

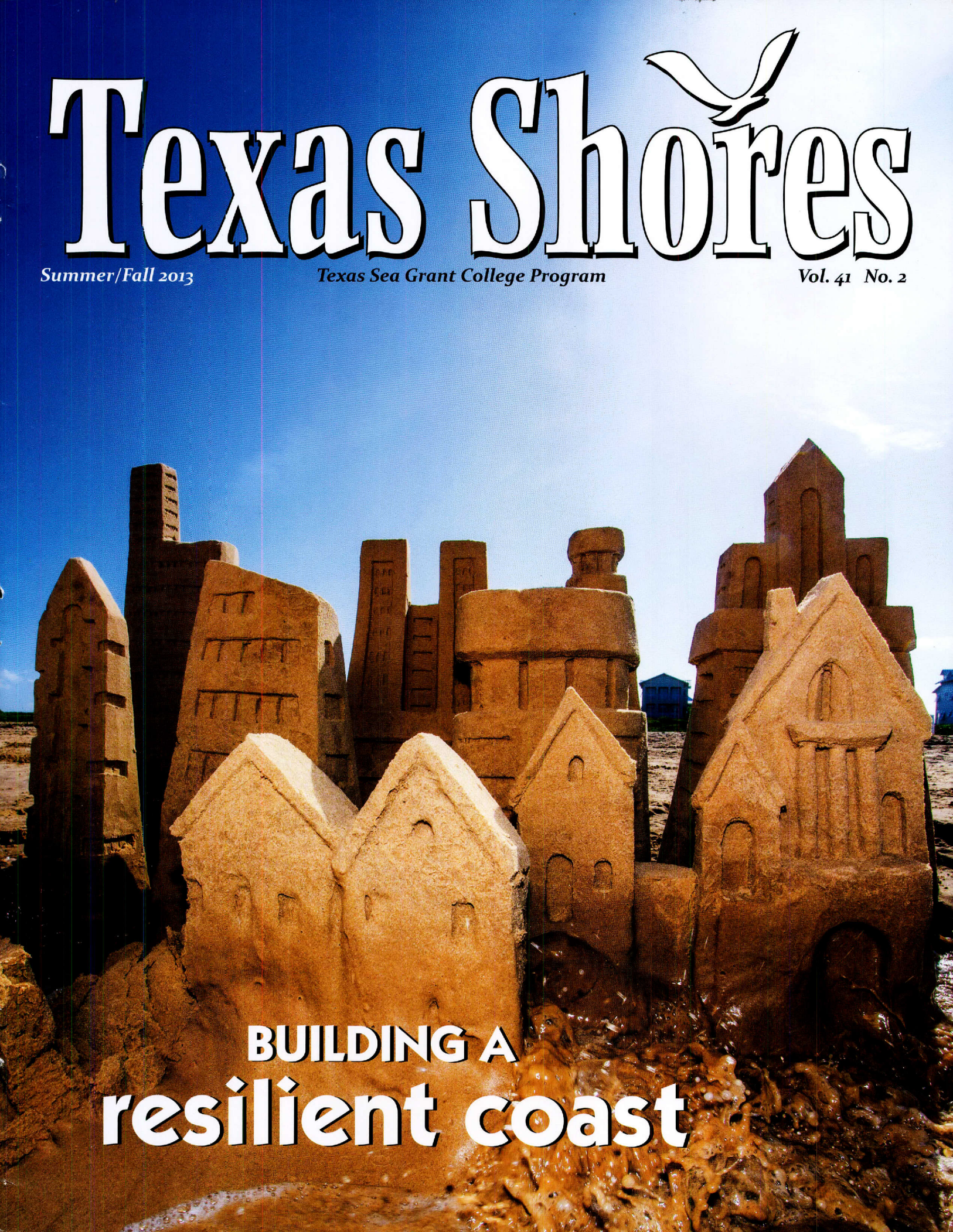
# Texas Shores



Summer/Fall 2013

Texas Sea Grant College Program

Vol. 41 No. 2



**BUILDING A  
resilient coast**



Corpus Christi, Texas.  
Photo courtesy  
Texas Department of  
Transportation.



**ON THE COVER:** The greatest threat to coastal communities in Texas is the same as the one faced by a sandcastle on the beach: the power of Mother Nature. Sand sculpture by South Padre Island artist Lucinda “Sandy Feet” Wierenga (<http://sandcastleworkshops.com/>) and her assistant, Ken Barnett. Photo by Seth Patterson.

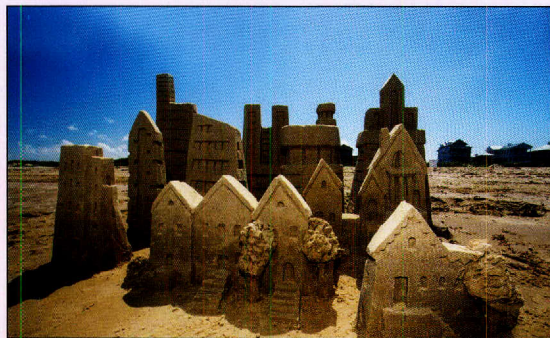


# contents

## 10 feature story

### Building a resilient coast

*Living on the coast is a balancing act between necessity and hazards. Increasing coastal resilience can reduce risks and make communities more sustainable in the long term.*



## 28 sea science

### Sheldon Lake State Park

*A new technique that uses historical conditions as a template for restoration shows great promise in the freshwater coastal prairie wetlands of east Houston.*



## 32 coastal icon

### Not your average Catholic priest

*Colorful Port Chaplain the Rev. Sinclair Oubre is a tireless advocate for his flock, especially the merchant mariners and shrimp fishermen of Port Arthur.*



TEXAS SHORES is published twice a year by the Texas Sea Grant College Program to promote awareness and understanding of the Texas marine environment. Texas Sea Grant is made possible through an institutional award from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, as well as appropriations from the Texas Legislature and local governments.

**Change of Address, Subscription Information or Other Questions:** Texas Shores, Texas Sea Grant College Program, Texas A&M University, 4115 TAMU, College Station, Texas 77843, call (979) 862-3774, or email [sgpublications@seagrants.tamu.edu](mailto:sgpublications@seagrants.tamu.edu). Please include old label when changing mailing address.

TEXAS SHORES (ISSN 0747-0959) is published by the Texas Sea Grant College Program, Texas A&M University, 4115 TAMU, College Station, Texas 77843. Subscriptions are free to U.S. residents. International addresses will be charged postal fees. Periodical postage is paid at College Station, Texas.

**Postmaster:** Send address changes to Texas Sea Grant, Texas A&M University, 4115 TAMU, College Station, Texas 77843.

© 2013 Texas Sea Grant College Program.

**Editor**  
Cindie Powell

**Graphic Designer**  
Vicky Nelson, TTI

**Contributing Writer/Photo Editor**  
Jim Hiney

**Contributing Writers**  
Roberto Molar-Candanosa  
and Jessica Scarfuto

**Texas Sea Grant Director**  
Dr. Pamela Plotkin

  
Sea Grant  
Texas

AT TEXAS A&M UNIVERSITY  
[TexasSeaGrant.org](http://TexasSeaGrant.org)





## Sea Grant staffers collecting potential restoration sites

Two Texas Sea Grant staff members are building an inventory of potential sites along the Texas Gulf coast where restoration of the historic natural flow of water would improve the health of local ecosystems and fisheries habitat.

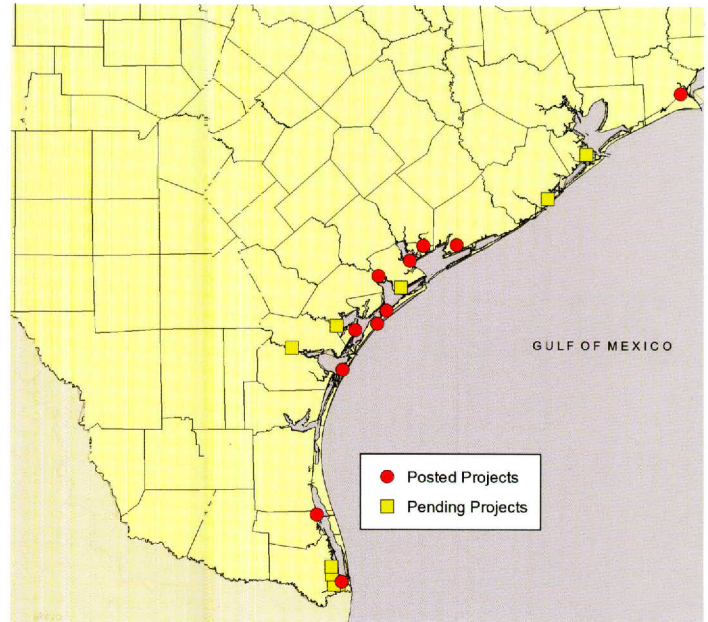
As part of a regional effort by the National Oceanic and Atmospheric Administration (NOAA) Restoration Center and the Gulf of Mexico Sea Grant College Programs, Research Assistants Karen Bishop and Karla Dunlap are evaluating sites where human-built structures like culverts or bridges are blocking historical water flows for possible inclusion in the inventory, which can be used by nonprofit organizations and other local stakeholders to fund hydrological restoration projects.

The Gulf of Mexico Hydrological Restoration Projects Inventory began in September 2010 as a pilot effort to remove man-made barriers along the Gulf coast and restore historic tidal estuarine and freshwater exchange. "It's about restoring them back to how they were historically, whether it was 100 years ago or 10 years ago," Dunlap says of the program. Project sites are identified initially through connecting with local stakeholders via phone calls, emails and meetings, and through online research. Each project is then evaluated for inclusion in the inventory based on whether it would remove or modify man-made impediments to historic water exchange, would restore the historic tidal estuarine and freshwater exchange within the specified area once the barrier is removed, and would benefit coastal and marine fisheries habitat. Additionally, each project must cost less than \$5 million, restore five or more acres of habitat and have at least a 20-year lifespan.

Progress on the Texas portion of the project accelerated with the hiring of Bishop and Dunlap in October 2012. "We now have 11 projects listed, and only three of those were in the inventory when we started," Bishop says of their progress by early summer. The compiled projects, which currently span eight counties, are expected to total more than 23 once the pending sites are added to the inventory. Combined with the projects from Sea Grant programs in Florida and Louisiana and the Mississippi-Alabama Sea Grant Consortium, a total of 80 projects are listed, a number that is growing daily.

Bishop, who is in Port Aransas, and Dunlap, who is located in the McAllen area, say working with local stakeholders has been an important part of identifying projects. "I think everyone we have spoken to, if they haven't had a project in mind, has been able to suggest additional contacts who may have projects in areas nearby," Bishop says. The two have worked with non-profits, state and federal agencies and local interest groups, and have also spoken to private landowners who have expressed interest in the inventory. They are hoping to further their outreach by connecting with smaller nonprofit groups, such as "friends of" groups, and additional landowners.

## Hydrological Restoration Inventory Texas Sea Grant Pending and Posted Projects, 6/2013



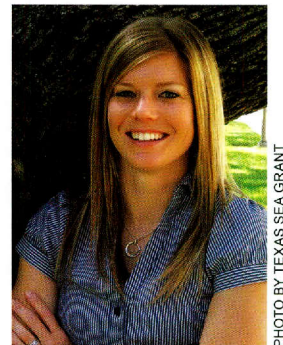
Several sites along the Texas coast have been posted to a Gulf-wide inventory of potential sites for hydrological restoration.

The Gulf of Mexico Hydrological Restoration Projects Inventory is considered a pilot effort and is still in its early phases, but both Bishop and Dunlap hope that it will continue to grow and that many Texas projects will receive funding. "It's nice to see that all along the Gulf Coast there's this high interest in restoring natural water passages," Bishop says of the support they have received from local communities. "We're still looking for projects, so if Texas Shores readers have information about a project, it would be great to hear from them." Although the effort is presently concentrated on improving estuarine systems along the Gulf coast, if the program is successful, it could be expanded to other U.S. shorelines.

—Jessica Scarfuto



Karen Bishop



Karla Dunlap





## Water survey results presented to state leaders

The lead developer of a Texas Sea Grant-supported survey on Texans' attitudes toward their water resources says the results helped the efforts of Texas leaders who work on water-related legislation.

Dr. Arnold Vedlitz, Director of the Institute for Science, Technology and Public Policy (ISTPP) at Texas A&M's Bush School of Government and Public Service, presented the results of the survey April 26 in Austin to staff members representing Texas legislators, Gov. Rick Perry, Lt. Gov. David Dewhurst, the Texas Water Development Board and the Texas Commission on Environmental Quality.

Vedlitz told the staff members that respondents to the survey indicated they were concerned about the increasing number and severity of droughts in Texas and about the availability of enough water to serve all the state's water needs. They also expressed support for policies to address their concerns.

The staffers responded that "the information in this survey was very useful to state decision makers in helping to work out a plan for this very important state issue," he says.

During the recent legislative session, lawmakers passed several water-related bills, including one that calls for the Texas voters to decide if the state will create a \$2 billion fund aimed at helping local communities make improvements to their water infrastructures, Vedlitz says.

He and other researchers at ISTPP designed the survey, which was conducted during February and March 2013 by global market research company GfK Group and partially funded by Texas Sea Grant. Additional funding was provided by the Office of the Vice President for Research at Texas A&M and ISTPP.

"This survey revealed that Texans are very worried about our state's diminishing water resources, and that they are willing to see conservation methods put in place," Vedlitz says. "They are also concerned about how our water resources are managed and used."



PHOTO © EARL NOTTINGHAM/TEXAS PARKS AND WILDLIFE DEPARTMENT

*The Brazos River ran dry in Knox County during the summer drought of 2011. A 2013 survey found that Texans are concerned about the increasing number and severity of droughts and the availability of water.*

Texas Sea Grant Director Dr. Pamela Plotkin says one of the results she found interesting and important was "how strongly Texas citizens feel about keeping water resources available for our natural environmental assets like our bays and estuaries and other life-giving environmental assets so important to our state's health, natural beauty and economy."

Overall, survey respondents ranked water issues fifth on a list of ten major issues facing the country, after government spending, health care, the economy and national security. About 55 percent said they had experienced drought in their region in the past year, and of those who had experienced drought, more than 95 percent said those droughts are as frequent or more frequent and as severe or more severe than ever. And while most believe that short-term changes in annual rainfall are a major cause of water shortages, they also cited overuse and inadequate management of water resources, increased demand and climate change as additional, important factors affecting drought. Respondents also believe that during the next five years, diminishing water resources will result in more conflicts over water use, higher water costs, greater fire danger, increased food prices, a loss of recreational opportunities and damage to plant and animal species.

When asked about how they might personally act to alleviate water shortages, a majority stated they were already reducing their water usage by watering lawns less, washing their cars less frequently, or using appliances more efficiently. Vedlitz says Texans seem ready to accept mandatory lawn watering restrictions if necessary to preserve important water resources for other key agricultural, economic and quality of life issues.

A number of possible policy options to improve water availability for now and the future received strong support, including water-related infrastructure improvements, such as those recently signed into law (64 percent), education and public relations campaigns to encourage greater voluntary conservation (67 percent), tax incentives and tax cuts to encourage water conservation (67 percent), and protecting some water resources for environmental needs (71 percent).

For more information about the survey, contact Vedlitz at [avedlitz@tamu.edu](mailto:avedlitz@tamu.edu). The survey results are available on line at <http://bush.tamu.edu/includes/images/news/Texas%20Water%20Survey.wmv>.

— Susan Robertson, Bush School of Government and Public Service, and Jim Hiney







## Aglantis, E. Crab Gill find home at Texas A&M

The first major component of a local outreach initiative arrived at Texas A&M University in April when Texas Sea Grant installed a new 300-gallon saltwater aquarium in the Memorial Student Center (MSC).

"Aglantis" — named through an online contest — was constructed on the lower level of the MSC directly beneath the Memory Cloud sculpture as an Earth Day gift to the Brazos Valley.

"The aquarium is part of Texas Sea Grant's outreach initiative, sponsored by the Texas A&M Provost's Office, to promote ocean awareness among Brazos Valley residents and improve the understanding, wise use and stewardship of Texas coastal and marine resources," says Rhonda Patterson, Texas Sea Grant Outreach Specialist.

The aquarium's first inhabitant was its mascot, a maroon-and-white spotted calico crab dubbed "E. Crab Gill." Additional species native to the Gulf of Mexico and Caribbean have been gradually added, allowing Texas Sea Grant to use the aquarium and its affiliated website as teaching tools. Links to webcams that will stream images of the aquarium around the clock are expected to be available soon.

For more information on Aglantis, go to the aquarium's website at <http://tamaquarium.tamu.edu/>, or follow E. Crab Gill on Facebook at <https://www.facebook.com/ecrab.gill> and on Twitter @ECrabGill.

— Jim Hiney

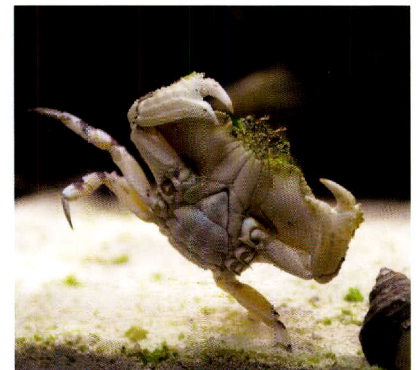


PHOTO BY JIM LYLE/TTI

*E. Crab Gill welcomes visitors to Aglantis in the Memorial Student Center at Texas A&M University. Texas Sea Grant operates the 300-gallon saltwater aquarium to support local outreach efforts.*

## Texas students honored at national competition

A group of Corpus Christi high school students were hailed as the most sportsmanlike participants at the 2013 National Ocean Sciences Bowl (NOSB®) Finals Competition in Milwaukee April 18-21.

Annapolis Christian Academy was chosen from 25 teams to receive the James D. Watkins Sportsmanship Award. Determined by the competition's volunteers, the award recognizes the team that best embodies the spirit of earnest competition while demonstrating exemplary decorum during the weekend-long event.

"The entire event was marked by such a great spirit of respect and encouragement among the teams and volunteers that it is a true honor to win this award," says Annapolis Christian Academy Coach Sarah Borchardt. "So many other teams deserved it, too."

NOSB, hosted in Texas by the Texas Sea Grant College Program at Texas A&M University, is a competition intended to increase knowledge of the oceans on the part of high school students, their teachers and parents, and to raise the visibility and public understanding of the national investment in ocean-related research, says Terrie Looney, NOSB regional coordinator for Texas. Looney is also Texas Sea Grant's Coastal and Marine Resources Agent for Jefferson and Chambers counties.

About 2,000 students from more than 300 high schools participated nationwide in 2013. Texas Sea Grant hosts two NOSB regional competitions each year: the Loggerhead Challenge, open to teams from south and west



PHOTO BY WILL RAMOS/CONSORTIUM FOR OCEAN LEADERSHIP

*Annapolis Christian Academy from Corpus Christi was honored with the James D. Watkins Sportsmanship Award during closing ceremonies of the 2013 National Ocean Sciences Bowl (NOSB) Finals Competition in Milwaukee on April 21. The award was presented by NOSB Director Kristen Yarincik (far left) and Robert Gagosian (far right), President/CEO of the Consortium for Ocean Leadership, which sponsors NOSB. Team members are, from left, Colton Garrett, Emily Borchardt, Andrew Hanks, Austin Jones, Sam Stephens and Coach Sarah Borchardt.*

Texas and held in the Coastal Bend area, and the Dolphin Challenge, open to teams from north and east Texas and held in Galveston.

The Annapolis Christian Academy team of Emily Borchardt, Andrew Hanks, Austin Jones, Colton Garrett and Sam Stephens advanced to the NOSB National Finals by defending its Loggerhead Challenge championship on Feb. 9 at The University of Texas Marine Sciences Institute in Port Aransas. The Village School "B" Team, from Houston, defeated its "A" Team

compatriots in the final round to win the 2013 Dolphin Challenge on Feb. 23 and earn a place in the NOSB National Finals.

The NOSB is managed nationally by the Consortium for Ocean Leadership, a nonprofit organization based in Washington, D.C., representing 94 of the leading public and private ocean research and education institutions, aquaria and industry with the mission to advance research, education and sound ocean policy.

— Jim Hiney





## Texas Sea Grant Scholars present research to Texas Legislators

In its first year of existence, the Texas Sea Grant Scholars Program sent three of its initial class to present their research findings to Texas Legislators.

Cyreneia Millberry, a senior at Texas A&M University, and the team of Josh Carter and Raven Walker — both seniors at Texas A&M University at Galveston (TAMUG) — represented their respective institutions at Texas Undergraduate Research Day at the State Capitol in Austin on April 26. The event showcases the research experiences of undergraduate students for Texas legislators and the public and highlights how the research they and their peers conduct positively impacts Texas and Texans.

Millberry, with guidance from Wildlife and Fisheries Sciences (WFS) Assistant Professor Dr. Masami Fujiwara, studied how the combination of freshwater from river discharges and changes in tides affect populations of white and brown shrimp in Texas estuaries. “Freshwater inflows can determine salinity and temperature in estuaries, which affects shrimp growth,” Millberry says. “This is important to Texans because if you live in this state you are in some way affected by the economic impacts of the Gulf of Mexico shrimp fishery. If shrimp populations are affected, then other estuarine-dependent species might be as well.”

She presented part of her results in January to a meeting of the Texas Chapter of the American Fisheries Society in Conroe.

Carter and Walker used the economics principle of supply and demand, and “ephemera” like newspaper ads and restaurant menus, to infer the population health of commercially valuable animals in the Chesapeake Bay area through a timeline of their prices going back to 1850 — 100 years before the federal government began recording catch data. The pair, under the mentorship of Marine Sciences Professor Dr. Glenn Jones, found that the price for most of the species rose faster than the inflation rate, indicating that these populations were in decline long before official records began.

Millberry, Carter and Walker are three of six students chosen to undertake independent research projects as part of the inaugural Texas Sea Grant Scholars Program, which is a cooperative effort between Texas Sea Grant and the Undergraduate Research Scholars Program administered by Texas A&M’s Honors and Undergraduate Research (HUR) Office. The Texas Sea Grant Scholars Program is open to students at Texas A&M and TAMUG.

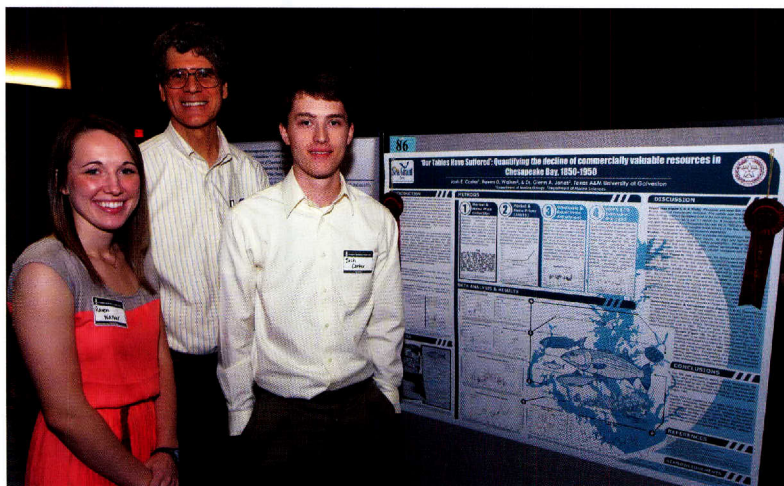


PHOTO BY JIM HINEY/TEXAS SEA GRANT

*Raven Walker (from left), Dr. Duncan MacKenzie and Josh Carter stand by a poster explaining the students’ research project, which utilized old menus and newspaper advertisements to infer the population health of animal species collected for the commercial seafood industry in the Chesapeake Bay area through a timeline of their prices going back to 1850. The students were selected to present their research at the State Capitol in April.*

“The Texas Sea Grant Scholars Program and the funding it provides creates opportunities for undergraduates to do research and present results that may not exist without it,” Millberry says. “I think being a Texas Sea Grant Scholar and conducting this research is the most valuable thing I’ve done in my academic career.”

Dr. Pamela Plotkin, Director of Texas Sea Grant, developed the idea for the scholars program as a way to engage undergraduate students. “As a recognized high-impact practice, undergraduate research experiences increase student learning and success, not only while students are at Texas A&M, but long after graduation,” she says. “This new partnership with the Honors and Undergraduate Research program enables Texas Sea Grant to invest in Texas A&M students and develop our future workforce. The Texas Sea Grant Scholars program is the first of our efforts to support Texas students with the aim of developing a cadre of ocean and coastal leaders in Texas.”

Dr. Duncan MacKenzie, HUR’s associate director for undergraduate research, says the Texas Sea Grant Scholars Program provides a great opportunity to recognize and reward outstanding undergraduate researchers. “We expect this program to attract academically talented undergraduate students to the study of the marine environment, nurture their development as independent researchers with practical, hands-on knowledge of modern research techniques, and prepare them to continue on to academic, industrial, or governmental careers where their knowledge will directly benefit the Texas marine environment.”

Other members of the first class of Texas Sea Grant Scholars were Marcella Nunez, a TAMUG senior Marine Science major; Gary Baine, a TAMUG senior Marine Biology major; and Ellen Giddens, a TAMU junior WFS major.

Baine, working under Associate Professor of Marine Biology Dr. Christopher Marshall, studied variations in skull shapes between closely related species of sea lions



in the northwest Pacific Ocean region of the country and possible correlations to the sea lions' hunting capabilities and choice of prey animals. He hopes to determine if a change in or movement of the prey animals has hampered the sea lions' ability to find and catch food, which may be responsible for an 80 percent decline in their populations over the past 40 years.

Giddens, mentored by WFS Assistant Professor Dr. Luis Hurtado, sampled blue crab DNA from nine sites spread between South Padre Island and Tampa, Fla., to determine if these populations are genetically different from each other. The results may lead to better management of blue crab populations.

Nunez, a student of Associate Professor of Marine Biology Dr. Antoinetta Quigg, sought to determine if sodium bicarbonate — baking soda — can become a less expensive source of carbon for growing microscopic marine algae and if limiting nitrogen would increase the amount of fat the microalgae produce. The fat burns at a high temperature and can potentially replace some of the petroleum in fuel blends. The resulting alternative fuel releases less carbon dioxide during burning than does traditional petroleum-based fuel.

More information about the Texas Sea Grant Scholars Program is available at <http://texas-sea-grant.tamu.edu/WhatWeDo/UndergraduateResearchScholarsProgram2013.html>.

— Jim Hiney

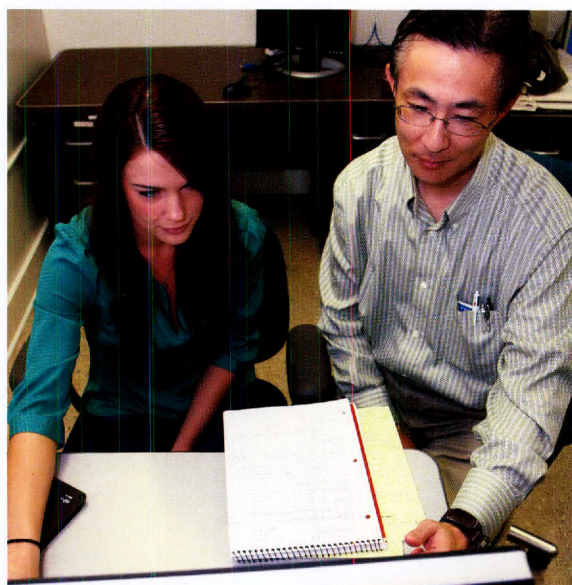


PHOTO BY JIM HINEY/TEXAS SEA GRANT

Cyrene Millberry analyzes data from her research with Dr. Masami Fujiwara. Millberry was one of three Texas Sea Grant Scholars to present her findings at Texas Undergraduate Research Day in Austin.

## La Petite Belle sets sail



PHOTO COURTESY TED RICCIO

*La Petite Belle*, a half-size replica of La Salle's square-rigger, is sailing the bays near Palacios.

After a decade of work by Palacios residents, *La Petite Belle* had its maiden voyage in February. The ship, a half-size, seaworthy replica of *La Belle*, the ship of famed French explorer René-Robert Cavelier, Sieur de La Salle, is sailing Tres Palacios Bay and Matagorda Bay, where the wreck of the original 17th century ship was discovered by divers in 1995.

*La Petite Belle* is part of the La Salle Odyssey, an exhibit that narrates the story of the first European settlements in Texas. The vessel was constructed to be a tourist attraction for Palacios, an icon for LaSalle and his expedition, and an example of classic square riggers.

The project to build the *La Petite Belle* began in 2002 with the tenacious efforts of the late Roberta Ripke from the Palacios Area Fund (see Texas Shores, Spring/Summer 2012) and Lane Hollister. Models of what the ship would look like were created with the help of square-rigger reconstruction programs such as George Washington's *Federalist* and John Paul Jones' *Providence*, as well as other naval archives from the Smithsonian Institution.

Construction concluded in December 2012 with the help of local resident Barney Gulley and Ted Riccio, Chairman of the Distribution Committee for the Palacios Area Fund. While Riccio took care of the administration aspect of the project, Gulley acted as construction manager. "He is responsible for the way the boat looks now," Riccio says. Ownership of *La Petite Belle* was recently transferred to the Palacios Area Historical Association.

The vessel, which was commissioned in April 2013, is 30 feet long and 8 feet wide, and weighs 15,000 pounds. Though it has the appearance of a wooden ship, the materials used for its construction are modern — a fiberglass hull and cedar or pressure-treated pine decks. The masts are welded aluminum and its cleats, bollards and rails are attached with epoxy and stainless steel screws. Though the ship is equipped to sail perpendicular to the wind, she also has a diesel engine for times when the winds are contrary.

— Roberto Molar-Candanosa





## Texas Sea Grant awards \$30,000 to graduate students for research

Texas Sea Grant recently awarded \$30,000 in grants to 21 graduate students at three Texas universities to support their research.

The funding comes from Texas Sea Grant's new Grants-in-Aid of Graduate Research Program, which is intended to promote scientific excellence and achievement by providing small grants to graduate students enrolled at Texas A&M University (TAMU), Texas A&M University at Galveston (TAMUG) or Texas A&M University-Corpus Christi (TAMUCC) whose marine- or coastal-related research in any field of study is relevant to Texas, though not necessarily based in Texas.

"Supporting graduate students at this critical time in their scientific careers, as they are learning how to develop and test

hypotheses, collect and analyze data, and communicate their findings, is important to Texas Sea Grant," says Dr. Pamela Plotkin, Texas Sea Grant Director. "This program also provides them with hands-on experience finding funding, writing competitive grant proposals, navigating the peer-review process and conducting funded research within a timeline and budget – important professional skills that are not covered in the classroom."

The 21 graduate students were selected from a field of 31 applicants to receive funding for projects beginning on June 1, 2013, and ending on May 31, 2014. The proposals were scored based on students' academic and employment histories, the intellectual merits and broader impacts of the proposals, and the students' statements of career goals and reference letters.

Nine students received \$2,000 grants: Ellie Figuera, TAMU doctoral candidate in Physics and Astronomy; Melissa Hawkins, TAMU doctoral candidate in Biomedical Engineering; Debra Hoekel, TAMUCC master's candidate in Biology; Chi Huang, TAMU doctoral candidate in Landscape Architecture and Urban Planning; Laura Lomeli, TAMU doctoral candidate in Industrial/Organizational Psychology; Adriana Mendez, TAMU doctoral candidate in Wildlife and Fisheries Sciences; Alicia Shepard, TAMUG doctoral candidate in Oceanography; Matthew Streich, TAMUCC doctoral candidate in Marine Biology; and Travis Washburn, TAMUCC doctoral candidate in Marine Biology.

Another 12 students received \$1,000 grants. They are Kevin Andrews, TAMU doctoral candidate in Agricultural Leadership, Education, and Communications; Xochitl De La Rosa, TAMU doctoral candidate in Wildlife

## Texas Sea Grant helps connect West Texas youth to the Gulf

Marfa-area 4-H members visited the Gulf Coast in July as the culmination of a seven-month educational program designed to teach inland youngsters about how actions taken far from the coast can impact the sea.

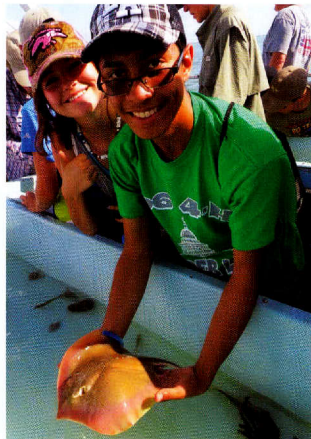
The "Linking Inland to the Gulf" program, led by Texas Sea Grant's Jefferson and Chambers County Agent Terrie Looney, Texas A&M AgriLife Presidio County Agent Jesse Lea Schneider and Hudspeth County Agent Cathy Klein, helped the students learn about watersheds and wetlands, water cycles, pollution and the interaction of the sea and land.

During their field trip to Corpus Christi, the 4-H members learned hands-on with activities aboard Texas Sea Grant's Floating Classroom, the *R/V Karma*, participated in National Seashore Day, and visited the Texas State Aquarium and the *U.S.S. Lexington*. Texas Sea Grant's Calhoun County Agent Rhonda Cummins helped out with instruction and activities during the beach day at the Padre Island National Seashore.

Next year, students in the Rio Grande 4-H will participate in the program, with senior members of the Marfa 4-H providing leadership and helping teach the curriculum.

— Texas A&M  
AgriLife Extension Service

PHOTOS BY TEXAS A&M AGRILIFE EXTENSION SERVICE



**FROM LEFT:** Texas Sea Grant's Terrie Looney teaches Orly Holguin the parts of a fishing pole as other Marfa 4-H members in the background prepare to fish the Gulf. • Marfa 4-H members Michaela Serrano and Cesar Torres with a stingray on the *Karma*. • Students prepare to seine the bay aboard the *R/V Karma*.



and Fisheries Sciences; Gloria Espinoza, TAMUG doctoral candidate in Marine Biology; I-Shuo Huang, TAMUCC master's candidate in Life Sciences; Clare Iseton, TAMUG master's candidate in Marine Biology; Kole Kubicek, TAMU master's candidate in Wildlife and Fisheries Sciences; Rika Muhl, TAMU doctoral candidate in Wildlife and Fisheries Sciences; Avery Scherer, TAMUCC doctoral candidate in Life Sciences; Kaitlyn Schroeder, TAMUCC doctoral candidate in Coastal and Marine System Science; Sasa Tatapaneyakul, TAMU doctoral candidate in Ecosystem Science and Management; Carolyn Weaver, TAMUG doctoral candidate in Ecosystem Science and Management; and Kathryn Wedemeyer, TAMU doctoral candidate in Marine Biology.

More information about the Grants-in-Aid of Graduate Research Program is available at the Texas Sea Grant website (<http://TexasSeaGrant.org/WhatWeDo/Funding.html>) or by contacting Texas Sea Grant Research Coordinator, Dr. Mona Behl, by email at [monabehl@tamu.edu](mailto:monabehl@tamu.edu) or by telephone at (979) 458-0449.

— Jim Hiney

## Prizes awarded in Asian tiger shrimp contest

Tony Reisinger, Texas Sea Grant's Cameron County Coastal and Marine Resources Agent, has awarded prizes to the winners of an Asian tiger shrimp contest among the Brownsville-Port Isabel shrimp fleet.

Reisinger started the competition in 2012 to increase the number of specimens of the invasive shrimp turned in by shrimp fishermen with accompanying data on when, where and how they were caught. Prizes of \$225 each were awarded for the largest, smallest and greatest number of the shrimp caught.

Captain José Enrique Guillen of the *F/V Captain Bligh* received the prizes for both the largest and smallest specimens — 11.5 and 8.3 inches, respectively. Captain Victor Morales of the *F/V Miss Lauren* submitted the most, catching 11 of the 42 that were turned in with the necessary data.

The information and specimens are turned in to the Texas Parks and Wildlife Department, who sends them on to the U.S. Geological Survey to conduct genetic testing in an attempt to determine the source of the invasive shrimp, such as whether they are from a wild population or if they can be traced back to a population that escaped from an aquaculture facility. Reisinger says the majority of the Asian tiger shrimp turned in by Brownsville-Port Isabel shrimp fishermen were caught in deep water off the coast of Louisiana. He says that only one specimen was turned in during 2013, indicating a possible decline in catch rates.

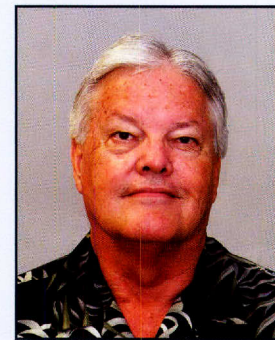
The prizes were awarded at the annual blessing of the shrimp fleet on July 9. The prize money was provided by Reisinger, the Brownsville-Port Isabel Shrimp Producers Association and Zimco Marine.

— Cindie Powell

## Changing tides



Internationally respected Aquaculture Specialist Granvil Treece retired from the Texas Sea Grant College Program on June 30. Treece joined Texas Sea Grant in 1983 and during his 30-year career worked extensively with aquaculturists in Texas and around the world to design shrimp and finfish production facilities, train scores of people to efficiently operate aquaculture businesses, and disseminate information on the latest technologies and government regulations. Among his many innovations, in 1986 Treece created the popular Texas Shrimp Farming Short Course and Marine Finfish Culture Course, a five-day program designed for individuals interested in expanding or increasing the profitability of current mariculture businesses or starting new operations. He was part of a Texas Sea Grant team honored with a Texas A&M AgriLife Extension Superior Service Award for helping commercial fishermen and aquaculturists cope with competition from imported seafood by providing training and financial assistance through the U.S. Department of Agriculture's Trade Adjustment Assistance Program. He has served on the Texas Aquaculture Association (TAA) Board of Directors since 1984 and was honored by the group with its Outstanding Service Award in 2012. TAA also presented Treece with its Distinguished Service Award in 2004 and cited him for outstanding achievement in support of Texas Aquaculture in 2002.



Granvil Treece



Biologist Rhonda Patterson joined Texas Sea Grant in February. As the new outreach specialist, she has been charged with raising awareness about ocean issues and Texas Sea Grant both on the Texas A&M campus and in the surrounding communities. Patterson comes to the program from Texas A&M's Biology Department, where she began working as an undergraduate student in 1990 and since 1995 had supervised care of all of the department's aquatic animals that were used in teaching and research. Part of her animal care duties included educating tour groups visiting the Biology Department about aquatic animals and making presentations in school classrooms. Among her more visible current Texas Sea Grant projects is supervising operation of Aglantis, the 300-gallon saltwater aquarium that the program installed in April on the lower level of Texas A&M's Memorial Student Center, directly below the Memory Cloud living sculpture. Anyone interested in learning more about Texas Sea Grant's Brazos Valley outreach program can contact Patterson at [r-patterson@tamu.edu](mailto:r-patterson@tamu.edu) or 979-845-3857.



Rhonda Patterson



*By Cindie Powell*

# BUILDING A resilient coast

Living on the coast is risky business,  
but it's a hazard we can't avoid.

Dr. John Jacob, Texas Sea Grant's Coastal Community Development Specialist, recalls the clamor in 2005 after Hurricane Katrina hit New Orleans — mostly from people in other parts of the country — to abandon the coast.

“Coasts are an inherently hazardous place, there's no question about that, but there's no choice about being there,” Jacob says. “It's the interface, it's where commerce happens, and it's just part of who humans are — we're always going to be on the coast, whether it's for commerce or recreation. People like the coast.”



*Sand city by Lucinda  
Wierenga and Ken Barnett,  
South Padre Island.*



It is the dilemma that has been faced for centuries by founders of all coastal communities: placing a city where it shouldn't be because it must be there. Richard Campanella, writing about the founding of New Orleans, the lowest-lying city in the nation, in his book *Bienville's Dilemma*, described it as the balance between site and situation — further inland from the coast on higher ground would have been a better location in terms of hazards, but the city would have had less access to water-borne traffic, a worse situation.

Geographer Dr. Peirce Lewis, also writing about New Orleans, called it an “inevitable city on an impossible site” — and the same could be said of many coastal communities in Texas. “He’s right about that. It’s an impossible place. Who in the world would want to put a city at the mouth of this great river, with all the dangers and problems of lowlands?” Jacob says. “But how could there not be a city there, draining this vast area, especially when so many things were moved by water during the last two centuries?”

“It’s inevitable that you’re going to have these kinds of issues, but we will be on the coast. We just have to get down to making the best of it and choosing the best place. Even though the whole coast is dangerous, there are still choices to be made, and some choices can be worse than others.”

Those choices — where to build and how to develop — are among the key factors in building resilience, which in general terms is the ability to bounce back from a disruption. “It comes from the Latin for spring, as in the kind you can press and it pops back up,” Jacob says. “That’s a good definition — you can put stress on it, and it comes back to what it was.”

“Look at Galveston. Almost the whole place was blown away (after the 1900 Storm),” he adds. “They came back, they rebuilt. The part that was constructed carefully and withstood the storm gave them enough to rebuild around, and the town’s still here. I would call that a resilient community.”

Dr. Sam Brody, Director of Texas A&M’s Institute for Sustainable Coastal Communities (ISCC) in Galveston, defines resilience as “the ability of a system to absorb a disturbance or impact without altering its basic functions.”

An example for a coastal community, he says, is “the ability to deal with a hurricane without

experiencing a complete collapse in the society. It’s not crossing a threshold that fundamentally alters the economy, or the physical infrastructure, or the ecological and natural features.”

He says there will always be impacts from a disaster, but a resilient community has the ability to absorb those impacts without changing into a completely different state. “The impacts won’t be so great that, for example, you lose half your population, or your economy tanks, or you’ve got people living under blue tarps five years later,” he adds. “Those are all signs of impacts beyond a threshold where things are no longer functioning properly — the disturbance results in catastrophic loss of property and lives. That’s what we want to avoid.”

He cautions against measuring resilience only by how quickly a society returns to its original condition. “Bouncing back to where you started isn’t necessarily a resilient strategy if where you started from wasn’t resilient or sustainable in the first place,” he says.

There may be as many ways to define sustainability as there are people and groups defining it. At its heart is the idea of not depleting resources to the point that an activity or entity cannot be sustained. A city might want to restore its pre-hurricane population, Brody says, but rebuilding that includes homes that were located in vulnerable areas is a strategy that invites future disasters, and needing to rebuild them after every storm is not a sustainable practice.

“Resiliency is tied to sustainability. It’s not just about being resistant or bouncing back after a storm, it’s about maintaining the functions — ecological, economic and social — of a community over the long term.”

Another example he gives is the practice of paving over wetlands. “Pavement is the best predictor of flood damage. Wetlands’ primary function is to absorb, hold and slowly release water, so they’re natural flood mitigation tools. When we pave over naturally occurring wetlands on the Texas coast, we exacerbate flooding. It’s unsustainable behavior that makes us less resilient when there is a big rainfall or storm surge. It comes to the point that you’ve paved so much, the disturbance results in catastrophic loss of property and lives. We’re talking billions of dollars of loss in the Houston-Galveston area alone.”



## Storm Warning

There is no shortage of hazards that coastal communities must face. The most obvious are hurricanes and tropical storms. The deadliest and costliest natural disasters in U.S. history were both hurricanes — the 1900 Galveston Storm killed an estimated 8,000 people, and Hurricane Katrina in 2005 cost \$108 billion.

An average Atlantic hurricane season sees 12 tropical storms, including six hurricanes, two of them major ones. According to a study by the National Weather Service of past storm tracks, Texas is hit by a hurricane or tropical storm three out of every four years, and the frequency of hurricanes making landfall along any 50-mile stretch of coast is one every six years. Based on past landfalls, the probability of a strike in any given year ranges from 31 percent at Sabine Pass up to 41 percent around Matagorda Bay.

Tropical storms and hurricanes are types of storms called tropical cyclones — organized, circulating systems of clouds and thunderstorms that form over tropical or subtropical waters. What are called tropical storms and hurricanes in the Atlantic, Gulf of Mexico and east Pacific, are known as typhoons in the west Pacific. All have circulation around a clear area

in the center, called the eye, with highest winds in the area immediately around the eye, known as the eye wall.

Tropical cyclones are categorized on the Saffir-Simpson Hurricane Wind Scale based on sustained wind speeds. Anything less than 39 miles per hour is a tropical depression; storms with higher winds but still less than 74 miles per hour are tropical storms. The weakest hurricanes, at Category 1, have winds of 74 to 95 miles per hour; at Category 2, winds are 96 to 110 miles per hour. With wind speeds of 111 miles per hour and higher, hurricanes at Category 3 and above are considered “major hurricanes” because of their potential for significant loss of life and damage. At the top of the scale, a Category 5 hurricane is one with winds of 157 miles per hour or more. Researchers estimate that damage quadruples for each increase in a hurricane’s category.

“Run from the water, hide from the wind” is the old saying associated with hurricanes. While high winds from a Category 5 storm can completely destroy a framed house, the feature of a hurricane most dangerous to life and property is the water — storm surge and waves, and flooding from heavy rains. Storm surge

is a dome of water pushed ashore by the winds of a hurricane or tropical storm. The circulation around the eye of the storm creates a mound in the water at the storm’s center. As the hurricane nears the coast and the water becomes shallower, the water is forced up and inland, with the highest surge tending to be near the strongest winds of the storm.

---

*While high winds from a Category 5 storm can completely destroy a framed house, the feature of a hurricane most dangerous to life and property is the water — storm surge and waves, and flooding from heavy rains.*

---

Storm surge can reach 20 feet or more in height and can span hundreds of miles of coastline as a storm comes ashore. The storm surge that inundated Galveston in 1900 is blamed for the storm’s high death toll, and has been blamed for 90 percent of direct deaths from hurricanes overall. It can cause the greatest damage to roads, bridges and buildings, and can flood large areas; the saltwater intrusion also can spoil water supplies and damage estuarine ecosystems. Storm surge doesn’t always correlate to the Saffir-Simpson scale, because the highest storm surges don’t always come from storms with highest sustained winds and thus highest category of storm. Hurricane Katrina, a Category 3 when it made landfall in New Orleans in 2005, and 2008’s Hurricane Ike, a Category 2 when it hit Galveston, both had catastrophic storm surge, Katrina at 28 feet and Ike at 20 feet. On the other hand, Hurricane Charley, which struck Florida in 2004, was a Category 4 hurricane with a storm surge of 6 to 8 feet.

The Saffir-Simpson scale is used to determine evacuation zones, but factors like storm surge are also considered when

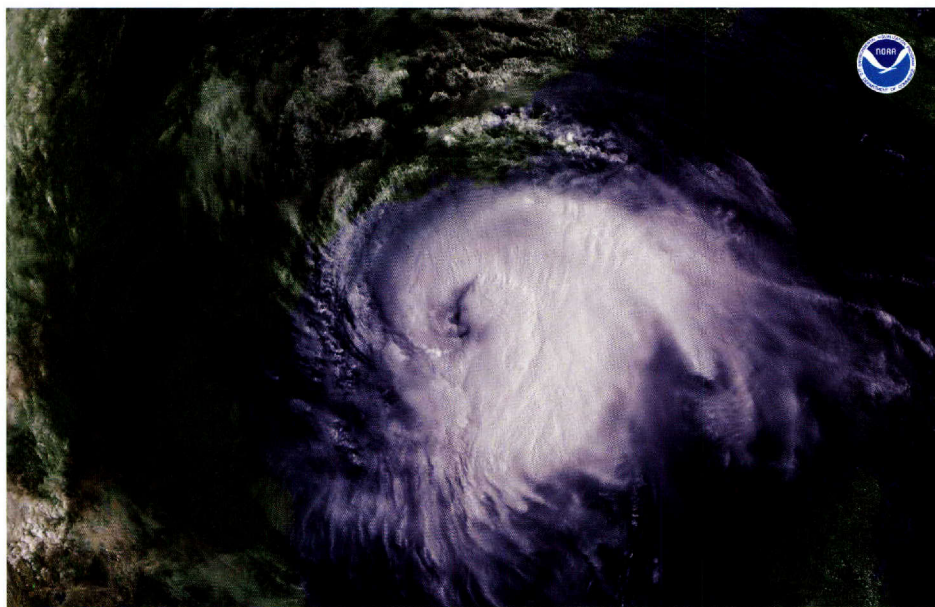


PHOTO BY NOAA

*Hurricane Ike nears the Texas coast.*





*The Bolivar Peninsula  
after Hurricane Ike.*

PHOTO BY NATIONAL WEATHER SERVICE



# resilient coast

warnings are issued. As Hurricane Ike neared Galveston, the National Weather Service advised that residents in single-family houses in some areas of shoreline on Galveston Bay might face “certain death” from the storm surge — unusually strong wording reserved for the most dangerous storms.

Hurricane storm surge can extend several miles inland, and it does not act alone; water levels are even higher when tides and waves are taken into consideration. A storm tide is what happens when a hurricane making landfall coincides with a high tide, and breaking waves will ride a storm surge toward shore, pounding the undersides of structures and bridges, and in some cases lifting them off their supports.

When it rains, it pours. In addition to the saltwater nearing shore from the ocean, freshwater inundation from rain is also a threat. Hurricanes are, after all, circulating masses of clouds and thunderstorms, and often the heaviest, most catastrophic rainfall is associated with relatively weaker storms. 1989’s Tropical Storm Allison, though not strong enough to be classified as a hurricane, flooded southeast Texas with more than 30 inches of rain, caused \$500 million in damages and killed 11 people, not all of them on the coast. In fact, deaths associated with hurricanes often occur as a result of inland flooding, sometimes far from where the storms make landfall.

The effects of climate change on hurricane frequency, intensity and rainfall is the subject of numerous scientific studies. NOAA’s Geophysical Fluid Dynamics Laboratory provides a regularly updated overview of the current research on how Atlantic hurricanes may change. The current consensus is that there may be the same number or fewer storms, but those that do form are expected to be stronger, wetter and ultimately more destructive. In fact, storms by the end of the century may be dumping up to 20 percent more rain within 100 kilometers — 62 miles — of the storms’ centers. The studies suggest that, even with fewer total storms, more Category 3 and above storms may form each hurricane season.



PHOTO BY TEXAS SEA GRANT

*Ike devastated recreational boating facilities and the commercial fishing industry in Galveston and other parts of the upper Texas coast.*

There is less agreement about the future frequency of hurricanes. A study published in the *Proceedings of the National Academy of Sciences* in July predicts there may be as many as 20 additional hurricanes and tropical storms globally each year, with the greatest increases in the western North Pacific, South Indian Ocean and North Atlantic, including the Gulf of Mexico. The study also projected that the average intensity of storms to make landfall could increase by 55 percent, with an increase around the middle of the century.

Though there is still uncertainty about how a warming planet will affect the frequency and intensity of future hurricanes, another impact of climate change is already being recorded: sea level rise.

## Rising Water, a Sinking (and Shrinking) Coast

As the earth warms from heat trapped by greenhouse gases in the atmosphere, so do the oceans, expanding the volume of the water. At the same time, more water is being added to the oceans as glaciers and ice sheets melt. The net effect is sea level rise. After the last ice age 21,000 years ago, sea levels rose incrementally, but leveled off between 3,000 and 2,000 years ago. Global sea level did not change significantly again until the late 1800s. Most recently, sea levels worldwide have risen an average of

7 inches in the past 100 years, with the fastest rate of increase recorded since 1993. Projections vary, but by the end of 2099 the world’s seas could be anywhere from 7 to 23 inches higher than they were in 1990.

NOAA’s Center for Operational Oceanographic Products and Services has been monitoring sea level for more than 150 years using tide stations on U.S. coasts; since 1993, satellites have been able to make more accurate sea level measurements. In Texas, tide gauge data for sea level has been collected for 40 or more years, and for 100 years in one location. And as long as these records have been kept, sea levels in Texas have been rising.

The rates of increase vary depending on location, because the relative sea level rise — the increase in the water level relative to a location on land — also depends on the movement of the land. In some places around the globe, land is physically rising because of the geological forces that build mountain ranges, cause earthquakes and create volcanoes. In other places, including the Texas coast, the land is sinking. The increase in sea levels being reported in the Gulf of Mexico is 1/5 inch per year, one of the highest recorded in the world and five times the rate researchers have calculated as occurring during the previous 4,000 years. According to the best-case scenario — one in which sea levels continue to rise at the current rate of increase — water levels on the Texas coast would be 1 to 2 feet higher, depending on the specific



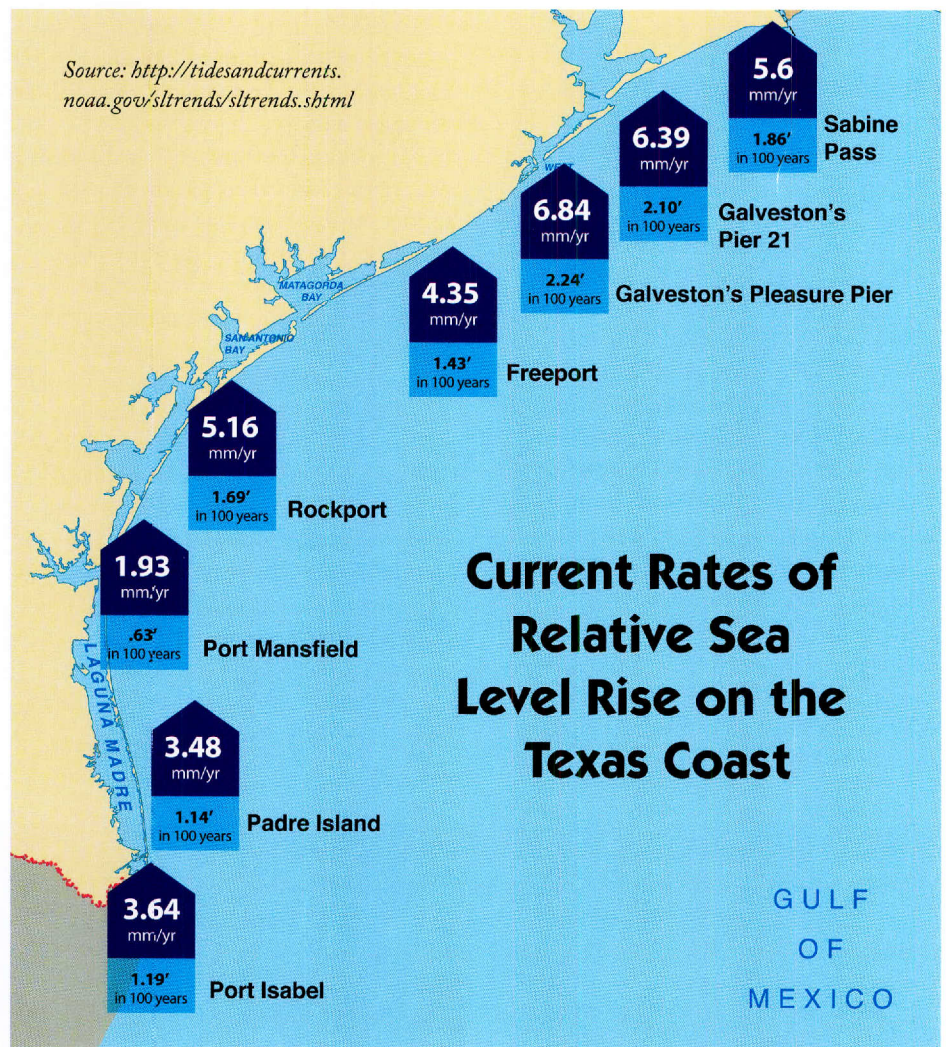
location, by the end of 2099. Worst case? Some models predict an acceleration of sea level rise, and the water could be 6 feet or more higher on the Texas coast by the end of the century.

*Texas has some of the highest erosion rates in the country. Statewide, the erosion rate is 2.3 feet, or 235 acres of land scoured away each year.*

Texas is sinking from subsidence caused by the compaction of sediments, fault activity and, most of all, groundwater pumping and oil and gas extraction. At its worst, the Houston-Galveston region was sinking by nearly 5 inches a year between 1964 and 1973; since then, the rate of subsidence has decreased with a reduction in groundwater pumping.

NOAA reports trends for several locations on the Texas coast. Port Mansfield is sinking at the slowest rate, 1.93 millimeters per year (0.63 feet in 100 years). Galveston is sinking the fastest at 6.84 millimeters per year (2.24 feet in 100 years) at the Pleasure Pier and 6.39 millimeters per year (2.10 feet in 100 years) at Pier 21, the latter of which includes recorded data as far back as 1908.

In addition to rising water and sinking land, coastal communities are also seeing the land wash away. Because of the system of barrier islands that make up the Texas Gulf coast, most of the rivers in the state empty into the bays. Only two rivers — the Brazos in the north and the Rio Grande in the south — empty directly into the Gulf of Mexico. Previously, these two rivers would transport sediments into the Gulf, building delta fans that were the sources of sand that would nourish the barrier islands. But dams and increased water withdrawals have reduced the amount of sediment being transported to the coast. Meanwhile erosion, including from storms that pull sand far offshore, now exceeds the coast's ability to regenerate, so the Texas shoreline is retreating.



Texas has some of the highest erosion rates in the country. Statewide, the erosion rate is 2.3 feet, or 235 acres of land scoured away each year. A few locations are losing 30 feet of coastline a year, and more than two-thirds of the coast is eroding an average of 6 feet a year. The bay-facing shoreline in some areas is also in retreat.

Because the Texas coast is so flat, and because the differences in water level between high tide and low tide are relatively small, the natural ecosystems are more sensitive to major changes in the water level than in other parts of the country. If the change is slow enough, the vegetation line moves inland ahead of the encroaching saltwater from rising seas — if it can. But if it is blocked by either

natural barriers or manmade ones like a sea wall, the incoming sea will wipe out low marshes altogether, turning them into open water and diminishing the ability of these ecosystems to provide habitat, water quality improvement, and flood and storm protection for coastal communities. Researchers estimate that for every acre of native coastal wetland lost, flood damage increases by \$1.5 million.

Taken together, sea level rise, subsidence and a retreating shoreline spell trouble for the Texas coast — especially when combined with hurricanes and their storm surge and waves. Past high tides may well become the new low tide. And population growth in the region is only exacerbating the problems.



## Here Comes the Neighborhood

Of the 10 costliest hurricanes ever to hit the United States, nine have occurred since 2004. Only 1992's Hurricane Andrew, which made landfall in Florida as a Category 5, later struck Louisiana as a Category 3 and caused \$26.5 billion in damages, happened before the turn of the 21st century. Last year's Hurricane Sandy entered the list at number two with an estimated \$65 billion in damages. It knocked Tropical Storm Allison, which flooded Houston in 2001 and caused \$5.5 billion in damages, off the top 10 list.

If storm damages are adjusted for inflation to 2010 dollars and ranked again, only two pre-21st century storms, Andrew and 1989's Hugo, would have cost enough to be included in the top 10. Why are the most recent storms the most expensive? According to researchers, it's

largely due to more people moving to the coast, bringing with them more homes, more infrastructure and more potential for economic damage.

Crunching the numbers in a different way, researchers calculated the impacts of past storms if they had occurred on the 2010 coast, incorporating not only adjustments for inflation but also the increases in development and population. What if the 1900 Storm had struck Galveston in 2010 instead? The cost would have been \$104 billion. 2005's Katrina, adjusted for an additional five years of development and inflation, would have cost \$113 billion instead of \$108 billion. And the most expensive storm of all would have been the 1926 storm that hit Miami — to the tune of \$164 billion.

The 2010 figures are a NOAA extrapolation based on an earlier study that used 2005 as the baseline; the earlier project also noted that, at that time,

85 percent of U.S. hurricane damage came from 24 percent of the storms — major hurricanes, Category 3 and above. Their conclusion: damage totals will only increase as long as more people and their property are on the coast.

It goes back to Dr. Peirce Lewis's observation about the "inevitable" location. Four of the nation's 10 busiest ports by tonnage are in Texas — Houston, Corpus Christi, Beaumont and Texas City. Texas leads the nation in waterborne commerce, with more than 500 tons of cargo passing through the state's ports each year, everything from cars to grain to oil. On the export side alone, \$251 billion in goods left the United States through Texas ports in 2011, including \$6 billion in agricultural commodities produced in the state. More than 1.4 million jobs depend on the ports, and they generate \$6.5 billion in tax revenues and \$48 billion in personal income each year. These figures



*Houston and the rest of Harris County may have 1.4 million more people by 2030.*

PHOTO BY TEXAS DEPARTMENT OF TRANSPORTATION



will only increase with the upcoming expansion of the Panama Canal.

The Port of Houston generated an economic impact of \$178 billion statewide in 2011. The shutdown of the port for five days in the wake of Hurricane Ike cost the economy an estimated \$322 million per day — a total impact of \$1.6 billion, for a hurricane that missed the “sweet spot” that would have done the most damage to the port and ship channel. Transportation may have changed in the years since coastal cities were founded, but transportation by water is still the most cost-effective intercontinental shipping method.

The ports are there, and coincidentally, so is the oil. A recent study estimated that Gulf-wide coastal energy assets, including offshore oil platforms, pipelines and power plants, are worth about \$800 billion.

All this activity on the coast means jobs, and jobs mean people. It should be no surprise, then, that the nation’s ocean and Great Lakes coastlines are home to the vast majority of the country’s urban centers. Coastal counties make up less than 10 percent of the country’s land area (excluding Alaska), but by 2010, they were home to 39 percent of the nation’s population — more than 124 million people, and six times the population density of inland counties. That number has been growing — shoreline counties added 125 people per square mile between 1970 and 2010, compared to 39 people per square mile nationwide. The coastal population overall increased by 39 percent over that period — and will continue to rise into the future, much more rapidly than population growth elsewhere in the nation.

The projected population gains in coastal Texas are even higher than coastal counties nationwide. As of the 2010 census, 6.1 million people were living on the Texas coast — a quarter of the state’s population. By 2050, that number is expected to increase by 50 percent, or by 3.2 million more people.

According to population projections in NOAA’s *State of the Coast* report, almost two million more people will be living on the Texas coast by 2030. Most will be moving to the Houston area, with Harris County population estimated to increase by 1.4 million, a 35 percent increase, and Brazoria County picking up an additional 155,000 people, a nearly 50 percent jump. The Rio Grande Valley is also a prime growth hotspot, with Cameron County population expected to rise by almost 50 percent or 202,000 people to total more than 600,000.

The Texas State Demographer’s projections are more conservative, but still show substantial growth by 2030 in all three locations: a 40 percent jump in Brazoria County, a 19 percent increase in Harris County and a 31 percent increase in Cameron County.

Heather Wade, Texas Sea Grant’s Coastal Planning Specialist, says the high density of population on the coast nationally is one reason why so much attention with respect to resilience is paid to the coastal environment — hurricanes and other natural hazards on the coast become major disasters when people and property are in the affected areas. “An increase in population on the coast magnifies the problems,” she says.

## Armoring the Urban Coast

Throughout the United States, many coastal cities — especially those most recently impacted by major storms — have been taking steps to prepare for future storms. Last year’s “Superstorm” Sandy and its record 14-foot storm surge that flooded Lower Manhattan prompted New York City Mayor Mike Bloomberg’s June 2013 proposal of a \$20 billion system of flood barriers to protect low-lying areas of his city during future storms, especially in light of sea level rise projections. After Hurricane Katrina in 2005, Congress gave the U.S. Army Corps of Engineers \$14.6 billion to improve hurricane and flood protection in New Orleans. The Corps has completed a 130-mile system of levees, walls and gates that is designed to keep out the storm surge from a 100-year storm — one that has a 1 percent chance of occurring in any given year.

---

*The devastation from Hurricane Ike in 2008 led Galveston to consider armoring its coast with an “Ike Dike” that could cost \$4–6 billion. It’s a way to protect the city from the type of storm surge that happened during Ike.*

---

Closer to home, the devastation from Hurricane Ike in 2008 led Galveston to consider armoring its coast with an “Ike Dike” that could cost \$4–6 billion. Dr. Bill Merrell, who holds the George P. Mitchell ’40 Chair in Marine Sciences at Texas A&M University at Galveston (TAMUG), proposed the project as a way to protect the city from the type of storm surge that happened during Ike, when it reached 15–20 feet above normal tide levels on the Bolivar Peninsula and much of the Galveston Bay area. The plan calls for building on the protection from the existing 17-foot-high Galveston Seawall by building either a 17-foot-high revetment — a sloping structure angled to absorb the energy of incoming water — in the form of sand-covered dunes with hardened cores along the beach, or by elevating the coastal highways to create a barrier that would protect the west end of Galveston Island and the Bolivar Peninsula. The Bolivar Roads channel project would also incorporate floodgates at several locations, including at the entrance to the Houston, Texas City and Galveston ship channels, to block Gulf surges into Galveston Bay.

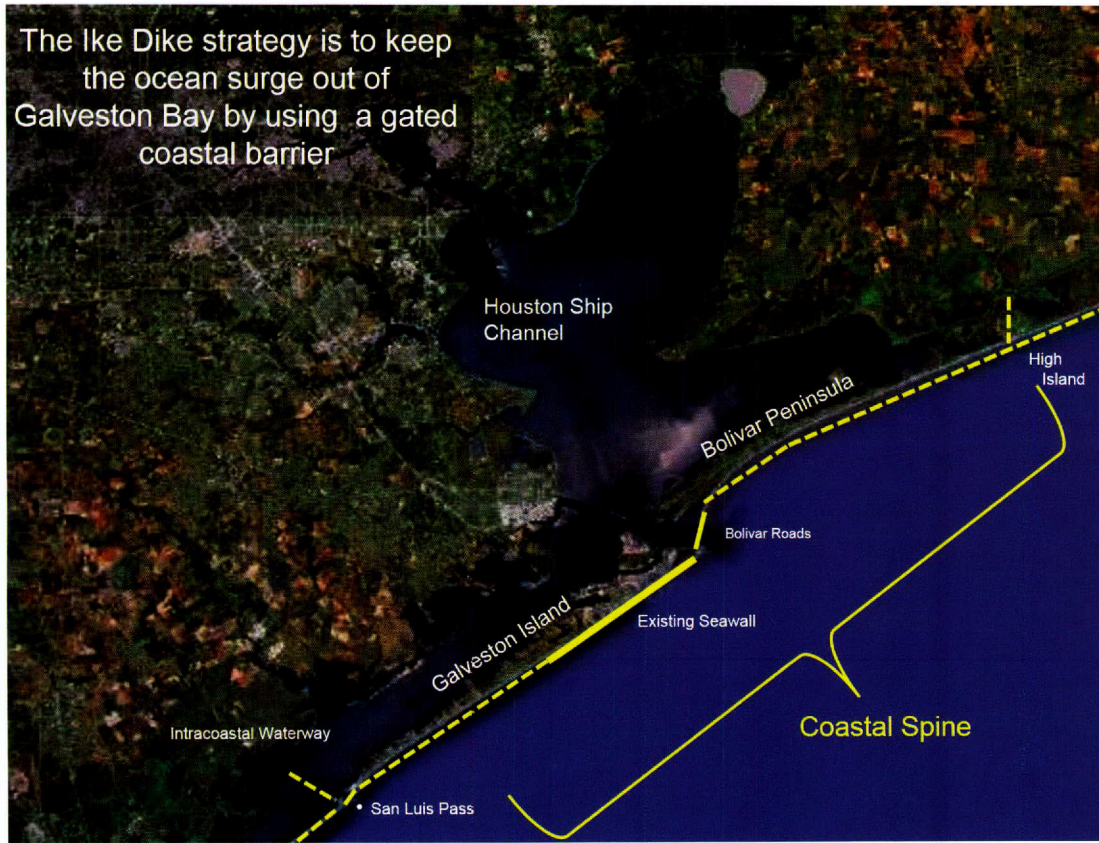
Merrell, like many proponents of constructed barriers for storm surge protection, points to the highly successful model of surge protection in the Netherlands, in particular their Delta Works project.

The Dutch have been building protective barriers against the North Sea for 2,000 years, and in 1986 they created a new province from land reclaimed from the ocean. Approximately 27 percent of the country, which is about the size of Connecticut



# resilient coast

The Ike Dike strategy is to keep the ocean surge out of Galveston Bay by using a gated coastal barrier



COURTESY DR. BILL MERRELL

One possible design for the Ike Dike combines the existing Galveston Seawall with solid-core, sand-covered dunes or elevated highways, and flood gates at inlets to Galveston Bay and the ship channel.

and Massachusetts combined, is below sea level, and about 60 percent of the country's 15.8 million people live in those areas.

The Delta Works incorporates dams, dikes, levees, locks, sluices and surge barriers. It shortens the coastline — and the areas needing to be protected by dikes — by using barriers and gates to seal off bay entrances to block storm surge, a technique that Merrell believes would work well with the geography of the Galveston Bay System. “It’s technologically possible,” he says. “The Dutch are doing it in a much more difficult situation than we have. Sixty percent of their economy is generated at or below sea level. In Galveston Bay, none of our housing or any of our cities or industrial complex is below sea level.”

He says the higher elevation means a project protecting the Houston-Galveston area from storm surge would not need to be water-tight like the Netherlands and New Orleans projects that have to keep water from encroaching on areas that are below sea level. “Water can leak from the Gulf

of Mexico into the bay, because leaks into the bay aren’t going to affect the surge. The storm surge will already be gone. We can do a little bit different design. There’s a lot of cost associated with making something water-tight, and we may be able to avoid some of those costs.”

The Ike Dike gates, which would be closed across Bolivar Roads and the San Luis Pass only when a hurricane approaches, would be left open for smaller storms and when no storms are present, allowing for the natural flow of water through the inlets into the Galveston Bay ecosystems, which Merrell calls “Houston-Galveston’s greatest environmental treasure.”

“The real trick of the Ike Dike and the coastal barrier is to preserve ecosystem function as well as protect for surge in those rare times that you need to,” Merrell says.

Researchers from TAMUG, Delft University in the Netherlands, the University of Houston and Jackson State University in Mississippi are studying the

viability of the Ike Dike and its cost and benefits with storm surge modeling, economic analysis and barrier designs. Merrell says it may be a year and a half to two years before the studies are complete.

Brody’s ISCC in Galveston is also working with Delft University to develop a flood risk reduction program that would apply the time-tested Dutch methods to the upper Texas coast. He says he sees potential benefit in building megastructures like the Ike Dike to concentrate development and relieve development pressure on other parts of the coast. “That’s not going to be attractive to everybody, especially if you’re a property owner wanting

to build a condo on the beach, but from an overarching resilient coastal development approach, that makes a lot of sense.”

Brody, who holds the George P. Mitchell ’40 Chair in Sustainable Coasts at TAMUG, is also the director of the Environmental Planning and Sustainability Research Unit and the Center for Texas Beaches and Shores. He agrees that the Delta Works model is a good one to follow for areas that are the most economically and socially important, but only if the Dutch strategy is embraced in full.

“In places where we already have critical and strategic facilities, like the upper Texas coast, it’s appropriate to think about larger-scale flood and surge-suppression systems,” he says. He adds that in order for it to work effectively, however, the Ike Dike needs to include “a system where the structures enhance the ecological functions of the coast. For example, you can have a dike that is coupled with the creation of dunes and



# Texas Shores *is still FREE!*

To receive a printed subscription, mail in the attached card.

Or, to receive email alerts when each issue is available online, send a request to our email address at [sgpublications@seagrants.tamu.edu](mailto:sgpublications@seagrants.tamu.edu). You can also visit our website at <http://TexasSeaGrant.org>.

Texas Shores is produced by the Texas Sea Grant College Program, a partnership of the State of Texas and the National Oceanic and Atmospheric Administration (NOAA).



# Texas Shores



Please send me printed copies of **Texas Shores** magazine, free to subscribers in the United States, to the address below.

---

Name

---

Address

---

Address

---

City

State

Zip



---

Place  
Stamp  
Here

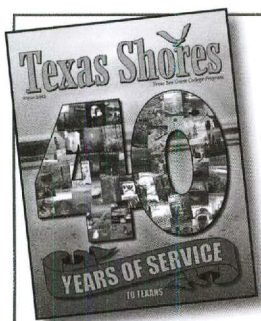
# Texas Shores

Texas Sea Grant College Program

4115 TAMU

College Station, Texas 77843-4115





# Reader Survey

Help us make *Texas Shores* better  
by giving us your feedback!

Please fill out this survey and mail it back in the attached envelope,  
or complete it online at [https://www.surveymonkey.com/s/Texas\\_Shores](https://www.surveymonkey.com/s/Texas_Shores) or by clicking the link at  
<http://TexasSeaGrant.org/NewsAndEvents/TexasShores.html>. (Respond by November 30, 2013, to enter  
a drawing for one of two prepaid \$100 VISA cards. One mail-in and one online respondent will win.)

---

## Part A: How you use *Texas Shores*.

- How many people (including yourself) usually look at your copy of *Texas Shores*?  
 1                                       2 to 4                                       5 or more
- How did you find out about *Texas Shores*?  
 subscriber prior to 2012  
 received a copy at a public event, professional meeting or other program  
 saw someone else's copy  
 saw it on Texas Sea Grant's website/Facebook/Twitter (circle one)  
 other: \_\_\_\_\_
- If you were a subscriber prior to 2012, how do you rate the current *Texas Shores* compared to the pre-2012 *Texas Shores*?  
 better now                                       not as good now                                       about the same
- On average, how much time do you spend reading each issue of *Texas Shores*?  
 less than 15 minutes                                       15 minutes to an hour                                       more than an hour
- What do you usually do with *Texas Shores* after you have read it?  
 save it                                       give it away                                       recycle it  
 other: \_\_\_\_\_
- Preferred formats for *Texas Shores* (please check one):  
 I cannot access *Texas Shores* online, so I can only read it as a printed magazine.  
 I am able to access *Texas Shores* online, but I prefer a printed magazine.  
 I would prefer to read *Texas Shores* on my computer or laptop.  
 I would prefer to read *Texas Shores* on a mobile device, such as a smart phone or tablet.
- How frequently should *Texas Shores* publish?  
 four times a year                                       once a year  
 twice a year (current frequency)                                       other: \_\_\_\_\_



8. Should *Texas Shores* be:

more pages

fewer pages

the same length

9. What is your favorite part of *Texas Shores*?

main topic/theme story

Sea Science (*research story*)

Coastal Icon (*personality feature*)

Sea Notes (*news briefs*)

other: \_\_\_\_\_

10. Rate your agreement with the following statements:

	<i>strongly agree</i>	<i>agree</i>	<i>neutral</i>	<i>disagree</i>	<i>strongly disagree</i>
a. I am satisfied overall with <i>Texas Shores</i> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I think <i>Texas Shores</i> should include more topics instead of focusing on one major topic in each issue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I think the stories are too long.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I think the stories are too technical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I prefer in-depth articles to news in brief.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I would like to see more photos and graphics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I am satisfied with the visual design of the magazine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. I subscribe to <i>Texas Shores</i> to stay informed about issues affecting Texas' coast.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. I can use the information I get from <i>Texas Shores</i> in my work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. I learn things from <i>Texas Shores</i> that help me understand my community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. I learn things from <i>Texas Shores</i> that have led me to change my behavior ( <i>begin recycling, conserve water, watch out for rip currents, etc.</i> ).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. I would be willing to pay an annual subscription fee of up to \$10 per year to continue to receive printed copies of <i>Texas Shores</i> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**  
FIRST-CLASS MAIL · PERMIT NO 148 · COLLEGE STATION TX

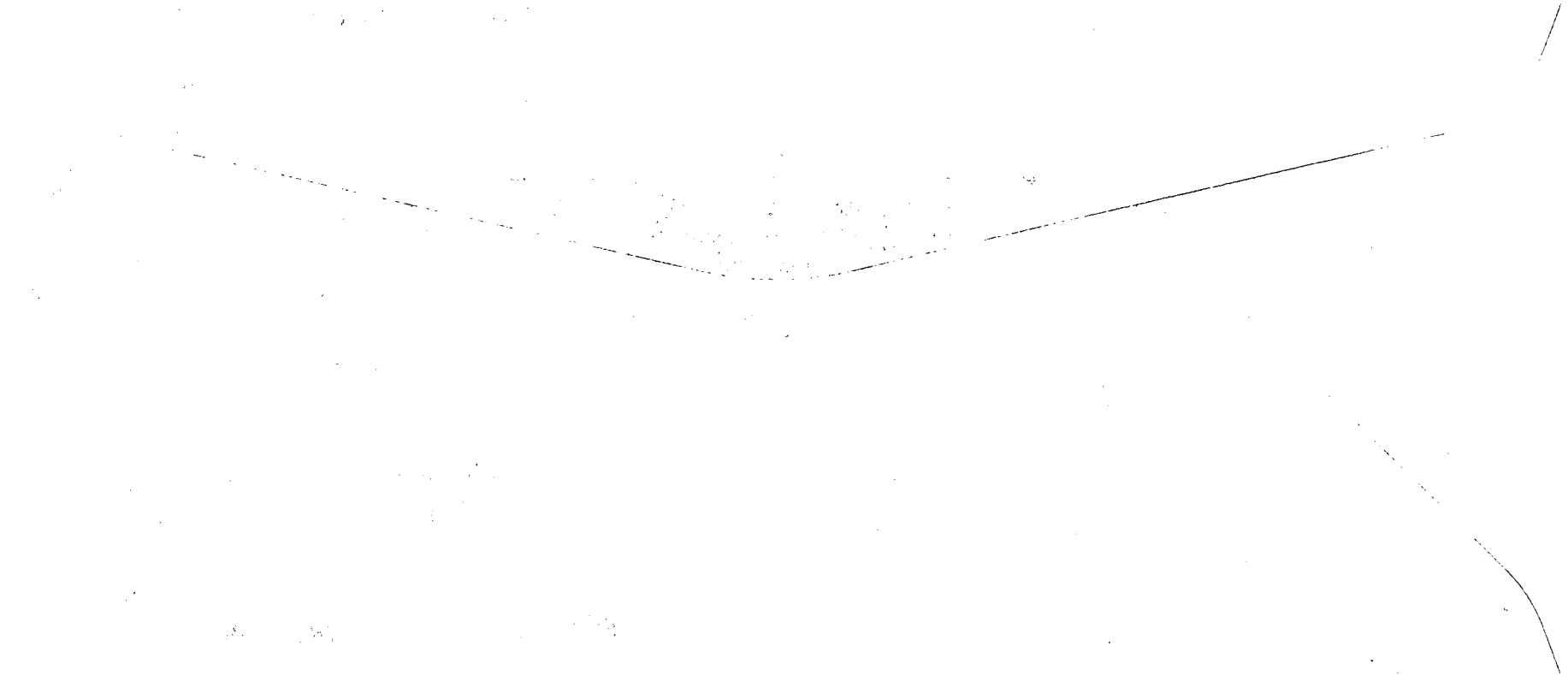
POSTAGE WILL BE PAID BY ADDRESSEE



CINDIE POWELL  
TEXAS SEA GRANT COLLEGE PROGRAM  
4115 TAMU  
COLLEGE STATION TX 77843-9988









11. Which of the following topics interest you most? (please choose three)

- marine science research
- coastal community resilience and sustainability
- coastal habitats and wildlife conservation
- commercial fishing, aquaculture and other seafood issues
- marine education
- beach, coastal and marine recreation (tourism, boating, recreational fishing)
- coastal and offshore industries (refineries, energy exploration and production, etc.)
- ports and harbors/marine transportation
- other: \_\_\_\_\_

12. What topics would you like to see covered in future issues?

---

---

---

---

---

---

## Part B: About you.

13. Please check all that apply:

- I live in a coastal county.
- I live in Texas.
- I live inland.
- I live outside of Texas.

14. How would you describe yourself? (please check all that apply)

- researcher or scientist
- K-12 or informal science educator
- commercial fisherman or seafood processor
- aquaculturist
- non-seafood marine industry member
- non-governmental organization staff
- Sea Grant or NOAA staff member
- other federal agency or state agency staff
- local government (city or county) staff or elected official
- Winter Texan
- retired, permanent resident
- student
- someone not in any category above who is a frequent recreational visitor to the coast (boating or fishing, relaxing on the beach, ecotourism, etc.)
- other: \_\_\_\_\_



15. Age:

under 18

35 to 49

18 to 24

50 to 65

25 to 34

66+

16. I have internet access (please check all that apply):

at home (dial-up)

at home (high-speed)

at work

on a mobile device (smart phone or tablet)

I do not have internet access.

17. Please provide any additional comments you would like to share below:

---

---

---

---

-----  
*To receive your gift card if you are a winner, please provide your mailing address below. Your address will not be shared, and it will not be used for any other purpose.*

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

PHONE: \_\_\_\_\_

If you do not currently receive *Texas Shores* but would like to become a subscriber, please check one of the boxes below:

add me to the mailing list at the address above (*Texas Shores* is currently free to domestic subscribers)

add me to the online subscription list. My email address is: \_\_\_\_\_

*Thank you!*



dune restoration — it's a systematic approach where you're thinking about connecting people to places."

Brody has visited the Delta Works project, and he describes standing on a dune in a beautiful national park at what he thought was a dune restoration project — only to find that the dune was, in fact, the dike. "It took a lot of foresight and proactive planning to create a system of defense that's so beneficial in so many different ways. If it's done properly, it could really enhance the ecology and economy of the Texas coast. I question whether we have that same level of patience and political will to create something so valuable.

---

*"I'm sure that a strong dike could be built, one that would have much less probability of failing, but if you put all your money into that, instead of building more resilient places, are you really that far ahead? I think you'd be better off building strong, vibrant places that are interesting and resilient."*

—Dr. John Jacob

---

"My biggest worry is that in the U.S., we will build our wall, our dam, our dike, and we will pile people and structures behind it, which can exacerbate the situation, particularly for other types of hazards such as rainfall-based flooding or even drought.

"What is rarely talked about is that in the Netherlands, they look at what is going in behind the walls and the protective devices. They're very careful to think about the pattern of development, both on top of and behind their dikes and levees. We need to do the same in the United States."

Texas Sea Grant's Jacob echoes his concerns. "One of the problems with any big structure like that is it can instill a false sense of security: 'That dike's there, so I'm OK.' We saw what happened in New Orleans.

"There's the old saw about there being only two kinds of levees or dikes: Those that have failed and those that will fail," Jacob says. "I'm sure that a strong dike could be built, one that would have much less probability of failing, but if you put all your money into that, instead of building more resilient places, are you really that far ahead? I think you'd be better off building strong, vibrant places that are interesting and resilient, than trying to protect low-grade suburban development that might make some people some money but that is not going to be, in my opinion, resilient in the long run."

## Building Community Resilience

In June 2013, the Obama Administration released the *President's Climate Action Plan*, which emphasized the need for federal agencies to support community-based preparedness and resilience. "Promoting on-the-ground planning and resilient infrastructure will be at the core of our work to strengthen America's communities," the plan pledges.

In addition to promoting stronger and safer communities and infrastructure, the plan calls for protecting the nation's economy and natural resources, and using sound science to manage climate impacts. Later this year and into the next, federal agencies are expected to report on the impacts of climate change on several key sectors and provide strategies to address them; the oceans and coastal communities are listed as priorities in this effort. The plan also directs NOAA, the U.S. Geological Survey and the National Aeronautics and Space Administration, among others, to create interactive, data-driven resilience tools and services. These include NOAA storm surge models and interactive maps that combine tidal data, projected sea levels and storm wave heights that would be folded into a centralized virtual toolkit.

Several of the measures — including a basis in sound science, creation of a virtual toolkit and support for community-based actions — are already being addressed in Texas. In Galveston, the ISCC is a relatively new research center. Opened just last year, it is a joint initiative between TAMUG and Texas A&M University's College of Architecture. It brings together researchers from both institutions, in particular those affiliated with the Center for Texas Beaches and Shores, the Hazard Reduction and Recovery Center (HRRC) and the Center for Housing and Urban Development. The ISCC's mission is to conduct research that combines planning and development with coastal processes, to ultimately provide information for local communities and other stakeholders on the Texas coast.

In addition to its project with Delft University, the ISCC is wrapping up a NASA-funded project to study the ability of coastal wetlands in the Gulf of Mexico to sequester carbon. In a project with the Houston Advanced Research Center, the ISCC is conducting a survey in Harris County to find out public preferences for storm surge reduction, and what factors might influence an inclination for a gate over other types of mitigation. "There's a lot of work being done by engineers and other types of professionals, but nobody has asked the public, who ultimately makes the decision," Brody notes.

The cornerstone of the ISCC is the Texas Coastal Communities Planning Atlas. Developed by Brody and Dr. Walter Peacock, TAMU Professor of Landscape Architecture and Urban Planning and Director of the HRRC, with funding from Texas Sea Grant, the Atlas is an interactive scenario-building tool that helps users envision the impacts and outcomes of possible future development on the Texas coast. Anyone with an Internet connection can access the Atlas and use the interface to develop a visual representation of current conditions and potential outcomes from development, including environmental degradation, natural hazard risks, vulnerable populations and changes in land use. Brody says the Atlas is continuing to evolve, and ISCC will soon release a new interface that increases interactivity and gives users more capability. He adds that presentations to introduce stakeholders to the Atlas in recent



# resilient coast

years have included state representatives and state agency staff, non-governmental organizations, special districts, other researchers, and city officials from Houston, Galveston and several smaller cities within the metroplex.

Another organization that is working on issues of coastal community resilience and community planning is the Texas Coastal Watershed Program (TCWP). The Houston-based partnership of Texas Sea Grant and the Texas A&M AgriLife Extension Service is directed by Texas Sea Grant's Jacob. TCWP conducts outreach to local governments and residents on the impacts of land use on watershed health and water quality.

One of the development techniques TCWP emphasizes is Smart Growth, a planning strategy that moves away from car-based suburban sprawl and instead promotes higher-density mixed land uses, compact building design and walkability. Smart Growth is designed to foster communities with a distinct sense of place — like the Strand in Galveston or New Orleans' French Quarter — while preserving open spaces, including wetlands that help provide protection and resiliency for coastal communities. It focuses development on existing communities and encourages revitalization of established waterfront locations.

Jacob, a nationally recognized authority on Smart Growth, says a Smart Growth implementation project in Houston conducted by TCWP more than five years ago is still influencing the city's urban corridor planning efforts. He contends that the key to coastal communities improving their resilience is not just where they

develop, but a combination of three factors: where, how and what.

"Of course they need to think hard about where they build, because even though every city on the coast is in an 'impossible' place, some areas are more vulnerable than others. The first thing to do is to stay out of the flood surge zone. But if you are going to build in the flood surge zone, build high — instead of 14 feet, you build at 17 feet. That's what they did on the Bolivar Peninsula — they have built those houses way higher and way stronger. There could still come a perfect storm that could blow those down, but if another Ike comes along, they might weather that much better.

"So where you build and how you build are important. The final thing is what you build. If you really want to build a strong, vibrant and resilient community, then you build one that maximizes resiliency across the board — not just the physical structures themselves, but a stronger civic culture where people take care of each other. Part of that is building a better place, a more interesting place. The Strand and those neighborhoods around it are good models. It's an urbanism that was built on walkability, on interaction between people, and I think coastal communities have a choice about building those kind of communities — the statistics tell us that half of what will be here in 2040 hasn't even been built yet, so there's still a lot of buildings to come."

This fall, TCWP is offering a training program for regional, state, county and local elected and appointed officials. The two-month Texas Coastal Citizen Planner program is designed to educate officials about land use policy tools and resiliency evaluations. The curriculum emphasizes coastal hazards and storms, and is tailored for participants who will play the most

significant role in shepherding the development of the Texas coast. TCWP also conducts training and demonstration projects for WaterSmart landscaping and wetlands restoration — activities that conserve water, mitigate flooding and improve water quality.

One of the tools TCWP has developed is a GIS-based model that coastal residents and community leaders can use to see the impacts of different development scenarios. The Community Health and Resources Management (CHARM) model incorporates data from several sources, including the ISCC's Atlas, in an interface that allows users to instantaneously see the consequences of development with respect to runoff pollution, water consumption, storm surge and flood damage, among other impacts.

The CHARM model is most often used with the weTable, a piece of Texas Sea Grant-adapted technology, in development planning workshops. The weTable — so named because it allows communities and their residents to collaborate and participate directly in planning efforts — depends heavily on Nintendo Wii technology that uses the Wii remote, a wireless controller, to detect movement. Using a laptop computer, a projector, a light pen and a Wii remote, a tabletop becomes as interactive as an expensive computer touch screen — but at a significantly lower equipment cost. It allows even communities with minimal resources to take part in planning for the community's future. The Wii remote detects the light pen's position on the table, so participants can exchange control of the weTable by handing off the light pen, enabling all participants to interact with data, maps and each other instead of crowding around a computer monitor or passively attending a presentation by a specialist. TCWP staffers have conducted hands-on workshops to train planners and city officials, with attendees from throughout the Houston-Galveston metroplex, as well as to train trainers from other states in the use of the technology. Jacob says it is a necessary first step before working directly with communities through guided workshops focusing on their specific situations and needs.

---

*The weTable — so named because it allows communities and their residents to collaborate and participate directly in planning efforts — depends heavily on Nintendo Wii technology that uses the Wii remote, a wireless controller, to detect movement.*

---





---

*Waves from Hurricane Ike in 2008 slam into the 17-foot Galveston Seawall and reach over the top of the memorial to the victims and survivors of the 1900 Galveston Storm, which killed 8,000.*

---





## Boots on the Ground

Last year, TCWP received a \$100,000 grant from NOAA to use the CHARM model and weTable in a series of development planning workshops over an 18-month period in the Rockport area. Initial workshops last summer laid the groundwork for ongoing efforts to update the model with data that is most applicable to the Rockport area. Texas Sea Grant's Wade has been one of the leaders in these efforts on the central Texas coast. The Coastal Planning Specialist

is headquartered at the Mission-Aransas National Estuarine Research Reserve (MANERR) at The University of Texas Marine Science Institute in Port Aransas, and her position is a partnership between Texas Sea Grant and MANERR.

"In doing CHARM in Rockport, our focus has been increasing resiliency to coastal hazards and climate change," Wade says. "Rockport's a good location because we've been doing ongoing work with them, and they're very active in the coastal hazards and emergency management communities.

"Really, it's not just Rockport," she

adds. "I should give the whole region credit, because while Rockport was the main supporter, we also had support from Aransas County, the Town of Fulton and other local organizations.

"It is genuinely a regional effort, and that's something I think you'll find a lot in this area in general, it's not just with Aransas County, Rockport and Fulton, but also with Corpus Christi and the surrounding communities," Wade says. "All these communities are pretty collaborative when it comes to trying to be resilient to coastal hazards."

## Swept away

For an example of the cost of non-resilience, look no further than the Texas town of Indianola.

In 1875, this bustling coastal community was the county seat of Calhoun County, the second-largest port on the Texas coast and home to 5,000 people. In its earliest incarnation in the 1840s as Indian Point, it had been the port of entry for tens of thousands of German, Swiss and French immigrants to Texas. It was the gateway to the settlement of "Western Texas," as the land west of the Colorado River was known, because of its location as the eastern end of the shortest overland route to California and the Pacific Ocean. By the time it was incorporated in 1853 as Indianola, however, new development had shifted the town to lower ground on Matagorda Bay and Powderhorn Lake to take advantage of the deeper water required for the steamship traffic.

In September 1875, a devastating hurricane swept away three quarters of the town. The highest measured winds were 88 miles per

hour — recorded before the instrument blew away — with estimates of later gusts reaching 145 to 150 miles per hour. Residents took refuge in the second floor of their homes or in the county courthouse, which had a 6-foot-deep foundation. An estimated 270 people died.

Indianola was partially rebuilt, in many cases using the wreckage from the storm as building materials. According to some accounts, moving the town further inland was considered, but political ambitions scuttled the plan. Indianola went on, even if not quite on the same scale as before the 1875 storm.

Then 11 years after the first, a second, stronger hurricane came ashore and brought with it the beginning of the end. In the August 1886 storm, recorded winds reached 72 miles per hour before the Signal Office collapsed, killing the signal officer and another man and starting a fire that spread to surrounding buildings even as the hurricane raged and heavy rains pounded the town. By the end of the storm, none of the houses left standing were



*This store on East Main Street was completely demolished in the Indianola Storm of 1886.*



*The 1886 storm also caused a raging fire. Eleven people sheltered in the cottage in the background.*

safe. The long wharf and train depot had been destroyed, and the county courthouse and other buildings that had survived the 1875 hurricane were also destroyed or badly damaged. Between the storm and the fire, Indianola's residents fled.

A month later, most of the stragglers who remained were chased off by high winds and flooding rains from another hurricane that made landfall in Brownsville; all but one family evacuated, many in boats. With the town all but abandoned, the following year the county seat was moved to Lavaca — Port Lavaca today — and the post office was closed. Today, Indianola exists as a small, unincorporated community of about 100 people; its place in Texas history is commemorated by a historical marker at the site.



Wade conducted workshops for the county and Rockport that introduced community leaders to the tools and information available for their use when they are conducting planning activities. Wade's other work in the area has included guiding Rockport, Fulton, Aransas County and the City of Corpus Christi through completion of a Coastal Resilience Index (CRI).

Developed by the Mississippi/Alabama Sea Grant Consortium with funding from the NOAA Coastal Storms Program and the Gulf of Mexico Alliance, the CRI is a simple, inexpensive way for communities to assess their own preparedness for a major hurricane and the length of time that would be needed to recover. Through a guided discussion, each community's participants — usually elected officials, emergency managers, planning staff and other community leaders — respond to the eight-page questionnaire of mostly "yes" or "no" questions in the context of a past storm and a future hurricane that is 50 percent worse.

The index covers the six areas that must be strong for a community to bounce back after a disaster: critical infrastructure and facilities, transportation issues, community plans and agreements, mitigation measures, business plans and social systems. The exercise is designed to help communities identify problem areas that would keep them from maintaining an acceptable level of functioning after a disaster, so additional study and resources can be focused on those areas.

Rockport is preparing in other ways. The city recently completed construction of a new city service center to house the Building and Development Department and the Public Works Department. It has been designed to withstand 150 mile per hour winds — or a Category 3 hurricane — for two hours or more. "It was an opportunity to build in some emergency response capabilities," says Rockport City Manager Kevin Carruth. "In the event of a catastrophic storm or some other event, the city and other responders can operate out of that building for an extended period, since it has independent power, water and sewer."

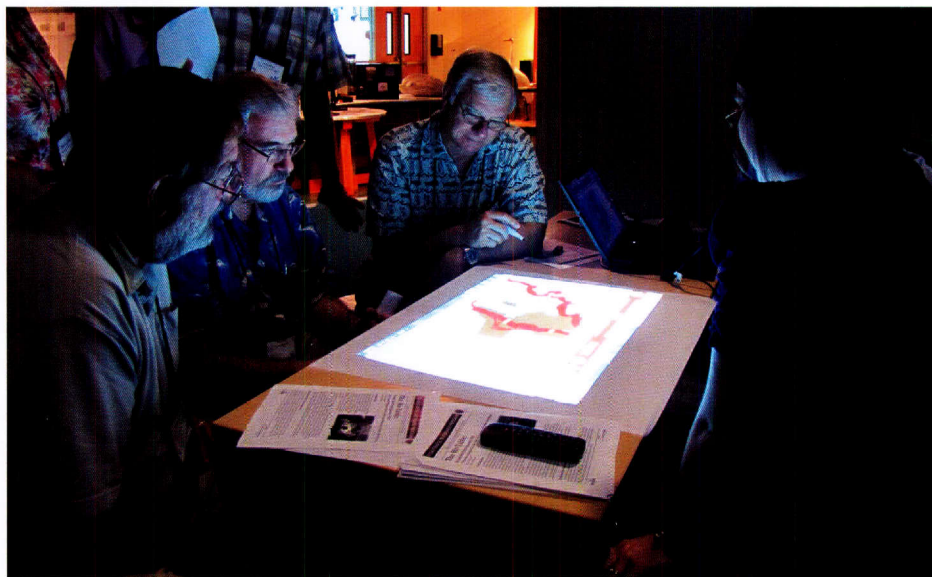


PHOTO BY TEXAS SEA GRANT

*At a resilience workshop in Rockport, local officials access the Texas Coastal Communities Planning Atlas using the weTable. Pictured are, from left, David Vyoral, Aransas County Road and Bridge Engineer; Mike Henry, Rockport Director of Building and Development; and Rockport Mayor Charles "C.J." Wax. Heather Wade, Texas Sea Grant's Coastal Planning Specialist, right, facilitated the workshop.*

Rockport, Fulton and Aransas County officials serve together on the executive committee of the Emergency Operations Center, through which they determine priorities, assign resources and make decisions about evacuations. Other regional efforts include a Stormwater Advisory Committee with representation from Rockport and Fulton. "As low as our elevation is, it's important that we get rid of water as quickly as we can," Carruth says. "We do a lot of coordination through the Stormwater Committee, and there's also a new committee that's being spearheaded by the Navigation District on inflows into Little Bay. It's a stormwater-related issue, but also has to do with the quality of the water as it comes out."

He adds the city has also done its part for water quality in Little Bay with the completion last winter of an anoxic basin at the wastewater treatment plant. The basin has already cut the nutrient level in its effluent by more than two-thirds.

"Anytime that government entities can cooperate and coordinate, that ultimately saves money and leads to a better product, especially in our particular situation. The whole county's about 25,000 people and we're on a peninsula just a few miles wide, so everything impacts everybody," he says.

"It only makes sense to coordinate with one another. Of course, with the stormwater issues, it minimizes the threat to people and property."

Though they're not expecting an influx of people on the scale of the Houston-Galveston area, Rockport is preparing for growth by increasing the capacity of its utilities infrastructure, including a new water tower next to the new service center, updating zoning for newly annexed areas, and comprehensive planning with the assistance of Wade. They also are continuing to participate in the CRI process.

To the south, the City of South Padre Island is also beginning to focus more on resilience. Last year, the organization held a Blue Ribbon Resilient Community Forum on South Padre Island to help local stakeholders assess the community's vulnerabilities and plan for the future. The forum was conducted by the America's WETLAND Foundation, which was founded in Louisiana in 2002 in response of the loss of coastal wetlands there and works with communities throughout the Gulf of Mexico.

South Padre Island is also hosting the national conference of the American Shore and Beach Preservation Association in



# resilient coast

October. Wade is scheduled to conduct a short course there focusing on the weTable and CHARM model — and why they're relevant to coastal development and coastal hazards — for the geologists, engineers, planners and beach renourishment specialists from around the country who are expected to attend.

Reuben Trevino, South Padre Island's Coastal Resources Manager, says he is fairly new to the topic, but he is learning all he can about resilience. He says his greatest concern currently is development occurring north of the city. "We've got some developers out there trying to build 250 feet from mean low tide in an area that's historically retreated 10 to 12 feet a year. We're really nervous about this." He says the property has great potential for development, but it has to be done appropriately. "In this day and age we know what's going to happen. Thirty years ago we didn't know the erosion problems. Parcels that sold in the 1960s and 1970s

are now under water."

He says that because the property is outside the city limits in the city's extraterritorial jurisdiction, "it's not our call at this point, but it's going to be our headache in the future."

Across the causeway from South Padre Island, the City of Port Isabel has joined a growing number of coastal cities investigating the concept of Smart Growth. As part of a grant-funded national technical assistance program, the city hosted a workshop in May conducted by Smart Growth America.

Brody says the resilience work being done up and down the Texas coast is fairly ad hoc and uncoordinated. With respect to Galveston since Hurricane Ike, he says, "I think our emergency management plans are better, but we're still putting people into clearly flood-prone areas, and the average resident is just not aware of the risk. The message is just not getting through.

"The professionals are keenly aware and have been working on it. There are discussions between top-tier decision makers and researchers, but we're talking to ourselves in a lot of ways."

He notes that direct outreach to residents in coastal communities is a critical component of building resilience, and is an ideal role for outreach-focused programs like Sea Grant. "We're finding in our research that education of homeowners significantly reduces flood damage at the parcel level."

Brody adds there are several policies communities can pursue to improve their resilience. "From an ecological perspective, they can better protect naturally occurring wetlands, critical habitats, riparian areas and natural dune structures. From an economic perspective, they can work to better diversify their economies — not just rely on one sector, for example, whether that's tourism or industry. From a sociological perspective, they can work



PHOTO BY SEITH PATTERSON



on building social capital, which involves having good networks of communication and information sharing, and not isolating socially vulnerable groups, which are the elderly, the young, the poor and the less educated.”

Like Jacob, he urges communities to focus development in the areas least exposed to risk, and if they are building in risky areas, to do it in ways that minimize impacts, such as higher elevations, stronger structures and better drainage. “That’s not just at a structural level but at a neighborhood and community level as well.”

Jacob characterizes the resilience on the Texas coast as a “mixed bag.”

“Houston as a metropolis is not going anywhere, but what would happen if a big one were to hit Houston, right around Freeport in our sweet spot? There still could be thousands of people dead. We have some pockets of non-resilient areas that are in tremendous danger. We have

a lot of low-lying development in places where it shouldn’t be. We’re putting more people in those low-lying areas — and every time somebody puts in a new subdivision, evacuation times become worse. Things could bounce back, but are those the kinds of losses we want to face? I don’t think so.

“I think we face this up and down the coast, but probably more so in the two areas of larger growth, Houston and the Rio Grande Valley. Many of our smaller cities on the coast are vulnerable as well, where construction is not as good as it should be, and they’re just not quite ready for the big storm that will come one day.”

On the other hand, he says, coastal residents in Texas are a “fairly resilient lot.”

“We’ll learn. Every storm teaches you something if you have your eyes open and you pay attention, so across the board we will come back.”

Brody also sees the upcoming coastal population boom as one of the critical

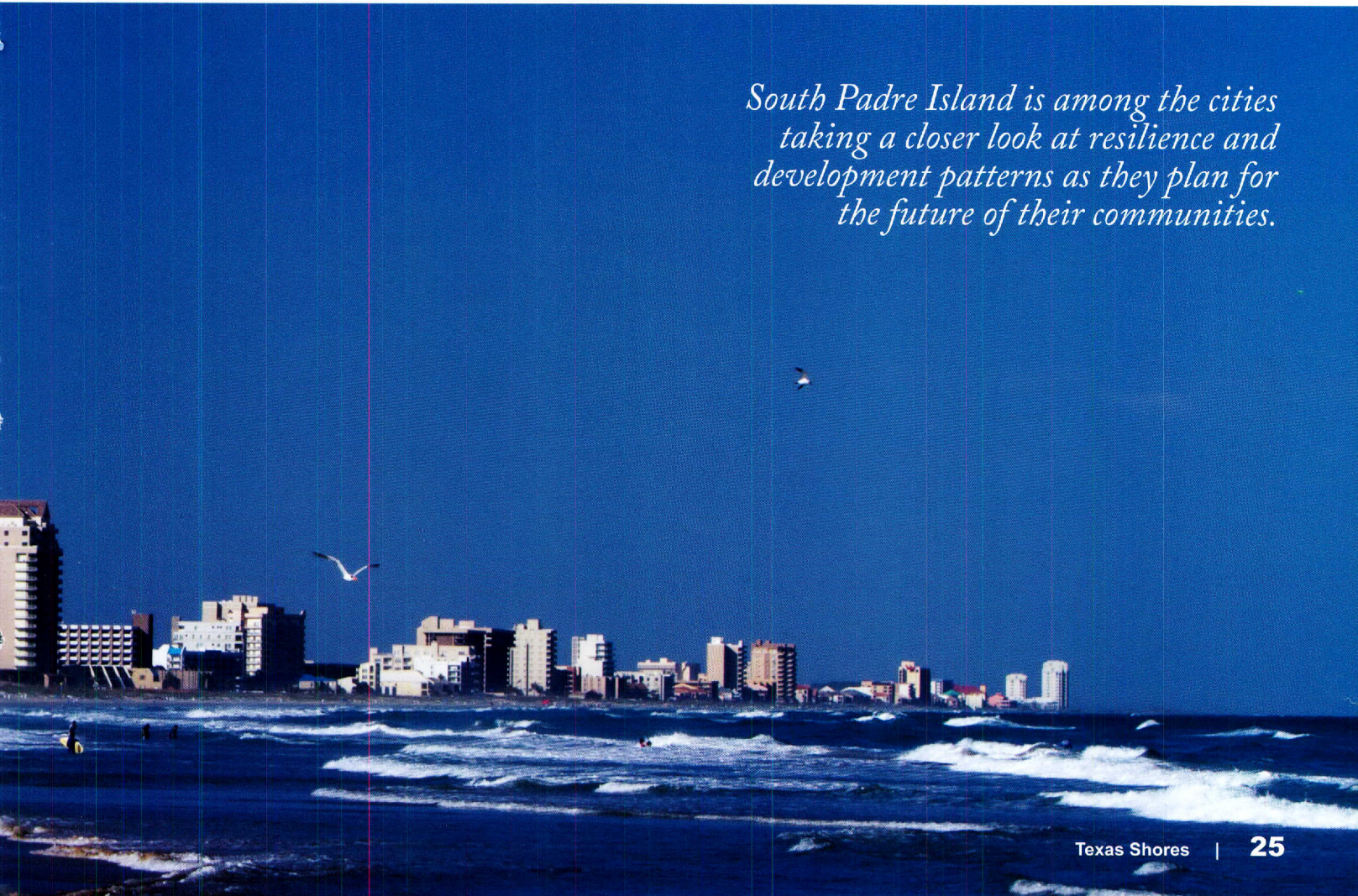
turning points for the Texas coast. “Most of the coast is still undeveloped, and it’s poised for development. The recession slowed that down, but now things are ramping up. The way we choose to put structures and communities and economies along the coast is going to be the most critical issue for resiliency over the long term. If we continue to develop in the way that we’ve done over the past 20 years, we’re talking about continued chronic and catastrophic damages to homes, properties and businesses.

“We now have the tools and the knowledge to do a much better job.”

In short, since living on the coast is a risk, it needs to be a calculated one, based on scientifically supported information and thoughtful planning.

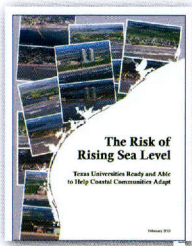
“We’re always going to develop and live on the coast, and that’s a good thing,” Brody says. “But making adjustments to do it in a way that’s smarter helps everybody.”

*South Padre Island is among the cities taking a closer look at resilience and development patterns as they plan for the future of their communities.*





## For Further Reading:



### **The Risk of Rising Sea Level – Texas Universities Ready and Able to Help Coastal Communities Adapt**

Texas has one of the highest rates of sea level rise in the world, one that is increasing by about five times the average calculated over the previous 4,000 years. This booklet explains why Texans should care about

issues such as global climate change and what the future holds for the Texas coast. With references to recent disasters such as Superstorm Sandy, it stresses the effect of rising sea levels on storm surges and acknowledges the gaps in research that need to be addressed.

Read it online at <http://texas-sea-grant.tamu.edu/includes/TheRiskofRisingSeaFinal.pdf> or request a copy by calling Dr. Wendy Gordon at (512) 924-2731 or Peggy Foster at (979) 845-1245.

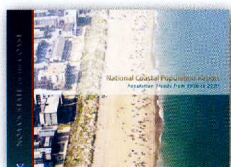


### **The Texas Coast: Shoring Up Our Future**

The Texas coast is deteriorating. With the loss of wetland habitats, estuaries, bays and barrier islands, communities are more exposed to the dangers of flooding and

hurricanes, which can devastate an area. Using diagrams, maps, photos and statistics, the Texas General Land Office's *The Texas Coast* explains in detail the impact of a deteriorating coastline on community resiliency, ecological health and economic growth, and stresses a healthy balance between the three.

Read it online at <http://www.shoringuptexas.org/> or request a copy by calling Maria Saenz at (800) 998-4GLO.

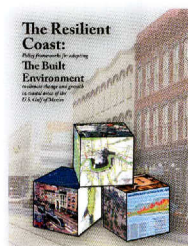


### **National Coastal Population Report – Population Trends from 1970 to 2020**

This NOAA *State of the Coast* report offers basic demographic status and trends information for coastal shoreline

counties and coastal watershed counties. Among the factors presented are education attainment, household income, age, race and population density. Such statistics allow the coastal management community the opportunity to choose the appropriate statistics for their needs.

Read it online at <http://stateofthecoast.noaa.gov/coastal-population-report.pdf> or request a copy by calling Peggy Foster at (979) 845-1245.

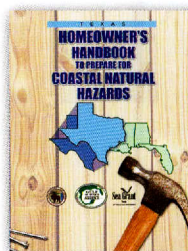


### **The Resilient Coast: Policy Frameworks for Adapting the Built Environment to Climate Change and Growth in Coastal Areas of the U.S. Gulf of Mexico**

Climate change is affecting the Gulf Coast at alarming rates. Part

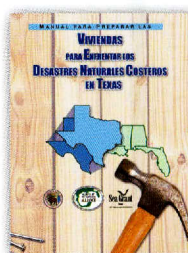
of a two-part series on policy issues related to coastal resiliency, this booklet reviews the existing legal and institutional frameworks for adapting to growth and climate change in the Gulf States and examines steps that might be taken to improve the resilience of the Texas coast.

Read it online at [http://tcwp.tamu.edu/files/2012/06/TheBuiltEnvironment08-sm\\_000\\_3.pdf](http://tcwp.tamu.edu/files/2012/06/TheBuiltEnvironment08-sm_000_3.pdf) or request a copy by calling Rhonda Meyer at (281) 218-0570. Other publications on the topic are available at <http://tcwp.tamu.edu/publications/>.



### **Texas Homeowner's Handbook to Prepare for Coastal Natural Hazards**

A well-organized and easy-to-follow guide for homeowners on the coast, this handbook provides information on how to increase roof stability, keep water out and minimize wind damage. The booklet also includes basic information such as what to pack in your emergency evacuation kit, and debunks several myths that typically cause homeowners to not adequately prepare for hurricanes, tornadoes and flood hazards. It is also available in Spanish: *Viviendas para Enfrentar los Desastres Naturales Costeros en Texas*.



Read it online at <http://texas-sea-grant.tamu.edu/WhatWeDo/online%20publications/HomeownersHandbook.html> or request a copy by calling Maria Saenz at (800) 998-4GLO.



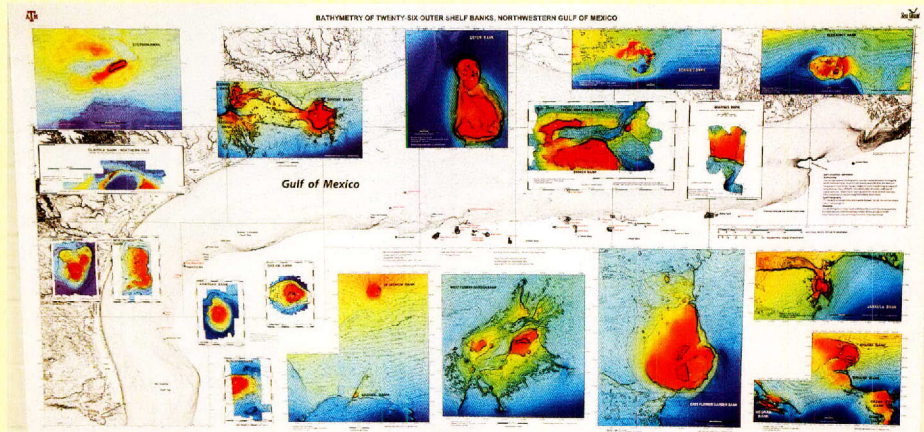
# Gulf of Mexico Bathymetry

For ordering information, contact Cindie Powell at cpowell@tamu.edu or (979) 862-3770.

Prepayment or an official purchase order is required.

## Bathymetry of Twenty-Six Outer Shelf Banks, Northwestern Gulf of Mexico

By T.L. Holcombe, C.A. Arias and W.R. Bryant



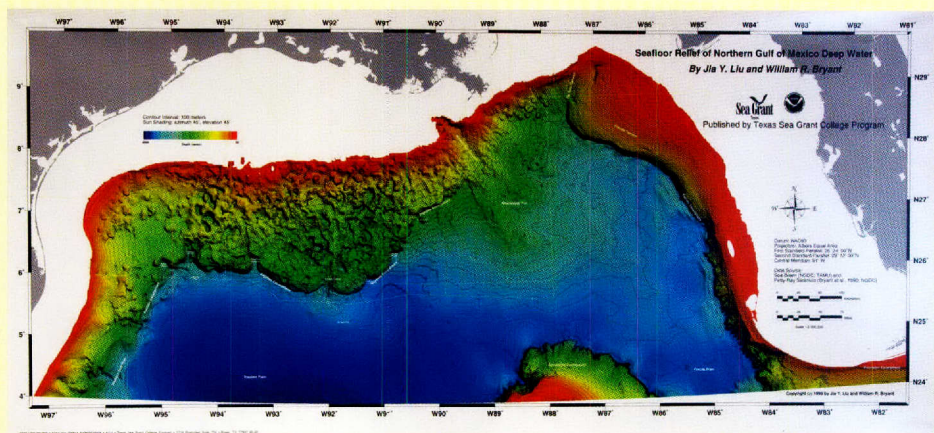
Price: \$5.00 (includes taxes and shipping)

This large (37" x 75"), full-color map contains bathymetry of 26 separate outer-shelf banks at a one-meter contour interval (with one at a half-meter contour interval). All are indexed to a large bathymetric map of the outer Continental Shelf. Sources of bathymetry are multibeam surveys conducted by the U.S. Geological Survey, National Oceanic and Atmospheric Administration, and the Harte Research Institute for Gulf of Mexico Studies.

## Seafloor Relief of Northern Gulf of Mexico Deep Water

By J.Y. Liu and W.R. Bryant

Price: \$3.00 (includes taxes and shipping)



The most detailed, up-to-date seafloor morphology of the northern Gulf of Mexico continental slope is depicted on a 35" x 16" full-color bathymetric map.



By Jessica Scarfuto

## Sheldon Lake State Park:

### Using modern technology to restore a pre-settlement landscape

Dig a hole anywhere and fill it with water — this was the typical method used to build and restore wetlands in the Houston-Galveston area. This approach, however, often fails because the complexity of the ecosystem makes these habitats difficult to recreate. Today, state and local natural resource and restoration specialists are collaborating to overcome that challenge by pioneering a new restoration technique at a state park in east Houston.

*“What I had seen in other wetland restoration projects — just leveeing up a field — wasn’t really replicating or producing what we see in native wetlands, so that’s what I was trying to do.”*  
— Andy Sipocz

Freshwater coastal prairie wetlands are made up of a combination of dome-like sediment heaps called mima mounds and wetland depressions known as prairie potholes. Found only in Texas and Louisiana, these vital ecosystem components provide critical flood control, water cleansing services and habitat for wildlife along the Texas coast, but many of these wetlands were filled in during the 20th century to make room for agricultural production and other development. Several years ago, researcher Andy Sipocz, Natural Resource Coordinator for the Texas Parks and Wildlife Department (TPWD), received a grant from the U.S. Environmental Agency (EPA) to study and characterize the coastal prairie wetlands. What he found inspired him to devise a new restoration method that uses the historical landscape to reconstruct wetland ponds.

“What I had seen in other wetland restoration projects — just leveeing up a field — wasn’t really replicating or producing what we see in native wetlands, so that’s what I was trying to do,” Sipocz says. In a case study at Sheldon Lake State Park, he and a team of collaborators from TPWD and the Texas Coastal Watershed Program (TCWP), a partnership of the Texas A&M AgriLife Extension Service and Texas Sea Grant, used the natural history of the land to successfully map out wetlands that were buried decades earlier for rice farming. These maps were used as a guide to re-excavate ponds in the wetland and created a more targeted, logical and ultimately successful method of restoration than what was used in the past.

Located on 2,800 acres of land about 15 miles from downtown Houston, Sheldon Lake State Park was initially constructed in 1942 as a water source for war industries. It became a state park in 1984, and its mission and goals shifted to environmental conservation and education. As the park developed a strategic plan during the 1990s, one of the main goals identified was to restore the prairie wetlands for a portion of the park. “Sheldon is really the only park that has a large area that has been altered like this for farming,” says Sipocz. “We try to restore the natural plant and animal communities on all of our state parks, and Sheldon needed it the most.”

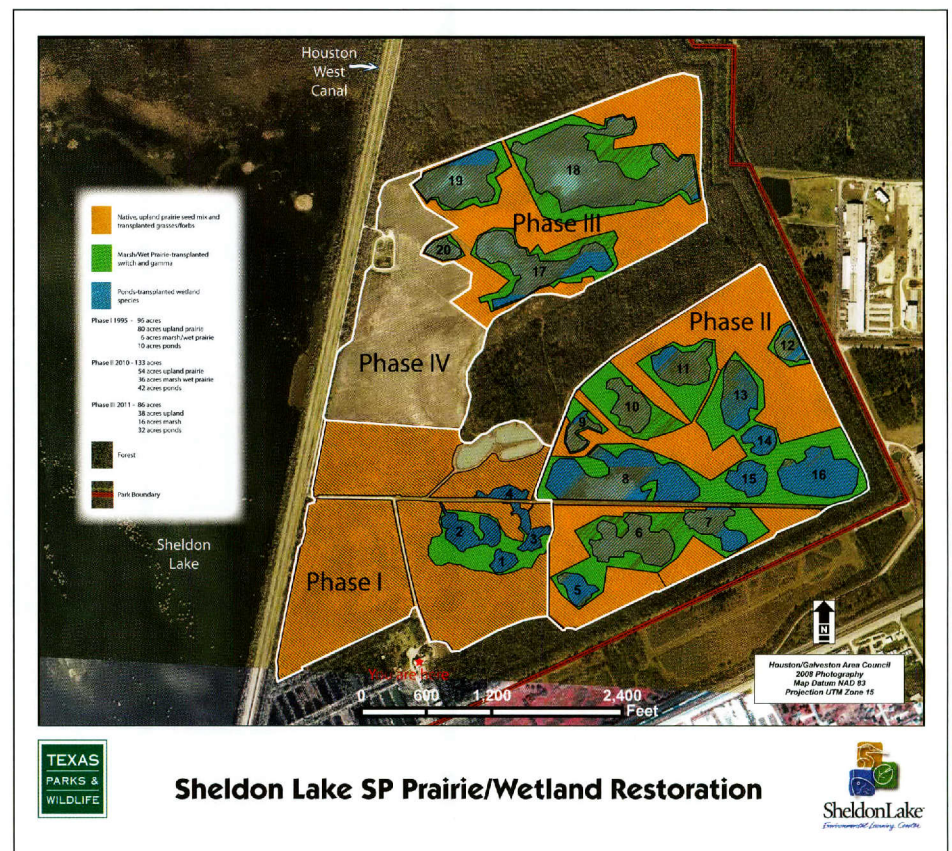






PHOTO © STEVEN UPPERMAN

*Geese and ducks take off from a pond at Sheldon Lake State Park.*

---

*“We try to restore the natural plant and animal communities on all of our state parks, and Sheldon needed it the most.”*

*— Andy Sipocz*

---

major restoration of the wetlands to their original, pre-agricultural state. When the park expressed interest in the same goal as Sipocz, the partnership clicked. “It was a right-time, right-place kind of thing,” says Marissa Sipocz, TCWP’s Wetland Program Manager, of the arrangement.

During the 20th century, changes in land use altered the surface and sub-surface of the land in the Houston-Galveston area to such an extreme degree that its earlier topography was unrecognizable. Plowing and land-leveling caused soils to be scraped from neighboring and upland areas to fill in the ponds, burying or draining many of the region’s wetlands for agricultural development. Along with losing the ecosystem benefits of having a wetland — such as increased resilience to flooding and drought — this mixing of soils caused many of the natural features of the land to be completely eradicated and created a hard-packed, almost impenetrable clay.

Since Andy Sipocz’s methodology required knowing the exact historical location of wetland ponds or basins, he examined soil maps and historic aerial photographs of the Sheldon area in search

Any work Texas A&M AgriLife does must be on publically owned property, which makes Sheldon Lake State Park an ideal site for the project. In the 1990s, TPWD had already been renovating infrastructure in the park to increase recreational access. Then, in the early 2000s, they sought to undertake a

of mima mounds and prairie potholes, both of which are key distinguishing features. Soil signatures can help determine where a wetland once existed, because hydric soils — the special type of soil found in wetlands — appear darker in color than other soils, but the signatures alone are not accurate enough to determine the exact boundaries of a wetland. “The only real way we had of knowing what the property looked like before it was leveled was to get historic aerial photos,” Sipocz says.

When the project first began in the early 2000s, using aerial photos to pinpoint the wetlands boundaries was an arduous task. Without more recent technologies such as Google Earth, which archives photos of a region over time and makes it easy to see the distinction between dark and light soils, Sipocz had to do all the work by hand. By matching the soil signatures to key landscape features such as the main irrigation canal in current photographs, he was able to define the boundaries of what would become the restored wetlands area.

Having the right soils in place is vital to a successful wetland restoration. Hydric soils go through periods of exposure and inundation or flooding, making them anaerobic over time. Devoid of oxygen, they retain a unique chemical structure to support wetland vegetation and appropriate hydrology. “People think that if you just dig a hole anywhere, you’ll get a wetland,” says Marissa Sipocz, but digging a pond randomly in the landscape does not guarantee that the pond will fill up when it rains, nor that the water will stay there for any significant amount of time. Without the right soils, wetland plants will likely die and be replaced by weedy vegetation, leading to reduced plant and animal diversity. Andy Sipocz’s success in the Sheldon Lake State Park restoration hinged on pinpointing where these soils were located.





PHOTO © STEVEN UPPERMAN

Volunteer John Egan places some of the first plants in the second phase of restoration work at Sheldon Lake State Park.

To complete the restoration, Andy Sipocz divided the land into four sections to be completed over time as funding became available. After defining the boundaries of each section, he charted the location and depth of ponds or water basins, much of which was based on the soil data; then excavation could begin. The park itself was responsible for excavating the ponds. Once that task was complete, the Wetland Restoration Team, which included TCWP personnel and members of Texas A&M AgriLife's Texas Master Naturalist Program, was in charge of the planting.

To maintain the genetic integrity of the restored plant community, plant material for the project was collected from an area of 50 miles or less around the state park. "If the area hasn't been completely devastated, you may actually get lucky and have a seed bank in the soil," says Marissa Sipocz, although this was unfortunately not the case at Sheldon. But by collecting the plants from as close to the state park as possible, the Wetland Restoration Team ensured that only plants adapted for local and regional soil and hydrological conditions were introduced to the site.

Though considered a successful test of the new restoration method, the project at Sheldon Lake State Park has faced its share of struggles since the restoration began in 2003. One of the most serious

problems resulted from a series of severe droughts that hit the Texas Gulf Coast beginning in 2011 just as the Wetland Restoration Team was undertaking the planting part of the second and third phases of the project. "When we put plants in the ground, we have to be able to establish some sort of watering system for them, and there just wasn't any way to get water realistically out to the plants," says Marissa Sipocz. The drought prevented native wetland plants from taking root and favored exotic and invasive species such as Vasey grass and deep-rooted sedge, which can quickly take over the area if water levels are low or nonexistent in the ponds. Some of the ponds in phases two and three are now so overrun with Vasey grass that the Wetland Restoration Team may need to replant the affected areas.

The good news is that once fully established, the wetlands are resilient in the face of drought. Phase one, which was already completed at the time the drought began, remains significantly unaffected by invasive grasses. The ponds have naturalized to such a degree that the original boundaries of the mapped out wetland are unrecognizable, and it is likely that this resilience will extend to the later phases of the restoration as long as the plants have taken root before a severe drought hits again.

Looking forward to the fourth and final phase of the restoration project, Andy Sipocz says it will present new challenges. Unlike the first three phases, phase four includes an ecotone, or transitional area between two different ecosystem types — one being the freshwater coastal prairie wetlands and the other a shady understory — with characteristic plants unique to each. According to Sipocz, the presence of a natural canopy in the area will change the species composition and plant life to one that is suited to the new conditions.

So far the Wetland Restoration Team has restored 136 acres of wetland habitat at Sheldon Lake State Park with the support of the Texas State Soil and Water Conservation Board and EPA, and hopes to add another 52 acres with the completion of phase four. Texas A&M AgriLife has now secured most of the funding for phase four, and project leaders are hopeful that the rest will begin to come in later this year.

In addition to restoring wetlands habitat, community outreach is another goal for Marissa Sipocz and TCWP. Through volunteerism and education about water resources and wetlands restoration, Sipocz and TCWP hope to engage and educate volunteers about the function and importance of wetlands. Volunteer opportunities are available on Wednesday mornings for adults and teens to participate in planting and other jobs necessary to the restoration project. "The team is usually a very friendly group of adults who enjoy working together, and over time they get a lot of experience working with different kinds of plants," Marissa Sipocz says, adding that volunteering can be hard work but its rewards





are learning more about the wetlands ecosystem and making lasting friendships, all while making Houston a more sustainable and resilient community.

The restoration team will likely be at Sheldon Lake State Park for several more years, since phase four has yet to begin. After that, they hope to continue restoring other wetlands with the methodology used at the park. Above all, Marissa Sipocz wants people to enjoy the recreational opportunities and educational resources that Sheldon has to offer. "It's an amazing little state park that is tucked away in the middle of industrial east-side Houston," she says. "It's a treasure that most people just don't even realize is there."

For more information about volunteering at the Sheldon Lake State Park restoration project, email Marissa Sipocz at [m-sipocz@tamu.edu](mailto:m-sipocz@tamu.edu) or call her at (281) 218-6253. ✓



PHOTO © STEVEN UPPERMAN

Volunteer Sue McManamer, readies plants for a day of restoration work.

# Giving to Sea Grant

<http://TexasSeaGrant.org/WhoWeAre/GivingtoSeaGrant2012.html>

Texas Sea Grant positively impacts the lives of coastal Texans, from shrimp fishermen to city planners, from teachers and their students to a wide range of businesses and industries, and with your help we can do even more.

You can support the mission of Texas Sea Grant by donating to the Texas Sea Grant Program Enhancement Fund. All donations are tax deductible. You can direct your donation to help support research, outreach or education programs, to general program support, or to the Ralph Rayburn Scholarship or *Texas Shores* magazine.

To make a gift of \$25 or more, you can submit online using a credit card for payment <http://giving.tamu.edu/how-to-give/default.aspx>.

To make a gift using a check in any amount, please send it via the U.S. Postal Service or courier service. Checks should be made payable to the "Texas A&M Foundation" with "Texas Sea Grant Enhancement Fund" written in the memo field.

Mail your contribution to:  
**Texas Sea Grant College Program**  
**Texas A&M University, 4115 TAMU**  
**College Station, Texas 77843**

If you have questions, contact Terry Poehl, Associate Director, at 979-845-3930 or [tlpoehl@tamu.edu](mailto:tlpoehl@tamu.edu).





# coastal icon

By Jim Hiney

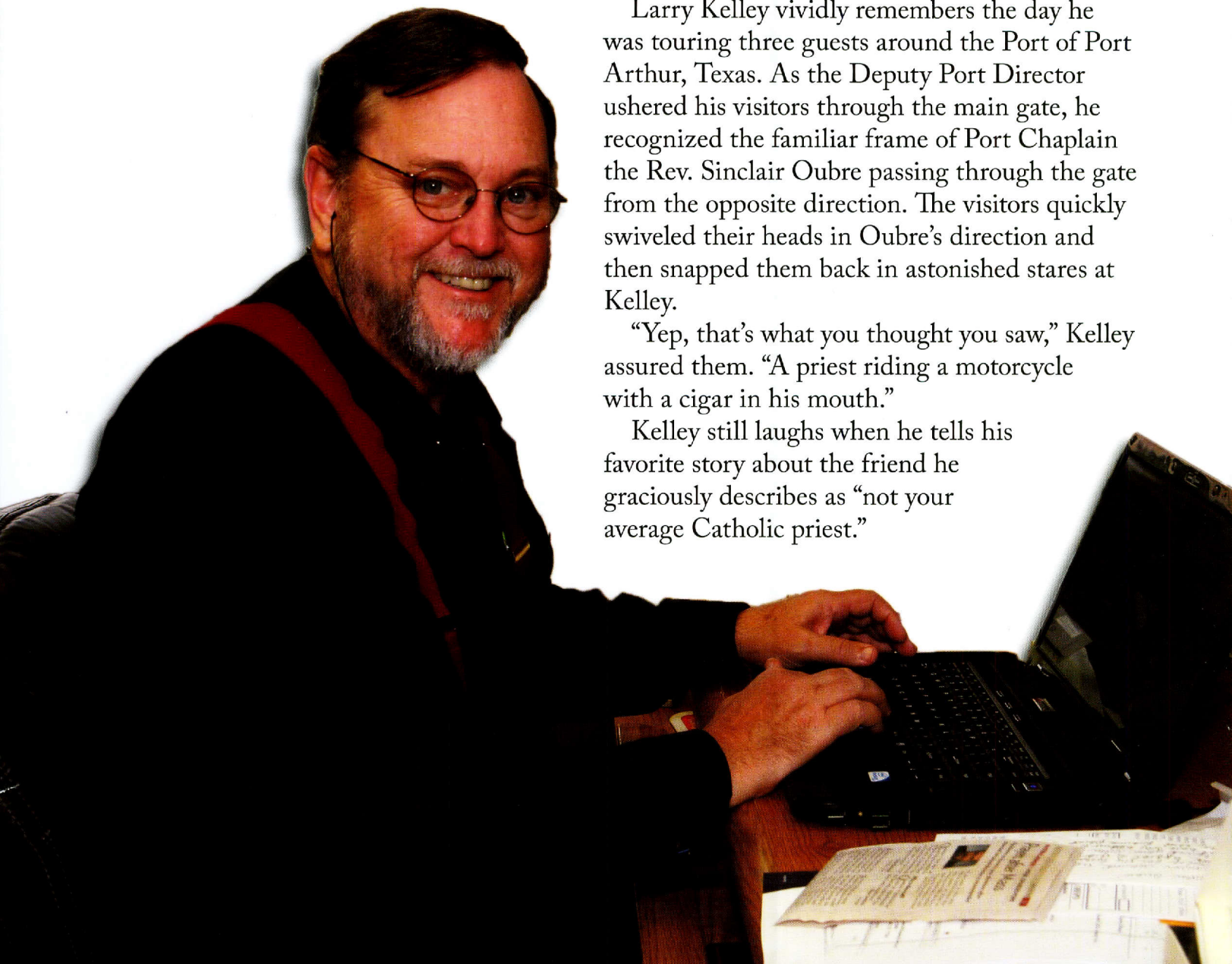
## Not your average Catholic priest

“Yep, that’s what you thought you saw,  
a priest riding a motorcycle with  
a cigar in his mouth.”

Larry Kelley vividly remembers the day he was touring three guests around the Port of Port Arthur, Texas. As the Deputy Port Director ushered his visitors through the main gate, he recognized the familiar frame of Port Chaplain the Rev. Sinclair Oubre passing through the gate from the opposite direction. The visitors quickly swiveled their heads in Oubre’s direction and then snapped them back in astonished stares at Kelley.

“Yep, that’s what you thought you saw,” Kelley assured them. “A priest riding a motorcycle with a cigar in his mouth.”

Kelley still laughs when he tells his favorite story about the friend he graciously describes as “not your average Catholic priest.”





---

*Oubre is a colorful, articulate and opinionated force of nature described by friends as approachable, gregarious, loyal, thoughtful, compassionate, humorous, intellectual and a bit eccentric.*

---

Oubre is a much-respected fixture in the realm of mariners worldwide and a well-known figure in the Beaumont-Port Arthur area. He is as enigmatic as his last name, which is pronounced “ōō-brē” in most of the world and “ōōb” (rhymes with “tube”) by the French and Cajuns. A great many people do not bother with either pronunciation and refer to him as “Father Sinclair,” but anyone who has known him from childhood simply calls him “Buddy.” It is a fitting nickname. He has proven himself a passionate friend and advocate for people who are marginalized, disenfranchised, overlooked or ignored, and for his down-on-its-luck hometown of Port Arthur.

A merchant mariner himself, Oubre is a tireless proponent of seafarers’ rights and was the driving force behind construction of the world-class Port Arthur International Seafarer’s Center (PAISC). He founded the Port Arthur Area Shrimpers Association as a means to bring solidarity to predominantly Vietnamese fishermen, and he annually celebrates Sea Sunday — a day to remember and pray for seafarers — with them in July. Oubre serves as the Diocese of Beaumont’s Diocesan Director of the Apostleship of the Sea (AOS) — the Catholic Church’s global outreach ministry to mariners — and frequently celebrates Mass on vessels passing through the Port of Port Arthur. He serves on myriad marine-related committees at the local, national and international levels for both the church and the federal government, and is involved in countless other activities involving mariners.

The man one friend characterized as the “real Energizer Bunny” also created the longest-lived charitable housing corporation in southeast Texas, instituted a motorcycle blessing event that draws more than 500 bikers annually, teaches at a kids’ camp geared toward grooming the next generation of marine-related business employees, and until recently carried out the duties of a parish priest.

FYI, the above is a partial list.



*Oubre speaks at the observance of National Maritime Day at the Seamen’s Memorial Sundial in May.*

PHOTOS BY JIM HINEY/TEXAS SEA GRANT

In the midst of this blur that is his life, Oubre still finds time to indulge in hobbies not often associated with priests — motorcycles, scuba diving, fencing and cigars — that garner him almost as much attention as his selfless work for others. He has parlayed his love for cigars into quarterly “Cigar Night” fundraising events for the PAISC. About 70 people pay \$45 each for three cigars and the opportunity to sample three premium rums and eat a chef-prepared gourmet meal.

Oubre is a colorful, articulate and opinionated force of nature described by friends as approachable, gregarious, loyal, thoughtful, compassionate, humorous, intellectual and a bit eccentric.

“But first and foremost he is a Catholic priest,” says Doreen Badeaux, a childhood friend who, as Secretary General of the AOS for the United States, shares a small office with Oubre in the United Steelworkers 13-423 Union Hall in Port Arthur. “He is a native of this area, so he is very dedicated to the City of Port Arthur and the Diocese of Beaumont, where he serves. He is unique and eclectic. He is a visionary. He sees the big picture. He can see how everything fits together in the bigger puzzle. He can see potential in things that no one else can see.”

“Buddy was always, I guess you can say, eccentric,” says Doreen’s brother and fellow priest, the Rev. Kevin Badeaux, who graduated with Oubre from Port Arthur’s Bishop Byrne High School in 1976. “He was always a little different and he enjoyed being different. He enjoyed doing things that made him stand out, like riding motorcycles or being dressier than other students.



PHOTO BY DOREEN BADEAUX



Patsy "Pat" Elaine Sinclair and Joseph Gerald Oubre

"He was one of just a couple of guys who took Home Economics, and he got to be a pretty good cook. One day the principal announced in school that "The winner of a Betty Crocker Award in Home Economics is Sinclair or Buddy Oubre?" Kevin Badeaux says, mimicking the principal's quizzical delivery. "Later he used that skill as a cook on workboats."

Oubre's quirky personality and his passion for advocacy are products of his childhood. He was the second of four children born to Patsy "Pat" Elaine Sinclair and Joseph Gerald Oubre. Pat was a homemaker and Gerald was a union carpenter who worked as a homebuilder with his father before doing commercial work as dispatched from the union hall.

The Oubres were originally told they could not have children. "I had a blood condition and the doctor told me I would get pregnant but I would never carry the child to term," Pat recalls with a bit of sarcasm in her voice. "He said he was so sure of this that if I did have a child, I could name it after him."

Exhibiting a sense of humor that is still evident today, Pat accepted the doctor's offer when her daughter, Max Stephanie, was born. Sixteen months later, Pat bestowed her maiden name upon her first son, but his sister took to calling him "Buddy Boy," and "Buddy" stuck. Two

more sons, Shawn and Stephan, completed the family.

Pat dryly recalls the time when her four young children begged her incessantly to take them to a place called "Six Flags" that all of their friends were talking about. "We didn't have any money, but I finally said, 'Okay, get in the car.'" She drove them to Greenlawn Memorial Park, in the neighboring city of Groves. The cemetery features six different flags — although not the same ones as the famous amusement park — flying near the entrance. "I said, 'Okay, count the flags. There are six flags.' Then I said, 'Okay, you've been to Six Flags,' and Buddy said, 'Well that sure wasn't fun.' I said, 'I told you I didn't know why you wanted to go.' They went for the longest time thinking the cemetery was Six Flags," she says with a bit of a laugh.

At the age of 4 or 5, Sinclair Oubre's greatest desire was to be a garbage man. "He was fascinated with the garbage trucks," Pat says. "They would come by the house and we would have to go look for him because he would follow the truck for several streets. He thought it was so cool that those big trucks could eat up those garbage cans."

---

*"You would see these buildings floating by," he says, still in awe. "As a little kid in the back of the car, I was fascinated by this. I developed a passion for the sea."*

---

His trash collecting dreams soon gave way to the allure of large vessels sailing through the Sabine-Neches Ship Channel. He watched them during family drives along Memorial Avenue, 9th Avenue and Stadium Road. "You would see these buildings floating by," he says, still in awe. "As a little kid in the back of the car, I was fascinated by this. I developed a passion for the sea. On TV I watched *Johnny Quest*, *20,000 Leagues Under the Sea*, Jacques Cousteau specials and *Sea Hunt* with Lloyd Bridges.

"There is no maritime history in my family at all. No one has any desire in any capacity at all, and yet I had a profound hunger for it," Oubre says. "I also get seasick. I'm not one of these hearty sailors who is bouncing off the walls and eating greasy food. I get seasick pretty fast, but I go to sea in spite of my tendency to get seasick."

Oubre also developed a deep fascination with the rituals performed by his priest at St. James Parochial School.

"I was in the second grade or so and I remember there was this special place that the priest held, the visions of him being at the altar and doing those holy things," Oubre says. "Me and my sister would get Necco Wafers and play communion. I wouldn't celebrate Mass or anything, but from a very early age I saw myself having a strong affinity to assist those who are marginalized, though 'marginalized' was not a word in my vocabulary at the time. Growing up in a union family I had an innate commitment to trade unionism and the importance of workers being able to organize together and come to a common voice in order to approach management for their needs. It made sense for me. I had an innate sense of what the Catholic Church teaches about the idea of solidarity and the important idea that everyone participates."

His desire to become a priest remained a deep secret through his elementary and middle school years, and he certainly didn't act priest-like. "He was never an overtly pious person. He was just one of the boys," Kevin Badeaux says. "There were some guys who people would say were going to the seminary, but Buddy was not one of those."

Adds Stephan Oubre, "There was no kind Christian nature given to his little brother whenever he wanted to beat the hell outta me."

As a pre-teen in the days before home air conditioning, Sinclair Oubre spent summer nights near an open window listening to muscle cars and motorcycles race down Port Arthur's main drag very near his house.





PHOTO © BART BRAGG

Oubre and his Buell 1125 CR.

“Right there at Rosedale and Gulfway was a light, and that was the Christmas tree for the drag strip,” he says. “I’d hear the roaring of the cars and bikes. That was always an appeal to me. But as much as I hunger for motorcycles, I am not a motorcycle enthusiast. I’m a biker. I do not polish chrome. My idea of a perfect bike is one that is completely flat black, that has been powder coated and requires no maintenance, because all I want to do is ride them, not clean them.”

He owns four motorcycles now and loves riding them whenever possible, but he’s continually bemused by people with non-biker mentalities who are astounded that he rides from Port Arthur to someplace as relatively close as Austin.

“That’s a short run. It was only 300 miles,” he says nonchalantly. “If I’m going to Chicago, I’ll click off 500 to 600 miles a day. That’s standard. If I’m making a long run, I’ll bump that up to 750 miles if I really have to get there. One time I was going to Daytona for Bike Week and I left here at 5 a.m. and got to Palm Coast, Fla.,

---

*“I’m a biker. I do not polish chrome. My idea of a perfect bike is one that is completely flat black, that has been powder coated and requires no maintenance, because all I want to do is ride them, not clean them.”*

---

around 8 p.m. — that’s just head down, butt up riding.”

Oubre finally confessed his seminary plans to family and friends when he graduated from Bishop Byrne High School and his religious studies took him to Houston, Washington, D.C., and Leuven, Belgium, before he was ordained in 1986.

While still a seminarian in Houston, he obtained the paperwork he needed to begin working in entry-level merchant mariner positions, and he found work on supply boats servicing offshore drilling

rigs. In the 35 years since he began his seafaring career, Oubre has worked his way up to the rating of Able Bodied Seaman-Limited, meaning he has spent almost 500 days at sea — usually 30 days at a time — and passed the required tests of his maritime knowledge.

His ship time gained him unique insight into a way of life that is invisible to most people outside of the 15-40 mostly men who serve as a ship’s crew.

“I’ve spent eight hours sitting on a milk crate busting rust on a ship and then rolling on a primer coat until I got off watch, and I was just exhausted,” he says. “I know that work well because I’ve done that work. I’ve done that work when it’s 97 degrees outside on the deck and you can’t bend down because you’ll burn your knees, but the expectation is that you are going to do that work.”

But he admits he did not understand the concept of a maritime ministry until about 1985, when the diocese stationed him in Beaumont and he met the port chaplain there. Oubre apprenticed with the chaplain for about three years, and his experiences combined with his childhood in a union household, his fascination with the merchant marine and his love of the priesthood brought into clear focus why he needed to be an advocate for seafarers.

“They make the quality of our life possible. They are not strangers. We’ve invited them here. We could not live the life that we do if the U.S. and foreign mariners did not leave their families over extended periods of time in order to sail ships,” he says. “Just name it — your clothes, your shoes, your car, your automobile parts, your gasoline or whatever it is — came to you by ship, either fully or partially. That Dell computer that was made in China was not put on an airplane. It came here by ship. If you are willing to give up all those things and basically go and live in a cave and live off the land, then you don’t need mariners.”

“Secondly, they are part of the people of God,” Oubre continues, before taking parish priests (himself included) to task for spending too much of their “ecclesial energy” making the sacramental life of





PHOTO BY DOREEN BADEAUX

Oubre and Deacon Tim Istre recite prayers over a bullhorn to the hundreds gathered at the 18th Annual B.J. Stelly Memorial Bike Blessing March 30 at the Port Arthur International Seafarer's Center.

the church convenient for parishioners while largely ignoring the needs of people who do not belong to mortar-and-brick churches.

"In Port Arthur we have eight Catholic churches. We have eight masses between 4 p.m. and 5 p.m. on Saturday. There is no lack of choice," he says. "But if I don't get to the ship when they call me, the crew do not get the liturgy. If I don't go to the prison when they call me, the prisoners don't get Mass. They don't let prisoners go out to the parish.

"If we take all of the Catholic mariners who are in this waterway (Sabine-Neches Ship Channel) on a Sunday and put them in one place, we'd probably have about 80 people and we'd call it a mission, and we would assign somebody to minister to them. But since they are spread out and they leave tomorrow, they don't become a constituency voice that is able to speak for themselves."

He found a similar need for advocacy among the mostly Vietnamese commercial shrimp fishermen based in Port Arthur. During the mid-1990s, Oubre realized that many people within Port Arthur's commercial shrimp fishing community did not speak English and, as a result, had very poor relationships with the U.S. Coast Guard and other governmental agencies. Oubre formed the Port Arthur Area Shrimpers Association so the fishermen could speak as a unified group, and it provided Oubre with a forum to share information, like the latest government regulations.

"Most of these fishermen came here from Vietnam, so they have a historic distrust of government now added to a language barrier, but they have a deep and abiding trust in the church," says Terrie Looney, the Texas Sea Grant College Program's Coastal and Marine Resources Agent for Jefferson and Chambers counties.

Through Oubre, Looney gained the fishing community's trust and cooperation in efforts that help their businesses operate efficiently and within government rules. "If a meeting or activity is associated with Texas Sea Grant and has been blessed by

---

*"If I don't get to the ship when they call me, the crew do not get the liturgy. If I don't go to the prison when they call me, the prisoners don't get Mass."*

---

the priest, the shrimpers will show up. Working with Father Sinclair has allowed me access to a community that I otherwise would not have been able to reach."

Vui "Kim" Tran, Vice President of the Port Arthur Area Shrimpers Association, says Oubre also "visits the boats and sees how hard-working the shrimpers are and how dangerous their work is." She says that Oubre's Sea Sunday observance, which occurs near the opening of shrimp season each year, gives her group spiritual comfort that is as valuable to them as knowing the most recent government regulations. "He supports us and prays for us. Anything the people need him to do, he is willing to help."

Oubre recently completed the second of his two six-year terms as pastor of St. John the Evangelist Catholic Church. In July he assumed the new role of judge for the Interdiocesan Tribunal in San Antonio, which is basically an appeals court that reviews marriage annulment cases. He will continue to live in Port Arthur and will travel to San Antonio about twice a month to preside over the tribunal.

"He's done well as a parish priest, but now he does not have a parish responsibility, which is probably good for him," says the Rev. Kevin Badeaux. "In a small diocese like ours there is not a lot of room for specialized ministries. Buddy has





PHOTO BY DOREEN BADEAUX

*Oubre blesses the bridge of the M/V Teo at the Port of Beaumont. The ship was loading bagged rice to be shipped to Iran. Oubre also celebrated Mass for the crew before their departure.*

*Vui “Kim” Tran says that Oubre’s Sea Sunday observance, which occurs near the opening of shrimp season each year, gives her group spiritual comfort that is as valuable to them as knowing the most recent government regulations.*

been a faithful pastor, but his passion is for these special projects. I’m glad he’s now in a position where he can put his energy into these ministries.”

Oubre will also continue riding motorcycles, smoking cigars, fencing and pursuing all of his other eclectic hobbies that entertain him, but don’t define him. It is his faith that does that.

“Father Sinclair is a very hard-working person, and while it is great to talk about the bikes and the fact that he is a merchant mariner, and while he certainly has fun with cigars and all of his other hobbies and interests, more than anything he is very committed to the church, to the people he serves through the church, including mariners, and he is very committed to this area,” Doreen Badeaux says, her respect for him evident in her tone. “He is very dedicated to building up the Kingdom of God by building up the little community around him.”

## Science and the Sea™

**Science and the Sea™** is a production of The University of Texas Marine Science Institute in Port Aransas. Its goal is to improve our understanding of the sea and its myriad life forms so that everyone can appreciate this amazing resource. Through our radio program, magazine articles, website, podcasts, news feeds and public kiosks, we provide entertaining stories that teach about the marine world and how scientists approach, and ultimately solve, some of the oceans’ mysteries.

Our radio program is the centerpiece of **Science and the Sea™**. It airs on radio stations across the country. Visit our website to hear recent episodes, search for specific topics, sign up for our podcasts or news feeds, or to check the listing of participating stations for one in your area.

[www.ScienceAndTheSea.org](http://www.ScienceAndTheSea.org)

The University of Texas Marine Science Institute





AT TEXAS A&M UNIVERSITY  
TexasSeaGrant.org

\*\*\*\*\*ECRL0T\*\*B100

TEXAS STATE LIBRARY  
DOCUMENTS LIBRARIAN/4 OF 4  
CAPITOL STATION  
PO BOX 12927  
AUSTIN TX 78711-2927

PRSR STD  
U.S. Postage  
**PAID**  
COLLEGE STATION,  
TEXAS 77843  
Permit No. 30



PHOTO BY SETH PATTERSON



summer/fall  
2013