

***The Only Barriers Along the Texas Coast are Islands:
The Science & Spanish Club Network Coastal Environmental Education Project***

Gulf of Mexico Foundation CMP Cycle 12 Contract # 08-012

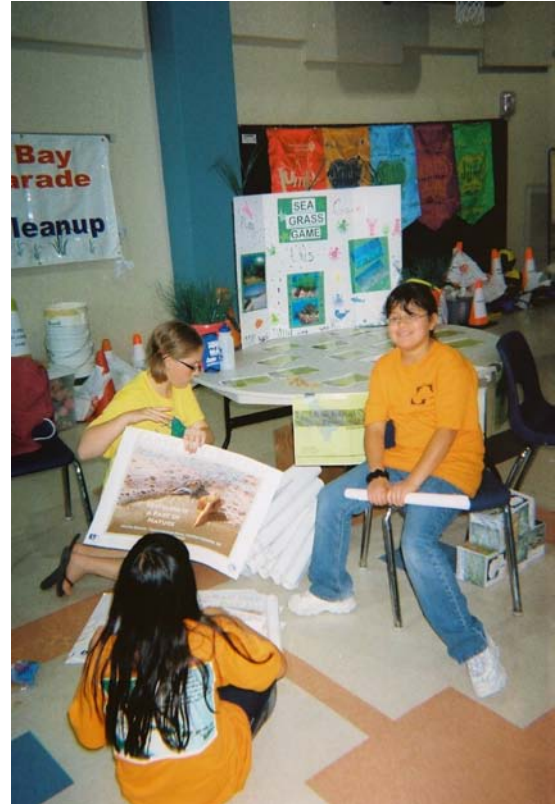
Final Report for Period November 6, 2007 to June 30, 2009

TASK 1. Redfish Bay Scientific Study Area-Survey of Recreational Users

Working Partners: Texas Parks & Wildlife Coastal Fisheries Division-Rockport Office, City of Aransas Pass, Aransas Pass Chamber of Commerce, Coastal Bend Bays & Estuaries Program, Coastal Bend Bays Foundation, and Redfish Nation Magazine.

Science & Spanish Club Partners: (Redfish Bay watershed Stream Team): Aransas Pass High School, AC Blunt Middle School-Aransas Pass, Sinton Junior High School, Ingleside Junior High School and Corpus Christi Martin Middle School.

The Science & Spanish Club Network and the Texas Parks & Wildlife Coastal Fisheries Division-Rockport Office successfully completed 627 surveys of public boat ramp users in the Redfish Bay State Scientific Study Area. This survey was to determine the effectiveness of a radio and television media campaign in the Coastal Bend media market about correct boating procedures for the shallow sea grass meadows in Redfish Bay. A final report (Attachment A) is available at TPW in Rockport with Ed Hagen, director.



Above upper right, is the Sea Grass Dice Game used in various outreach settings.



Redfish Bay Outreach Tent at Shrimporee 2008.

An article (Attachment B) about the Science & Spanish Club Network and its clubs from Aransas Pass, Ingleside, Sinton and Corpus Christi appeared in the Redfish Nation magazine in the Fall of 2008. In addition, the SSCN conducted an additional survey of 237 attendees at the 60th Annual Shrimporee in Aransas Pass on June 6-8, 2008. Survey results indicating that 25% of attendees own a boat and a significant majority are outdoor recreationists were submitted to the Aransas Pass Chamber of Commerce and to the Texas GLO. A sea grass dice game featuring the five major sea grasses of the Texas coast was developed for use as a public education tool.

TASK 2. Myrtle Whitmire Preserve Bilingual Freshwater In-flow and Birding Interpretive Poster

Working Partners: Guadalupe-Blanco River Authority (GBRA), Aransas National Wildlife Refuge (ANWR), Keep Calhoun County Beautiful Chapter, City of Port Lavaca,

Science & Spanish Club Partners: Calhoun High School and Travis Middle School, Port Lavaca

The Science & Spanish Club from Calhoun High School and Travis Middle School worked from the first month (October 2007) of the CMP Cycle 12 contract period to the last month (June 2009). Students were guided in developing and implementing a plan to recreate the Guadalupe River watershed native habitat from the Hill Country to the Gulf coast by faculty sponsor Sherrie Krause; Cinde Thomas-Jimenez, GBRA environmental educator; Tonya Stinson, ANWR environmental educator and Richard Gonzales, SSCN project coordinator.

Students had traveled the Guadalupe Watershed from 2003 to 2007 and had explored the Myrtle Whitmire Preserve on the grounds of the Aransas National Wildlife Refuge from 2005 to 2009. The native habitat with a focus on birding was a result of these field trips. Students also obtained a deeper understanding of the fresh water in-flow issue through a working partnership with the Guadalupe Land Trust (CMP Cycle 12 grant) which restored the old rice irrigation canals and now offer a fresh water source year round for coastal plains migratory birds.

Below photos show the work in progress from October 2007 to June 2009.



Project on June 2008



Project on October 2008

Project on June 2009 with bilingual birding signage.



TASK 3. Expand Aquatic Vegetation Propagation Ponds for Bahia Grande Restoration Project and Develop a Public Recreational Use Plan for the Bahia Grande North in the Back of the Port Isabel Junior High School and Non Point Source Pollution Campaign at San Martin Lake/Bahia Grande South

Working Partners: Cameron County Parks & Recreation Department, Jason Project at the University of Texas at Brownsville, City of Port Isabel Economic Development Commission, Pointe Isabel ISD, and Laguna Atascosa National Wildlife Refuge.

Science & Spanish Club Partners: Port Isabel Junior High School, Port Isabel Alternative School, Dr Garcia Middle School, Brownsville ISD, Calhoun County ISD, and Colegio Juvenal Rendon de Matamoros.

The propagation ponds provided by the Jason Project from the University of Texas at Brownsville have been installed at Dr. Garcia Middle School in Brownsville, Travis Middle School in Port Lavaca and the Port Isabel Alternative School in Port Isabel. Delays were incurred due to administrative obstacles at Port Isabel Middle School, space limitations at Colegio Juvenal Rendon de Matamoros and an anthropogenic decision (someone

reported a snake sighting and so all vegetation was ordered cut) to cut down all plants in the back of the Brownsville school site. Because of these delays, SSCN faculty sponsors, had to be re-enrolled in the Jason Project for 2009.

Propagation Pond at Travis Middle School in Port Lavaca is growing black mangroves from native seed collected in Port O'Connor in Calhoun County.

Propagation Pond at Dr. Garcia Middle School was improved after complete elimination by an administrator.



Above, propagation pond at Port Isabel Alternative School. All aquatic ponds are a work-in-progress with plans for future cultivation of black mangroves and marsh grasses to be transplanted in local restoration projects.

The SSCN in Port Isabel and Brownsville also worked on the Task 3 deliverable to organize a Bahia Grande Watershed Cleanup held the second Saturday in November and the first Saturday in April. This deliverable was done in partnership with the City of Port Isabel Economic Development Commission and the Cameron County Parks & Recreation Department.

Below, left, over 150 volunteers picked up shoreline and highway trash in and around the Bahia Grande. Below, right, Science & Spanish Clubs from Matamoros, Port Isabel and Brownsville take the lead in the newly established Bahia Grande Limpianato Parade, used to raise public awareness about coastal conservation.



The other Task 3 deliverable activity was conducting a survey of the students at Port Isabel Junior High School to determine their affinity for development of the beach area behind their school buildings which lies within the Bahia Grande Restoration area. The following is the summary of the survey results.

**Gulf of Mexico Foundation
Science & Spanish Club Network
Coastal Management Program Grant Cycle 12
Survey of Port Isabel Junior High School April 2008
Executive Summary**

The student population of Port Isabel Junior High School grades 6-8 is about 648 students. Port Isabel JHS is situated on the banks of the Little Laguna Madre a far reaching area of the recently restored Bahia Grande, a 9,000 acre wetland that had been without natural water circulation for over 50 years. A pilot cut was made to the Bahia Grande and water is now filling up the Little Laguna Madre which has created a beach environment behind the Port Isabel JHS building.

A survey instrument was created by Science & Spanish Club Network project coordinator, Richard Gonzales to determine the affinity for physical improvement to the new beach area. The survey was conducted in April of 2008 by Science & Spanish Club faculty sponsor Darrell Nash with 310 surveys completed with a 48% response rate. The response rate for 6th graders was 86 or 28% of total responses, 7th grade was 131 responses or 42% and 8th grade was 91 responses or 29% of total responses.

Below are the tabulations of the survey responses to questions that sought to determine the level of support for development of the beach area behind the school. Results indicate a strong degree of support for development with 86% of all students favoring development. The student body is relatively stable with 47% of respondent having lived in Port Isabel all my life and 26% of respondents having lived in Port Isabel 5-10 years and 27% having lived in Port Isabel for less than five years. As these respondents are in the 11-14 years old age range it may still mean that these respondents have lived a majority of their lives in Port Isabel.

It appears that the longer students live in Port Isabel, the more aware they become of the Bahia Grande. Respondents living all my life in Port Isabel had the greatest awareness of the Bahia Grande with 48% indicating so. They were followed by 37% of those students having lived in Port Isabel 5-10 years and 26% of those students having lived in Port Isabel less than 5 years.

Those students having lived in Port Isabel all my life also had the greatest awareness of the correct name of the water body behind the school building with 27% correctly answering Little Laguna Madre followed closely by 25% of those students having lived in Port Isabel 5-10 years.

It did not matter how long a student lived in Port Isabel as the number one choice for development was for a fishing/boating pier at 32%. The second choice, 30%, and third choices, 22%, for improvements, a nature/hiking trail and boating/kayak ramp, were also the choices of preference for all categories of how long a student lived in Port Isabel. There was less preference for a picnic area and outdoor science lab.

Survey Instrument (**Bold** indicates top or highest answer)

1. Which of the following categories do you fall under?	Total Responses	
a. Student	310	
b. Faculty		
c. Administration		
d. Parent		
e. Other		
2. If you are a student, please indicate which grade you are in?	Total Answers	% of Responses
a. 6	86	28%
b. 7	131	42%
c. 8	91	29%
3. How long have you lived in Pointe Isabel ISD?		
a. All my life	145	47%
b. 5-10 years	81	26%
c. less than 5 years	84	27%
4. What is the name of the body of water behind the Junior High School?		
a. Little Laguna Madre	76	25% correct name
b. Big Laguna Madre	94	30%
c. Tarpon Lake	27	9%
d. Tarpon Beach	30	10%
e. Tarpon Bay	79	26%
5. Are you aware of the Bahia Grande Restoration Project?		
a. Yes	122	39%
b. No	184	59%
6. Would you favor improvements to the beach shoreline area behind the Junior High School?		
a. Yes	267	86%
b. No	40	13%

7. If yes, which of the following improvements would be your first choice?

a. Fishing/boating pier	100	32%
b. Nature/hiking trail	77	25%
c. Picnic area	51	16%
d. Outdoor science lab	36	12%
e. Boating/kayaking ramp	41	13%

8. If yes, which of the following improvements would be your second choice?

a. Fishing/boating pier	67	22%
b. Nature/hiking trail	94	30%
c. Picnic area	46	15%
d. Outdoor science lab	37	12%
e. Boating/kayaking ramp	62	20%

9. If yes, which of the following improvements would be your third choice?

a. Fishing/boating pier	72	23%
b. Nature/hiking trail	68	22%
c. Picnic area	59	19%
d. Outdoor science lab	34	11%
e. Boating/kayaking ramp	68	22%

TASK 4. Tres Palacios Watershed Stream Team Cleanup/Matagorda Bayshed Cleanup Campaign

Working Partners: Matagorda County Precinct 3 Commissioner James Gibson, Wharton County Precinct 2 Commissioner, Matagorda County Environmental Health Department, Lower Colorado River Authority, Clean Rivers Program

Science & Spanish Club Partners: Van Vleck High School, Tidehaven High School, Tidehaven Intermediate School, Palacios Boys & Girls Club, El Campo Boys & Girls Club, Bay City Middle School, Edna Elementary and Aransas Pass High School.

The Task 4 deliverables included a series of activities that helped to bring three coastal counties (Matagorda, Calhoun and Jackson) together with a better understanding that they all are a part of the greater Matagorda Bay bayshed. Cleanups were conducted at Matagorda Beach twice with all bayshed SSCs participating. SSCs also marched in local parades to further promote the Tres Palacios Watershed.

A tri-lingual (English-Spanish-Vietnamese) sign depicting the primary coastal environmental issues was made to use at area festivals for outreach purposes. A t-shirt was designed and printed to further support this campaign and a final 4x8 foot Tres Palacios Watershed sign was made and placed in front of the Palacios Boys & Girls Club commemorating the 2006 Boys & Girls Club of America National Dragonfly Quest Science Fair Competition winning project in the environmental science category that this Tres Palacios Watershed Cleanup project won.

The Beaches & Bays of Matagorda County Habitat Toss game was also created and used for public education and outreach in several locations.

See trilingual signage below, right. Below, left is an Edna student preparing the Beaches & Bays of Matagorda County Habitat Toss Game for use at an event in Edna on May 21, 2009.



	Welcome	Bienvenidos	Hoan Nghênh - Juan Nin
	Recycle	Reciclar	Tài Chê - Tie Chê
	Reuse	Reusar	Xài Lại - Sigh Ligh
	Reduce	Reducir	Giảm Bớt - Zam But
	Septic System	Sistema Septico	Hâm Cầu Tiêu - Hum Cow Tio
	Outdoor Burning	Quemando Afuera	Đốt Rác Ngoài Trời - Do Rack Why Try
	Illegal Dumping	Tirando Basura Ilegalmente	Đổ Rác Trái Phép - Do Rack Try Fep



It's the SAME in All languages
Nó Đêū Giông Nhau Cho Mọi Ngôn Ngữ²
Es lo mismo en cualquiera idioma

The trilingual design was used to place this sign at the Palacios Boys & Girls Club June 2009.



Deliverable(s): Copies/pictures of trilingual non-point source pollution poster, billboard, t-shirt for Matagorda County Environmental Health Department and of the Beaches and Bays of Matagorda County Habitat Toss Game for festival outreach and high resolution photos of outreach events.

TASK 5. Coastal Bend Natural and Humanized Watershed Awareness Campaign

Working Partners: Lavaca-Navidad River Authority, City of Corpus Christi Water Department, South Texas Nuclear Power Plant, Guadalupe-Blanco River Authority, San Patricio Municipal Water District

Science & Spanish Club Partners: Edna Elementary, Edna Middle School, Aransas Pass, Ingleside, Sinton, and Corpus Christi

Science & Spanish Clubs from the Coastal Bend area made field trips to the South Texas Nuclear Power Plant to view the 7,000 acre man-made reservoir and then to the Lake Texana man-made reservoir to gain an understanding of how humans can manipulate nature for their needs. Students from Edna learned about the history of Lake Texana and were exposed to the economic impact of the millions of dollars that come into their local economy as a result of the City of Corpus Christi purchasing water rights from 1995 to 2037. Students made replicas of the Mary Rhodes Pipeline, the man-made 126 mile long structure that carries fresh water from

Lake Texana in Jackson County to the City of Corpus Christi Stevens Water Treatment Plant. Students also visited the water treatment plant to see first-hand how water is treated for drinking.

Over 180 SSCN students attended the April 18, 2008 Earth Day Bay Day event at Cole Park in Corpus Christi to sign the Mary Rhodes Pipeline replica as a symbol of the connectivity between Jackson County and the Coastal Bend communities who in turn buy water from the City of Corpus Christi. The students' signatures also symbolized the future contract renewal between the Lavaca-Navidad River Authority and the City of Corpus Christi which will occur in 2037, when some of these SSCN students will be in the 35-40 year old age range...and potentially, some of them could be signors of that contract renewal. One Mary Rhodes Pipeline replica was given to the Lavaca-Navidad River Authority in January of 2009 and a second replica given to the Port of Corpus Christi (builders of the humanized watershed pipeline) in February 2009.

Below, left, Richard Gonzales, SSCN project coordinator and Yolanda Marruffo, City of Corpus Christi Water Department marketing director present a Mary Rhodes Pipeline replica to Frank Brogan of the Port of Corpus Christi in February 2009. Below, right, Edna Elementary SSCN students with Bernard Paulsen of the Port of Corpus Christi right before presenting the Mary Rhodes Pipeline replica to the Lavaca-Navidad River Authority in January 2009.





Above, SSCN students from throughout the “Humanized” watershed made a public announcement about the humanized watershed and the need for regional collaboration now and into the future between the Coastal Bend and Jackson County at Earth Day Bay Day on April 18, 2008 in Corpus Christi.



Above, left, SSCN students visited the South Texas Nuclear Power Plant and its 7,000 acre man-made reservoir. Above, right, SSCN students then visited the Lake Texana man-made reservoir in Jackson County where the Mary Rhodes Pipeline carries water to the City of Corpus Christi. Students compared natural watersheds with humanized watersheds.

TASK 6. Making a Preliminary Design of a Sand Dune Erosion and Coastal Erosion Public Display at the LCRA Nature Learning Center at Matagorda Beach

Working Partners: Lower Colorado River Authority's Nature Learning Center at Matagorda Beach, Betsy Terrel, executive director; University of Texas Bureau of Economic Geology, Tiffany Hepner, project coordinator;

Science & Spanish Club Partners: Tidehaven High School, Tidehaven Intermediate, Van Vleck High School, Port Isabel Alternative School (participants in Isla Blanca on South Padre Island sand dune erosion monitoring project); Penuelas, Puerto Rico;

This deliverable task took on an unexpected twist when a "Message in a Bottle" washed up on Matagorda Beach and was found by a volunteer from Houston during the Matagorda Beach Adopt-A-Beach Cleanup in April 26, 2007. The bottle was a part of an current experiment conducted by Javier Gonzalez' ninth grade science class from Rafael Irrizary Middle School in Penuelas, Puerto Rico. These students launched these bottles on November 6, 2006 and it took this bottle six months to travel 1,600 miles from the Caribbean to the Texas Gulf. A relationship was established between the SSCN site closest to Matagorda Beach, Tidehaven and Puerto Rico.

This added an extra dimension for all students involved in the sand dune erosion monitoring program with the University of Texas Bureau of Economic Geology, as this discovery gave actual proof that we are all connected by the forces of nature. Puerto Rico became involved with this task immediately, actually doing the fine translation (Attachment C) of the Sand Dune Erosion Study panel from English to Spanish.

SSCN students from Penuelas, Puerto Rico visited Matagorda Beach in May 2008 at the same area where students from Tidehaven have been conducting dune erosion monitoring measurements since 2006.



Below, Tidehaven and Puerto Rican SSCN students visited the Lower Colorado River Authority Nature Learning Center in May 2008 where the bilingual Sand Dune Erosion Monitoring Study poster and three-dimensional model was on display from October 2008 to May 2009.



Deliverable(s): Copies/photos of sand dune erosion monitoring studies, bilingual outreach poster, and brochure for Matagorda County residents and beach visitors, bilingual coastal erosion display for LCRA Nature Learning Center.

Attachments to Final Report:

Attachment A-Redfish Bay Pubic Boat Ramp Survey Final Report

Attachment B- Redfish Nation Magazine article

TO: Steve Bowman, Redfish Nation Magazine

FROM: Richard Gonzales, project coordinator, Gulf of Mexico Foundation/Science & Spanish Club Network

RE: Submittal of Science & Spanish Club Network Redfish Bay, Texas photos and articles

DATE: July 7, 2008

The Science & Spanish Club Network, SSCN, is a multicultural approach to coastal environmental education program of the Gulf of Mexico Foundation, GMF. Established in 2000 with middle schools from Matamoros, Tamaulipas and Corpus Christi, Texas, the program has proven that youth can learn from each other through shared ecosystems. In this case, it was the Upper Laguna Madre of Texas and the Lower Laguna Madre of Tamaulipas that bonded these coastal communities, a bond that endures to this day!

As the 2008-09 school year approaches, there are now 22 Science & Spanish Clubs, SSCs. On average, each SSC has about 20 members. SSCs are organized by watershed and bayshed *Stream Teams* along seven coastal counties in Texas and soon in Cameron and Acadia Parishes in Louisiana. In addition, the SSCN has created a people to people connection between SSCs in the Gulf of Mexico and the Caribbean with Penuelas, Puerto Rico and St. Croix Central High School in the US Virgin Islands joining the network in 2008. As one student said, "*it's all connected.*"

The SSCN program began as a middle school extracurricular program, but now operates at the elementary, middle school and high school levels as students have become environmentally engaged...and stayed environmentally engaged through a three-phased curriculum that brings to the individual, a clear understanding of the responsibilities of living and working in the coastal zone. These responsibilities include coastal cleanups, fresh water balances in the estuarine ecology, public education and outreach, and the sustainability of coastal ecology and economy.

The Redfish Bay Stream Team, comprised of Aransas Pass AC Blunt Middle School, Aransas Pass High School, Ingleside Taylor Junior High School, Sinton Smith Junior High School and Corpus Christi Martin Middle School, also lies within the Aransas River watershed, and doubles up as a *bayshed* within the pristine Redfish Bay ecosystem.

The SSCN Redfish Bay Stream Team looks forward to joining the Redfish Nation as a community-based supporter because of their past, present and future projects within Redfish Bay in Texas. These projects include:

- Texas General Land Office Adopt-A-Beach Cleanups (September, February and April) at the Lighthouse Lake Trails Park, Conn Brown Harbor and other shoreline sites within Redfish Bay since 2002.
- Initiating a resolution in 2006 to local and state governments to rename Texas State Highway 361 from Aransas Pass to the Port Aransas ferry, Redfish Bay Causeway, as a way to better educate the public about Redfish Bay. An official ceremony will take place in 2009-10 after highway improvements are completed.
- Participation with Texas Parks & Wildlife Coastal Fisheries Division with surveying public boat ramp users at six different boat ramps around Redfish Bay. The survey included over 600 responses taken during the summer of 2007 that measured the effectiveness of a media campaign about Redfish Bay seagrass pasture boating and conservation practices.
- Public education and outreach (including giving away Redfish Nation Magazines) about the Redfish Bay State Seagrass Scientific Study Area designation at the first weekend in June annual Aransas Pass Chamber of Commerce Shrimporee event that attracts over 40,000 attendees, most of which visit Redfish Bay throughout the year for outdoor activities, especially fishing.
- Originating and organizing the annual Redfish Bay Trash Parade and Coastal Cleanup the third Saturday in February. This event started in 2006 and grows every year with the parade route beginning in Ingleside and ending in Aransas Pass.
- Inviting the Redfish Nation Professional Redfish Tour to Conn Brown Harbor in Aransas Pass on Redfish Bay!

For more information about the Gulf of Mexico Foundation go to www.gulfmex.org or email Richard Gonzales, project coordinator, Science & Spanish Club Network, richard@gulfmex.org.

Attachment C: English and Spanish text of Sand Dune Erosion Monitoring display poster at Lower Colorado River Authority Nature Learning Center

This is the text document that needs to be translated into Spanish! This is the English text of the existing exhibit at the LCRA Nature Learning Center.

Classroom at the Coast

The Texas High School Coastal Monitoring Program (THSCMP) engages people who live along the coast in the study of their natural environment. High school students, teachers, and scientists work together to gain a better understanding of dune and beach dynamics on the Texas coast. Scientists from the Bureau of Economic Geology (BEG) at the University of Texas at Austin provide tools and training needed for scientific investigation. Students and teachers learn how to measure the topography, map the vegetation line and shoreline, and observe weather and wave conditions. By participating in an actual research project, the students obtain an enhanced science education.

Students from Ball High School on Galveston Island have been participating in the THSCMP since 1997. Port Aransas High School on Mustang Island and Port Isabel High School near South Padre Island joined the program in 1999. The BEG has partnered with the Lower Colorado River (LCRA), to include three schools from the Bay City region in the THSCMP. Van Vleck Middle School and the Science & Spanish Club at Tidehaven Intermediate School began monitoring Matagorda Peninsula near the mouth of the Colorado River during spring 2005. Palacios High School will join this region's Program in the Fall 2006.

Field Measurements

Students use a pair of Emery rods, a metric tape, and a hand level to accurately survey a shore-normal beach profile from the foredunes to the waterline. The students begin the profile at a GPS-surveyed datum stake so that they can compare each new profile to earlier profiles. The graph above is an example of topographic data collected by students.

Using a differential GPS unit, students walk along the vegetation line and shoreline, mapping these features for display on Geographic Information System software. The GPS mapping provides measurements of the rate of shoreline change. Examples of GPS mapped shorelines and vegetation lines from site MAT03 are to the right.

Students measure wind speed and direction, estimate the width of the surf zone, and observe the breaker type. They note the wave direction, height and period, and estimate the longshore current speed and direction using a float, stop watch, and tape measure. Students also learn to obtain weather and oceanographic data from resources on the internet.

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For more information please visit our web site: <http://coastal.beg.utexas.edu/thscmp/>

Matagorda Bay Nature Park
Lower Colorado River Authority
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Spanish Translation **Monitoreo de Erosión de Dunas**

La sala de clase en la costa

El Programa de Monitoreo de Costas por Escuelas Superiores de Texas (THSCMP por sus siglas en inglés) envuelve a las personas que viven a lo largo de la costa en el estudio de su medio ambiente natural. Estudiantes de escuela superior, maestros, y científicos trabajan juntos para obtener un mejor entendimiento de la dinámica de las playas y las dunas de arena en las costas de Texas. Científicos del Buró de Economía Geológica (BEG por sus siglas en inglés) de la Universidad de Texas en Austin proveen las herramientas y el adiestramiento necesario para realizar la investigación científica. Estudiantes y maestros aprenden a cómo medir la topografía, trazar en mapas las líneas de vegetación y orillas de costa, y observar el clima y las condiciones del oleaje. Al participar en proyectos de investigación reales, los estudiantes obtienen y realzan su educación científica.

Estudiantes de la Escuela Superior Ball en Galveston Island han estado participando en el THSCMP desde 1997. La Escuela Superior de Port Isabel, cerca de South Padre Island y la Escuela Superior de de Port Aransas en Mustang Island, se unieron al programa en 1999. BEG ha unido esfuerzos con la Autoridad de Río Colorado Bajo (LCRA por sus siglas en inglés) para incluir tres escuelas de la región de Bay City en el THSCMP. La Escuela Intermedia Van Vleck y el Science & Spanish Club de la Escuela Intermedia de Tidehaven comenzaron a monitorear la Península de Matagorda

cerca de la boca del Río Colorado durante la primavera del 2005. La Escuela Superior de Palacios se unirá al Programa de esta región en otoño de 2006.

Mediciones de Campo

Los estudiantes utilizan un par de tubos Emery, una cinta métrica y un nivel de mano para monitorear y obtener medidas precisas del perfil normal de costa de las dunas y el nivel hasta donde llega el agua de la costa. Los estudiantes comienzan el perfil en un área previamente investigada la cual está marcada por una estaca cuya posición fue marcada usando por Sistema de Posicionamiento Global (GPS por sus siglas en inglés). De esta manera puedan comparar cada nuevo perfil que realizan con los realizados en investigaciones previas. La gráfica que se muestra arriba es un ejemplo de data topográfica recolectada por estudiantes.

Utilizando una unidad diferencial de GPS los estudiantes caminan a lo largo de la línea de vegetación y costa, trazando esos rasgos para que aparezcan en un programa del Sistema de Información Geográfica. Este monitoreo usando GPS provee medidas del ritmo al que ocurre el cambio en la línea de la costa. Ejemplos de líneas de vegetación y costa monitoreadas en el área MAT03 se muestran a la derecha.

Los estudiantes miden la rapidez y dirección del viento, estiman el ancho del área de navegación y observan el tipo de rompimiento. Anotan la dirección de las olas, altura y período, y estiman la rapidez y dirección de las corrientes largas de costa usando un flotador, reloj cronómetro y cinta métrica. Los estudiantes también aprenden a obtener data climatológica y oceanográfica de recursos en el internet.

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REN



Children of the Sea

The next generation of leaders
in the Redfish Bay community

Richard Gonzales is a man on a mission. For eight years, he has been working to educate children on the importance of the environment. He sees them as the next generation of stewards for the Gulf Coast region.

"The students voluntarily, in an extracurricular setting, keep coming back," said Gonzales.

Students from elementary through high school are getting hooked on an environmental leadership program called the GMF Science & Spanish Club Network (SSCN),

which Gonzales directs.

The program's main goal is to develop future leaders with an environmental awareness of the Gulf Coast region.

The SSCN takes this a step further by incorporating students from the United States and Mexico, blending multicultural diversity and environmental studies. The Gulf of Mexico is a shared ecosystem between Mexico and Texas; therefore it is only fitting for students from both regions to work together to achieve common goals.

"If you are going to develop the best sci-

entists and stewards of the Gulf of Mexico, you have to be bilingual," said Gonzales.

According to Gonzales, the students don't experience many problems with the language differences between English- and Spanish-speaking students. The science of the Gulf Coast region is a common bond the students share, transcending cultural differences.

"This is a medium by which we can remove these language barriers," said Gonzales.

The Network is driven by the enthusiasm of the students, many of whom have helped



» Science & Spanish Club students from Ingleside, Corpus Christi, Sinton and Aransas Pass transplanted over 1,700 marsh grass plugs in just two hours at the Goose Island State Park in Lamar, Texas.

to spread the SSCN message elsewhere. Some students have moved and formed additional clubs in their new neighborhoods, which Gonzales and the SSCN have been more than happy to accommodate.

One reason the students enjoy these clubs is that all expenses are paid for by the Gulf of Mexico Foundation, an organization that oversees the SSCN. The Texas General Land Office offers a Coastal Management Program grant the GMF has been fortunate to receive for the last several years, helping fund transportation, food, and other costs associated with the trips and outings the SSCN takes part in.

"With little or no cost to the student, it creates a level playing field for any kids to

join," said Gonzales.

One event that always draws a crowd and provides great publicity for the SSCN is the trash parade.

The purpose? "Raising public awareness about Redfish Bay," said Gonzales.

Students create handouts, give away fish rulers, and decorate signs and buses to use as educational tools. Then after the parade takes place, they go clean up two or three spots in the local watershed area.

The students also take part in surveying recreational boaters at public boat ramps, attending the annual Aransas Pass Chamber of Commerce Shrimporee and participating in adopt-a-beach cleanups.

One specific focus of the SSCN is the pro-

tection of seagrass pastures in Redfish Bay, which is located near Port Aransas, Texas. The bay is a shallow region that relies on seagrass to provide important resources both up and down the food chain.

Through seagrass dice games and boater surveys, the students hope to educate the public on the benefits seagrass has on people and the environment.

The SSCN is entering its ninth year and if student enthusiasm is any indication, the future of Redfish Bay and the surrounding community is in good hands.

For more information on the GMF Science & Spanish Club Network visit the Gulf of Mexico Foundation at www.gulfmex.org. 

» The first-ever Redfish Bay Trash Parade was created to raise public awareness of the Texas State Redfish Bay Scientific Seagrass Study Area.



» Nearly 200 SSCN students and faculty sponsors attended the Annual Gulf of Mexico Youth Leadership in Stewardship Conference held in Port Lavaca in 2007.

Protection of Seagrasses in the Redfish Bay State Scientific Area
Seagrass Outreach Assessment Survey
Contract No. 0602

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EXECUTIVE SUMMARY

In response to the seagrass protection regulation enacted in May 2006 for the Redfish Bay area, Texas Parks and Wildlife Department (TPWD) conducted surveys at surrounding boat ramps by interviewing boaters. The main objectives of this study were to gather information from the boating public to: 1) assess what counties Redfish Bay users are from, 2) their awareness of the no-uprooting law in RBSSA 3) what media sources they utilize to better focus outreach efforts, 4) determine most frequently viewed television channel and time of day viewers observed the seagrass public service announcement, and 5) evaluate the effectiveness of informational signs placed surrounding and within the Redfish Bay State Scientific Area (RBSSA). From 4 April 2007 through 19 August 2007, 24 days were selected for interviews. A total of 625 interviews were conducted including 67 parties intercepted on multiple occasions for a total response rate of 89%. Results from the study showed that boaters from Bexar County comprised the highest percentage of users (22%) followed by Aransas County residents (17%). Almost all (92%) boaters had been informed about the regulation. Almost one-third (29%) of boaters had heard about the regulation through word-of-mouth followed by print material (22%) which included newspaper, flyers, and TPWD outdoor annual. Almost one-half (42%) of boaters had seen the public service announcement with ABC (Ch. 3) the most frequently (9%) viewed channel and "sometime during the evening" was the most frequently viewed time frame (16%). Of the 68% of boaters that stated they had boated within the area during the past year, 65% also noted they had seen the signs of which 87% and a majority (87%) said that the signs were helpful. Additional information was collected on boating aids usage. Results from this study will be used to assess current outreach efforts and to determine new outreach venues..

INTRODUCTION

Redfish Bay, near Port Aransas, supports extensive seagrass stands (including all five species found in Texas) oyster reefs, mangroves, as well as a main Gulf pass at Port Aransas (Figure. 1). This rich and diverse habitat creates a robust system that can support an abundance of marine life: over 185 different species have been encountered in Texas Parks and Wildlife Department (TPWD) gill net and bag seine sampling since 1975.

Light requirements restrict seagrass growth to shallow areas, where they can be subjected to propeller damage as boaters cross shallow flats. Concern over mechanical damage caused by boat propellers increased with the advent of tunnel-drive flats-boats in the mid 1980s. An article in the Texas Parks and Wildlife magazine dating back to July 1993 states, "But modern boat design technology has changed all that, ushering in an age of easy access to these once isolated areas, with the potential for long-term damage to the vegetation that is the foundation of this valuable marine community"(Edwards 1993).

In November 1996, a seagrass symposium held in Corpus Christi sponsored by TPWD, General Land Office (GLO), and what is now known as the Texas Commission on Environmental Quality (TCEQ), gathered state and federal agency representatives as well as scientists and local specialists to review seagrass issues. Commentary from the symposium was formulated by TPWD into the *Seagrass Conservation Plan for Texas* (SCPT 1999) which outlines future research needs, management issues, and educational efforts necessary for seagrass conservation. In October 2000 the Texas Parks and Wildlife Commission created the Redfish Bay State Scientific Area (RBSSA) and three voluntary no-prop areas were established. After five years, the RBSSA was renewed, but because the voluntary measures proved unsuccessful, a no-uprooting law was mandated for the entire 32,000 acre area beginning May 1, 2006.

This study was designed to assess the effectiveness of on-going outreach regarding seagrass with the following main objectives: 1) to assess which counties Redfish Bay users are from, 2) their awareness of the no-uprooting law in the RBSSA, 3) to establish what media sources they utilize, 4) to determine which television channel and what time of day viewers most frequently observed the seagrass public service announcement, and 5) to evaluate the effectiveness of informational signs placed in and around the RBSSA. Additional information was collected on boater practices and opinion of boating aids.

METHODS

Survey locations were randomly selected from seven public boat ramps surrounding the RBSSA (Figure 2): Ingleside Cove, Port Aransas Public, South Conn Brown Harbor, North Cove Harbor, Crab Man, Aransas Pass Airport, and Ransom Channel Park. In-person interviews were conducted by TPWD employees, with assistance from local students, as boaters were preparing to launch their boats. Surveys

were conducted from 4 April 2007 through 19 August 2007 (24 days total) on Friday, Saturday, and Sunday mornings beginning at sunrise and continuing for three hours (Appendix. T1).

Seven local Science and Spanish Club Network Program students from Aransas Pass High School and A.C. Blunt Middle School (Appendix. P1) contributed by recording interview responses and tracking number, gender, and age group (adult or youth) of party members. Interviewed parties included recreational as well as guided trips, commercial fishermen, and pleasure craft.

Although a sample size of 384 interviews was sufficient for a 95% confidence level (+/- 5% confidence interval), a minimum of 500 interviews were to be conducted to factor in refused interviews and the possibility of intercepting individual boaters on repeat occasions (Salant and Dillman 1994).

The data collection form (Appendix. T2) included questions regarding boater knowledge of the seagrass protection regulation, sources of information, use of GPS for navigation, awareness of the "Lift, Drift, Pole, or Troll" public service announcement (PSA), use of tide chart, and observation and value of seagrass informational signage. Boaters were asked specifically if they had heard about the seagrass regulation in Redfish Bay. If they responded "Yes," the interviewer then asked how they heard about it. If they answered "No," the interviewer asked them how they typically get their information about saltwater fishing. For questions regarding signage, respondents were first asked if they boated within the Redfish Bay area since the regulation was enacted. A visual aid was used to ask respondent if they had seen any of the signs during a previous trip (Figure 3).

Boat identification numbers were collected during interviews to ensure individual boaters were not interviewed on multiple occasions. Responses from these interviews were not used unless the boater's county of origin differed as this may be the case for many guided trips.

A media buy coordinated and funded by the Coastal Bend Bays and Estuaries Program (CBBEP) ran concurrently with the survey period during which time the PSA was aired on four local channels (ABC, KIII, Ch. 3; NBC, KRIS, Ch. 6; CBS, KZTV, Ch. 10; and KORO Ch. 28) for a total of 721 spots.

RESULTS

A total of 24 surveys were conducted between of which the Science and Spanish Club Network Program students participated in 14 survey days.

Response Rate

A total of 625 interviews were conducted for a total response rate of 89%. Sixty-seven individuals (11%) were intercepted on multiple occasions and three were unwilling to participate in the survey. The largest proportion of interviews (38%) were conducted at S. Conn Brown Harbor followed by N. Cove Harbor (36%) and Port Aransas Public (13%) (Table 1). Overall, S. Conn Brown Harbor was surveyed most frequently (29%) followed by N. Cove Harbor Ramp (21%) and Ransom Channel Park (17%) (Table 1). Port Aransas Public Ramp and Aransas Pass Airport Ramp each comprised 13% of the total survey effort.

Fifty-seven Texas counties (Table 2) were represented during the survey with Bexar County showing the highest representation (22%), followed by Aransas (17%), San Patricio (12%), Travis (6%), and Harris (5%). Nueces County boaters comprised only 3% of the responses while Comal and Wilson counties were both higher (5% and 4%, respectively). The eight counties previously mentioned comprised almost three-quarters (74%) of the total interviews (Figure 4). These eight counties were subdivided into two groups: 1) local coastal counties (31% of total responses) surrounding RBSSA which included Aransas, San Patricio, and Nueces Counties, and 2) inland counties (37% of total responses) which included Bexar, Comal, Harris, Travis, and Wilson Counties. Out-of-state boaters were intercepted from Oklahoma and Colorado.

Regulation Awareness

Almost all (92%) boaters had been informed about the regulation (Table 3). Of the two counties with greatest representation, 89% of Bexar County respondents (n=121) had heard about the regulation and 99% of Aransas County respondents (n=94) had heard about the regulation.

Media Sources

Responses from boaters on how they heard about the regulation, or, if they had not heard about it, how they typically get their information about saltwater fishing, were classed into 10 categories: word of mouth, print material, multimedia sources (more than one media type), magazine articles, conservation groups, signs, television, radio, internet, or other. Print material included publications such as newspaper, specifically Corpus Christi Caller Times, Port Aransas South Jetty, Rockport Pilot, San Antonio Express News, Austin American Statesman, Houston Chronicle, and the Texas Parks and Wildlife Outdoor Annual. Magazines mentioned were: Texas Fish and Game, CCA Tide, Texas Saltwater Fishing, Texas Parks and Wildlife, and the Salty Angler (Table 4). Coastal Conservation Association (CCA) was by far the most frequently referred to conservation organization, although Saltwater-fisheries Enhancement Association (SEA), the Boatman's Association, the Coastal Bend Guide's Association, and the Kayak Grass Association were also mentioned.

Almost one-third of boaters (29%) who indicated they had been informed about the regulation had heard about it through word of mouth which included friends, family members, TPWD personnel, guides, and fishing seminars (Table 4). Print was the second highest media source used (22%) while radio was the least (<1%) likely source used. The 27 respondents who had not heard about the regulation indicated they typically get their information about saltwater fishing primarily through word of mouth (57%), print and television (15%), and internet (11%) (Table 4).

As results for the top eight counties comprised 74% of the interviews, responses from these counties were divided into two subgroups (local coastal counties and inland counties). Word of mouth and print material remained the most frequently used media source, but there were other notable differences. Among the five inland counties combined, magazine article was the third-highest media source used (14%, Table 6) in contrast to the three coastal counties combined it ranked the sixth most frequently used media source (6%) (Table 5). The percentage of boaters in the three coastal counties (9%) that heard about the regulation through television was third highest, opposed to the five inland counties where it was the seventh most frequently used media source (5%). Conservation groups, internet, and signs were somewhat less frequently used among the two groups.

Although 92% of boaters indicated they have access to the internet (Table 7), most boaters did not hear about the regulation through the internet (Tables 5 and 6). Almost one-third of boaters (29%) indicated they had previously received a seagrass brochure (Table 8).

Public Service Announcement (PSA)

Almost half of the respondents (42%) said they had observed the "Lift, Drift, Pole, or Troll" PSA on television (Table 9). When asked specifically what channel they were watching when they observed the PSA, the majority of boaters that could remember indicated ABC (9%, n=19), followed by NBC (5%, n=11) and CBS (5%, n=10) (Table 10). Boaters viewed the PSA more frequently sometime during the evening (16%, n=36), followed by sometime during the morning (6%, n=14), and the afternoon (1%, n=3) (Table 11).

Informational Signs

Questions asking boaters about signage in the RBSSA were refined part-way through the study. As a result, only responses gathered after the changes were made were used for analysis (n=290). Of the 68% of respondents that stated they had boated within the area (Table 12), 92% also noted they had seen the signs (Table 13). Eighty-seven percent of these respondents said that the signs were helpful while 13% said they were not helpful (Table 14). Input gathered from the respondents on how signage could be improved included: increase sign size, increase amount of signs, and mark navigation channels. Several boaters indicated the signs were helpful and reminded them of the regulation. One boater suggested including the cost of fines on the signs.

Boating Aids

Boater response was evenly divided (51%=yes, 49%=no) when asked if a tide chart was checked before beginning a trip (Table 15), but 79% agreed that a tide chart posted at the boat ramp would be helpful for them (Table 16). A few boaters indicated they typically look for visual references like waterlines or algae growing on docks or bulkheads to determine tide levels and a simple tide staff at the boat ramp would be very useful. When boaters were asked if they use a GPS unit for navigation, 57% said they do and 43% said they do not (Table 17).

Impression and Brochure Totals

A total of 1,156 impressions were made during the course of the study (Table 18). This included boaters interviewed as well as party members observing the interview. Over half (58%) of these impressions made were adult males while youth females comprised the lowest percentage (2%). A total of 404 waterproof seagrass brochures were handed out to boaters during the study period.

DISCUSSION

The objectives of this study were: 1) to assess what counties Redfish Bay users are from, 2) their awareness of the no-uprooting law in the RBSSA, 3) to establish what media sources they utilize, 4) to determine most frequently viewed television channel and time of day viewers observed the seagrass public service announcement, and 5) to evaluate the effectiveness of informational signs placed surrounding and within the RBSSA. Although results did not include responses from repeat boaters, a future study which included this analysis would be useful. TPWD will use information gathered from this study to improve the efficacy of their outreach efforts regarding the seagrass protection regulation in the RBSSA.

Results indicate outreach efforts have been successful locally as well as in surrounding cities such as San Antonio, Austin, and Houston. Overall, while boaters seem to be informed primarily through word of mouth, print material seems to be the second best method to reach the boating public. Articles in magazines such as Tide, Texas Saltwater Fishing, and Texas Fish and Game would be more beneficial for reaching the inland boating communities. In future studies, more emphasis on gathering responses from boaters that had not been informed about the regulation would be helpful in determining other media sources that could be utilized. Also, with such a high rate of internet users this may be a worthwhile tool for reaching boaters by posting a link to the TPWD website on credible web pages.

County of residence of boaters in the Redfish Bay area change seasonally with distinctive visitor groups in the summer and winter. During this study, out-of-state boaters were intercepted only during the first part of April. A winter-spring study should be considered to intercept out-of-state boaters that may not be exposed to the same media sources as in-state boaters.

Boater usage for each ramp could be narrowed down to certain ramps to target specific audiences. Bexar County boaters showed the highest representation at S. Conn Brown and Port Aransas Public ramps and second highest at Aransas Pass Airport and N. Cove Harbor. San Patricio County showed the highest representation at Aransas Pass Airport, Ingleside Cove, and Ransom Channel Park while Aransas County showed the highest representation at N. Cove Harbor. These results followed similar trends found in TPWD creel survey data (unpublished data).

While results from questions asked about the PSA were insightful, providing more structure to the questions such as specific times when the news is aired as well as specific channels would perhaps better convey boater's responses. A few out-of-town boaters observed the PSA while visiting the area. As most visitors plan weekend trips, scheduling spots during the weekends early in the mornings or evenings would better capture this audience.

In the future, larger signs perhaps emphasizing logo based designs should be used to mark the RBSSA boundaries. Supported by the fact that the majority (79%) of boaters said a tide chart posted at the boat ramp would be helpful, TPWD personnel will discuss feasibility of installing tide charts or staffs at boat ramps surrounding the RBSSA. While there was no strong trend for GPS usage among respondents, this may be a tool more commonly used in the future.

Increasing public awareness of the no uprooting regulation as well as the importance of seagrass habitat has been a key component of TPWD's seagrass outreach objectives. This study confirms outreach efforts have made an impact on a local level as well as state-wide. TPWD plans on continuing to spread the message that boaters can prevent damaging seagrass beds by familiarizing themselves with the limitations of their equipment as well as learning the area they are boating in. With this continued approach of putting the responsibility on the boater to be accountable for their boating practices, TPWD believes changing boating behavior will ensure continued diligence of seagrass perseverance for years to come.

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Salant, P., & Dillman, D.A. 1994. How to Conduct Your Own Survey. NY: John Wiley and Sons.

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Figures and Maps

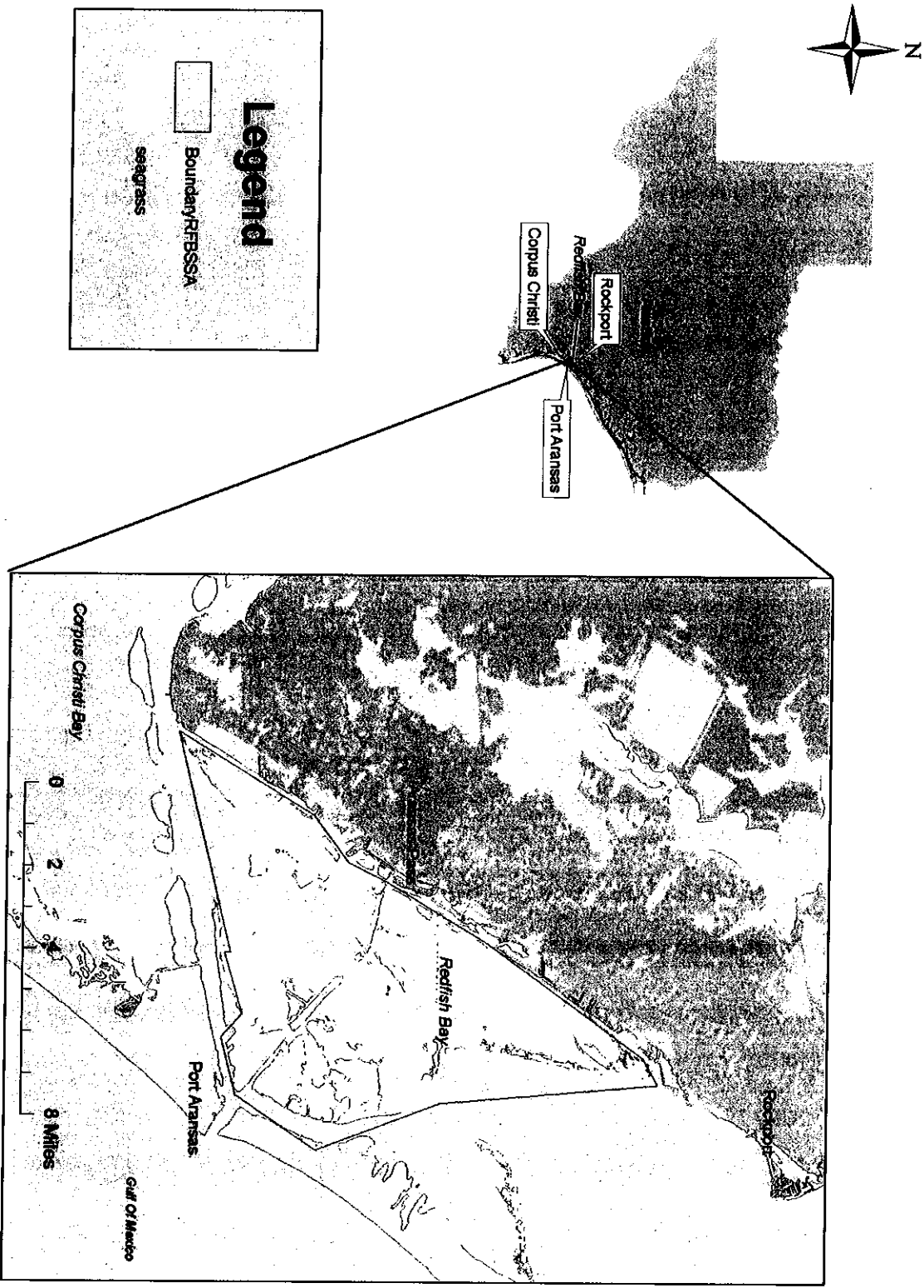


Figure 1. Redfish Bay State Scientific Area (RBSSA) location map.

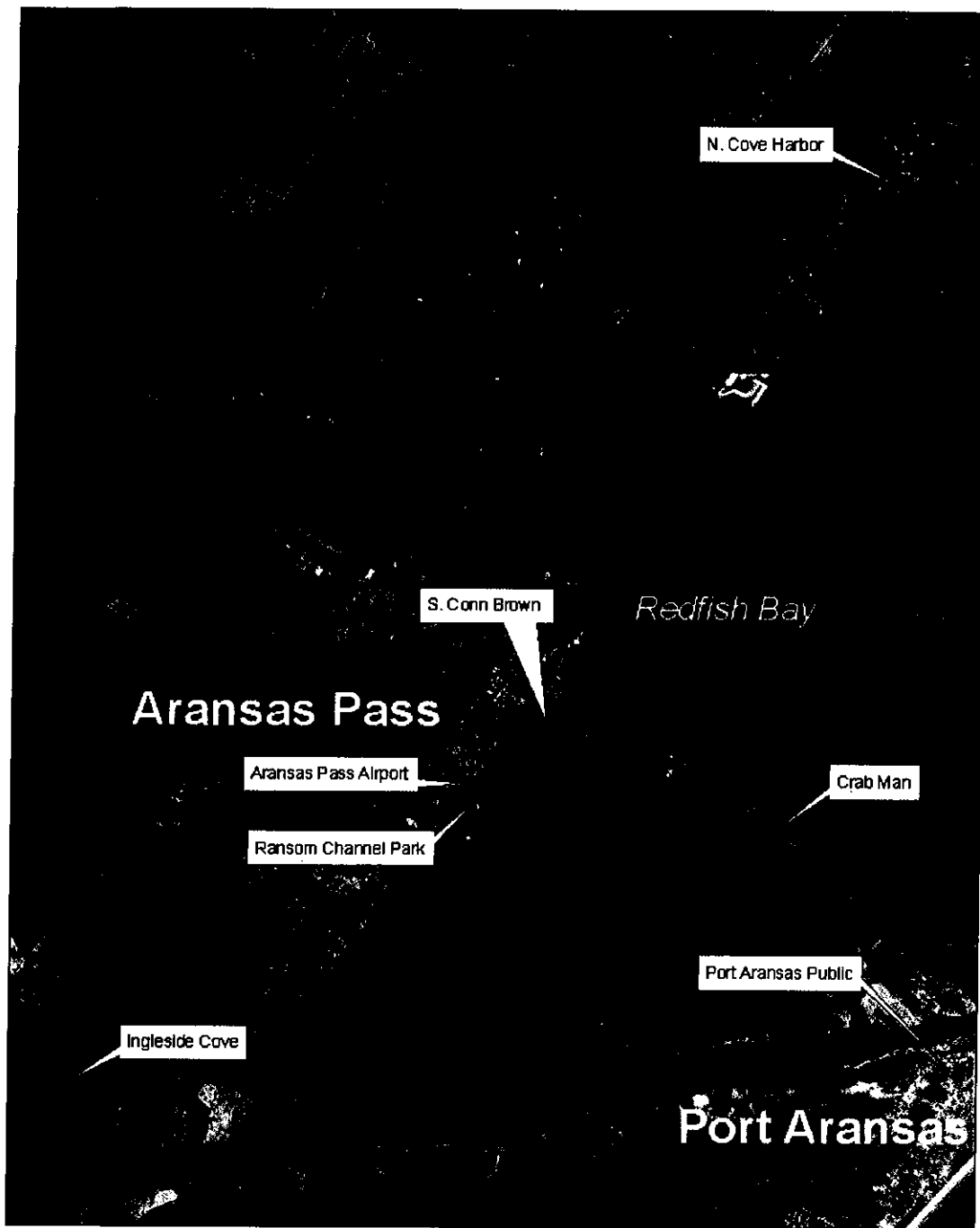


Figure 2. Map representing seven boat ramp survey sites

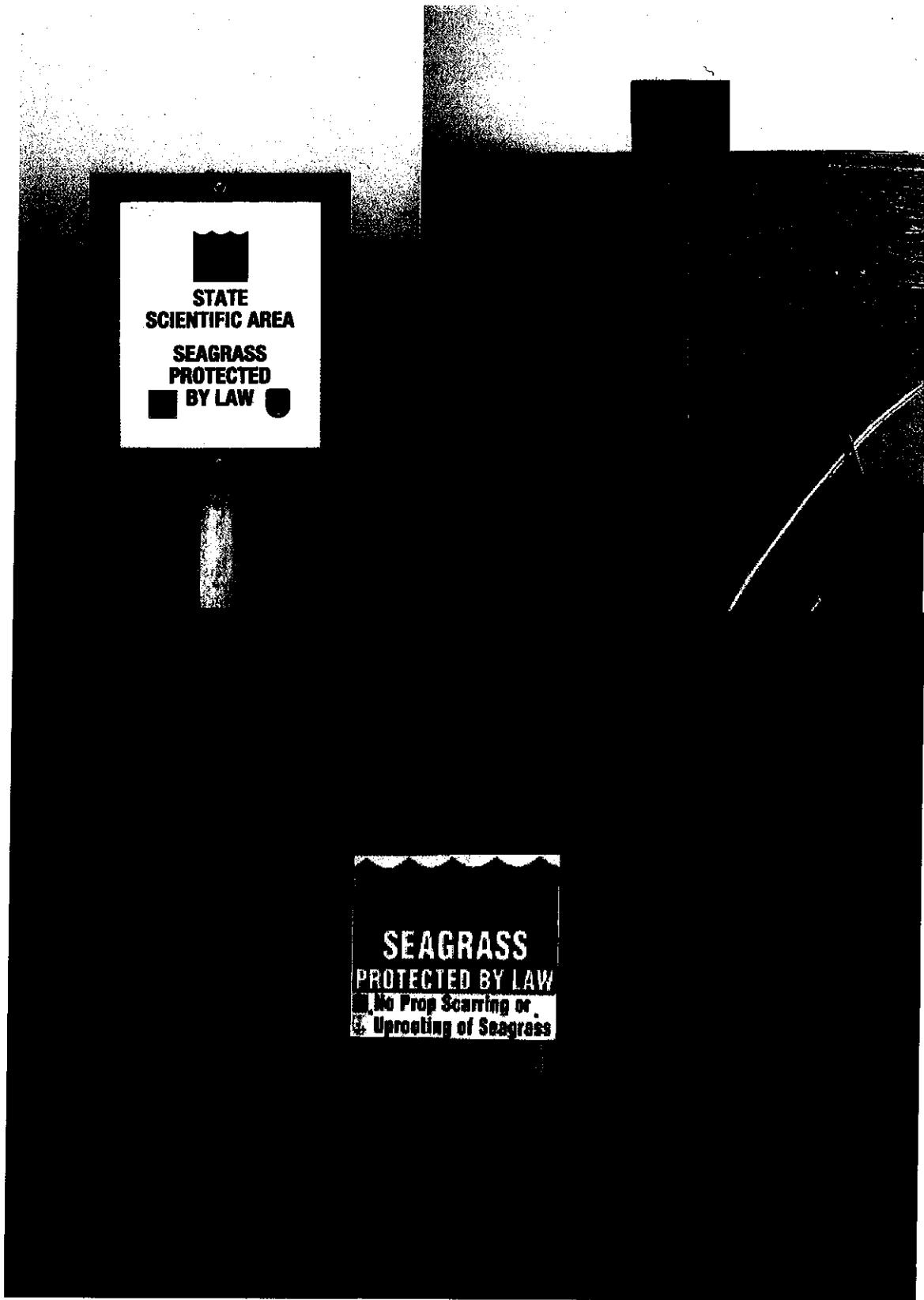


Figure 3. Visual aid of signs presented to interviewed boaters.

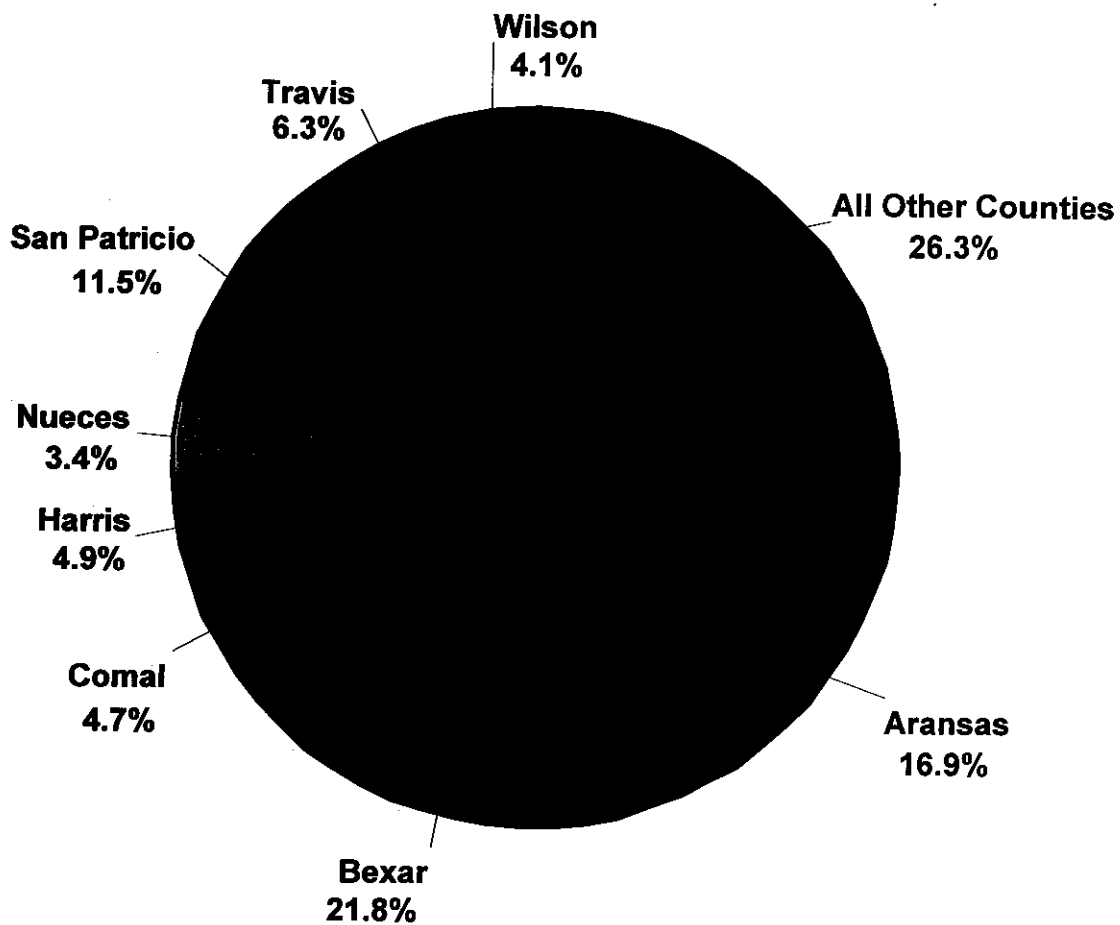


Figure 4. Distribution (%) of responses for each of the eight counties (Aransas, Bexar, Comal, Travis, Harris, Nueces, San Patricio, Wilson) with the highest representation.

Summary Tables of Responses to Survey Items

Table 1. Total number of days (n=24) and responses (n=555) for each ramp surveyed.

Ramp Name	Number of days surveyed	Percent of days surveyed	Frequency of Responses	Percent of Responses
Port Aransas Public	3	12.5	70	12.6
Crab Man	1	4.2	5	.9
S. Conn Brown Harbor	7	29.2	212	38.2
Ransom Channel Park	4	16.7	38	6.8
Aransas Airport	3	12.5	16	2.9
Ingleside Cove	1	4.2	15	2.7
N. Cove Harbor	5	20.8	199	35.9

Table 2. Distribution of responses for each county (n=555).

County	Frequency	Percent
Aransas	94	16.9
Atascosa	6	1.1
Bandera	4	0.7
Bastrop	5	0.9
Bee	2	0.4
Bell	3	0.5
Bexar	121	21.8
Brazoria	3	0.5
Burleson	1	0.2
Burnet	1	0.2
Caldwell	2	0.4
Calhoun	2	0.4
Chambers	4	0.7
Collin	1	0.2
Comal	26	4.7
Dallas	1	0.2
Denton	2	0.4
DeWitt	2	0.4
Ellis	1	0.2
Ft Bend	1	0.2
Galveston	3	0.5
Gillespie	1	0.2
Gonzales	3	0.5
Guadalupe	16	2.9
Harris	27	4.9
Hays	8	1.4
Jefferson	1	0.2
Karnes	1	0.2
Kendall	6	1.1

Continued

County	Frequency	Percent
Kenedy	1	0.2
Kerr	5	0.9
Kimble	1	0.2
Lampasas	1	0.2
Lavaca	3	0.5
Lee	3	0.5
Liberty	1	0.2
Matagorda	1	0.2
McLennan	5	0.9
Medina	6	1.1
Montgomery	2	0.4
Navarro	1	0.2
Nueces	19	3.4
Palo Pinto	1	0.2
Parker	1	0.2
Refugio	3	0.5
San Patricio	64	11.5
Smith	1	0.2
Tarrant	5	0.9
Terrell	1	0.2
Tom Green	1	0.2
Travis	35	6.3
Uvalde	1	0.2
Victoria	5	0.9
Waller	1	0.2
Webb	1	0.2
Williamson	11	2.0
Wilson	23	4.1
Colorado State	3	0.5
Oklahoma State	1	0.2

Table 3. Distribution of boaters having heard about the seagrass protection regulation in Redfish Bay (n=552).

	Frequency	Percent
No	45	8.2
Yes	507	91.8

Table 4. Responses from boaters how they heard about the regulation or if they had not heard about the regulation where they typically get their information about saltwater fishing from (n=525).

Media Type	Frequency	Percent
¹ Yes Conservation group	42	8.4
Does not remember	3	0.6
Internet	22	4.4
Magazine	44	8.8
Multimedia sources	45	9.0
Other	6	1.2
Print	111	22.3
Radio	3	0.6
Signs	42	8.4
Television	34	6.8
Word of mouth	146	29.3
² No Internet	3	11.1
Magazine	1	3.7
Multimedia sources	1	3.7
Print	4	14.8
Television	4	14.8
Word of mouth	14	51.9

¹ "Yes" media types only includes responses from boaters who had heard about the regulation (n=498).

² "No" media types only include responses from boaters who had not heard about the regulation (n=27).

Table 5. Cumulative totals of boaters from three coastal counties (Aransas, Nueces, and San Patricio) how they heard about the regulation (n=174).

Media Type	Frequency	Percent
Conservation group	23	10.8
Does not Remember	1	0.5
Internet	8	3.8
Magazine	12	5.6
Multimedia sources	20	9.4
Other	3	1.4
Print	50	23.5
Radio	0	0.0
Signs	9	4.2
Television	19	8.9
Word of mouth	68	31.9

Table 6. Cumulative totals of boaters from five inland counties (Bexar, Comal, Harris, Travis, Wilson) how they heard about the regulation (n=204).

Media Type	Frequency	Percent
Conservation group	16	7.8
Does Not Remember	3	1.5
Internet	12	5.9
Magazine	29	14.2
Multimedia sources	16	7.8
Other	2	1.0
Print	47	23.0
Radio	2	1.0
Signs	13	6.4
Television	10	4.9
Word of mouth	54	26.5

Table 7. Distribution of boaters having access to the internet (n=554).

	Frequency	Percent
No	45	8.1
Yes	509	91.9

Table 8. Distribution of boaters previously given a seagrass brochure (n=541).

	Frequency	Percent
No	384	71.0
Yes	157	29.0

Table 9. Distribution of boaters having viewed the seagrass public service announcement (PSA) (n=552).

	Frequency	Percent
No	320	58.0
Yes	232	42.0

Table 10. Responses from boaters indicating which television channel they were watching when they viewed the PSA (n=208).

Television Channel	Frequency	Percent
CH. 10 CBS	10	4.8
CH. 3 ABC	19	9.1
CH. 6 NBC	11	5.2
Does Not Remember	164	78.8
Local channel	4	1.9

Chart only includes valid responses with frequency > 2

Table 11. Responses from boaters indicating what time of day they viewed the PSA (n=226).

Time of Day	Frequency	Percent
Early morning	2	0.9
AM	5	2.2
Mid morning	6	2.7
Afternoon	1	0.4
12:00 PM	1	0.4
PM	2	0.9
Late afternoon	16	7.1
Evening	1	0.4
5:00 PM	12	5.3
6:00 PM	2	0.9
10:00 PM	2	0.9
11:00 PM	2	0.9
Does Not Remember	1	0.4
8:00	171	75.7
Primetime	1	0.4

[] = morning, [] = afternoon, [] = evening

Table 12. Distribution of boaters having fished Redfish Bay in the last 12 months (n=290).

	Frequency	Percent
No	92	31.7
Yes	198	68.3

Table 13. Responses from question asking boaters if they noticed any signs while out on the water (n=205).

	Frequency	Percent
No	16	7.8
Yes	189	92.2

Table 14. Responses indicating if the signs were helpful (n=188).

	Frequency	Percent
No	25	13.3
Yes	163	86.7

Table 15. Number and percent of boaters who consult a tide chart before beginning a trip (n=555).

	Frequency	Percent
No	270	48.6
Yes	285	51.4

Table 16. Responses indicating if a tide chart posted at the boat ramp would be helpful for them (n=550).

	Frequency	Percent
No	118	21.5
Yes	432	78.5

Table 17. Responses indicating use of a GPS unit for navigation (n=551).

	Frequency	Percent
No	238	43.2
Yes	313	56.8

Table 18. Total brochures handed out and impressions made.

Date	Brochures Dispersed	Adult				Youth			
		Male	Female	Minority	Physically Challenged	Male	Female	Minority	Physically Challenged
04-Apr-07	14	58	9	25	1	12	5	12	
15-Apr-07	17	44	6	7		6		1	
21-Apr-07	15	23	2	5					
27-Apr-07	19	49	17	22			5		
04-May-07	4	16				2			
06-May-07	28	34	5	5		1	2		
12-May-07	40	68	16	10					
18-May-07	12	18	3	3					
20-May-07	29	108	21	46		8	1	1	
02-Jun-07	12	23	3	13		3			
03-Jun-07	18	52	14	21		4	2	5	
09-Jun-07	17	56	23	26		4		4	
17-Jun-07	21	29	12	16		6	2	5	
22-Jun-07	3	10	1						
01-Jul-07	19	26	16	5		11	1	4	
13-Jul-07	13	26	3	5		5	1	3	
14-Jul-07	43	65	11	12		10			
20-Jul-07	17	48	7	19		5	1		
22-Jul-07	5	8	2	2		3			
03-Aug-07	9	21	3	4			1	1	
11-Aug-07	23	10	5	13		1			
17-Aug-07	2	13	1	2					
19-Aug-07	24	46	14	15		5	4	1	
Totals	404	851	194	276	1	86	25	37	0

Total Brochures **404**
Total Impressions **1,156**

Appendix: Survey Data Collection Form, Schedule, Photo

T1. Texas Parks and Wildlife pre-launch survey calendar

	Site	Day	Date	Start Time	End Time	Students	School
1	S. Conn Brown Harbor	Friday	April 4, 2007	7:00 AM	10:00 AM	1 none 2	
2	Ransom Channel Park	Friday	April 13, 2007	7:00 AM	10:00 AM	1 none 2	
3	Port Aransas Public	Sunday	April 21, 2007	7:00 AM	10:00 AM	1 none 2	
4	Port Aransas Public	Saturday	April 21, 2007	7:00 AM	10:00 AM	1 none 2	
5	N. Cove Harbor	Friday	April 27, 2007	7:00 AM	10:00 AM	1 none 2	
6	Aransas Pass Airport	Friday	May 4, 2007	7:00 AM	10:00 AM	1 none 2	
7	S. Conn Brown Harbor	Sunday	May 6, 2007	7:00 AM	10:00 AM	1 Adrian Young 2 Bradlee Kilgore	APHS APHS
8	N. Cove Harbor	Saturday	May 12, 2007	7:00 AM	10:00 AM	1Adrain Young 2	APHS
9	Ransom Channel Park	Friday	May 18, 2007	7:00 AM	10:00 AM	1 none 2	
10	S. Conn Brown Harbor	Sunday	May 20, 2007	7:00 AM	10:00 AM	1 Meg Goff 2	APHS
11	Ingleside Cove	Saturday	June 2, 2007	6:45 AM	9:45 AM	1 Bradlee Kilgore 2	APHS
12	S. Conn Brown Harbor	Sunday	June 3, 2007	6:45 AM	9:45 AM	1 Meg Goff 2 Maddie Goff	APHS AC Blunt MS
13	N. Cove Harbor	Saturday	June 9, 2007	6:45 AM	9:45 AM	1 Meg Goff 2 Maddie Goff	APHS AC Blunt MS
14	Port Aransas Public	Sunday	June 17, 2007	6:15 AM	9:45 AM	1 Megan Goff 2 Adrian Young	APHS APHS
15	Aransas Pass Airport	Friday	June 22, 2007	6:15 AM	9:45 AM	1 none 2	
16	S. Conn Brown Harbor	Sunday	July 1, 2007	6:15 AM	9:30 AM	1 none 2	
17	Ransom Channel Park	Friday	July 13, 2007	6:15 AM	9:30 AM	1 Jason Van Buren 2	APHS
18	N. Cove Harbor	Saturday	July 14, 2007	6:15 AM	9:30 AM	1Jason Van Buren 2	APHS
19	S. Conn Brown Harbor	Friday	July 20, 2007	6:15 AM	9:30 AM	1Jason Van Buren 2	APHS
20	Crab Men's Ramp	Sunday	July 22, 2007	6:15 AM	9:30 AM	1none 2	
21	Crab Men's	Saturday	July 28, 2007	6:15 AM	9:30 AM	1 canceled 2	
22	Ransom Channel Park	Friday	August 3, 2007	6:00 AM	9:30 AM	1 Jason Van Buren 2 Adrain Young	APHS APHS
23	S. Conn Brown Harbor	Saturday	August 11, 2007	6:00 AM	9:30 AM	1 Jocelyn Lara 2 Marcela Lara	APHS APHS
24	Aransas Pass Airport	Friday	August 17, 2007	6:00 AM	9:30 AM	1 Jason Van Buren 2	APHS

12. Texas Parks and Wildlife Department Pre-launch data collection form

Date	Location	Start Time	End Time	Surveyor	Student	School
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ID No.	County	Reg	Media Sources	Has Bochure	GPS	PSA	Channel	Time	Tide	Post	Intrnt	Fished	Signs Helpful	Comments
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	
		Y/N		Y/N	Y/N	Y/N			Y/N	Y/N	Y/N	Y/N	Y/N	

QUESTIONS

- 1) What county or state is your boat registered?
- 2) Yes or No: Have you heard about the seagrass protection regulation in Redfish Bay?
 - a. If yes How did you find out about it (i.e. newspaper/magazine article, TV or radio program, website, word of mouth, other)?
 - b. If no *Briefly explain the regulation and ask them where they typically get their information on saltwater fishing from*
- 3) Yes or No: Do you use a GPS unit for navigation?
- 4) Yes or No: Have you seen the public service announcement on TV explaining how to "lift, drift, pole, or troll" while boating in shallow areas to protect seagrass?
 - a. If yes What channel and time of day were you watching TV? DR = don't remember
 - b. If no Continue to question 5
- 5) Do you check a tide chart before beginning your trip?
 - 6) If a tide chart was posted at a boat ramp would it be helpful for you?
 - 7) Do you have access to the internet?
 - 8) Have you fished Redfish Bay in the last XX months?
 - a. If yes Did you notice any of these signs while out on the water?
 - i. Were they helpful for you?
 - ii. End survey
 - b. If no 1. End Survey



Image of Adrian Young and Bradlee Kilgore, Aransas Pass High School students, assisting with interviews.