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VOL. 5, No.2 - SPRING 1999

NEWSLETTER OF THE COASTAL BEND BAYS AND ESTUARIES PROGRAM - SOUTH TEXAS

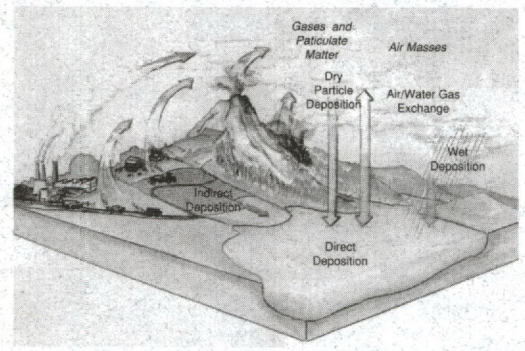
# Atmospheric Deposition Monitoring Continues through August

Evidence has mounted over the past two decades that atmospheric transport is an important pathway by which certain toxic chemicals and nutrients reach coastal waters. Pollutants released into the air are carried by wind away from their place of origin. These pollutants come from sources such as the burning of fossil fuels, industrial processes, cars and other forms of transportation, fertilizer, and vaporization of animal wastes. Air deposition can also come from natural sources. For example, up to 25 percent of the mercury emitted worldwide is released naturally as part of the global mercury cycle. Depending on weather conditions and the chemical and physical

properties of the pollutants, pollution can be carried significant distances from its original source and can undergo physical and chemical changes as it travels. Some of these chemical changes include the formation of new pollutants such as ozone, which is formed from nitrogen oxides (NO<sub>x</sub>) and hydrocarbons.

wildlife are called *persistent bioaccumulative pollutants*. These substances tend to linger in the environment, build up in plant and animal tissues, and pose great risk to human health and the environment.

Atmospheric deposition occurs when pollutants in the air settle on the land or water. Pollution deposited in snow, fog, or rain is called *wet deposition*, while the deposition of pollutants as dry particles or gases is called *dry deposition*. Some common forms of pollutants transported by atmospheric deposition include nitrogen, mercury, copper, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), chlordane, lead, and Diazinon. Even chemicals that are no longer in use in the United States (such as PCBs) can be deposited because they are emitted from incinerators that burn contaminated garbage, or because they are blown in from other countries.



Atmospheric Deposition Cycle

Nutrients are another critical source of deposition. Nitrogen is a nutrient essential for plant growth and is naturally cycled through land, water, and air. When nitrogen becomes overabundant in groundwater, surface water, soil, or the air it becomes a pollutant. Many coastal waters in the eastern United States and Gulf of Mexico have suffered high levels of nitrogen in the water and have been linked to a condition known as *eutrophication* (a process by which a body of water becomes enriched in dissolved nutrients that stimulate the



## What's Inside

- Seismic Activity in the Coastal Bend
- "Texas Estuaries Act" House Bill Filed
- Neighborhood News
- Teaching Environmental Science at TAMU-CC Continues This Summer

### Which Pollutants Pose the Greatest Concerns?

Pollutants that persist in the environment for many months or years and which accumulate in plants, fish, and

see 'Atmospheric' next page

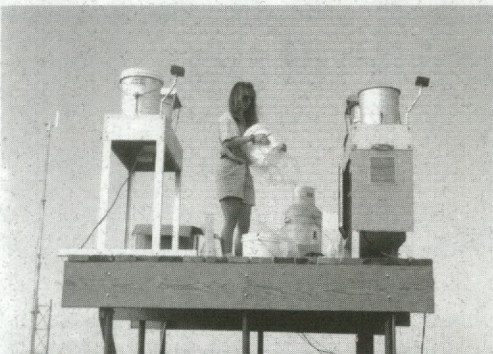
growth of aquatic plant life, usually resulting in the depletion of dissolved oxygen).

## Local Initiatives

In June 1997 the Coastal Bend Bays and Estuaries Program (CBBEP) initiated a 12-month data collection and assessment project involving two sampling stations at representative sites on the shores of Corpus Christi and Nueces Bays. Concentrations of selected contaminants in both wet and dry deposition are cur-



*Dr. Terry Wade of TAMU GERG demonstrates sample collecting equipment.*



*Graduate student at TAMU-CC takes samples at Atmospheric Deposition Sampling Station on campus.*

rently being measured. This project will measure the concentrations of selected contaminants (trace elements and nutrients) that the bays receive from both wet and dry deposition. The Geochemical and Environmental Research Group (GERG) from Texas A&M University is

conducting the project in conjunction with the Texas Coastal Oceanic and Observation Network (TCOON) and the Illinois State Water Survey (ISWS).

Dr. Terry Wade, a geochemical oceanographer with GERG states that nutrients are a major concern in Corpus Christi Bay. "Nutrient deposition is a nonpoint source pollutant, therefore very difficult to control, but it is measurable. Using the data we have and are currently gathering, we plan to develop a nitrogen budget for Corpus Christi Bay, similar to the one developed for Chesapeake Bay," Wade said. This budget will enable scientists to assess the relationship between air and water pollution in Corpus Christi Bay, which will in turn provide resource managers the information needed to implement ecologically sound

management strategies.

This new information, coupled with other studies being conducted in Corpus Christi Bay, will help develop a clearer picture of impacts from atmospheric sources of pollutants. Additional funding has been allocated by the EPA-funded Coastal Management Branch for National Estuary Programs to set up coastal air deposition monitoring sites. The CBBEP has taken steps to acquire some of this funding in order to become part of the National Atmospheric Deposition Program and continue to gather information to better analyze trends.

The CBBEP's current project will continue through August 31 with a final report completed by December 1, 1999.



*Around the Bend is produced quarterly by the Coastal Bend Bays & Estuaries Program with funding from the U.S. Environmental Protection Agency and the Texas Natural Resource Conservation Commission. For more information about the Program or to request a subscription to Around the Bend, contact the CBBEP office at 512/980-3420.*

*Articles are provided through contract with the Center for Coastal Studies, TAMU-CC. Contributors to this issue include: Susan Childs, Liz Smith, Ph.D., Smiley Nava, Ken Rice, Amanda Mintz, and Mercedes M. Salinas.*

*News items, photographs, and letters are welcome and may be submitted to the CBBEP office, Natural Resources Center, Suite 3300, TAMU-CC, 6300 Ocean Drive, Corpus Christi, Texas 78412. The submission deadline for the next issue is May 20, 1999.*

*Printed on recycled paper.*

*This project has been funded in part by the United States Environmental Protection Agency (EPA) under assistance agreement #NW-986147-01-0 to the Texas Natural Resource Conservation Commission (TNRCC). The contents of this document do not necessarily represent the views of the EPA or the TNRCC. The mention of trade name or commercial products does not in any way constitute an endorsement or recommendation for use.*

## NPS APDP SUMMARY REPORT AVAILABLE IN MAY

The Coastal Bend Bays and Estuaries Program (CBBEP) will publish a summary report of three Action Plan Demonstration Projects addressing nonpoint source pollution (NPS) in mid-May. Each project demonstrates a technology or management approach that has been used to implement Actions in the **Coastal Bend Bays Plan**.

In addition to summarizing the methodology and results of each project, the *Summary Report* provides useful information on costs, sources of funding, and contacts. This information can be used by local governments interested in pursuing their own nonpoint source pollution prevention, management, or education project and contains good examples of small-scale projects that can be easily implemented at the local level. The summary report includes

*see 'Report' page 5*



# Seismic Activity in the Coastal Bend

*Activity in the Laguna Madre has residents concerned; Texas General Land Office responds*

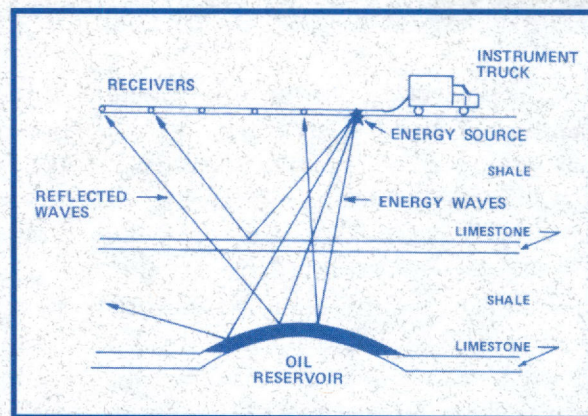
## Background of Seismic Technology

The word *seismic* pertains to earth vibrations that result from either earthquakes or artificially induced disturbances. Earthquake seismographs were invented to record ground vibrations from earthquakes and are currently used worldwide to study natural events.

Today, the geophysicist's primary resource is the reflection seismic method. Reflection seismic surveys record the seismic waves that return or reflect from subsurface formation interfaces after a seismic shock wave has been created on the surface.

8,500 fish. Another investigation in Nueces Bay during spring 1996 resulted in a kill of 184,078 fish, predominantly composed of bait fish. Fish kill numbers are often underestimated due to delayed reporting, natural predation, and difficulty in documenting actual losses. TPWD sought and received restitution monies from the responsible party for these kills. All monies received are used to replace the impacted resources.

Over the past several years, TPWD and Texas General Land Office (TGLO) have worked closely with the seismic companies to minimize impact to fish during seismic blasting. Techniques have been implemented to move fish from the seismic area prior to dynamite detonations as well as to reduce the amount of dynamite used in shot holes in some project areas.



*Refraction method of the seismic process on land.*

on state land leases. The permit identifies the frequency of seismic testing allowed.

In addition to concerns of possible environmental impacts, citizens living close to seismic activity have complained of noise from airboats used by seismic companies. Many residents along the Laguna Madre complain that airboat noise disrupts their peaceful mornings and continues into the evening hours.

TPWD recommended the use of airboats over prop-driven motors to avoid



*A seismic exploration company's airboat in the Upper Laguna Madre. TPWD prescribed the use of airboats and environmental surveyors.*

## Seismic Tests and Fish Mortality

Recent dynamite seismic exploration for oil and gas deposits along the Texas Gulf Coast has resulted in concerns among waterfront home-owners, natural resource managers, and recreational and commercial entities that utilize the bays and estuaries. Since 1995, the Texas Parks and Wildlife Department (TPWD) investigated two significant seismic-related fish kills along the lower Texas coast. According to Ken Rice, TPWD Lower Coast Kills and Spills Coordinator, fish kills occurred in July 1995 in St. Charles Bay resulting in a loss of over

The frequency of seismic exploration activity in state-owned submerged land has increased significantly over the past five years according to Bill Grimes of the TGLO Resource Management Division. The TGLO is responsible for permitting seismic exploration on state-owned submerged lands. State tracts are nominated by industry during two annual lease sales. These sales allow the successful bidder (lessee) rights to the subsurface minerals for five years. The lessee must obtain a seismic permit from the TGLO prior to conducting exploration



*TPWD personnel monitor fish communities in Upper Laguna Madre.*

damage to shallow seagrass beds in the Laguna Madre. Seagrass habitats are important to fish and other aquatic living organisms particularly as nursery and feeding areas. "The seismic testing

*see 'Seismic' Page 5*

# House Bill 2561 "Texas Estuaries Act" Filed

## Statewide Recognition of Texas' Estuary Programs

State representatives from the Coastal Bend and Galveston areas have filed a bill before the 76<sup>th</sup> Texas Legislature that would recognize the significance of estuaries along the Texas coast. House Bill 2561, titled the "Texas Estuaries Act," also designates the Texas Natural Resource Conservation Commission (TNRCC) as the lead state agency for implementation of approved comprehensive conservation and management plans developed under EPA's National Estuary Program (NEP) and makes these management plans eligible for state funding.

The purpose of this legislation is to have the Texas Legislature formally recognize the *state purpose* of the Coastal Bend Bays and Estuaries Program (CBBEP) and the Galveston Bay Estuary Program. "This bill will not only establish the importance of the two programs to the state's economy and protection of our coastal natural resources, but it will also designate the TNRCC as the lead state agency for the implementation process," says Ray Allen, a consultant working with local partners of the Coastal Bend Program.

"If the bill becomes law it would put the state legislature on record as approving the *state purpose* of both programs. However, it is important to distinguish that H.B. 2561 does not provide funding—it is simply a purpose bill," Allen said. John Hoffman, executive assistant to TNRCC Commissioner John Baker, believes that passage of this bill will have great significance for the future of the NEPs. "It is incredibly important for this bill to reach fruition for the future of both of Texas' NEPs," he said.

The National Estuary Program was established in 1987 through amendments to the Clean Water Act to identify, re-

store, and protect *nationally significant* estuaries of the United States. Unlike traditional regulatory approaches to environmental protection, estuary programs target a broad range of issues and engage local communities in the process. These programs focus not just on improving water quality in an estuary, but on maintaining the integrity of the whole system—its chemical, physical, and biological properties as well as its economic, recreational, and aesthetic values.

The CBBEP (formerly the Corpus Christi Bay National Estuary Program) emerged in August 1998 upon completion of the *Coastal Bend Bays Plan*. At present, the CBBEP is sponsored by EPA and TNRCC.

In addition to the TNRCC, H.B. 2561 identifies the Texas General Land Office, Texas Parks and Wildlife Department, Texas Department of Transportation, Railroad Commission of Texas, Texas State Soil and Water Conservation Board, Texas Water Development Board, and the Texas Department of Health as agencies that will participate in and provide assistance to the estuary programs in implementing approved comprehensive conservation and management plans.

The Texas Natural Resource Conservation Commission is seeking a legislative appropriation of nearly \$2 million for implementing the Coastal Bend Bays Plan over the next two years.

For more information on the Texas Estuaries Act, contact Ray Allen, 3718 Shore Drive, Corpus Christi, Texas 78418, or call 361/937-3014.

## SPONSORS OF HOUSE BILL 2185

John Davis	District 129	Houston
Patricia Gray	District 23	Galveston
Judy Hawley	District 31	Portland
Vilma Luna	District 33	Corpus Christi
Gene Seaman	District 32	Corpus Christi
Zeb Zbranek	District 20	Liberty

## Program Seeks Beneficial Use Project Ideas

The CBBEP is requesting your input regarding the beneficial uses of dredge materials. Beneficial uses have been described by EPA as "...constructive alternatives to simply dumping dredged material as waste." Dredging operations will continue to take place in our bays and estuaries to provide navigable waters for various economically important industries throughout the area. Therefore, there is a need to plan for the use of dredged material in a manner beneficial to the environment.

In recent years dredged material disposal has taken on a different form and has been used to create habitat, nourish beaches, provide fill material for construction projects, protect shorelines, and other related uses.

In an effort to assist the sponsors of dredging projects, the CBBEP has convened a *Beneficial Uses Work Group Steering Committee* to solicit your project ideas and develop a plan for future use of this material. The Committee will develop selection criteria to prioritize projects. Ultimately, the group will identify potential funding sources and develop partnerships to implement projects as funds become available. For more information, please contact Sandra Alvarado at the Program Office at 361/980-3420.



employees have been instructed to perform *hazing*, a method of scaring fish away from a detonation site by circling the area with the airboat," says Smiley Nava, the Lower Coast Conservation program leader with TPWD's Resource Protection Division.

Nava adds that TPWD staff have little or no relevant information to assess and comment on environmental impacts of increased seismic activity on state-owned submerged land. To counter this lack of information, "We are currently monitoring seismic fish mortality in the Laguna Madre and Redfish Bay," said Nava. Biologists are comparing bottom trawl samples taken before and after detonations. Trawl samples taken before

the detonations provide information on fish species composition and mortality that might be attributed solely to trawling in the project monitoring area. Control

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*Seismic testing companies perform 'hazing' - a method of scaring fish away from a detonation site by circling the area with an airboat.*

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samples are then compared to trawl samples taken after detonations to determine the impact or mortality attributed to seismic operations.

The TGLO must make decisions based on the needs of all citizens it represents. "This

is a multi-stakeholder issue," says Grimes, "and there will be some inconvenience to populations in and around the area where seismic investigations are occurring." Grimes also says, "anybody that causes damage is liable whether they are permitted or not. Seismic companies are responsible for any damage that occurs while this work is being done. However, as technology increases so does the technique being utilized, and that will reduce the environmental impacts."

*'Reports' from page 2*

multiyear projects designed to assess the quality of runoff from agricultural land in San Patricio County; a vegetated biofilter at Ingleside Cove Park; and constructed wetlands at Lions/Shelly Park in Refugio. They have provided the CBBEP with valuable information on the amount of time and resources required for basinwide implementation of these management strategies and technologies.

The **Odem Ranch** watershed demonstration project was initiated to provide farmers and policy makers in the Coastal Bend with quantitative data on agricultural runoff. Detailed records of nutrient and pesticide applications together with data on constituents in rainfall were used to determine total loadings to cropland. Edge-of-field monitoring was used to quantify pollutant loadings in the runoff. This information will be used to assess the effectiveness of agricultural Best Management Practices

implemented within the watershed.

In **Ingleside**, a vegetated biofilter for stormwater runoff was designed to reduce the amount of pollution reaching the Bay. The biofilter slows the flow of stormwater and traps sediment and pollutants. In addition to reducing pollution, this project increased the community's understanding of nonpoint source pollution prevention and revitalized an urban park.

In **Refugio**, Best Management Practices and public education were used to reduce nonpoint source pollution. Through multiple grants, Refugio constructed a retention pond on Little Creek and recontoured the creek and pond banks to create an extended wetland fringe. The pond holds stormwater, reducing the occurrence of localized flooding. The wetlands serve as a filter for nonpoint source pollutants found in stormwater.



*Volunteers help plant vegetation at Little Creek in Refugio.*

The *Summary Report* will be available at no cost through the Program Office.

The CBBEP actively seeks partnerships to implement the Coastal Bend Bays Plan. If your community has a project that will further the goals and objectives of the Bays Plan, contact the CBBEP Office (361/980-3420).

# Teaching Environmental Science at TAMU-CC

## Continues this Summer

*CBBEP and Port Industries of Corpus Christi help sponsor environmental education opportunities for K-12 grade teachers*

One of the strongest messages the public has put forth in the development of the *Coastal Bend Bays Plan* is that efforts to educate tomorrow's environmental leaders must begin today. The Texas Natural Resource Conservation Commission, Texas A&M University-Corpus Christi (TAMU-CC), the Coastal Bend Bays and Estuaries Program (CBBEP), and the Port Industries of Corpus Christi (PICC) will once again sponsor two "Teaching Environmental Science" (TES) graduate courses for primary and secondary school teachers. Tuition for teachers who enroll in TES will be paid by the PICC. Teachers will only have to pay a \$25 registration fee.

These courses will offer three hours of graduate credit and full certification by the Texas Environmental Education Advisory Committee. Malcolm Butler, Ph.D., education professor at TAMU-CC, and Ron R.

Smith, program coordinator for the Adopt-A-Wetland Program at the Center for Coastal Studies, will instruct the TES classes.

These courses are designed to provide balanced information about the environment and to promote partnerships among teachers, government agencies, businesses, and community organizations.

TES I is geared for elementary through middle school teachers (grades K-8). TES II is designed for upper-level secondary educators (grades 6-12). Teachers who teach 6-8 grades can attend either course. "We would like for the teachers to finish with a better understanding of the environment and estuaries," Butler said. "In addition, we want to make sure teachers are aware of the resources available to them."

TES II will focus on estuarine functions, water quality, freshwater inflow, habitat usage, dredging/maritime commerce issues, industrial issues, and human impacts on the environment. Teachers will learn about different student curriculum activities pertaining to experimental design, wetland vegetative zones, field sampling, data analysis, and investigations of water quality. Several field trips to coastal environments will provide real hands-on experience that can be easily extended to the classroom. Additionally, the course content will enhance the ability of participating teachers to satisfy the Texas Education Agency's requirements for the Texas Essential Knowledge and Skills (TEKS) and in the long-term, improve TAAS testing scores.



*TES II teachers go seining for species in local waters.*



*1998 participants during a TES II field trip to Redfish Pass.*

### TEACHER'S BENEFITS

- FREE TUITION
- 3 HOURS GRADUATE CREDIT
- FULL CERTIFICATION BY TEEAC
- FIELD TRIPS TO LOCAL INDUSTRIES
- HANDS-ON ACTIVITIES
- EXCELLENT CONTACTS
- CLASSROOM MATERIALS

### COURSE DATES

TES I (Grades K - 8)  
June 2-15, 1999  
8 a.m. - 2 p.m.

TES II (Grades 6 - 12)  
June 17-30, 1999  
8 a.m. - 3 p.m.

For More Information on TES Courses, Please Contact:

Dr. Malcolm Butler  
TAMU-CC, Education Building  
6300 Ocean Drive  
Corpus Christi, TX 78412  
361/994-6032  
mbutler@falcon.tamucc.edu

# Neighborhood News

## Big Plans at the Gardens

### Botanical Gardens prepare for expansion



The 180 acres that makes up the Corpus Christi Botanical Gardens plays an important educational role in the lives of locals and visitors who are interested in learning about the flora and fauna of South Texas. The Gardens are managed by the Corpus Christi Botanical Society, Inc., (CCBS) a nonprofit organization. The mission of the CCBS is to advance the knowledge and appreciation of plants in relation to personal and community well-being and scientific understanding.

The objectives of the Gardens are to develop exhibits that highlight the native flora and fauna of the Texas Coastal Bend, as well as provide examples of ornamental plants best suited to the area's climatic regime. Another objective is to establish partnerships with research institutions and resource management agencies.

#### Plans at the Gardens

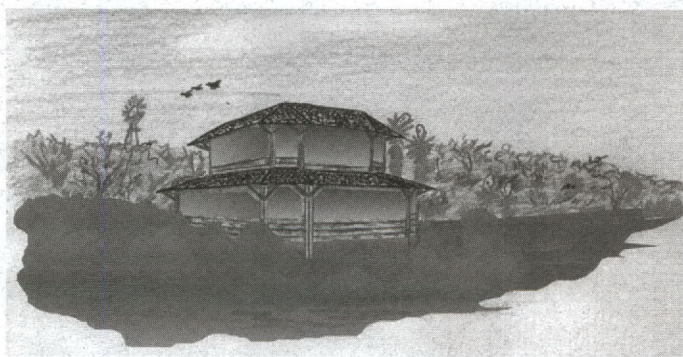
The Gardens are located adjacent to Oso Creek where some of the last remaining native habitats in the area are found. They serve as a prime example for demonstrating on-site conservation and enhancement activities.

Wetlands compose the majority of natural habitat at the Gardens. Many of these areas are essential to waterfowl and waterbirds for feeding, resting, and nesting. Wetland habitats have been significantly altered by land use practices upstream. Because wetlands have extensive stands of marsh vegetation, they act as filters to cleanse the water before it enters Oso Creek.

Gator Lake is a natural attraction for

observing wildlife and for educational and research opportunities. Over the last two years the Botanical Society has received \$200,000 from the Texas Coastal Management Program to build a wetlands education and interpretive center adjacent to Gator Lake. The center will include an all-weather, bi-level observation pavilion and boardwalks. Visitors will enjoy a human-eye viewing area five feet above mean water level; and a bird's-eye view area 15 feet above mean water level. A third dimension, a fish-eye view of wetland activity, will be simulated in interpretive exhibits. Boardwalks will also allow visitors to view various wetland plants and animals without impacting them.

"The addition of an interpretive center and boardwalk will help to increase wetland educational opportunities in the Coastal Bend, placing an emphasis on the importance of this unique sys-



*Future wetlands interpretive center on Gator Lake*

tem in an urban landscape," says Dr. Liz Smith, president of the Botanical Society. She is optimistic when asked about the future of the Gardens as a formidable educational centerpoint. "As Corpus Christi continues to grow, the Gardens will become the regional focal point for residents and visitors to understand how wetlands work," she said.

In addition to Dr. Smith, spearheading



*Gator Lake, located at the Botanical Gardens, is an attraction to local residents and visitors alike.*

the efforts to secure funding for the interpretive center and additional boardwalks is a committee of dedicated and committed wetland professionals including Wayne Hanselka, Ph.D., Texas A&M Extension Service range specialist and Will Cohen, Ph.D., Texas A&M Extension Service wildlife specialist.

#### Recent Accomplishments

##### 1996

- Moved into Visitors Center on 180 acres
- Completed Master Plan of Gardens

##### 1997

- Plant collections of different climates added
- Completed Phase I of Sensory Garden
- Designed Rose Perennial Garden

##### 1998

- Acquired funding for Rose Perennial Garden
- Acquired funding for Wetlands Enhancement & Nursery/Research
- Acquired funding for Hibiscus Garden
- Acquired funding for pavilion/boardwalk
- Landscape design of Upland Gardens
- Landscape design for main building

# CBBEP Riparian Habitat Assessment

## A Call for Field Sites!

The Riparian Habitat Project is one of the first implementation projects under the *Coastal Bend Bays Plan*. The project will assess existing riparian habitat along major drainage areas in five coastal counties (Refugio, Aransas, San Patricio, Nueces, and Kleberg). The project also will develop a strategy for protecting remaining functional riparian habitat.

Riparian habitats (vegetation along drainage areas) serve many important functions, including surface water filtration, soil erosion control, and wildlife habitat. Most riparian habitat does not come under any public jurisdiction; therefore, no regulations apply to management of the lands.

A critical component to the success of this project is obtaining access to riparian habitat, as most habitat is on private lands. The project calls for a look at habitat quality and areal extent; vegetative communities including dominant species and community structure; and identification of areas that exhibit the greatest potential for impacts from urbanization and those that need restoration.

A multi-disciplinary team has been organized to combine diverse expertise and skills necessary to accomplish this project: Dr. Liz Smith and Ms. Suzanne Dilworth (Center for Coastal Studies, TAMU-CC), Drs. Warren Pulich and Dan Moulton (Texas Parks and Wildlife Department), Dr. Lynn Drawe (Welder Wildlife Foundation), Mr. John Lloyd-Reilley (Kika de la Garza Plant Materials Center), and Dr. Gary Jeffress (Department of Geomatics/GIS, TAMU-CC).

Land owners who participate will be provided with copies of the photo/assessment at the project's completion. In many cases, habitat that has been degraded may be a candidate for technical and financial assistance for restoration. Please contact Dr. Liz Smith (361/994-6069) if you are interested in or have questions about this project.



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