

TABLE OF CONTENTS

| | |
|---|-----------|
| Introduction | 1 |
| Purpose and Scope | |
| Seabrook | |
| Planning Process | |
| Wetland Conservation Goals and Objectives | 4 |
| Critical Resources and Identification Maps | 6 |
| Priority Sites | 12 |
| Methods of Preservation | 17 |
| Regulatory | |
| Acquisition | |
| Conservation Easements | |
| Mitigation | |
| Education | |
| Other Tools | |
| Implementation Strategy | 20 |
| Appendix A | 23 |
| The Benefits of Wetlands and Open Space | |
| Appendix B | 25 |
| Current Regulations and Assistance | |
| Appendix C | 30 |
| Grants and Other Resources | |
| Appendix D | 38 |
| Bibliography | |
| Appendix E | 44 |
| Contact Information | |
| Map | |
| Seabrook Vicinity Map | 1 |
| Figures | |
| 1. Seabrook Open Space | 2 |
| 2. Wetland Areas of Interest | 6 |
| 3. USDA, NRCS Soil Survey | 8 |
| 4. NWI Wetland & Habitat Classification | 10 |
| 5. Floodplain | 11 |
| 6. Priority Sites | 13 |

INTRODUCTION

Purpose and Scope

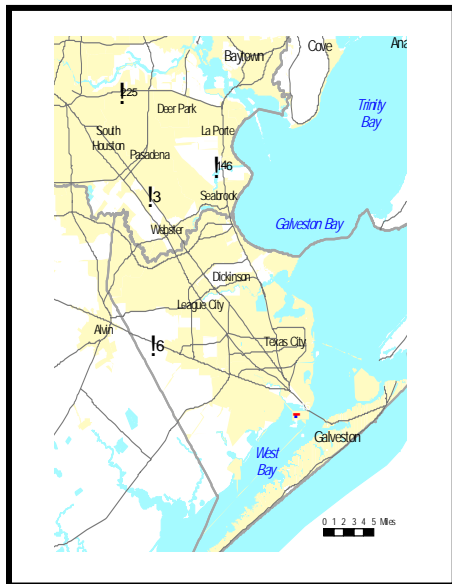
The Seabrook Wetland Conservation Plan was funded by a grant from the U.S. Environmental Protection Agency (EPA) in accordance with the Clean Water Act and coordinated through the Texas Natural Resource Conservation Commission (TNRCC) and the Galveston Bay Estuary Program (GBEP). GBEP contracted with the Houston-Galveston Area Council (H-GAC) to prepare the plan. H-GAC worked extensively with the City of Seabrook, representatives of other state and federal agencies, environmental organizations, and concerned citizens to develop this plan.

The plan was developed using the model conservation planning process outlined in the Texas General Land Office's (GLO) *Texas Coastal Wetlands: A Handbook for Local Governments*. This is one of the first projects in the state to apply the handbook's recommended local government planning process. This project will also further the goals of the Texas Parks and Wildlife Department's (TPWD) *Texas Wetlands Conservation Plan* and the Habitat Protection Actions of the *Galveston Bay Plan*.

The purpose of the Seabrook Wetland Conservation Plan is to present a balanced approach to conserving Seabrook's unique wetland resources while promoting economic growth and improving the quality of life for its residents. This plan will also serve as a model for other bay-area cities and help to insure the health and diversity of the entire Galveston Bay Estuary.

Seabrook

The City of Seabrook brings to this project a level of local commitment and involvement that would be difficult to match in any similar-sized city in the bay area. Seabrook incorporates nearly 13 square miles of land, including 11 miles of waterfront property just north of the narrow channel where Clear Lake opens into Galveston Bay (see vicinity map). This places the city amid the vibrant Clear Lake area; the third-largest boating center in the nation (with 1,250 slips in Seabrook alone) and home to NASA and its associated aerospace support companies (just four miles from Seabrook). Seabrook had its start as a league of land obtained from the Mexican Government in 1832, was finally developed as a new town site just after 1900, and became an incorporated city in 1961 to avoid annexation by Houston or La Porte. Within the Seabrook city limits may be found brackish, intermediate and fresh wetlands, including forested wetlands, estuarine bays, and bayous. The *Texas Wetlands Conservation Plan* recognizes these types of wetlands as "productive nursery and spawning areas, and habitat for seafood species and other marine organisms," as well as "important wintering and migration areas for North American waterfowl."



Seabrook Vicinity Map

Water, wind, and time have shaped Seabrook's fresh, salt, and brackish marshes and riparian and upland woodlands. Many of the freshwater depressions seen today in Seabrook were created by the remnants of the Brazos River. These freshwater depressions are known as prairie potholes. These wetlands once covered vast expanses of prairie before urbanization and agriculture destroyed most of them. (John Jacob, Sea Grant)

Galveston Bay and associated waterways are a destination for migratory birds and other wildlife. There are approximately 292 species of birds which live and migrate through Seabrook. Seabrook's list of wetland-dependent fauna also includes various amphibians, crustaceans, fish, and reptiles. Deer, raccoon, rabbit, and armadillo also reside in the upland habitats.

With an estimated 1999 population of 9,906, Seabrook is unique in maintaining and regularly updating a comprehensive plan for the city with direct citizen involvement. Seabrook also has invested well in its 78-acre local parks system. Seabrook's park system is a jewel, especially for a city of its size. The parkland provides a wide range of both indoor and outdoor activities. The parks plan includes a list of natural areas, open space, and greenbelts to conserve for its citizens and visitors. This list also includes sites appropriate for wetland mitigation projects.

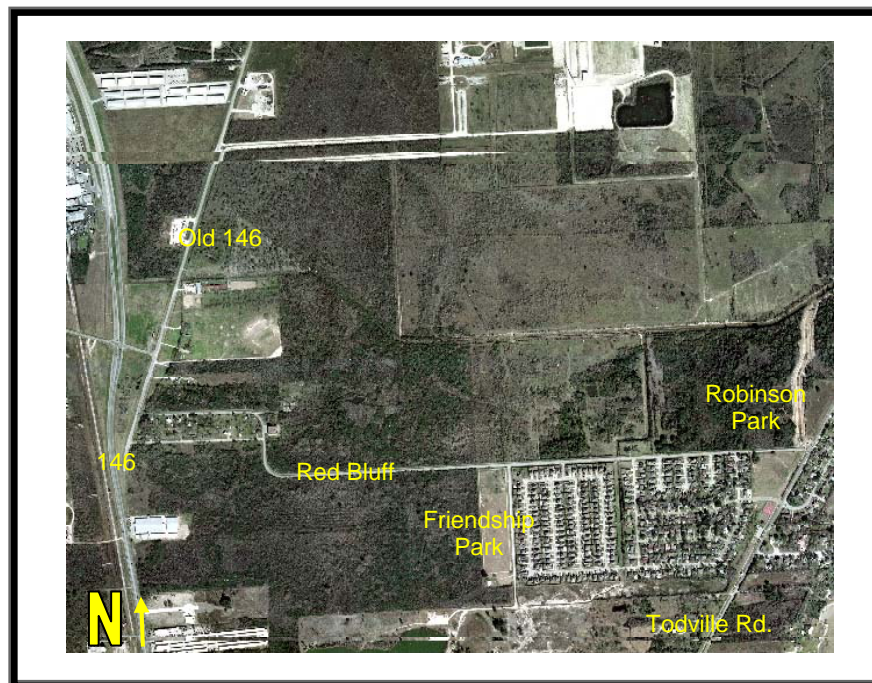


Figure 1 Seabrook Open Space. This image depicts two parks and one of the last remaining parcels of significant acreage that has not been developed or platted for development. That will soon change, if steps are not taken immediately to preserve this area.

Water and wildlife are part of what attracts homeowners to the area. But, the continuing strong market demand for housing and commercial development will place a strain on the City's infrastructure and environment. New development will reduce the amount of pervious groundcover, which will cause water to runoff at a faster rate, creating a drainage problem for which the city does not have proper facilities to handle.

Although Seabrook borders Galveston Bay and two tertiary bays there are no local shoreline protection or wetland conservation policies. With the expansion of NASA Road One,

commercial property in the road's corridor is at a premium. Every lot of land along Clear Lake is slated for development, leaving no feasible options for public shoreline preservation or access. Currently, there are only limited state and federal regulations to protect these shorelines from man-made impacts on fish and wildlife habitat. However, federal and state funding is available to acquire and/or protect significant coastal wetlands and for shoreline erosion control projects.

Erosion and subsidence are also threatening much of Seabrook's developable property along with fish and wildlife habitat. The lagoons near Old Seabrook have claimed city streets and private property. The predominately privately owned shoreline is also eroding. A recent experiment in one of the lagoons tested the possibility of restoring habitat by planting wetland grasses. To this date the experiment has been successful in creating marsh habitat and protecting the shoreline from further erosion. But, more erosion control projects and plantings are needed.

Planning Process

The advisory team assembled to develop the wetland conservation plan came from an existing network of regional, state, and federal natural resource agencies and a core group of concerned citizens, business leaders, elected officials, and staff members representing the City of Seabrook. The key team members who were actively involved include: Shari Baldrige, Port of Houston; Bruce Bennett, US Army Corps of Engineers (USACE); Alisha Goldberg, Galveston Bay Foundation (GBF); Richard Harral, citizen; John Huffman, US Fish and Wildlife Service (USFWS); John Jacob, Sea Grant Marine Advisory Service (Sea Grant); Kay Jenkins, TPWD; Chris Kuhlman, Seabrook Eco-Tourism Committee; Jerry C. Larsen, Seabrook City Council; Tom Knickerbocker, Centurion Consulting; Garry McMahan, GLO; Cathy Palmer, Galveston Bay Information Center (GBIC); Bob Robinson, Seabrook Mayor; Robert Rudolph, GBEP; Eddie Seidensticker, USDA-Natural Resources Conservation Service (NRCS); Marisa Sipocz, Sea Grant; Kerry M. Stanley, USACE; Bob Webbon, Seabrook Parks Board; Ron Wicker, Seabrook City Manager.

The team met monthly from July 1999 to March 2000. One of the first tasks of the advisory team was to determine goals and objectives both for the plan (featured on pages five and six) and for the project. Once the goals and objectives were established, the tools for conservation were discussed. Consultants and experts on the tools were brought in to lead discussions and answer any questions from the advisory team. While evaluating the tools, the team also considered sites within Seabrook city limits that are in danger of development before their wetland values are truly understood.

The goals set forth by the team for the project include:

- Create a plan that establishes goals and objectives, identifies areas for wetland conservation projects, and provides an implementation strategy to guide development and land use decisions.
- Provide current data for the purpose of identifying wetland and special geological features.
- Evaluate the economic value of wetland conservation.
- Educate citizens about the wetland conservation plan and the importance of wetland conservation.

WETLAND CONSERVATION GOALS AND OBJECTIVES

Once the advisory team established the goals of the project, the vision, goals, and objectives were established for the plan. Realizing that the action steps would stem from these objectives, the team worked to develop goals that would represent the purpose and intention of the plan. The following goal and objective statements acted as a rudder to give direction to the rest of the plan.

| |
|---|
| <p style="text-align: center;">Vision Seabrook as the Model in the Region for Conservation and Preservation of Wetlands</p> |
|---|

Goal 1
Protect Top Priority Sites

The best protection and control comes from the acquisition of development rights either through purchase or donation through a conservation easement. While regulation and education will improve individual land management, it is important for the City to partner in responsibility and funding with private business, public agencies, and nonprofit organizations to help preserve and protect wetlands and open space (Appendix C).



Objectives

- Identify specific sites for preservation by building on the data collected for the Seabrook Parks and Recreation Plan and by using the expertise of state and regional agencies
- Obtain a stake in priority sites through donation or purchase of land or development rights
- Secure funding sources for the purpose of acquiring land and development rights
- Identify a timeline for acquisition of priority sites
- Identify wetland habitats in Seabrook and any potential threats to them

Goal 2
Minimize Wetland Loss and Promote Replacement and Enhancement of Degraded Wetlands

The US Army Corps of Engineers Section 404 permits are designed to meet the goal of “no net loss” (Appendix B). Since the Corps is overseeing the regulation of the entire system of US wetlands, local regulation would minimize net loss due to oversight. The integration of wetland requirements into city ordinances would encourage the conservation of wetlands and the enhancement of wetlands within the Galveston Bay watershed.



Objectives

- Develop a resolution that would guide the city’s planning commission and council in wetland conservation
- Integrate wetland conservation measures into current city codes
- Identify potential mitigation projects

Goal 3

Raise Awareness of Residents, Land Owners, and the Development Community

The greatest threat to wetlands is the lack of understanding of their benefits. It is important to educate citizens and developers as well as city officials on the values of the wetlands to the region and to the local economy (Appendix A). This education process must start with the individual landowner, then spread through the schools, and out into the rest of the community.



Objectives

- Encourage land stewardship through state and regional agencies and organizations (See Appendix E for contact information)
- Compile information on existing wetland educational programs
- Promote wetland educational programs in schools, summer programs, and other educational outlets
- Establish a City-wide Wetland Focus Week and coordinate it with regional wetland activities
- Increase wetland literature in the public library

Goal 4

Encourage Ecotourism

Ecotourism is one of the many benefits of wetland habitats. Ecotourists are highly desirable visitors due to their buying power and environmentally friendly activities. In order to attract bird watchers and hikers, the city needs businesses that provide food, lodging, and equipment. Another important part of attracting these desirable tourists is providing informative signage along trails, maintaining trail systems, and creating viewing stations. See Appendix C for a list of grants and resources that can be used to promote ecotourism.



Objectives

- Develop an ecotourism development plan
- Investigate the need and funding opportunities for an informational tourist/nature center
- Encourage the development of restaurant, lodging, and specialized equipment businesses that cater to the ecotourism market
- Place interpretive signage in public open spaces and parks
- Develop and distribute birding and trail brochures specific to Seabrook and its habitat

CRITICAL RESOURCES AND IDENTIFICATION MAPS

Areas of Geological Interest

The wetlands of Seabrook are the result of ancient geologic processes. It is located on the terrestrial terminus of a large SE-trending meander ridge of the ancient Brazos River. A meander-ridge is an elevated (2-5 feet above surrounding landscape), broad (2-5 miles across) ridge built up by a flowing river. This ridge was created more than 30,000 years ago. The sinuous channel scars left by the river have been greatly modified from deposition by wind and animal action, such that the original channel scars are often no longer detectable on the landscape. Most of the wetlands in this area are in depressions formed either directly by the ancient river or by subsequent wind action. Pimple mounds or small knolls are a common feature of these wetland complexes, and may have been the result of wind action. The resulting pattern of wetlands and mounds is referred to as a prairie-pothole complex, and is an irreplaceable geological legacy. The potholes, mounds, and intermound flats constitute a highly complex mix of hydrologic extremes; from the semi-arid climate on the mounds to near permanent saturation in the deeper potholes. The short-range complexity of this pattern forms a template for biological complexity.

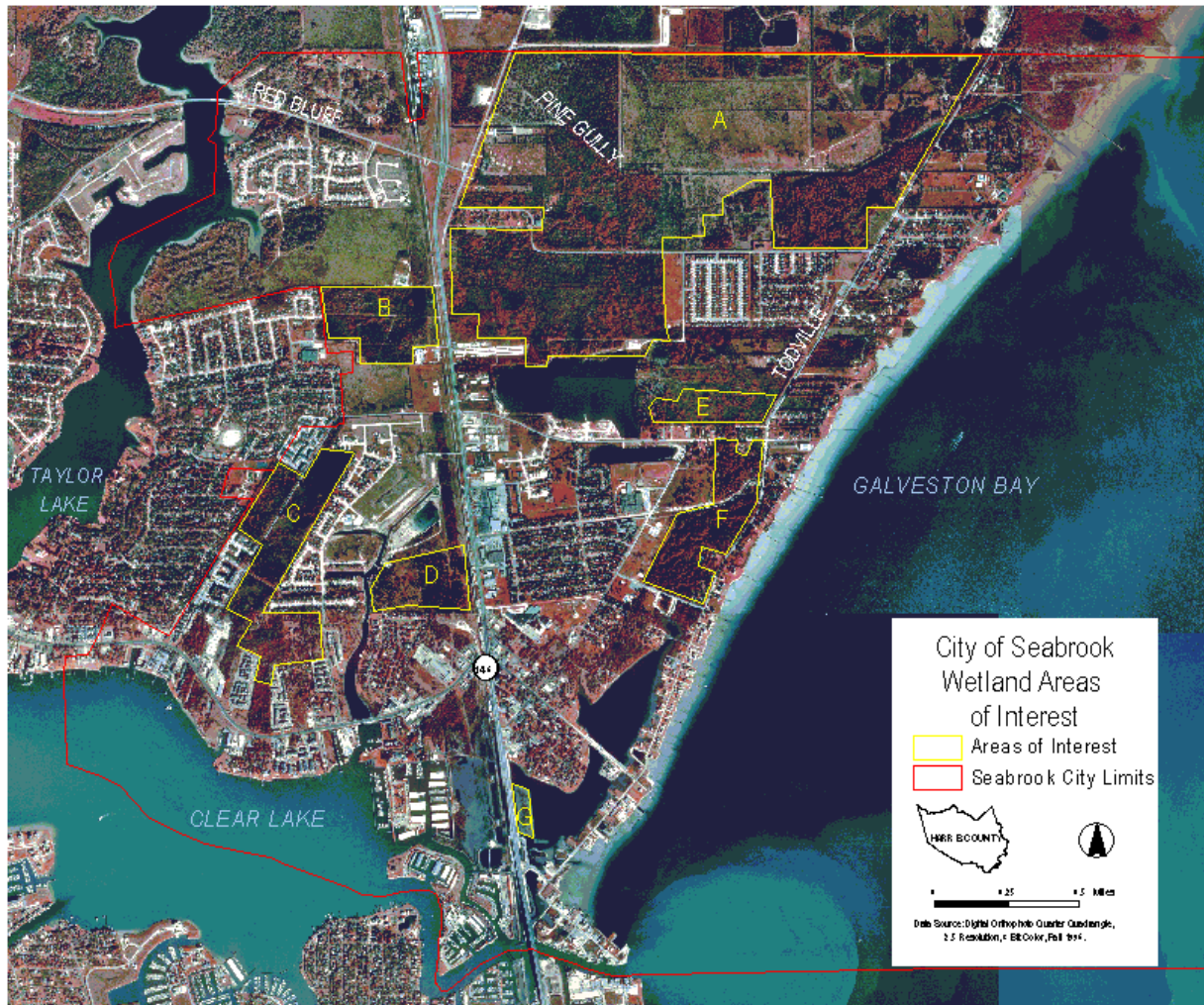


Figure 2 Wetland Areas of Interest

The Coastal Prairie was once covered with prairie pothole complexes, but most have been leveled due to agriculture and urbanization. Some of the best remaining complexes are in the urban fringe, but these are also the complexes most threatened due to development. All of the native wetlands in Seabrook, excluding the few acres of salt marsh, are remnants of prairie pothole complexes.

The area labeled “A” is a very significant prairie pothole complex remnant. It is of sufficient size that it could be managed “ecologically”. That is, it could be managed as a system rather than as a postage stamp remnant. This area appears never to have been land-leveled. It has been heavily impacted by invasive species such as Chinese Tallow and Yaupon, but because it still retains the original depositional topography, this site is an excellent template upon which restoration can take place. Area “B” has a similar topography and while much smaller in size than “A”, is still significant primarily because of its adjacency to “A”.

Area “C”, “D”, “E”, and “F” also appear to be prairie pothole remnants, but are much smaller and much more fragmented, and thus the ability to manage these sites as ecological units is greatly diminished. Area “G” is a small fragment of salt marsh.

Soils (Soil Survey of Harris County, Texas; USDA, Soil Conservation Service 1976)

Seabrook is part of the Midland-Beaumont association, which is characterized by its poorly drained, very slow permeable, loamy and clayey soils. The city also consists of nine other dominant soils that almost always are nearly level.

The Beaumont soils (Ba, Bd) “have a surface layer of very firm, very strongly acid, dark gray to gray clay about 21 inches thick.” The surface layer slowly changes grade to a depth of 38 inches while maintaining its firmness. Vamont soils (VaA, VaB, Vn) are another dominant soil type that is adjacent to the Beaumont soils and forms a gentle slope that leads to drainageways, like the area along Galveston Bay. Voss soils (Vs) also are found along the Bay, but they are formed in “deep sandy alluvial sediments.” The Atasco soils (AtB), like the Vamont soils, lead to drainageways and can be found along Taylor Lake.

Like the Beaumont soils (Ba, Bd), Midland soils (Md) are also firm. The surface of the soil may be smooth or form pimple mounds that are a part of wetland complexes. Another dominant soil that occurs as a pimple mound is Edna (Ed). Edna soils can be found in the northwest quadrant of the City.

Aldine soils (Am, An), in contrast with the Midland and Beaumont soils, are friable at the surface. Like the Midland soils, Aldine soils are nearly level but do form pimple mounds in areas. Aris soils (Ap) are also friable. They are known to be smooth and are found on upland prairies. The Lake Charles soils are also found in uplands and form in alkaline marine clay.

Harris soils (Ha) are found in coastal marshlands and are formed in “saline, clayey coastal sediments.” These soils can be found on the west side of the lagoons. Like the Harris soils, Ijam soils (Is) are also formed in saline, clayey sediment. These soils are usually part of the dredged material removed from the floodways of bayous, lakes, and rivers in the coastal flats. Ijam soils can be found in the Seabrook Shipyards.

Aldine (Am), Edna (Ed), Harris (Ha), Ijam (Is), and Midland (Md, Mu) are good for growing “annual and perennial wild herbaceous plants that grow on moist or wet sites.” These wetland plants attract wildlife such as egrets, herons, rails, coots, gallinules, and other migratory birds. The following map shows the city broken into dominant soil categories.

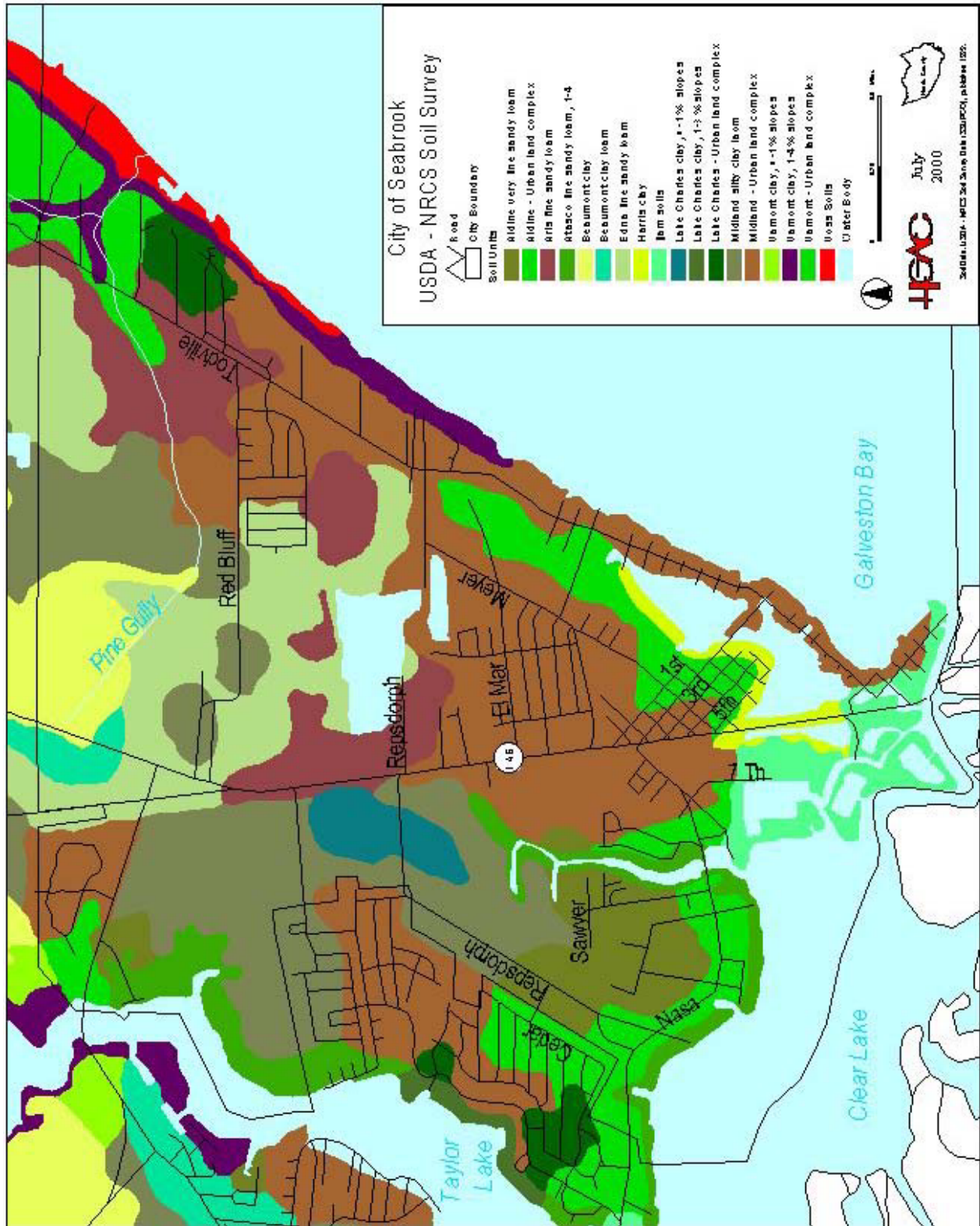


Figure 3 USDA, NRCS Soil Survey

National Wetland Inventory

The following terms and definitions are taken from the document, *The Classification of Wetlands and Deep Water Habitats of the United States*, put together for the Department of the Interior by USFWS, USGS, Department of Natural Resources, University of Rhode Island, and NOAA.

Estuarine

The Estuarine System consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of seawater. The Estuarine System includes both estuaries and lagoons. Estuaries are affected by one or more of the following forces: oceanic tides, precipitation, freshwater runoff from land areas, evaporation, and wind.

Palustrine

The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie. It also includes the small, shallow, permanent or intermittent water bodies often called ponds.

Forested Wetland

The class Forested Wetland is characterized by woody vegetation that is 20 feet tall or taller. Forested Wetlands occur only in the Palustrine and Estuarine Systems and normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer. Forested Wetlands in the Estuarine System are known by such names as swamps, hammocks, heads, and bottoms.

Shrub Wetland

The Class Scrub-Shrub Wetland includes areas dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-Shrub Wetlands may represent a successional stage leading to Forested Wetland, or they may be relatively stable communities. They occur only in the Estuarine and Palustrine Systems.

Flat

A level landform composed of unconsolidated sediments- usually mud or sand. Flats may be irregularly shaped or elongate and continuous with the shore.

These terms describe the type of wetlands that have been identified in Seabrook by the USFWS as described by the National Wetland Inventory, published in 1992. Each type of wetland plays a role in the breeding, rearing, and protection of various wildlife and plant habitats. The map on the following page shows wetland and habitat classification locations in Seabrook.

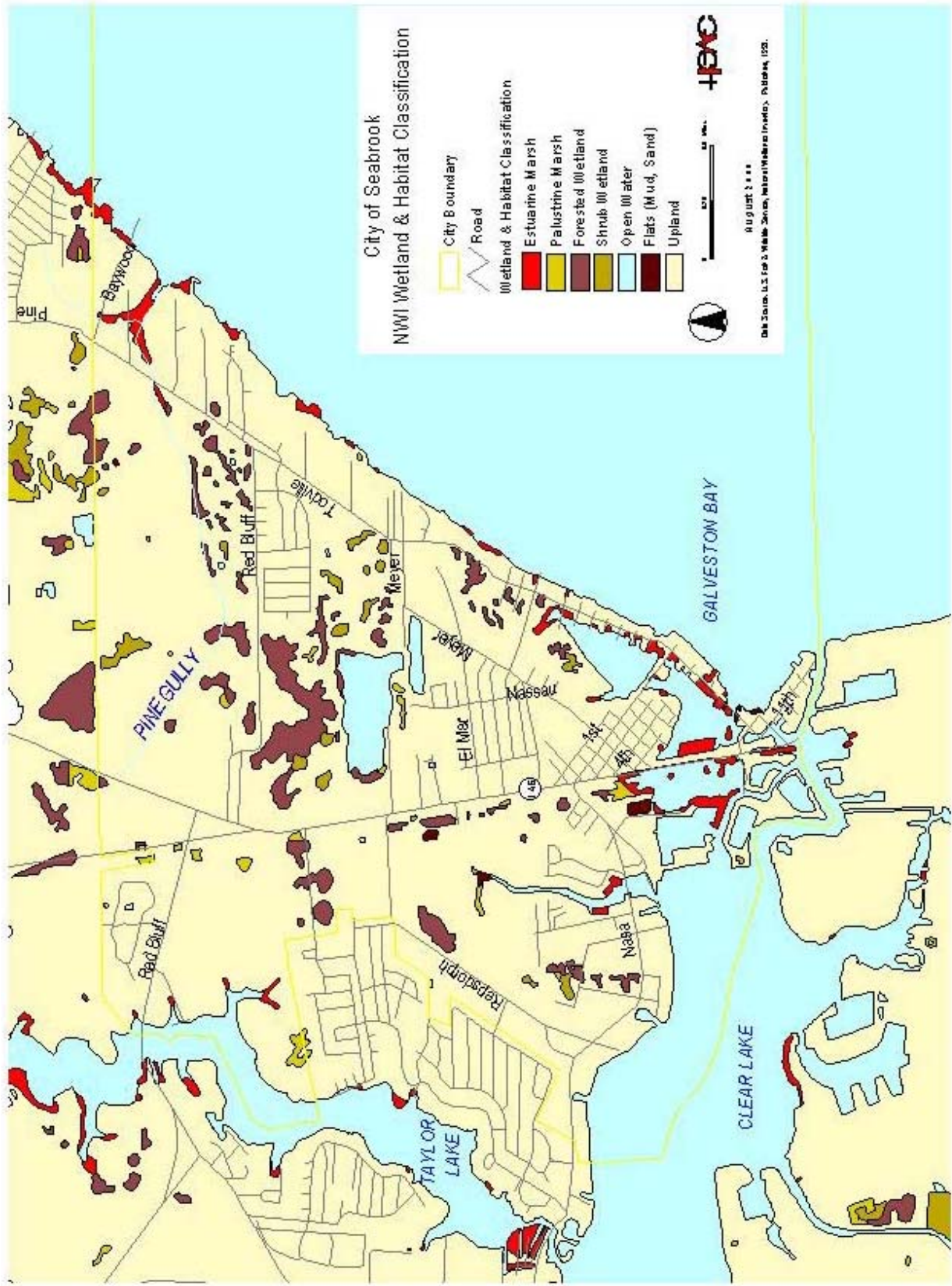


Figure 4 NWI Wetland & Habitat Classification

Floodplain

Clear Lake, Taylor Lake and Galveston Bay are some of the features that attract people to Seabrook. During an average summer day in Seabrook, citizens and tourists alike can be found fishing and sitting on decks of homes and restaurants watching the boats go by. But with the warm summer weather comes hurricane season and the chance of massive flooding in the city. In the event of a storm, houses and other structures that have been built in the floodplain are threatened by rising water. When a storm strikes the city, “mitigation is the cornerstone of emergency management.” (FEMA, <http://www.fema.gov/mit/whatmit.htm>) Wetlands, a natural resource, are a key mitigation tool in the fight against rising floodwaters. Wetlands diminish wave action, therefore controlling erosion. They also allow sediment to settle out of storm water, therefore improving water quality. When wetlands are filled for construction, the above-mentioned benefits are lost; water flow is restricted causing greater flooding; and valuable property is lost causing a hike in flood insurance rates.

Promoting sound land use planning in the flood plain, relocating or elevating structures out of the floodplains, are developing, adopting, and enforcing effective building codes and standards are key to protecting valuable property and beauty of the city. The following map shows the location of the 100-year floodplain in Seabrook.

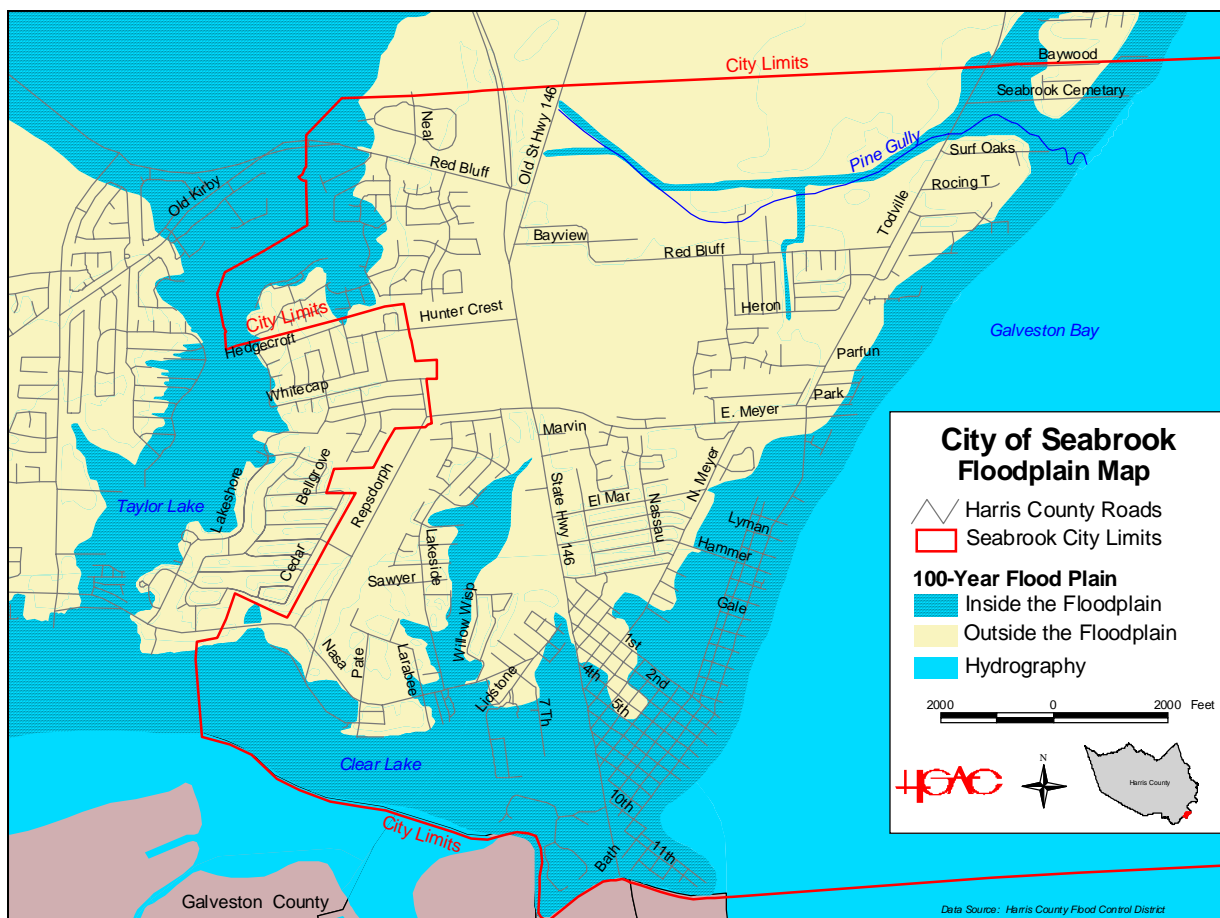


Figure 5 Floodplain Map

PRIORITY SITES

The Seabrook Parks Board, Ecotourism Board, Planning Commission and City Council worked to prioritize a list of sites for protection, preservation and enhancement in Seabrook. The list of sites came from recommendations made in the *Seabrook Parks, Recreation and Open Space Master Plan* and recommendations by the Parks and Ecotourism Boards. The sites were placed in three categories (see map on the following page): those owned by the city needing enhancement and protection, those that need to be acquired for preservation, and those that need to be acquired as funding becomes available.

There are three sites that are owned by the City that need further protection, Pine Gully Park Shoreline, Hester Gully, and Wildwood Park. Each of these sites provides an opportunity for pilot wetland preservation and shoreline protection measures, as well as provides educational opportunities for school science classes and others interested in wetlands.



The shoreline along Pine Gully Park is eroding. Making it a priority will allow the City to leverage funds to slow the loss of valuable land. There are currently new developments in shoreline protection using natural materials for construction like an oyster reef. The oysters are placed in wire formations, and once the reef is in place it will begin to grow and create a natural barrier against wave action.

Hester Gully provides drainage for Miramar Subdivision and is managed by Harris County. The gully has suffered a loss of vegetation due to clear-cutting and straightening of the gully. It is believed that the gully would better serve the citizens if it were left as a meandering waterway with enhanced marsh habitat and trails. The gully flows next to the public library and is used as an outdoor classroom for intermediate science classes. This makes it a good candidate for wetland restoration projects that can be led by students and other interested citizens.



Photo provided by Chris Kuhlman

The City purchased Wildwood Park in 1992 in order to provide more open space for the east side of the city. The park is located on NASA Road One creating high visibility and is included as a priority because it contains wetlands. Texas Department of Transportation created the wetlands for the purpose of mitigation. The park's wetlands could be enhanced and increased in size in order to provide a better educational experience. Signs and improved trail access would also enhance the educational experience.

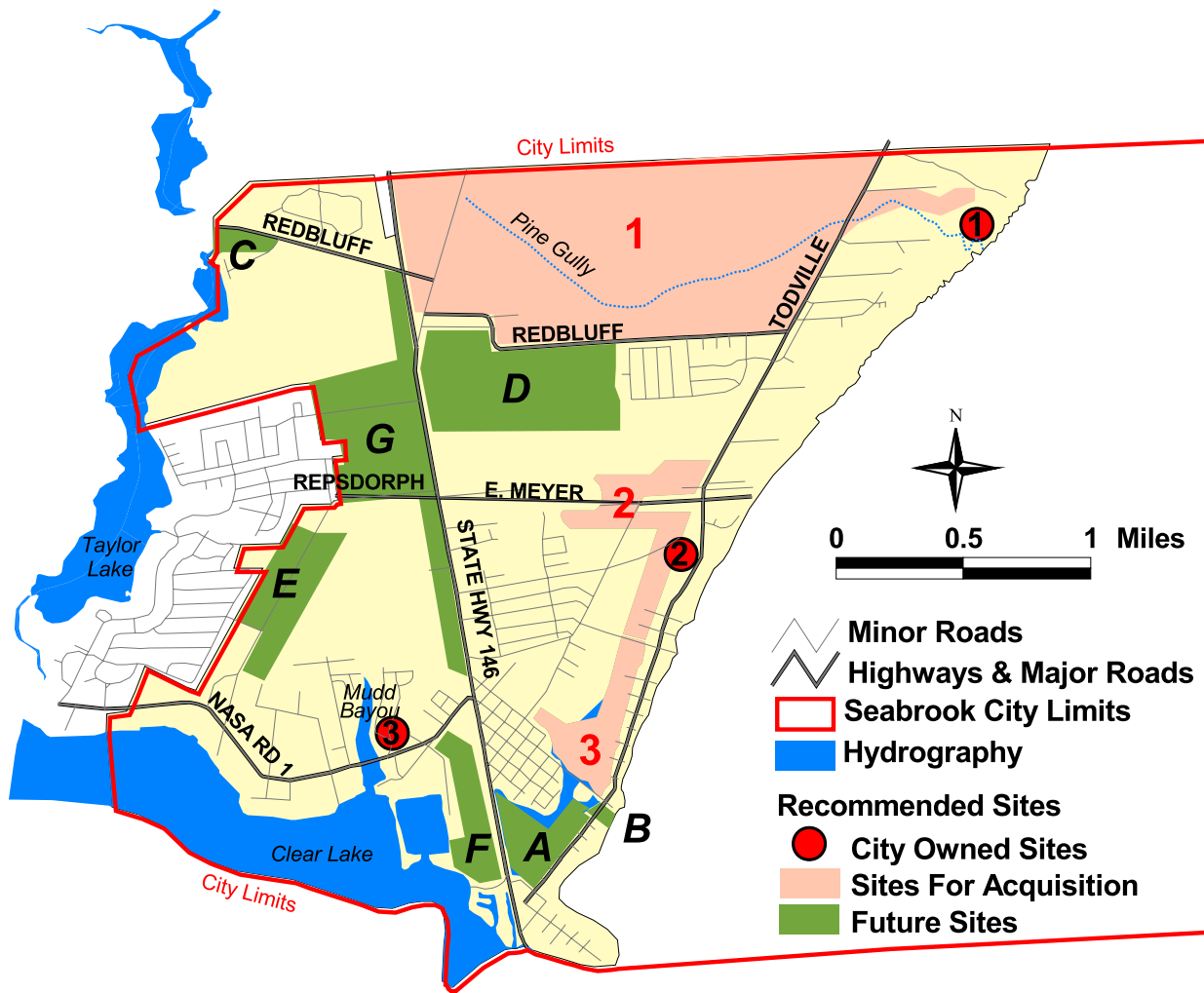


Figure 6 Priority Sites

- | | | |
|--|---|---|
|  City Owned Sites (Highest Priority) 1. Pine Gully Shoreline 2. Hester Gully 3. Wildwood Park |  Sites for Acquisition (High Priority) 1. North Red Bluff 2. Meyer Street-East Lagoon 3. Hester-Central City Greenbelt |  Future Sites (Priority) A. Clear Lake Marshland B. Galveston Bay Open Space C. Red Bluff-Taylor Lake D. Friendship Open Space E. Repsdorph Natural Area F. South NASA Road One G. West Central Open Space |
|--|---|---|

The second category of priorities includes three sites that are to be acquired, North Red Bluff, Meyer Street-East Lagoon Natural Area, and Hester-Central City Greenbelt. The sites are selected in order to protect open space that contains wetlands from being over-developed.

North Red Bluff

This area is bounded by Red Bluff Road on the south, the city limits on the north, highway 146 on the west, and Todville Road on the east. It is made of 30 tracts of land and approximately 650 acres. The three largest landowners include American Acryl, Interfinancial Corp, and Bayport. This natural area contains isolated wetlands, Robinson Park, and most of Pine Gully. The area acts as a natural buffer between Seabrook residents and the petrochemical industry north in the City of Pasadena.



Photo provided by Chris Kuhlman

Meyer Street-East Lagoon Natural Area

This area is located between 2nd Street and Bimini Way. It is surrounded by residential neighborhoods along Todville Road and N. Meyer Street. The area is described as residential in land use but is largely under the water of the lagoon. This area is also unique in its transition between wetlands and uplands, but unlike the South NASA Road 1 Open Space, the site contains old tree growth. The site is approximately 50 acres in size. The City owns 10 acres in the northern portion of the area.

Hester-Central City Greenbelt

This greenbelt is a linear area that is bounded by residential development, two parks, and the Meyer Street East Lagoon Natural Area. The area is predominantly residential in land use with one small, $\frac{3}{4}$ acre, commercial parcel and a 34-acre agriculture parcel. It contains part of the trail network that links with Hester Garden Park, Meador Park, and Miramar Park. This greenbelt provides a natural link between residents and open space.

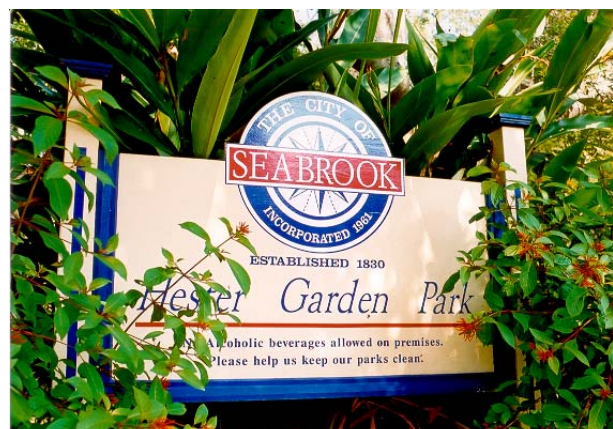


Photo provided by Chris Kuhlman

Information including property ownership and acreage was obtained from the 1999-2000 HCAD Web Site, <http://www.hcad.org>

The third category includes sites that are still considered priorities for protection, preservation and enhancement but will only be acquired as grant funding or donations are available. These sites include Clear Lake Marshland Natural Area, Galveston Bay Open Space, Red Bluff-Taylor Lake Open Space, Friendship Open Space, Repsdorph Natural Area, South NASA Road One Open Space, and West Central Open Space/Greenbelt.

Clear Lake Marshland Natural Area

This is a tidal area that is owned by the Texas General Land Office (GLO). The GLO and US Army Corps of Engineers along with Reliant Energy HL&P worked to restore marshland in this area, but more wetland habitat is needed to act as a fishery, protecting and feeding young fish. The area also attracts birds and other wildlife that add interest to the area for citizens and tourists alike.



Galveston Bay Open Space



This site is near downtown at the terminus of 2nd Street. The space is one of the last remaining public access areas to the Bay. The site is currently privately owned. This area would be useful as a public park that could be connected to Old Seabrook through signage and a trail system.

Red Bluff-Taylor Lake Open Space

This area is bounded by Red Bluff Road on the north, Taylor Lake on the west, and Shady Lake Drive on the east and south. It is currently divided into two tracts of land. One tract is approximately 4.3 acres and is currently owned by a Seabrook resident. The second tract is owned by Harris County and is part of the right-of-way for Red Bluff Road. The area is adjacent to Old Red Bluff Road Bridge that is used as a fishing pier by local residents. Armand Bayou Park is located less than a mile east of this area.



Information including property ownership and acreage was obtained from the 1999-2000 HCAD Web Site, <http://www.hcad.org>

Friendship Open Space

This open space is bounded by Red Bluff Road on the north, Friendship Park on the east, Highway 146 on the west, and a subdivision development on the south. It contains some of the last remaining heavily wooded tracts of land in Seabrook. The area has potential for upland enhancement and wetland creation through mitigation performed by local developers. It is made of 16 tracts and approximately 146 acres. Two of the large tract owners include Trust Me and Interfinancial Corp.



Photo provided by Chris Kuhlman

Repsdorph Natural Area

This area is surrounded by single and multi-family housing. Repsdorph Road runs through the center of the natural area. It is characterized by dense forest and freshwater wetlands. A portion of this area is being preserved in Repsdorph Park with a grant from the Texas Parks and Wildlife Department. The presence of wetlands prevents high-density development, therefore, making the land a good candidate for preservation. The area is made of approximately 60 acres and is predominately vacant commercial land.

South NASA Road One Open Space

This open space is located in a predominately commercial area bordered by NASA Road 1, 7th Street, Hwy. 146, and the Seabrook Shipyards. The area is unique in its transition of wetlands to uplands. The space consists of approximately 57 acres. The two main landowners are the Ben Taub Estate and Houtex Holding I LTD.



West Central Open Space/Greenbelt



The bulk of the area is bounded on the west side by El Lago and the east side by State Highway 146. It also has areas that stretch down the utility easement on the west side of 146 from Red Bluff to just before NASA Road One. It is characterized by both open areas and dense tree growth. The open space along 146 has the capacity to support a safe trail for pedestrians and bicyclists. The area is made of approximately 152 acres. It is predominately residential with pipeline and utility easements. Bayport owns the largest parcel of land, approximately 51 acres.

Information including property ownership and acreage was obtained from the 1999-2000 HCAD Web Site
<http://www.hcad.org>

METHODS OF PRESERVATION

Local governments have a role in the protection of wetlands. Although traditionally the role of the state and federal governments, home-rule cities have regulatory authority that can be used to protect wetlands. Zoning, subdivision regulation, and nuisance prohibition are some of the regulatory tools, but sometimes, it is better to reward than to regulate. Preserving wetlands through conservation easements and mitigation areas can be ways for both the landowner and the city to financially benefit. The Texas General Land Office (GLO) and Berg Oliver Associates, Inc. made the following information about methods of preservation available.

Regulatory (*Texas Coastal Wetlands*, December 1996, GLO)

Zoning—Although zoning has not traditionally been used in a manner that promoted the conservation of wetlands, it is an effective tool that Texas home rule cities may use to protect wetlands. The techniques listed below will allow a city like Seabrook, with zoning regulations already in place, to protect their natural resources and sensitive areas.

Planned Unit Development (PUD): A PUD allows a tract of land to be planned and developed in its entirety, instead of lot by lot. Development restrictions that protect sensitive areas may be incorporated into PUD regulations. The developer must then identify wetlands and either protect or take steps to compensate before construction begins.

Buffer Zoning: Buffers may be established around a sensitive area to protect against over-development. When determining a buffer there are two options; (a.) the buffer may be set at varying depths depending on the type of development that is to occur around the protected site; or (b.) one set depth may be determined for the entire buffer around the site.

Set-Asides: Set-asides are similar to impervious cover restrictions. They require that a certain amount of land remain undisturbed.

Overlay Zoning: A zoning overlay is the addition of a restrictive zoning ordinance to the base zoning ordinance. An overlay ordinance may require additional criteria to develop in or around a sensitive area.

Cluster Zoning and Density Transfers: This type of zoning allows a developer to build more densely in one area of the property in return for protecting or not disturbing a sensitive area on the site.

Acquisition (*Texas Coastal Wetlands*, December 1996, GLO)

Fee-Simple Ownership—Acquiring the full property rights and responsibility for management.

Less-Than-Fee Ownership—Acquiring ownership of some of the rights such as mineral or development rights.

Options—Acquiring the right to purchase the land at any time for a predetermined price.

Rights of First Refusal—Obtaining the right to match any offer should the owner decide to sell the property

Life Estate Purchase—Acquiring property but allowing the original owner to manage the property and retain some of the property rights until the owners death, at which time the full rights of the property would then be transferred.

Installment Sale—Acquiring property and making payments to the owner over a period of years.

Bargain Sale—Acquiring wetlands at less than market value due to donation by a property owner, who can then be eligible for a tax deduction.

Full Market Value—Acquiring property at full market value.

Purchase and Leaseback Agreement—Acquiring property and then leasing it back to the original owner with certain restrictions for a set period of time.

Post-Acquisition Disposal—Acquiring property, placing restrictions on the deed, and then reselling the land.

Conservation Easements

Easements allow owners to retain their property under restrictions of land use. The easement may be obtained by contractual agreement between the landowner and the local government or another appropriate organization. This agreement is most beneficial to a landowner that has no intention of developing the land. In most cases, when a permanent easement is donated, the landowner will qualify for some form of tax deduction.

Mitigation (Berg Oliver Associates, Inc. and *Texas Coastal Wetlands*, December 1996, GLO)

Mitigation Bank—wetlands restored, created, or enhanced, under permit of the USACE, in order to provide advanced compensation for those wetlands destroyed or lost due to development activities. A mitigation bank is assessed credits by the USACE. These credits can be withdrawn and debited from the bank to compensate for losses incurred during development activities.

Pros

- Wetlands constructed in advance thus lower mitigation ratios.
- Liability reduced to applicant.
- Site selection allows for selection of characteristics needed to ensure success.

Cons

- Large front end expense.
- Expensive lengthy process for MOA and minimum success.
- Liability assumed by Sponsor.

Examples and Exhibits in the Houston-Galveston Region

- Harris County Mitigation Bank
- Katy Prairie Mitigation Bank

Mitigation Areas—wetlands restored, created, or enhanced, under permit of the USACE, in order to provide compensation for those wetlands destroyed or lost due to development activities. A mitigation area is different from a bank, because a developer creates the wetlands instead of purchasing credits against existing wetlands. A mitigation area may function as a large bank in which the owner of the land acts as a sponsor and has a plan for how the wetlands are to be created and function.

Pros

- Expenses paid for by applicant (not sponsor) - incurred as needed.
- Normal Section 404 Permit Process
- Sponsor does not assume liability for the required success of the wetland.

Cons

- Mitigation ratios are slightly higher.
- Requires 3-5 year monitoring for minimum success criteria.

Examples and Exhibits in the Houston-Galveston Region

- Katy Prairie Mitigation Area
- Jack Road Mitigation Area
- Telge Road Forested Area

In Lieu Fee Possibilities (Pending approval of the USACE)—fees paid by the developer to a sponsor for the restoration, creation, or enhancement of wetlands to compensate for the loss or degradation of wetlands during development activities.

Pros

- Funds for development of wetland from applicant
- Normal Section 404 Permit
- Economic Development Potential

Cons

- Sponsor responsible for wetland development and success
- Fee is estimated therefore cost/success risk assumed by Sponsor

Education

Wetland Resource Identification—Soils and plant material must be identified and used as indicators of wetland resources. Vacant lots and park sites should be identified for potential wetland enhancement and mitigation

School Education Programs—Provide resources and management for programs that have a mascot and can provide educational activities for students during primary education years and programs that include field trips and volunteer activities for secondary school aged children.

Landowner Education—Texas Parks and Wildlife Department provides a guide for landowners who have wetlands on their property. The web site with this information is www.tpwd.state.tx.us/conserves/wetlands/wetintro.htm.

Library Expansion/Clearing House—The Harris County Library located in Seabrook could be expanded to include materials on wetlands and their importance to the community.

Nature Center—The City of Seabrook is working on a plan that would include purchasing a building located on the Bay shoreline for the Seabrook Parks Department. This could be expanded to include a nature center that would act as headquarters for wetland education and information distribution as well as demonstration gardens.

Other Tools (*Texas Coastal Wetlands*, December 1996, GLO)

User Fees—Fees collected for the use of parks, recreation centers, and other public facilities.

Impact Fees—Fees that may be collected from a developer for the impact new development has on wetlands and open space.

Voluntary Utility Payment—A program that provides a box to check on the utility bill where citizens, who want to contribute money to an on going wetland conservation fund maintained by the city, may check a box and include the monetary contribution with their utility payment.

IMPLEMENTATION STRATEGY

| ACTION Goal No.- Action No. | TITLE | PRIORITY | DESCRIPTION | STEPS | LEAD | OTHER PARTICIPANTS |
|-----------------------------------|--------------------------|--|--|--|--|---|
| 1-1 | Wetland Advisory Board | Highest Priority Target Date: August 2001 | Board appointed by the City Council and advised by the City staff for the purpose of making recommendations to the council on wetland conservation | <ul style="list-style-type: none"> • City council establishes and appoints board, with representation from the following stakeholders: landowners, developers/contractors, environmental organizations, and interested citizens. Ex-officio members should include representatives of natural resource agencies and a fiscal advisor. • Board be given the opportunity to review, comment and provide recommendations to the Seabrook Planning Commission and/or City Council on plats or permits related to land development. The Board should also be authorized to formulate comments on behalf of the City on Section 10/404 permits and Environmental Site Assessment Studies (phase 1) for projects within the City of Seabrook. • Board should recommend grants and other funding sources to be pursued by the City to achieve the goals and objectives of the Seabrook Wetland Conservation Plan. • Board should provide input and recommendations regarding updates and implementation strategies for the City's parks and comprehensive plans. • Board should review and amend, as necessary, the list of priority site acquisitions locations every two years. • Board should make any other recommendations to the City Council it deems appropriate to realize the achievement of the goals and objectives of the Seabrook Wetland Conservation Plan. | City Council City Manager City Planner City Parks Department | <ul style="list-style-type: none"> • GBF • GBEP • TPWD • USFWS • USACE |
| 1-2 | Identify Priority Sites | High Priority Target Date: August 2001 | Identify priority sites for acquisition. | <ul style="list-style-type: none"> • Use city studies and regional environmental agencies to identify specific acreage within priority sites for acquisition through conservation easements, in lieu fees, fee-simple ownership, or less-than-fee ownership. • Determine a timeline for the acquisition of sites. • Determine the best method for acquiring and/or protecting each site. • Determine the best funding sources for acquisition and continued protection. | Wetland Advisory Board City Parks Department | <ul style="list-style-type: none"> • Parks Board • Eco-tourism Committee • City Planner • TPWD • USFWS • GBEP • GBF • GBIC • Sea Grant • The Nature Conservancy • Legacy Land Trust |
| 2-1 | Mitigation Areas | High Priority Target Date: December 2001 | Create a mitigation area to provide developers a way for mitigating wetland loss within the City. | <ul style="list-style-type: none"> • Determine, as appropriate, sites for establishing mitigation areas. • Identify and pursue options for acquiring sites if not yet City-owned. • Create a US Army Corps of Engineers approved plan for mitigation areas, to include educational and recreational benefits for the residents of Seabrook. • Use fees charged to developers for mitigation rights to establish a funding source to provide maintenance for mitigation areas. • Promote utilization of the mitigation areas by developers in need of wetland mitigation. | Wetland Advisory Board City Parks Department City Council | <ul style="list-style-type: none"> • City Planner • USACE • Parks Board • Eco-tourism Committee • H-GAC • TPWD • GBEP • GBF • USFWS • GLO |
| 2-2 | Policies and Regulations | Medium Priority Target Date: August 2002 | Incorporate wetland goals into the comprehensive plan and wetland regulations into local zoning and building codes. | <ul style="list-style-type: none"> • Develop an ordinance and permitting process for projects requiring the clearance of land parcels ½ acre and larger. • Delineate “environmentally sensitive areas” in the comprehensive plan. • Establish a buffer zone around sensitive areas that are to be protected from development. • Establish impervious cover restrictions in sensitive areas. • Establish policies for allowing density transfers out of sensitive areas. • Establish a shoreline protection zone. • Require a permit for any land disturbing activity in the shoreline protection zone. | City Planner Wetland Advisory Board City Council | <ul style="list-style-type: none"> • City Manager • Planning and Zoning Commission • GLO • TPWD • USFWS |

| ACTION Goal No.- Action No. | TITLE | PRIORITY | DESCRIPTION | STEPS | LEAD | OTHER PARTICIPANTS |
|--|----------------------------|---|---|--|---|--|
| 3-1 | Education Facility | High Priority Target Date: October 2004 | Create a nature/ information/research center that acts as a clearinghouse for wetland and coastal information as well as a wetland demonstration site. | <ul style="list-style-type: none"> Secure funding through grants and/or city funds to acquire the TPWD building in Seabrook on Todville Road. Establish a wetland information clearinghouse and education center at the facility. Create a wetland demonstration site at or near the facility through funding from the Galveston Bay Estuary Program and/or the General Land Office Coastal Erosion Planning and Response Act program. Hold informational workshops and seminars at the facility for landowners, students, and other interested parties. Create a central hub for wetland tours and project research. | Galveston Bay Estuary Program, Public Participation and Education Subcommittee Wetland Advisory Board | <ul style="list-style-type: none"> City Parks Department Eco-tourism Committee GBF GBIC Sea Grant TAMU-Galveston |
| 3-2 | Student Education Programs | High Priority Target Date: August 2001 | Establish a science-based program that focuses on wetlands, habitat establishment, and water quality in an outdoor environment. | <ul style="list-style-type: none"> Create a partnership between the local school district and the Galveston Bay Estuary Program, Public Participation and Education Subcommittee. Create a curriculum that correlates with the Texas Essential Knowledge and Skills (TEKS). Create an educational laboratory for students to use in their study of wetlands. Create a permanent teaching position for this program. | Galveston Bay Estuary Program, Public Participation and Education Subcommittee Seabrook ISD | <ul style="list-style-type: none"> GBF GBIC Sea Grant TAMU-Galveston City Parks Department Eco-tourism Committee |
| 3-3 | Wetland Information | Medium Priority Target Date: October 2001 | Disseminate wetland information to residents and businesses in the form of brochures and other media. | <ul style="list-style-type: none"> Obtain wetland habitat and other wetland informational brochures from the Eco-tourism Committee and Galveston Bay Information Center. Place brochures in libraries, schools, and other public buildings. Create a citywide festival at Repsdorph Park that provides educational and family oriented activities. | City Parks Department Wetland Advisory Board | <ul style="list-style-type: none"> Parks Board Eco-tourism Committee H-GAC TPWD GBEP GBF USFWS GLO |
| 4-1 | Ecotourism Plan | Medium Priority Target Date: January 2002 | Develop a plan that promotes ecotourism building on Seabrook's wetland resources. | <ul style="list-style-type: none"> Establish goals and objectives for the plan. Determine action steps. Establish a timeline for action steps. Coordinate actions with implementation of comprehensive plan, parks plan, and the Seabrook Wetland Conservation Plan. | Eco-tourism Committee | <ul style="list-style-type: none"> City Parks Department Parks Board City Planner TPWD GBF GBIC |
| 4-2 | Encourage Development | Medium Priority Target Date: December 2005 | Encourage the development of restaurants, lodging and specialized equipment businesses that cater to the ecotourism market. | <ul style="list-style-type: none"> Identify desired business types needed to attract ecotourists Develop and initiate targeted recruitment campaign. | Eco-tourism Committee Chamber of Commerce | <ul style="list-style-type: none"> H-GAC City Council |

| ACTION Goal No.- Action No. | TITLE | PRIORITY | DESCRIPTION | STEPS | LEAD | OTHER PARTICIPANTS |
|--|------------------------------------|---|--|--|-----------------------|--|
| 4-3 | Interpretive Signage | Medium Priority Target Date: May 2002 | Place interpretive signs along trails and near wetlands. | <ul style="list-style-type: none"> • Determine the proper placement of signs. • Secure funding through grants from local agencies for signs. • Purchase signs that are congruent with other trail and park signs. | City Parks Department | <ul style="list-style-type: none"> • Eco-tourism Committee • GBIC • GBEP • GBF • TPWD |
| 4-4 | Birding Brochures and Trail Guides | Medium Priority Target Date: May 2002 | Develop birding brochures and trail guides for Seabrook. | <ul style="list-style-type: none"> • Develop a list of the birds that migrate through and reside in Seabrook and the best viewing areas. • Develop a list of Seabrook's wetland flora and fauna. • Develop a trail guide. • Make brochures and guides available in local shops, restaurants, and public buildings. | Eco-tourism Committee | <ul style="list-style-type: none"> • City Parks Department • TPWD • GBF • GBEP • GBIC |

APPENDIX A

THE BENEFITS OF WETLANDS AND OPEN SPACE

In order to preserve open space in Seabrook, it is important to explain the value it holds. In the past, wetlands were seen as a hurdle to overcome. Until recently, many wetlands in the United States were routinely dredged and filled for agriculture and urban expansion purposes without thought of the value lost. The Texas Wetland Conservation Plan (TWCP) estimates that the United States contained 392 million acres of wetlands in 1780. As of 1980, only 103.3 million acres of wetlands remain (TWCP). Today it is known that wetlands are an important habitat for fish and wildlife and provide protection from flooding and erosion. Wetlands are also known for improving water quality and mitigating pollution. Due to their rarity and the biological functions they provide, federal, state, and local governments are recognizing the need to preserve these areas in the form of nature preserves, parks, and conservation easements. Since the mid-1980s, the rate of wetland loss is declining, and 90,000 acres have been added (TWCP).

Wetlands and other types of open space have value that is difficult to express in monetary terms, including scientific value, historical value, cultural value, recreational value, and wildlife diversity value. Approximately 35% of rare and endangered animals use wetlands for their home and food source (TWCP). Millions of Americans take advantage of wetland diversity each year. In 1991, approximately 18 million Americans hunted wetland dependant game; approximately 35 million fished wetland dependant waterways; and 30 million observed wetland dependant wildlife (TWCP). Wetlands do not just provide beauty and diversity in flora and fauna, but they also contribute billions of dollars and many jobs to the national economy.

Since local governments depend on property tax for operating revenue, the value of open space is becoming one of the key fiscal and economic considerations for municipalities. Although quantifying the value of each acre of wetland as open space, habitat preservation, or flood mitigation can be difficult, the impacts of wetlands and other types of open space on property value have been studied as individual cases. Both the Texas Wetland Conservation Plan produced by the Texas Parks and Wildlife Department and a report, "The Economic Value of Open Space" (Fausold), written by Charles Fausold and Robert Lillieholm compiled several of these case studies which are mentioned below.

Cost of Services versus Tax Revenue

- In Connecticut, Massachusetts, and New York, six rural towns were surveyed. This survey determined that on average for every \$1 made in revenue, residential development require \$1.13 in services, while farm, forest, and open space only required \$0.29 in city services (Fausold).
- In New England, for every one dollar in revenue, residential development required \$1.14 in services, commercial and industrial development required \$0.43, and forest, farm, and open space only required \$0.42 (Fausold).

Location! Location! Location!

- In Boulder, Colorado, there was a \$4.20 decrease in property value every linear foot from the greenbelt. The additional property tax generated by the properties located on or near the greenbelt was \$500,000 (Fausold).
- In the Charles River basin in Massachusetts, property abutting wetlands was worth on average an additional \$400. For each acre of wetland, \$150 was added to the value of abutting properties (Fausold).

Economic Benefits of Wetlands

- Each acre of wetland is valued at \$2,000 per year in flood prevention, \$16,960 in pollution reduction, and \$100, 730 in water supply (TWCP).
- Louisiana valued its wetlands at \$1,915 per acre in storm water protection (TWCP).
- If existing wetlands were destroyed, the cost in flood related repairs would be \$7.7 billion to \$30.9 billion each year for taxpayers (TWCP).

- Wetland buffers reduce the impact of hurricanes and prevent an estimated \$4 million in damage each year (TWCP).
- In 1991, wetland dependent fresh and saltwater fish and shellfish that were caught in the U.S. were worth \$2 billion (TWCP).
- Wetland game hunters spent \$2.2 billion on hunting related equipment and travel (TWCP).

Ecotourism

- The President's Commission on American Outdoors (1987) ranked natural beauty as the single most important factor in deciding a tourist destination. (Fausold)
- In 1991, more than 24 million Americans took bird watching trips, 14 million took hunting trips, and 35 million took fishing trips. Non-game expenditures equaled \$19 billion (Fausold).
- According to a USDA Forest Service report, bird watchers spend \$20 billion each year on seed, travel, and birding equipment. (Fausold)

Ecotourism is an evolving term used to describe a type of travel which is rapidly taking the place of the standard vacation. Ecotourism as defined by The Ecotourism Society (TES) is responsible travel to natural areas that conserves the environment and sustains the well being of local people. Ecotourism includes canoeing, camping, fishing, and birding. The following breakdown provides an idea of the majority of people who are pursuing sustainable travel.

Ecotourist Profile (The Ecotourism Society Web Site).

- 35-54 years old
- equal male to female ratios overall
- 82% college graduates
- 60% travel as a couple, 15% as a family, and 13% travel alone
- Vacation length-8 to 14 days
- 26% of experienced ecotourists (more than 1 ecotour) are prepared to spend between \$1,001 and \$1,500 per trip
- Types of preferred trips include wilderness setting, wildlife viewing, and hiking/trekking

Although each region of the United States will experience variations of the case studies and traveler profile, the one constant that remains is that wetlands are more valuable in their natural state than filled and tilled. The identification and preservation of wetlands can promote a balance in the community that will protect the long-term value of land for property owners as well as the community as a whole.

The effects of ecotourism have been studied in High Island (noted by Ted Eubanks, Paul Kerlinger, and R. H. Payne in Birding magazine), and surveys showed that nonresident visitors totaled 57.6%. The nonresident tourists came from 43 states and 6 countries. Tourists from the States spent an average of \$693 per trip, and tourists from other countries spent approximately \$1,881 per trip.

APPENDIX B

CURRENT REGULATIONS AND ASSISTANCE

Federal Agencies

Army Corps of Engineers

<http://www.wetlands.com/regstlpqe00a.htm>

<http://www.usace.army.mil/inet/functions/cw/cecwo/reg/rhsec10.htm>

<http://www.usace.army.mil/inet/functions/cw/cecwo/reg/sec404.htm>

<http://www.swg.usace.army.mil/reg/>

Regulatory Programs

Section 10 and Section 404 Permits

The U.S. Army Corps of Engineers (Corps) administers permitting programs established by Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

Section 10 permits are required “of any structure in or over any navigable water of the United States, the excavation, dredging, or deposition of material in these water, or any obstruction or alteration in a navigable water.”

Section 404 requires a permit for the disposal of dredged material into “waters of the U.S.”, or fill including wetlands. If an activity is subject to both laws, a joint “Section 10/404” permit process is employed. If negative impacts to the wetlands are deemed unavoidable, a permit applicant must mitigate habitat losses through the creation/enhancement/preservation of new wetland habitat. This is now often accomplished through “mitigation banking.”

Section 404 permits require an Environmental Assessment or possibly an Environmental Impact Statement, prepared by the Corps for review by the U.S. Environmental Protection Agency (EPA), under the National Environmental Policy Act (NEPA). The Corps and EPA are jointly responsible for enforcing violations, which are subject to fines, civil and criminal penalties.

The Texas Natural Resource Conservation Commission (TNRCC) must also issue a water quality certification for permits involving the placement of fill into waters of the US, under Section 401 of the CWA. Additionally, the following agencies also review and comment on the permits: U.S. Fish and Wildlife Service (FWS); National Marine Fisheries Service (NMFS), the Texas Parks and Wildlife Department (TPWD) and the Texas General Land Office.

Many of the types of shoreline structural projects in the study area and along Galveston Bay are covered under “general permits” for projects of similar nature that will create minimal individual and/or cumulative environmental impacts. General permits apply to many smaller structures such as bulkheads, piers and decks for individual residential properties. More substantial improvements require a full permit review.

Environmental Protection Agency

EPA Hotline:
1-800-832-7828

Website:
<http://www.epa.gov>

Regulatory Programs

Stormwater Discharge Permits

EPA also has responsibility for issuing NPDES permits for stormwater discharges (though this responsibility will eventually be delegated to the TNRCC). NPDES stormwater permits are required for any land development/construction activity that will disturb five (5) or more acres of land to ensure that proper methods for controlling polluted runoff are in place. Industrial and certain commercial land uses are also subject to NPDES permit requirements for controlling polluted runoff. Agricultural uses, aside from concentrated animal feeding operations, are not subject to NPDES requirements.

Local governments with storm drainage conveyances also are subject to the stormwater permit requirements. Large governmental jurisdictions fell under Phase I of this program and those permits are already in place. The City of Dickinson and a number of other Galveston Bay area communities will be required to have permits under Phase II of this program by January 31, 2003.

Non-regulatory programs.

EPA provides grants to support projects for environmental education, reducing nonpoint source pollution, promoting sustainable development, and implementing recommendations of Comprehensive Conservation Management Plans for Estuaries of National Significance.

Fish and Wildlife Service

<http://www.fws.gov>
<http://www.southwest.fws.gov>

Regulatory Programs

The U.S. Fish and Wildlife Service (FWS) is responsible for wildlife law enforcement, including the federal Endangered Species Act. The FWS also reviews and comments on Section 10/404 permit applications under the Clean Water Act and other projects requiring federal permits or funding.

Non-Regulatory Programs

The FWS is responsible for management of the National Wetland Inventory maps and reports, federal wildlife management, habit enhancement and research programs. It also is responsible for a variety of public education programs, including publications, visitor centers, nature trails and recreational activities.

National Marine Fisheries Service

Southwest Region, Long Beach, CA

Web Site:
<http://www.nmfs.gov>

Regulatory Programs

The National Marine Fisheries Service (NMFS) is responsible for ensuring compliance with federal laws involving species and habitat protection for marine wildlife. The NMFS reviews and comments on Section 10/404 permits applications and other projects requiring federal permits or funding with respect to their potential impact on marine wildlife habitat.

Natural Resources Conservation Service

Web Site:
<http://www.nrcs.usda.gov>

Non-Regulatory Programs

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), formerly known as the U.S. Soil Conservation Service, provides technical assistance for conservation projects, water quality and other natural resource management efforts. It also provides technical and financial assistance through its Resource Conservation and Development (RC&D) program.

Federal Emergency Management Agency

Regional Main Line: 940-898-5399

<http://www.fema.gov>

Regulatory Programs

The Federal Emergency Management Agency (FEMA) is responsible for establishing standards for construction in flood prone areas. Communities must comply with these provisions to be eligible to participate in the National Flood Insurance Program (NFIP). Local government compliance with the NFIP is monitored by the TNRCC.

Non-Regulatory Programs

FEMA is responsible for issuing disaster relief funds to state and local governments. It also conducts a number of disaster mitigation programs, which include grants to state and local governments for mitigation planning and implementation. FEMA also produces a variety of publications and maintains a web site with educational information on mitigating the impacts of natural disasters.

State Agencies

Texas Natural Resource Conservation Commission

Web Site:

<http://www.tnrcc.state.tx.us>

Regulatory Programs

Federal Clean Water Act, Section 401

Section 401 of the Federal Clean Water Act (CWA) requires the state of Texas to certify that a proposed CWA Section 404 permit will not violate water quality standards. The TNRCC makes these certifications for all projects except those related to the exploration, development and production of oil, gas, or geothermal resources, which are certified by the Railroad Commission of Texas.

National Flood Insurance Program

The TNRCC also coordinates the National Flood Insurance Program (NFIP) for the Federal Emergency Management Agency (FEMA), which requires local governments to meet FEMA standards for the regulation of new construction and improvements in flood prone areas.

Non-regulatory Programs

The TNRCC administers several EPA grant programs to combat nonpoint source pollution and to promote regional water quality planning. Also, under the Texas Clean Rivers Program, the TNRCC helps coordinate and fund water quality monitoring programs, tailored to address the individual issues of the state's major river basin.

The Galveston Bay Estuary Program (GBEP) is also administered by the TNRCC. GBEP is responsible for coordinating the implementation of the recommendations of the *Galveston Bay Plan*, through grant funding, coordination, and project review.

Texas General Land Office

Web Site:

<http://www.glo.state.tx.us>

Regulatory Programs

Coastal Public Land Management

Under the Texas Coastal Public Lands Management Act of 1973, GLO approval is required for any proposed project that will impact state-owned submerged lands, defined as those below the mean high water line in an area of tidal influence. This includes the erection of a dock, pier or any other structure and/or the discharge of dredged or fill material into any state-owned wetlands.

The GLO will inspect the site of a proposed project and evaluate its impact on the submerged land. If approved, the GLO will draw up a contract to issue a lease or easement. The GLO also determines if the proposed project is consistent with the Texas Coastal Management Plan.

Open Beaches Act and Dune Protection

The GLO is responsible for enforcing the Texas Open Beaches Act, which requires free public access to coastal beaches, and the Texas Dune Protection Act, which grants coastal counties the authority to develop dune protection lines. Both of these laws apply to the Gulf Coast and are not a factor in shoreline management within the study area.

Texas Coastal Management Plan

GLO is responsible for ensuring that projects requiring federal, state or local permits or funding are consistent with the Texas Coastal Management Plan (CMP). GLO staffs a multi-agency Coastal Coordination Council (CCC), which reviews the projects and determines their consistency with the CMP. Projects above a certain threshold size are automatically referred for CCC review. Any of the participating agencies may also specifically request review by the CCC.

Non-Regulatory Programs

The GLO is the lead agency responsible for the Texas Coastal Management Plan and the Coastal Wetlands Conservation Plan. The GLO receives funding under the federal Coastal Zone Management Act to provide grants for a variety of coastal management projects. Under the Texas Coastal Erosion Planning and Response Act, passed in 1999, state grant funds will also be available from GLO for shoreline erosion control projects.

The GLO also offers technical assistance and educational materials on the various coastal permitting processes and appropriate management of state-owned submerged lands. GLO has also taken an active role in promoting wetlands conservation planning.

Texas Parks and Wildlife Department

Web Site:

<http://www.tpwd.state.tx.us>

Regulatory Programs

The TPWD is responsible for enforcing Texas State laws protecting fish and wildlife. The TPWD also reviews and comments on projects requiring Section 10/404 permits, evaluating their potential impact on wildlife habitat. Recreational boating on state waters is also regulated by the TPWD.

Non-Regulatory Programs

TPWD manages state parks and wildlife management areas, and also provides grant funding to local governments for parks, boat ramps and other recreational facilities.

Local Agencies

Harris County Flood Control District

Main Line:

(713) 684-4000

Regulatory Programs

Drainage

The Harris County Flood Control District oversees two drainage channels in Seabrook, including Pine Gully (F2-20 Channel) and the second outlet of Clear Creek.

The district also approves subdivision drainage plans.

**Harris-Galveston Coastal
Subsidence District**

Main Line:
(281) 486-1105

Regulatory Programs

Groundwater Extraction

The Harris-Galveston Coastal Subsidence District (HGCSD) regulates groundwater extraction in Harris and Galveston Counties to limit further land subsidence. Within the study area, groundwater may only account for 10% of the water supply. The HGCSD estimates that Dickinson currently utilizes 90-95% surface water and most new development is expected to receive water from surface sources.

City of Seabrook

Main Line:
(281) 291-5600

Regulatory Programs

Development Regulations

The City of Seabrook regulates land development and construction within its boundaries under its *Comprehensive Zoning* regulation and *Subdivisions* code.

Comprehensive Zoning. Seabrook's zoning code establishes zoning districts and regulations associated with specific land uses. The ordinance regulates the land use in terms of the following categories:

- Single-Family, Low Density
- Single-Family Detached
- Single-Family Detached (small lots)
- Medium Density Residential
- Light Commercial
- Medium Commercial
- Heavy Commercial
- Commercial Special District
- Waterfront Activity
- Marine Oriented Mixed Use
- Old Seabrook
- Mobile Home

The current regulation includes restrictions for water-abutting yards. "Water-abutting" is a yard that touches Taylor Lake, Clear Lake, or Galveston Bay. This restriction requires a minimum setback from the water of 25 feet and does not allow the use of impervious fences in the waterfront setback.

The zoning code is enforced through a Certificate of Occupancy (CO). The CO must be obtained for any of the following activities:

- Construction or alteration and occupancy of a building
- Change in use of an existing building
- Occupancy and use of vacant land
- Change in use of land
- Significant modification, alteration, or change in a nonconforming use.

Subdivisions. Property owners who intend to plat or replat subdivisions must receive Planning and Zoning Commission approval. The *Subdivisions* code establishes requirements for minimum lot size and building setback, street plans and dimensions, and the provision of utilities and drainage. The ordinance also requires the dedication of park or recreation land. The City's subdivision ordinance works in conformance with *Comprehensive Zoning*. When there are contradictions, *Comprehensive Zoning* regulations will prevail.

Building Codes. While the building code is not specifically a wetland conservation tool, it contains restrictions for excavating and filling. The permittee must comply with specifications and request a permit in order to fill or excavate property within the City's jurisdiction.

APPENDIX C

GRANTS AND OTHER RESOURCES

| Assistance | Contact Information | Description |
|--|--|---|
| Administrative Grants for Federal Aid in Sport Fish Restoration Program (Grants) | U.S. Fish and Wildlife Service (USFWS) 4401 N. Fairfax Dr. Rm. 140 Arlington, VA 22203 (703) 358-2156 | <u>Purpose:</u> Support projects that assist with the administration and implementation of sport fish restoration programs; funds may be used for administrative projects, including investigations, administration, and execution of the Sport Fish Restoration Act. |
| Aquatic Plant Control (Specialized services from the Corps of Engineers) | Army Corps of Engineers (USACE), Office of Chief of Engineers Planning Department P.O. Box 1229 Galveston, TX 77553-1229 (409) 766-3001 | <u>Purpose:</u> Control aquatic plant infestations of economic significance <u>Example:</u> Fund research for alternative control methods and biological controls in conjunction with herbicide applications |
| Army Corps of Engineers Continuing Authorities Program (Cost Share) | USACE Rennie Sherman (202) 761-1975 | <u>Purpose:</u> To control flooding, prevent erosion, and protect navigation through small projects. <u>Example:</u> Emergency protection of public facilities, small beach erosion control, small navigation projects, mitigation of shoreline damage from federal navigation projects, small flood control projects, and snagging and clearing for flood control |
| Challenge Cost Share (50-50 Match) | USACE Bill Myer or Randy Porter U.S. Fish and Wildlife Service Refuges and Wildlife 500 Gold SW Albuquerque, NM 87103 (505) 766-2036 | <u>Purpose:</u> Operate and manage natural resources and recreational facilities at Army Corps water resource development projects <u>Example:</u> According to agency representative, "projects may include environmentally sensitive design but are rarely restoration... Probably less than 1% involve restoration." (RAE 1998) |
| Challenge Grant Cost Share (Grant) | U.S. Fish and Wildlife Service (USFWS) Ken McDermond 4401 Fairfax Drive Arlington, VA 22203 (703) 358-2422 | <u>Purpose:</u> Manage, enhance and restore fish and wildlife services <u>Example:</u> Private-public partnerships to restore habitat on and adjacent to Fish and Wildlife Service lands |
| Coastal Service Center Cooperative Agreements (Cooperative Agreements) | Coastal Services Center/ National Oceanic and Atmospheric Administration (NOAA) DOC, NOAA 2234 South Hobson Ave. Charleston, SC 29405-2413 (843) 974-6200 | <u>Purpose:</u> Supports projects aimed at developing creative science-based solutions to coastal management issues that will allow maintenance or improvement of natural resources while also allowing for economic growth <u>Example:</u> Program will assist in landscaping, characterization, restoration, remote sensing, training and meeting facilitation |

| Assistance | Contact Information | Description |
|---|---|---|
| Coastal Zone Management Estuarine Research Reserves (30% to 50% Match) | National Oceanic and Atmospheric Administration (NOAA) Randy Snyder Coastal Ocean Program National Oceanic and Atmospheric Administration Washington, DC (202) 606-4126 | <u>Purpose:</u> Provide grants to coastal states to acquire, monitor and develop specific Estuarine Reserves <u>Example:</u> Average grant amount is \$70,400 |
| Environmental Justice Small Grants (Grants) | U.S. Environmental Protection Agency (EPA), Office of Compliance Assurance Environmental Justice Hotline: 1-800-962-6215 | <u>Purpose:</u> Provide financial assistance to grass-roots, community-based groups to support projects related to environmental justice <u>Example:</u> Passamaquoddy Tribe efforts to monitor and improve the health of its estuarine waters |
| Environmental Education Grants (Grant with a 25% Match Requirement) | EPA Jo Taylor Region Six (214) 655-2204 http://eelink.umich.edu | <u>Purpose:</u> To support projects that design, demonstrate, or disseminate practices, methods, or techniques related to the teaching of environmental issues for students, teachers, and general public. <u>Example:</u> Funds may be used for but are not limited to designing, demonstrating, or disseminating environmental curricula; designing and demonstrating field methods, educational practices and techniques. |
| Extension Wildlife Program (Technical; Developing and Monitoring Management Plans; Plants or Seeds) | Texas Agricultural Extension Service Dr. William Johnson County Office (281) 534-3413 | <u>Purpose:</u> Increase landowner's awareness and management of wildlife habitat on their property <u>Example:</u> Currently conducting a project in Dickinson Bayou |
| Forest Legacy (Grant with a 25% Match Requirement) | United States Forest Service Department of Agriculture (USDA) Ted Beauvais (202) 205-1190 http://www.fs.fed.us/spf | <u>Purpose:</u> The U.S. Forest Service, in cooperation with state and local governments, private nonprofit organizations, and landowners, acquires permanent conservation easements in important forest areas threatened by conversion to non-forest uses. |
| Galveston Bay Estuary Program (GBEP) (Contracts) | EPA, Office of Water Robert Rudolph GBEP 711 Bay Area Blvd., Suite 210 Webster, TX (281) 332-9937 | <u>Purpose:</u> Protect and restore an estuary of national significance Cooperative agreements, monitoring surveys |

| Assistance | Contact Information | Description |
|--|--|---|
| Gulf Coast Prairies Safe Harbor Program (Cost-Share) | USFWS Will Roach 17629 El Camino Real, Ste. 211 Houston, TX 77058 (281) 286-8282 | <u>Purpose:</u> Encourage and promote the restoration, conservation, enhancement and maintenance of coastal prairies on private lands that support or have the potential to support threatened or endangered species; protects landowners from future regulation <u>Example:</u> Control brush, re-establish native vegetation |
| Marine Fisheries Initiative (Financial, Cooperative Agreements; Avg. \$50,000) | MARFIN Ellie Roach NMFS Regional Office St. Petersburg, FL (813) 893-3720 | <u>Purpose:</u> To research and develop projects which provide information for the use and enhancement of fishery resources, fish stock assessment, and fish stock enhancements |
| National Wetlands Conservation Grants (Grants) | USFWS Tom Taylor USFWS, Department of Interior Washington, DC 20240 (703) 358-1718 | <u>Purpose:</u> Restoration, enhancement, management, or acquisition of coastal wetlands <u>Example:</u> Acquisition, restoration, enhancement and management of wetland ecosystems and technical assistance to private landowners |
| Natural Resources Conservation Service Technical Assistance (Technical Assistance) | USDA, Natural Resources Conservation Service (NRCS) Field Office Temple, Texas (254) 742-9800 | <u>Purpose:</u> Provide technical assistance for managing, using, enhancing, creating, and restoring wetlands |
| North American Waterfowl Management Plan (Financial; Technical) | USFWS, Texas Parks and Wildlife Department (TPWD) David S. Lobpires TPWD 6414 Deer Trail Drive Wharton, TX 77488 (409) 532-5517 | <u>Purpose:</u> Protect, restore, and enhance wetlands important to waterfowl and other wetland-dependent bird species <u>Example:</u> Acquisition, restoration, enhancement and management of wetland ecosystems and technical assistance to private landowners |
| North American Wetlands Conservation Fund (Grants) | USFWS Vernon Bevill TPWD 4200 Smith School Road Austin, TX 78744 (512) 389-4578 | <u>Purpose:</u> Protect and restore coastal wetlands and their habitat <u>Example:</u> Wetland acquisition and restoration |
| Ocean Resources Conservation and Assessment Program (Grants or Cooperative Agreements) | NOAA NOS 1305 East-West Hwy. Silver Spring, MD 20910 | <u>Purpose:</u> Determine long-term impacts of uses of coastal and marine environments <u>Example:</u> Investigate ecological, economic, and social impacts upon the human, physical, and biotic environs; evaluate alternatives to minimize those impacts |

| Assistance | Contact Information | Description |
|---|---|--|
| Outdoor Recreation, Acquisition, Development, and Planning (Grants, one-to-one matching basis only) | TPWD, Land Water Conservation Fund Tim Hogsett 4200 Smith School Rd. Austin, TX (512) 389-4948 | <u>Purpose:</u> Acquire, develop, and maintain outdoor recreation land, water, and facilities |
| Outdoor Recreation Grants Program (Grant) | TPWD Elaine Dill, CLP Recreation Grants Branch 900 IH-35 South Ste. 100 Austin, Texas 78704 (512) 912-7115 | <u>Purpose:</u> Funds may be used to acquire public parkland and to develop or renovate public recreation areas. |
| Partners for Wildlife Program (Cost-Share; Technical Assistance) | USFWS Department of Interior 4401 N. Fairfax Dr. Rm. 400 Arlington, VA 22203 (703) 358-2201 | <u>Purpose:</u> Restore, enhance, and manage wetlands for fish and wildlife habitat; promote profitable land-use for agriculture, industry, and private landowners; and promote lasting land-use ethic <u>Example:</u> Have restored 360,000 acres of wetlands, 128,000 acres of prairie grassland, 930 miles of riparian habitat, and 90 miles of instream aquatic habitat |
| Partnership for Environmental Research: Water and Watersheds Competition (Grants) | Office of Research and Development National Science Foundation Barbara Levinson (202) 564-6911 | <u>Purpose:</u> Support research that contributes to an improved understanding of the processes that govern the quality of water resources |
| Pittman-Robertson Program (Wildlife Restoration) (Formula Grants) | USFWS Tom Taylor USFWS, Department of Interior 4401 N. Fairfax Drive Arlington, VA 22203 (703) 358-2156 | <u>Purpose:</u> Restore or manage wildlife populations; hunter safety and education <u>Example:</u> Wildlife habitat improvement, survey of wildlife populations and habitats |
| Private Lands Enhancement Program (Technical) | TPWD Kirby Brown PLEP/TPWD 4200 Smith School Road Austin, TX 78744 (512) 389-4398 | <u>Purpose:</u> Provide expertise to land managers in the conservation and development of wildlife habitat and the various wildlife populations that utilize that habitat <u>Example:</u> Give recommendations for habitat management based on the quality, quantity, distribution, and diversity of vegetation necessary to support wildlife populations |
| Private Lands Initiative (Cost-Share/Technical) | National Fish and Wildlife Foundation, TPWD Kirby Brown PLI/TPWD 4200 Smith School Road Austin, TX 78744 (512) 389-4395 | <u>Purpose:</u> To enhance wildlife habitat through partnerships |

| Assistance | Contact Information | Description |
|---|--|---|
| Regional Geographic Initiative (Grants) | EPA Peter Braasch Restore America's Estuaries (202) 289-2379 | <u>Purpose:</u> Develop multi-media small scale programs administered by regional offices |
| River Network Watershed Assistance Grants Program (Grants) | EPA's Office of Wetlands, Oceans, and Watersheds River Network P.O. Box 8787 Portland, OR 97207 (503) 241-3506 | <u>Purpose:</u> Help people organize to protect and restore rivers and watersheds |
| Section 1135 (Project Modification for Improvement of the Environment) (Corps of Engineers Services) | USACE, Office of the Chief of Engineers Jim Barrows Planning Department P.O. Box 1229 Galveston, TX 77553-1229 (409) 766-3001 | <u>Purpose:</u> Modify existing project facilities and areas to achieve ecosystem restoration and protection objectives <u>Example:</u> Restoration of Galilee Salt Marsh (Rhode Island) by reintroducing tidal exchange to dredge material placement site |
| Section 204 (Beneficial Uses of Dredge Material) (Corps of Engineers Services) | USACE Planning Department P.O. Box 1229 Galveston, TX 77553-1229 (409) 766-3001 | <u>Purpose:</u> Protect, restore and create habitats in connection with dredging operations <u>Example:</u> Restoration of formerly diked Sonoma Baylands tidal wetland in California |
| Section 206 (Aquatic Ecosystem Restoration) (Corps of Engineers Services) | USACE, Office of the Chief of Engineers Planning Department P.O. Box 1229 Galveston, TX 77553-1229 (409) 766-3001 | <u>Purpose:</u> Implement aquatic ecosystem restoration projects in order to improve environmental quality |
| Study and Project Specific Programs of the Civil Works Environmental Program (Specialized Services from the Corps of Engineers) | USACE Peter Braasch Restore America's Estuaries (202) 289-2379 | <u>Purpose:</u> Protect and restore environmental resources through civil works activities of the Corps of Engineers <u>Example:</u> Ecosystem restoration features of flood control projects and individually authorized ecosystem restoration studies |
| Surface Transportation Program (Grants) | Federal Highway Administration Dr. Paul Garret Natural and Cultural Resources (303) 969-5772 ex. 332 | <u>Purpose:</u> Provide a flexible source of funds for any surface transportation infrastructure project regardless of mode <u>Example:</u> Program lacks authority to restore habitat; can only mitigate wetlands destruction |

| Assistance | Contact Information | Description |
|--|---|---|
| Sustainable Development Challenge Grant Program (Grant with 20% Match Requirement) | EPA Karen Alvarez Region Six (214) 665-7273 http://www.epa.gov/ecocommunity | <p><u>Purpose:</u> To provide grants to communities as a way of catalyzing community-based and regional projects designed to promote sustainable development, build partnerships, and leverage public and private investments to enhance environmental quality.</p> <p><u>Example:</u> Projects include demonstrate environmental, economic, and community benefits associated with alternative development patterns; and nature-based tourism.</p> |
| Texas Coastal Management Program (Grants; Non-Federal Match Required) | Texas General Land Office (GLO) Diane Ramirez 1700 N. Congress Ave Austin, TX 78701-1495 (512) 463-5058 | <p><u>Purpose:</u> Implementing & enhancing coastal zone management programs</p> <p><u>Example:</u> Wetland protection; natural hazards management; public access improvements; assessment of coastal growth and development</p> |
| Texas Prairie Wetlands Project (Cost-share) | USFWS, TPWD, NRCS, Ducks Unlimited Prairie Wetlands Project 312 S. Main St., Rm. 310 Victoria, TX 77901 (512) 576-0282 | <p><u>Purpose:</u> Restore, create, or enhance wetlands beneficial for waterfowl and other wildlife uses in 28 Gulf Coast counties</p> |
| Texas Recreational Trail Fund Grants (50% Match) | TPWD Land Conservation Program (512) 389-4737 | <p><u>Purpose:</u> To construct new or improve existing trails, trailheads, and trailside amenities.</p> |
| Texas Wetlands Conservation Plan (Planning Advice) | TPWD Jeff Raasch 4200 Smith School Road Austin, TX 78744 (512) 389-4328 | <p><u>Purpose:</u> Links public or private property owners who want to restore or enhance wetlands with individuals or groups who need or want to restore wetlands</p> |
| Texas Wildscapes Program- Backyard Habitat Program (Educational/ Technical/ Financial) | TPWD Kelly Bender Nongame and Urban Program 4200 Smith School Road Austin, TX 78744 1-800-792-1112 | <p><u>Purpose:</u> Encourage landowners to convert portions of their land or yard to habitat-friendly areas</p> <p><u>Example:</u> Helped owners of property convert their lawns to habitat friendly, scenic backyards and enhance the beauty of their lawns</p> |
| The Trust for Public Land (Financial Incentives) | National Public Affairs Department of the Trust for Public Land 700 San Antonio Austin, TX 78701 (512) 478-4644 | <p><u>Purpose:</u> Conserve land for people to improve the quality of life in communities and to protect natural and historic resources for future generations</p> |

| Assistance | Contact Information | Description |
|---|--|--|
| Turner Foundation (Grant) | Ted Turner Peter Bahouth Executive Director Turner Foundation 1 CNN Center, Suite 1090-S. Tower Atlanta, GA 30303 | <u>Purpose:</u> Focuses on the environment and population; the Turner Foundation supports several program areas: energy, forests, habitat, water, toxics and populations |
| Unallied Management Projects (Cooperative Agreements) | National Marine Fisheries Service Buck Sutter 1315 East West Hwy. Silver Spring, MD 20910 (301) 713-2358 | <u>Purpose:</u> Conserve fishery resources and protect species and their environment in territorial waters <u>Example:</u> Rebuilding Louisiana oyster reefs damaged by hurricanes |
| Watershed and Air Management Cost Share (Cost-Share; Grants) | U.S. Forest Service Russell LaFayette (202) 205-1093 | <u>Purpose:</u> Work with partners to evaluate, protect and restore water, soil and air resources <u>Example:</u> Evaluation and restoration of resources, monitoring, and maintenance of projects |
| Watershed Protection and Flood Prevention (Technical/ Financial) | USDA, NRCS Ron Page P.O. Box 2890 Washington, DC 20013 (202) 720-4527 | <u>Purpose:</u> Provide improvements and assistance in watershed areas <u>Example:</u> Development of fish and wildlife habitat, irrigation, and water supply |
| Wetland Habitat Alliance of Texas (WHAT) (Financial) | USDA, NRCS Eric Frasier Wetland Habitat Alliance of Texas 118 E. Hospital, Suite 208 Nacogdoches, TX 75961 (409) 569-9428 | <u>Purpose:</u> Preserve Texas wetlands by raising public awareness and appreciation of wetlands, and funding projects to protect, enhance, and restore natural wetlands |
| Wetlands Project Site Registry (Mutually Beneficial Financial Agreements) | TPWD Jennifer Key 4200 Smith School Road Austin, TX 78744 (512) 389-8521 | <u>Purpose:</u> Identify potential sites and funding for wetlands restoration; it does not guarantee that all registered sites will be restored. Works like “want ads” to link interested property owners with those who are restoring, or want to restore, wetlands |
| Wetlands Protection Development Grants (Grant/ 25% Match) | EPA Becky Weber Region Six (214) 665-6680 http://www.epa.gov/OWOW/wetlands | <u>Purpose:</u> To support the development or enhancement of state, local and tribal wetlands protection programs. <u>Example:</u> State/Tribal Wetlands Conservation Plans, State/Tribal Section 404 Assumption Assistance, Wetland/Watershed Protection Approach Demonstration Projects, River Corridor and Wetland Restoration, Streamline State/Tribal Regulatory Programs, and Assessing and Monitoring the Ecological Integrity of Wetlands |

| Assistance | Contact Information | Description |
|---|--|--|
| Wetlands Reserve Program (Direct Payment (cost-share); Easement; Technical) | USDA, NRCS Leslie Deavers P.O. Box 2890 Washington, DC 20013 (202) 720-1067 | <u>Purpose:</u> Protect and restore wetlands, riparian areas, and buffer zones <u>Example:</u> Pay landowners to implement permanent easements, 30 year easements, or 10-year cost-share agreements |
| Wildlife Habitat Incentives Program (Cost Share) | Commodity Credit corporation (CCC), NRCS Leslie Deavers NRCS P.O. Box 2890 Washington, DC 20013 (202) 720-1067 http://www.nrcs.usda.gov | <u>Purpose:</u> To provide cost-share assistance to landowners seeking to integrate wildlife considerations into the overall management of their lands. <u>Example:</u> Funds may be used to restore aquatic habitat, as well as adjacent streambanks and uplands. The CCC will provide 75% of the funds to implement the plan, and the landowner must come up with the rest. |
| Wildlife Management Association and Co-ops. (Technical) | TPWD 4200 Smith School Road Austin, TX 78744 1-800-792-1112 | <u>Purpose:</u> Decrease habitat loss from land development, reduce the conversion of habitat to monocultures, and reduce the fragmentation of land tracts resulting from the break up of larger ranches and farms <u>Example:</u> Nearly 100 Wildlife Management Associations and Co-ops are currently operating in Texas |

APPENDIX D

BIBLIOGRAPHY

Publications

Above & Beyond, The Original Aerial-Pictorial Guidebook to The Galveston Bay System

Chris Kuhlman
1993

This book contains aerial photos and maps of the Galveston Bay system.

Birding

“High Island, Texas, Case Study in Avitourism”
Eubanks, Kerlinger, and Payne
December 1993

This article discusses ecotourism, from the birding perspective. The authors conducted a study on High Island to see what type of people are bird watching and how they are spending their money.

Buildings and Building Regulations

Chapter 18 of the Code of the City of Seabrook
1994

This ordinance contains Seabrook’s building construction code.

City of Reno Wetland and Stream Environment Policy

Reno Department of Planning and Community Development
September 1991

“Wetlands and stream environments are the most productive wildlife habitats.” The goal of this program is to prevent loss of these natural habitats.

Common wetland Plants of Southeast Texas

US Army Corps of Engineers, Galveston District

This book lists the scientific and common name and shows pictures of grasses, plants and trees frequently found in the wetlands of Southeast Texas.

Comprehensive Zoning

Code of the City of Seabrook
May 4, 1993

This ordinance contains the City’s zoning code including lot size, height, and setback requirements.

“The Economic Value of Open Space: A Review and Synthesis”

Charles J Fausold and Robert J. Lilieholm
1999

This report compiles and discusses several case studies concerning the economic benefits of open space.

Ecotourism Development Manual

Northwest Arkansas Resource Conservation and Development Council, Inc.
1997

This manual is a guidebook for local communities that are interested in developing an ecotourism program.

Environmental Land Planning Series: Riparian Buffer Strategies for Urban Watersheds

Metropolitan Washington Council of Governments, Washington, D.C.
Jordan Heraty, Herson-Jones December, 1995

This document is a guide for riparian buffer programs used to mitigate the impact of urban areas on nearby streams. Recommendations on buffer designs are made based on a national survey of buffer programs and a comprehensive review of riparian buffer literature. Additionally, this document analyzes pollution prevention techniques and buffer pollutant removal potential.

Environmental Land Planning Series: Site Planning for Urban Stream Protection

Center for Watershed Protection,
Silver Spring, Maryland
Tom Schueler
December 1995

This document presents a watershed approach to site planning through the description of ways to reduce pollutant loads and protect water resources. This document additionally stresses the importance of imperviousness, watershed-based zoning, the concentration of development, headwater sheets, stream buffers, green parking lots, and other land planning topics.

Federal Coastal Wetland Mapping Programs

US Fish and Wildlife Service
December 1990

This publication groups individual reports together that describe Federal coastal wetland mapping programs, purpose and intent of these programs, technology used in mapping, the products generated, and recommendations for action based on the data gathered.

"Greenhouse Effect and Coastal Wetland Policy: How Americans Could Abandon an Area the Size of Massachusetts at Minimum Cost"

Environmental Management
James G. Titus
1991
Vol. 15, No. 1, New York pp. 39-58

It is expected that sea level could rise 30-150 cm in the next century and more thereafter, causing a massive loss of coastal wetlands. Currently there are two strategies for protecting wetlands, but Titus proposes a third. In China and the Netherlands, dikes have been built for centuries. Wetlands in this case are squeezed between a progressing sea and protected land. In the United States, there is enough land to accommodate landward progression of wetlands, but governments cannot afford to buy all of the coastal lowlands that might potentially become wetlands. The third approach is to allow property owners to use coastal lowlands today as they choose, but set up laws to ensure that the land is abandoned if sea level rises enough to flood it.

"A Guide for Local Officials"

Model Soil Erosion and Sediment Control Ordinance
Northeastern Illinois Planning Commission. September 1991

This ordinance will assist local governments in better regulating construction and site erosion impacts.

Habitat Conservation Blueprint, A Plan to Save the Habitats of Galveston Bay

Galveston Bay Foundation
December 1998

This is a publication produced by the Galveston Bay Foundation in order to inventory important sites and note strategies for habitat conservation at these sites. The plan also contains a detailed list of resources that may be used by a number of interested parties to conserve habitats.

Louisiana Administrative Code, Title 43, Natural Resources, Chapter 7 Coastal Management

Louisiana Department of Natural Resources
June 1996

This code regulates Louisiana coastal activities including: levees, linear facilities, dredged spoil, shoreline modification, surface alteration, sediment transport, waste disposal, drainage alterations, oil, gas and other mineral activities, and mitigation.

Minnesota Wetlands Conservation Plan

Minnesota Department of Natural Resources
January 1997

The Minnesota Wetlands Conservation Plan was created in order to tie state and federal responsibilities together and provide guidance in administering programs. The plan addresses four areas of concern: recognizing regional differences, simplifying the permitting process, education of staff, and provide resource agencies a set of statewide strategies.

Model Flood Plain Ordinance for Communities within Northeastern Illinois

"The Model Flood Plain Ordinance is drafted to reflect the minimum requirements of the Federal Emergency Management Agency (FEMA) for eligibility of units of government in the National Flood Insurance Program as well as the requirements of the Illinois Department of Transportation, Division of Water Resources concerning development affecting floodways."

Model Regulations--Urban Soil Sediment Pollution Control

Division of Soil and Water Districts,
Ohio Department of Natural Resources
April 1980

These regulations are intended for municipalities and counties wanting to adopt an ordinance for controlling urban soil sediment pollution. The paper discusses general provisions, urban soil sediment pollution regulations, administration, penalties for violation, definitions and provides a table of permissible velocities for flowing water.

National Wetland Mitigation Banking Study, First Phase Report

US Army Corps of Engineers
Brumbaugh and Reppert
July 1992

The first phase report evaluates the capability of mitigation banking as a tool that is reasonable to help obtain no net loss and manage wetlands within the context of a watershed.

National Wetland Mitigation Banking Study, Expanding Opportunities for Successful Mitigation: The Private Credit Market Alternative

US Army Corps of Engineers
Shabman, Scodari, and King
July 1992

This report explains the concept of mitigation banks that are created by the private sector in order to sell credits to developers in need of compensatory mitigation. The report also evaluates how this type of banking could help meet Federal goals. It also explains the conditions necessary for success.

National Wetland Mitigation Banking Study, Wetlands Mitigation Banking Concepts

US Army Corps of Engineers
Reppert
1994

This study is a comprehensive review of mitigation banking.

"North American Ecotourism Markets: Market Profile and Trip Characteristics"
Journal of Travel Research

Wight
1996

This article describes the ecotourist profile and their preferences for trips. The article is the result of an in depth study of ecotourism markets.

"North American Ecotourism Markets: Motivations, Preferences, and Destinations"

Journal of Travel Research
Wight

This article is the second part in a two part series that discusses the ecotourism market. This article goes in to detail about the trip and activity preferences of the ecotourist.

Our National Wetland Heritage: A Protection Guide

Environmental Law Institute
Kusler and Opheim
1996

This guidebook is designed to help people at the local level take action to protect and enhance wetland habitats.

Parks, Recreation and Open Space Master Plan-1998, Seabrook, Texas

Clark Condon Associates, Inc.
1998

This document contains the City of Seabrook's goals for parks and open space projects. The plan details specific projects and areas located within the city's boundaries.

Protecting Coastal and Wetland Resources: A Guide for Local Governments Office of Water, U.S. Environmental Protection Agency, Washington, D.C. October 1992

This 1992 document is the EPA's first attempt to present coastal and wetlands resource protection issues in a comprehensive guide for small-town planners, local government and citizens.

Restoring the Range: A guide to restoring, protecting and managing grazed riparian areas Save Our Streams Program, Izaak Walton League of America, Inc., Gaithersburg, Maryland Jay West May 1995

This guide discusses the problems associated with overgrazing of riparian vegetation by livestock and provides practical solutions to restoring damaged riparian areas.

Seabrook, Texas, Comprehensive Plan 2010 Llewelyn-Davies Sahni, Inc. 1991

This document contains the City's 20-year plan, which is up for review in 2000. This document sets the direction for the city in development and regulation.

Subdivisions Chapter 62 of the Code of the City of Seabrook 1998

The subdivision ordinance is designed to coordinate the streets, utilities, and parks and open space of subdivision with existing and future development.

Summary of Economic Development Commission Action Plan Seabrook, Texas Llewelyn-Davies Sahni, Inc. June 1993

This document contains the economic development plans for a hotel, boardwalk retail, yachting center, Old Seabrook, and an ecology center.

Texas Coastal Wetlands, A Handbook for Local Governments Texas General Land Office

This guide is the basis for the Seabrook Wetlands Conservation Plan. The publication guides local governments through the process of preserving and enhancing wetlands.

Texas Wetlands Conservation Plan Texas Parks and Wildlife Department

Recognizing the importance of Texas wetlands to future generations, the Texas Parks and Wildlife Department wrote a wetland conservation plan. The plan falls into five categories: education, economic incentives, statewide and regional conservation, assessment and evaluation, and coordination and funding.

"Transfer Development Rights: Compensation for Owners of Restricted Property" *Zoning and Planning Law Report* Linda J. Bozung June 1983 Vol. 6, No. 6 129-136

This paper discusses the benefits of a TDR program, its obstacles to implementation and a case study of particular programs in Montgomery County, Maryland, Malibu-Santa Monica Mountains Area, California, and The Pinelands Area, New Jersey.

Water Resources Assistance US Army Corps of Engineers, Galveston District June 1999

This publication is a guide provided by the Galveston District of the Corps that gives an overview of the programs and ways in which the Corps may provide assistance.

Wetlands and Agriculture: Private Interests and Public Benefits Economic Research Service/USDA

This article evaluates wetlands in qualitative and quantitative terms.

Wetlands Assistance Guide for Landowner
Texas Parks and Wildlife
Julie K. Anderson

This guide discusses the variety of approaches made to assist landowners in the protection of wetlands. Program contacts are provided for the landowner for each protection approach.

"Wetlands Ordinance"
Gamebirds Unlimited
Newport, Oregon
February 1992

This paper discusses the topics of fill and removal and exceptions, mitigation plan, penalties, and includes wetlands definitions.

Wetland Restoration and Creation in Dickinson Bay and Dickinson Bayou
Coastal Division,
Texas General Land Office Calnan and Jennings
September 1994

This study is a plan for demonstration project to help revive and create wetlands in Dickinson Bay and Bayou. These plans may be used in mitigation projects for activities requiring compensatory mitigation under Section 404 of the Clean Water Act. Information gathered in this report can also be used in predicting potential impacts of future development in the Dickinson Bayou watershed and the Dickinson Bay area.

Wetlands: Status and Trends, Mid-1970s to Mid-1980s
USFWS, USDI, and USEPA
B. O. Wilen, T. E. Dahl, and W. E. Frayer

This report analyzes wetland data collected from a 10-state Southeast Region of the US Fish and Wildlife Service.

Wetland Restoration and Creation in Dickinson Bay and Dickinson Bayou
Coastal Division,
Texas General Land Office Calnan and Jennings
September 1994

This study is a plan for demonstration project to help revive and create wetlands in Dickinson Bay and Bayou. These plans may be used in mitigation projects for activities requiring compensatory mitigation under Section 404 of the Clean Water Act. Information gathered in this report can also be used in predicting potential impacts of future development in the Dickinson Bayou watershed and the Dickinson Bay area.

Web Sites

| | |
|---|---|
| City of Seabrook | http://www.seabrook-tx.com |
| Galveston Bay Estuary Program | http://gbep.tamug.tamu.edu/ |
| Galveston Bay Foundation | http://www.galvbay.org/ |
| Houston Advanced Research Center, Environmental Information Systems Laboratory | http://www.harc.edu http://q.eisl.harc.edu/~www/ |
| The Economic Value of Open Space: A Review and Synthesis | http://www.lincolnst.edu/workpap/cfpap.html |
| The Ecotourism Society | http://www.ecotourism.org |
| Minnesota Department of Natural Resources FAQ | http://www.dnr.state.mn.us/waters/wetlands/faq_wetlands.html |
| Texas General Land Office, WetNet | http://www.glo.state.tx.us/ http://www.glo.state.tx.us/wetnet/ |
| Texas Parks and Wildlife | http://www.tpwd.state.tx.us/conserve/ |
| Texas Sea Grant Marine Advisory Service | http://texas-sea-grant@unix.tamu.edu |
| Texas Water Resource Institute | http://twri.tamu.edu |
| TPL Report, Growing Smart | http://www.tpl.org/newsroom/reports/econbenz/econbenz_html/chap1.html |
| Understanding the Market for Sustainable Tourism | http://www.ecotourism.org/textfiles/eagles.txt |
| US Army Corps of Engineers | http://www.usace.army.mil/inet/functions/cw/cecw/cecw/reg/index2.htm |
| US Fish and Wildlife Service, National Wetland Inventory | http://www.fws.gov/ http://www.nwi.fws.gov/ |
| US Geological Survey, Texas | http://txwww.cr.usgs.gov/ |
| Wetlands | http://www.tpwd.state.tx.us/conserve/sb1/wetlands/texaswetlandresources/wetland.html |
| Wetlands and Economics: An Annotated Review of the Literature, 1988-1998 | http://www.cciw.ca/glimr/data/wetland-valuation/intro.html |
| Wetland Ordinances | http://www.ci.durham.nc.us/planning/zoneord/section11/115.htm http://www.spokanecounty.org/lrp/cao-toc.htm http://www.sawyercountygov.org/zow1.htm http://www.martin.fl.us/GOVT/depts/leg/ords/ord.548.pdf http://www.martin.fl.us/GOVT/depts/leg/ords/ord.548.pdf http://www.ci.plymouth.mn.us/cgi-bin/fufu.asp?file=/Reference/Regulations/ZoneOrd//21670-WETLANDS_DISTRICT.htm http://www.co.clark.wa.us/commish/ORD/ DATA/TITLE13/Chapter_13_36_WETLANDS_PROTECTION/index.html |

APPENDIX E

CONTACT INFORMATION

Galveston Bay Estuary Program
Robert Rudolph
711 W. Bay Area Blvd, Suite 210
Webster, TX 77598
Phone: (281) 316-3006
Fax: (281) 332-8590
E-mail: RRUDOLPH@tnrcc.state.tx.us

Galveston Bay Foundation
Alisha Goldberg
17324-A Highway 3
Webster, TX 77598
Phone: (281) 332-3381
Fax: (281) 332-3153
E-mail: gbf@electrotex.com

Sea Grant Marine Advisory Service
Marisa Sipocz
(281) 291-0551
P.O. Box 58828
Houston, Texas 77258
E-mail: ms4747@tamu.edu

Galveston Bay Information Center
Cathy Palmer
Texas A&M University, Galveston
P.O. Box 1675
Galveston, TX 77553-1675
Phone: (409) 740-4703
Fax: (409) 740-4702
E-mail: palmerc@tamug.tamu.edu

Houston-Galveston Area Council
Jeff Taebel
3555 Timmons Lane, Suite 500
Houston, TX 77027
Phone: (713) 993-4560
Fax: (713) 993-4503
E-mail: jtaebel@hgac.cog.tx.us

Texas Parks and Wildlife Department
Jarrett Woodrow
17629 El Camino Real, #175
Houston, Texas 77058
Phone: 281/461-4071 x22
Fax: 281/488-1752
E-mail: jarrett.woodrow@tpwd.state.tx.us

Texas General Land Office
Garry McMahan
11811 N. D Street
La Porte, TX 77571
Phone: (281) 471-0391 ext. 113
Fax: (281) 470-8071
E-mail: garry.mcmahan@glo.state.tx.us

US Fish and Wildlife Service
John Huffman
17629 El Camino Real, Suite 211
Houston, TX 77058
Phone: (281) 286-8282
Fax: (281) 488-5882
E-mail: John_Huffman@fws.gov

US Army Corps of Engineers
Kerry Stanley
P.O. Box 1229
Galveston, Texas 77553-1229
Phone: (409) 766-6345
Fax: (409) 766-3931
E-mail: kerry.m.stanley@swg02.usace.army.mil