^{-1}) from Calallen Pool to Rincon Bayou, scheduled for spring 2007.

To further understand the impacts of these freshwater diversions, the City has undertaken a long-term monitoring program. Monitoring is required under the Texas Commission on Environmental Quality (TCEQ) operating rule for the Nueces Estuary adopted 4 April 2001. Specifically, the rule requires the City to "implement an on-going monitoring and assessment program designed to facilitate an adaptive management program for freshwater inflows into the Nueces Estuary." Monitoring objectives include detecting changes in water column chemical and hydrological characteristics, phytoplankton biomass, emergent vegetation composition and distribution, soil characteristics, benthic, epifaunal, and nektonic macrofauna at several study stations along Rincon Bayou and the Nueces River. Monitoring at many of these stations began during the BOR Demonstration Project and has continued almost uninterrupted for nearly 17 years.

Project Objectives:

1. Develop and organize a geo-database to enable dynamic web-based access to data and facilitate spatial and temporal analysis.
2. Write a synthesis report based on analysis conducted using the new database.

VIII. Program Administration

CBBEP administrative staff (3 FTE's) will provide organizational and logistical support for Estuary Council and subcommittee meetings, and coordinate/communicate as necessary with appropriate groups, including stakeholder groups, state and federal agencies, local governments, and professional groups relevant to CCMP implementation. Staff will:

1. Acquire, manage, and disperse funds to implement the *Bays Plan*;
2. Monitor, track, and report on implementation performance by implementing partners, and work to maintain implementation commitments;
3. Develop a prioritized biennial work plan and budget for Estuary Council review and approval;
4. Coordinate the periodic update of the *Bays Plan*, the *State of the Bay* report, the *Implementation Strategy*, and other key documents of the program;
5. Provide logistical support for all meetings, workshops, symposia, and special events related to program mission;
6. Provide for overall program coordination with EPA Region 6 and TCEQ.
7. Participate in regional, state, and national conferences and meetings relevant to estuarine management.
8. Develop policies and procedures for an emergency contingency plan which will include: protecting financial records, office equipment, computers, and other vital records and equipment; employee responsibilities; backup and storage of data; and recovery actions to be completed by 9/30/06.
9. Develop and implement a management system to track and assess Quality Assurance Project Plans (QAPPs) and determine required corrective actions and follow-up to be completed on date determined by TCEQ.

IX. Project Management and Implementation

CBBEP Project Management staff (9 FTE's) will coordinate/communicate as necessary with appropriate groups, including stakeholder groups, state and federal agencies, local governments, and professional groups relevant to *Bays Plan* implementation. Staff will:

1. Develop and implement partnership projects with local governments, state, and federal agencies, and private organizations;
2. Monitor, track, and report on implementation performance by implementing partners, and work to maintain implementation commitments;
3. Provide communication and coordination with the Texas Coastal Management Program and the Coastal Coordination Council, the Gulf of Mexico Program, the Texas Commission for Environmental Quality (TCEQ), and other relevant coastal/watershed programs;
4. Coordinate the review of proposed actions of federal, state, and local projects in an open process for consistency with the *Bays Plan;*
5. Develop a prioritized biennial work plan and budget for Estuary Council review and approval;
6. Provide for overall program coordination, including quality control/quality assurance procedures with EPA Region 6 and TCEQ.
7. Participate in regional, state, and national conferences and meetings relevant to estuarine management.

X. Program Expenses

CBBEP funds will be used to support continued program implementation, evaluation, and reporting. Funds are also necessary to provide logistical support for Estuary Council and subcommittee meetings. Expense categories are as follows:

1. Travel – allows Program staff to attend state, regional and national meetings, workshops, and conferences;
2. Supplies – as needed, for the day-to-day operations of the Program;
3. Equipment – purchase of items over $1,000, i.e. computers;
4. Other – copier rental, temporary staff, postage, communication services, accounting services, printing, etc.

XI. Working Capital

The CBBEP Board of Directors has established working capital out of local funding. The funds will be set aside for possible future projects, matching funds and/or emergency funding.

XII. Summary

On September 1, 2007, the Coastal Bend Bays & Estuaries Program will begin Year 10 of implementing the *Coastal Bend Bays Plan*. This FY 2008 Work Plan describes the proposed work to be initiated during FY 2008. Of the total funds identified in the Work Plan budget, $418,000 are new (FY 2008) federal funds, $843,881 are new (FY 2008) state funds, $272,800 are new (FY 2008) project-specific funds, and $275,000 are new (FY 2008) local partner funds. When combined with carryforward from previous unspent federal and state funds, the total budget for this FY 2008 Work Plan is $2,076,881.

TABLE 1: FY 2008 COMPREHENSIVE ANNUAL WORK PLAN OUTLINE

PROJECT #	PROJECT TITLE	ACTION ITEM(S)	PERFORMING PARTY	EPA CWA 320	EPA CF	TCEQ	TCEQ CF	LOCAL	OTHER	TOTAL CBBEP FUNDING	MATCHING FUNDS
0801	Little Bay Seagrass Pilot Project	HLR-1, HLR-2	City of Rockport					$12,732		$12,732	
0802	Matagorda Island Marsh Restoration (Implementation)	HLR-2	Aransas National Wildlife Refuge	$10,000	$172,200				$67,800	$250,000	
0803	CBBEP Colonial Waterbird Management Project	HLR-1, HLR-4	CBBEP	$75,000				$25,000	$75,000	$175,000	
0804	Coastal Bend Environmental Science: *Learning on the Edge*	BTR-1, PEO-2, PEO-3, PEO-5	CBBEP	$93,500						$93,500	
0805	CBBEP Habitat Protection Media Campaign	PEO-1, PEO-2, PEO-3, PEO-5, BTR-1	CBBEP	$35,000						$35,000	
0806	Kritters 4 Kids	PEO-3, PEO-5, HLR-2, HLR-4, HLR-7	Coastal Bend Wildlife Photo Contest	$21,000						$21,000	
0807	Invasive Species Control – Matagorda Island Levees	HLR-2	Aransas National Wildlife Refuge	$34,000						$34,000	
0808	Keepers of the Coast	PEO-3, PEO-5	Texas State Aquarium			$10,000				$10,000	
0809	CBBEP/Coastal Bend Bays Foundation Community Outreach Partnership	PEO-1, PEO-2, PEO-3, PEO-4, PEO-5	Coastal Bend Bays Foundation			$30,000		$14,000		$44,000	
0810	Teaching Environmental Science I & II	PEO-3	TAMU-CC			$20,000				$20,000	
0811	Wetland Explorer: Coastal Marsh Discovery Program	PEO-1, PEO-3, PEO-5	Center for Coastal Studies			$7,500				$7,500	
0812	Whitney Lake Marsh Action Plan	BTR-2, PEO-3	CBBEP, Keep Ingleside Beautiful			$8,000				$8,000	

PROJECT #	PROJECT TITLE	ACTION ITEM(S)	PERFORMING PARTY	EPA CWA 320	EPA CF	TCEQ	TCEQ CF	LOCAL	OTHER	TOTAL CBBEP FUNDING	MATCH FUNDS
0813	Kayak Ramp – Philip Dimitt Municipal Fishing Pier	BTR-2	CBBEP, City of Corpus Christi			$10,000				$10,000	
0814	Debris Management at Public Access Sites	BD-1	CBBEP			$3,600				$3,600	
0815	Mollie Beattie Habitat Community Access Improvements	BTR-2, HLR-1	CBBEP, GLO, USFWS			$20,000			$30,000	$50,000	
0816	Oso Creek Bacteria Contamination Investigation	WSQ-1, WSQ-3, WSQ-5	TAMU-CC			$100,000				$100,000	
0817	Hypoxia Characterization in Corpus Christi Bay	WSQ-1, WSQ-3, WSQ-5	Harte Research Institute			$30,000				$30,000	
0818	Observations Data Model: Nueces Delta Freshwater Inflows	WSQ-4, HLR-1, FW-1	Harte Research Institute			$40,000				$40,000	
0819	Evaluation of Baffin Bays Arroyos as Critical Fish Habitat	HLR-4	TAMU-K, UTMSI				$45,000			$45,000	
0820	Oso-Watershed-Failing On-Site Septic Facilities (Yr 2)	WSQ-1, WSQ-3, NPS-3	Nueces County						$84,000	$84,000	
0821	Response of Nueces Marsh to Freshwater Inflows – Data Synthesis (Part 1)	FW-1, FW-3, FW-4	Harte Research Institute						$25,000	$25,000	
0822	Mustang and N. Padre Island Geo-hazard Analysis	HLR-1, HLR-2	Harte Research Institute					$50,000	$50,000	$100,000	
0823	Sunset Lake Mater Plan	BTR-2	City of Portland					$7,500		$7,500	
0824	Tow Vehicle & Passenger Trailer for NDP	PEO-3	CBBEP					$40,000		$40,000	
0825	Nueces Delta Preserve Education Materials	PEO-3	CBBEP					$30,000		$30,000	
0826	CBBEP Property Management	HLR-1	CBBEP					$25,000		$25,000	

PROJECT #	PROJECT TITLE	ACTION ITEM(S)	PERFORMING PARTY	EPA CWA 320	EPA CF	TCEQ	TCEQ CF	LOCAL	OTHER	TOTAL CBBEP FUNDING	MATCH FUNDS
0827	Response of Nueces Marsh to Freshwater Inflows – Data Synthesis (Part 1)	FW-1, FW-3, FW-4	UTMSI						$25,000	$25,000	
	TOTAL PROJECT FUNDS			**$268,500**	**$172,200**	**$279,100**	**$45,000**	**$204,232**	**$356,800**	**$1,325,832**	
	Administrative / Travel		CBBEP	$149,500		$564,781		$95,768		$751,049	
	TOTAL FUNDING			**$418,000**	**$172,200**	**$843,881**	**$45,000**	**$300,000**	**$356,800**	**$2,076,881**	