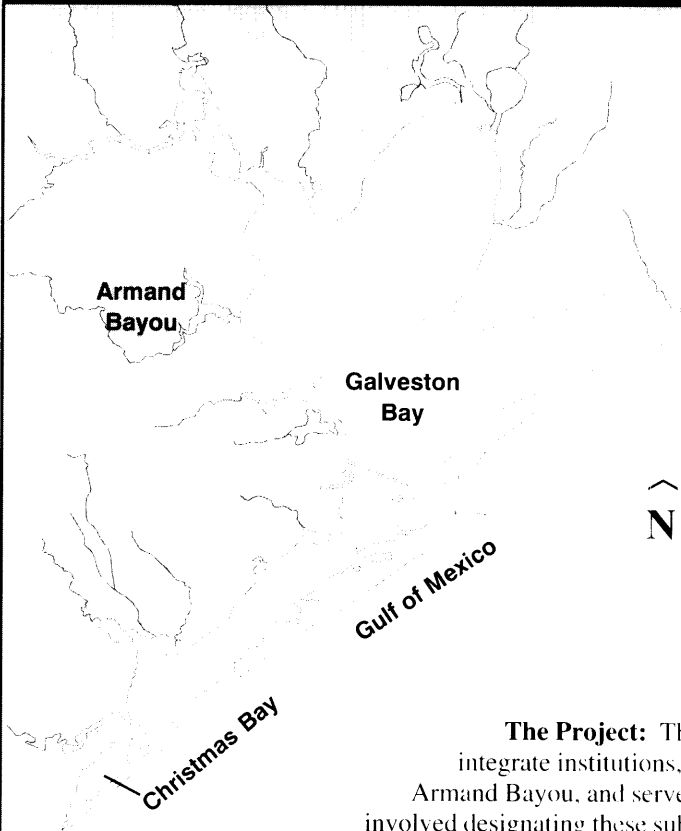**⚡EPA**

# Texas Coastal Preserves Project

## Demonstrating Practical Tools For Watershed Management Through The National Estuary Program

## Galveston Bay, Texas



**Armand Bayou**

**Galveston Bay**

**Gulf of Mexico**

**Christmas Bay**

N

### Characteristics:

■ The Galveston Bay watershed, including coastal embayments and streams such as Christmas Bay and Armand Bayou, is approximately 600 square miles in size.

■ Nearly 3.5 million people live in the Bay area.

■ Land use in the Bay area is 19 percent urban, 22 percent agricultural; the remainder is forest and open space.

**The Problem:** Lack of an integrated management strategy among regulatory agencies threatened the ability to protect the water quality and wildlife habitat of Christmas Bay and Armand Bayou.

■ Armand Bayou has lost 91 percent of its wetland acreage.

■ Water quality in Armand Bayou is poor, and water quality monitoring in both Christmas Bay and Armand Bayou is inadequate.

■ Although Christmas Bay is relatively healthy, submerged aquatic vegetation (SAV), such as clover grass and turtle grass, is vanishing at a steady rate.

**The Project:** The Texas Coastal Preserves Demonstration Project was designed to integrate institutions, elevate the level of ecosystem management in Christmas Bay and Armand Bayou, and serve as a model for similar programs in Galveston Bay. The project involved designating these sub-systems of Galveston Bay as Coastal Preserves and developing and implementing comprehensive management plans.

## The National Estuary Program

*E*stuaries and other coastal and marine waters are national resources that are increasingly threatened by pollution, habitat loss, coastal development, and resource conflicts. Congress established the National Estuary Program (NEP) in 1987 to provide a greater focus for coastal protection and to demonstrate practical, innovative approaches for protecting estuaries and their living resources.

As part of this demonstration role, the NEP offers funding for member estuaries to design and implement Action Plan Demonstration Projects that demonstrate innovative approaches to address priority problem areas, show improvements that can be achieved on a small scale, and help determine the time and resources needed to apply similar approaches basinwide.

The NEP is managed by the U.S. Environmental Protection Agency (EPA). It currently includes 28 estuaries: Albemarle-Pamlico Sounds, NC; Barataria-Terrebonne Estuarine Complex, LA; Barnegat Bay, NJ; Buzzards Bay, MA; Casco Bay, ME; Charlotte Harbor, FL; Columbia River, OR and WA; Corpus Christi Bay, TX; Delaware Estuary, DE, NJ, and PA; Delaware Inland Bays, DE; Galveston Bay, TX; Indian River Lagoon, FL; Long Island Sound, CT and NY; Maryland Coastal Bays, MD; Massachusetts Bays, MA; Mobile Bay, AL; Morro Bay, CA; Narragansett Bay, RI;New Hampshire Estuaries, NH; New York-New Jersey Harbor, NY and NJ; Peconic Bay, NY; Puget Sound, WA; San Francisco Bay-Delta Estuary, CA; San Juan Bay, PR; Santa Monica Bay, CA; Sarasota Bay, FL; Tampa Bay, FL; and Tillamook Bay, OR.

## Introduction To Galveston Bay

Galveston Bay is a diverse and expansive ecosystem which lies along the southeast Texas coast and empties into the Gulf of Mexico. Galveston Bay has been known for its resources for decades, exhibiting diverse plant and wildlife thriving within and around its coastal waters. Two important waterbodies of the Galveston Bay area are Christmas Bay and Armand Bayou. Although Christmas Bay is considered to be relatively healthy, resource agencies and the public have concerns about the long term conservation of its critical resources. Armand Bayou is subject to immediate and serious water quality and habitat problems. The Galveston Bay community realized the threats associated with habitat loss and declining water quality and recognized that radical changes in the management strategy of the Bay were needed.

## Overview Of Christmas Bay

Christmas Bay is a near-pristine 9 square mile embayment in the far southwestern portion of Galveston Bay. The waters have been designated as a nursery area by the Texas Parks and Wildlife Department (TPWD) due to their lush seagrasses, finfish, shellfish, and thriving oyster reef. Three of the four seagrass species in Christmas Bay are found virtually nowhere else in Galveston Bay.

Christmas Bay is home to 96 fish species, 68 crustacean species, 140 mollusk species, and numerous invertebrate animals. In addition, eight endangered or threatened species, including the bald eagle, brown pelican, whooping crane, and sea turtle, call Christmas Bay their home. Three additional endangered species of birds inhabit the adjacent Brazoria National Wildlife Refuge, while seven waterbird nesting colonies surround the Bay.

Over the past 40 years, some resources of Christmas Bay have been slowly, but steadily, declining. Evidence of this is documented in the amount of vegetation lost in both emergent and submerged wetlands present in Christmas Bay. Vegetation associated with emergent wetlands has dropped from 4,701 acres to 4,304 acres in just a little over two decades, and seagrass meadows, found in submerged wetlands, have suffered a 108-acre loss in just under three decades.
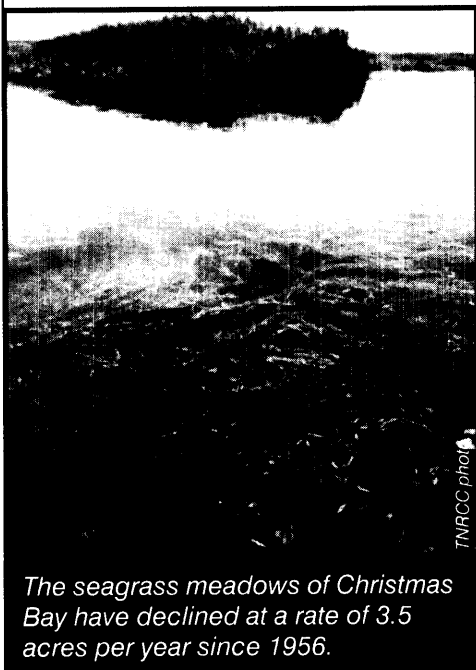


*The seagrass meadows of Christmas Bay have declined at a rate of 3.5 acres per year since 1956.*

The combined rate of seagrass and emergent wetland loss in Christmas Bay has been 3.5 acres per year since 1956. Although there was a regulatory structure in place for the management of Christmas Bay, there were many gaps in the regulations, resulting in continued habitat loss and threats to the numerous species living in and around Christmas Bay.

## Overview Of Armand Bayou

Armand Bayou is a 7 linear mile waterway located on the western shore of Galveston Bay. It is a hardwood and prairie bayou surrounded mainly by undeveloped flood plain and several major urban activity centers, including the NASA Johnson Space Center, a petrochemical complex, an oilfield, and an airport. Part of the watershed contains extensive salt marsh and bottom land hardwood wetlands, as well as diverse flora. It is known for its wildlife and its scenic, recreational, and educational values.

Armand Bayou's water quality is poor, with high nutrients which contribute to occasional low availability of oxygen for marine life. In addition, all 275 acres of the Bayou's naturally occurring wetlands have been lost to subsidence caused by groundwater and petroleum withdrawal. Currently, wetland re-establishment is minimal.
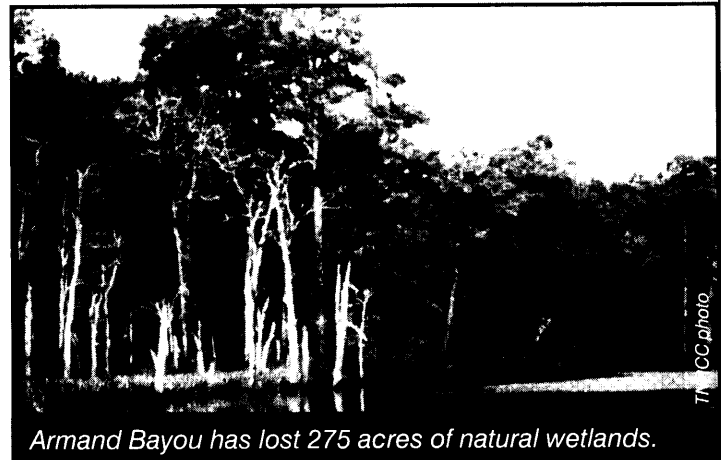


*Armand Bayou has lost 275 acres of natural wetlands.*

Like Christmas Bay, Armand Bayou had a regulatory framework in place. However, a key concern - pollution from nonpoint sources - was not well managed.

In an effort to be proactive in the preservation of Christmas Bay and Armand Bayou, local, state, and federal officials, with much public support, rallied together to designate these waters as Texas Coastal Preserves. This designation would require the development of a management plan, accepted by all relevant agencies in the region, which would provide guidance in the management of the resources.

Christmas Bay and Armand Bayou were chosen as demonstration projects because they typify two valued types of coastal waterways in Texas. Similar characteristics between these two waterbodies and other waters in Texas would allow the methods and results of the demonstration project to be broadly applied. Additionally, this project provided a unique opportunity to describe the actions needed to designate and plan for the management of a protected preserve. It would serve as a starting point

for organizing future management plans for the entire Galveston Bay system.

In 1990, EPA joined forces with the TPWD, the Texas General Land Office, and the Texas Natural Resource Conservation Commission (formerly the Texas Water Commission) to develop and execute the coastal preserves demonstration project. The Coastal Preserves Project was funded with federal money and the State of Texas General Revenues.

## Project Objectives

The primary objective of the demonstration project was the designation of Christmas Bay and Armand Bayou as preserves. An equally important objective was the development of a comprehensive management plan for each area to help protect and enhance the area resources. The expectation was that comprehensive planning for these two waterbodies would, in turn, encourage early development and implementation of comprehensive bay-wide planning in Galveston Bay.

## Implementing The Project

The Texas Coastal Preserves Program is a cooperative program of the TPWD and the Texas General Land Office/ School Land Board. Under this program, the School Land Board leases state-owned submerged lands to TPWD for ongoing management. The success of the entire demonstration project depended upon this designation, which meant the two preserves would have permanent preserve status, and consequently, permanent protection of water quality, living resources, and human health.

The designation and management plan process began in 1990 and was completed in 1993. Although the act of designating the two areas as preserves was not intensive, the preparation and planning for the protection of the preserves after designation required extensive research of the area. The process of designation and preserve management planning was as follows:

■ *Grant Proposal* - The first step taken in preserve designation was attaining funding through the development of a grant proposal. The proposal listed a series of projects needed to support the designation of the waterbodies as preserves and the corresponding management plans.

■ *Preserve Nomination and Approval* - The nomination of the two areas as preserves was a public policy decision. A nomination package was developed for the Galveston Bay National Estuary Program by the University of Texas Bureau of Economic Geology and submitted to a reviewing committee. The committee, consisting of the School Land Board and the Texas Parks and Wildlife Commission, reviewed the package and approved the designation.

After attaining preserve designation, the management plans were developed. The primary steps in plan development involved:

■ *Boundary Designation through Tide Gauge Operations* - Tide data were needed to establish the boundaries of public lands which would ultimately define the preserves and the future management of each. Two fully-automated water

level measurement systems were purchased, installed, and activated.

■ *Environmental Inventories* - Inventories were compiled for each preserve on endangered species, permitted point sources of wastewater discharge, dredging activities, agricultural practices in the drainage basin, and monitoring data concerning water quality and living resources. This resulted in inventories of 29 activities with potentially negative impacts on Christmas Bay and 32 types of activities with potentially negative impacts on Armand Bayou.

■ *Regulatory Surveys* - Conducted at the same time as the Environmental Inventories, the surveys described existing limits of jurisdiction for numerous agencies at the federal, state, and local levels and provided a listing of regulatory gaps, overlaps, and potential avenues for interagency coordination.

■ *Regulatory Evaluations* - Although not funded under the demonstration project, these evaluations pinpointed critical regulatory gaps, overlaps, and coverage, developed criteria to evaluate how effectively priority problems were handled, and generated ideas that would enhance interagency coordination.

■ *Management Plans* - Advisory groups were convened to assure broad-based consensus on critical environmental and regulatory issues and to draft a preliminary management plan outline for each preserve. The plans included specific actions to manage water quality, habitat, living resources, and human influences on each area.

■ *Action Implementation* - Implementation of the Management Plans began in summer 1991 and focused on resource use, including wastewater discharges, fisheries, petroleum releases, and recreation. To aid in action implementation, a new level of coordination and local government participation was sought. The emphasis was on interagency participation.

■ *Public Participation* - Public meetings were held to accommodate the high degree of public interest and stimulate public involvement in effective creation and management of the preserves.

## The Texas Coastal Preserves Success Story

The Texas Coastal Preserves Project was a success by any account. As a result of management plan implementation, water quality monitoring in Armand Bayou has taken place weekly since 1992. Data from the monitoring activities, performed by a volunteer citizens group, are being compiled and analyzed for trends in water quality to help the team identify persistent problems in the Bayou's water. Christmas Bay has remained a vital, productive ecosystem, as was intended. The implementation of the management plan has all but ensured protection of Christmas Bay from future problems, and has provided local organizations with a strategy for improving Armand Bayou. The project not only succeeded in designating the two waterways as preserves, but also demonstrated the value of comprehensive, coordinated action.
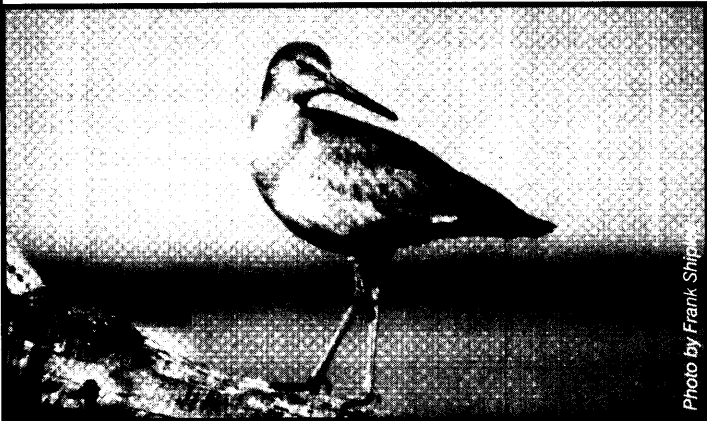
*The preserve designation of Christmas Bay and Armand Bayou will help ensure the long-term preservation of numerous plant and animal species.*

- In Texas, many levels of government share coastal management responsibilities, which can lead to inherent difficulties. The Texas Coastal Preserves Project established a precedent for interagency cooperation to overcome the problem of fragmented or overlapping jurisdictions. The new management plan identified existing regulatory responsibilities and management tools which could be used more effectively, and assigned these responsibilities to the participating agencies and interest groups.

- Environmental inventories and regulatory surveys are invaluable tools in developing management plans. The regulatory surveys of the numerous governmental agencies involved served as a mechanism to identify similar concerns regarding Galveston Bay as a whole.

- Sufficient time needs to be invested upfront in identifying significant management issues that need to be addressed in the management strategy.

In addition, the project has provided good examples of waterbody management for other potential sites within Galveston Bay. The designation served as a rallying point for six other locations that may be considered for inclusion in the Texas Coastal Preserves Program.

Other Gulf Coast states are also considering similar designation projects under the Gulf of Mexico Program. Cost estimates have been developed for these projects based upon costs incurred in implementing the Texas Coastal Preserves Project.

## Lessons Learned

*T*he demonstration project illustrated that designating waterbodies as preserves can help ensure that their resources are protected, conserved, and enhanced on a long-term basis. Among the other lessons learned:

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4

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