SEA GRANT COLLEGE PROGRAM

TEXAS SHORES

Texas Pride

NOTES

Kjerfve new Dean of Geosciences at Texas A&M

COLLEGE STATION — Björn Kjerfve, director of the Marine Science Program at the University of South Carolina, has been appointed as the dean of the Texas A&M University College of Geosciences, effective Aug. 15.

Kjerfve's appointment follows an extensive national search.

"We are very pleased indeed to welcome Dr. Kjerfve to this important leadership position," says Texas A&M Executive Vice President and Provost David Prior. "He brings a wealth of experience in research, teaching and administration, and is a recognized leader in coastal oceanography research, with extensive international experience, and connections with leading national and international agencies and institutions."

Kjerfve, originally from Sweden, came to the United States as a student in 1965. He holds a master's degree in oceanography from the University of Washington and a doctorate in marine sciences from Louisiana State University.

His research has focused on linking physical processes to ecology in a variety of coastal environments, principally in South America, the Caribbean and the southeastern U.S.

As dean, Kjerfve will oversee research and teaching programs in atmospheric science, oceanography, geology and geophysics, and geography, and Texas A&M's participation in the Integrated Ocean Drilling Program, the Texas Sea Grant College Program and the Geochemical and Environmental Research Group.

— Texas A&M University Office of University Relations

Increase in inland marinas continues

COLLEGE STATION — A recent survey of Texas marinas shows that the number of inland facilities has continued to rise, increasing by almost 35 percent since the first study was done in 1986.

Researchers at the Texas Sea Grant College Program polled more than 350 inland and coastal marina owners around the state to produce the 2004 *Texas Marina Facilities and Services Directory*. The study includes information on the numbers of wet slips available in each marina; in the case of inland marinas, the total has increased by almost 37 percent since 1986.

"The marina industry is changing, and we're seeing a much faster growth rate of inland projects," says Dewayne Hollin, Texas Sea Grant marine business specialist.

In contrast to the growth of inland facilities, there has been a 16 percent decrease in the number of coastal marinas. However, the higher capacity of today's larger marinas has kept the total number of wet slips available on the coast fairly steady.

About 70 percent of Texas' marinas are inland, with 30 percent serving coastal areas. The combined number of coastal and inland marinas in Texas has risen from 309 in 1986 to 353 in 2004. Today, these marinas provide a total of 43,794 wet slips.

"The biggest boating area in the state is still Clear Lake/Galveston Bay, with about 7,900 wet slips and more than 2,500 dry storage spaces," Hollin notes, adding that the other areas in the top five are Lake Travis, the Texas side of Lake Texoma, Lake Conroe and Lake Ray Hubbard near Dallas.

Dry storage of boats statewide has risen significantly, increasing by 105 percent from 6,958 in 1986 to 14,272 in the 2004 survey. Today, one out of every four boats at a Texas marina is in dry storage.

"With the dry stack system, marinas can store three or four hundred boats in an area that might normally hold 50 boats," Hollin says.

"Overall I would say the marina industry looks pretty healthy," he says. "Weather conditions and the shorter summers now because of school openings and closings have put a little pressure on operators to make their business during a shorter time period, but I see a lot of growth in the industry."

Copies of the 2004 *Texas Marina Facilities and Services Directory* are available from Texas Sea Grant for $8.15 each by contacting Hollin at (979) 845-3857 or dhollin@neo.tamu.edu. It lists contact information and data on numbers of wet slips, dry storage and ramps, and services available at each marina.

— Cindie Powell

O'Connell new marine agent for Matagorda County

BAY CITY, Texas — John O'Connell has been named the new Texas Marine Advisory Service marine agent for Matagorda County.

"We are thrilled to get such an experienced agent," says Matagorda County Judge Greg Westmoreland. "We certainly have a lot of marine issues in our county, and he can hit the ground running."

O'Connell, who has been the marine agent for Calhoun County since 1996, is a native of San Antonio. He previously spent two years as an assistant county agent with the Louisiana Cooperative Extension Service, and also has worked as a farm foreman with the aquaculture research and teaching facility at Texas A&M University.

He holds bachelor's and master's degrees in wildlife and fisheries science from Texas A&M, with a master's specialization in aquaculture. His other areas of expertise include live bait handling, monofilament line recycling, youth outreach, marine and natural resource education, nature tourism, watershed stewardship, wetland restoration, emergency management, commercial fisheries and bycatch characterization.

"I am excited about this new assignment. Matagorda County represents some unique challenges and opportunities for me," O'Connell says. "My experience in neighboring Calhoun County, and my familiarity with the coastal issues that impact both counties, should help me provide valuable support to Matagorda County's commercial stakeholders, government agencies and the public."

The Marine Advisory Service is a cooperative effort of the Texas Sea Grant College Program at Texas A&M University, the Texas Cooperative Extension, and commissioners' courts in participating counties.

— Cindie Powell

PHOTO BY SUSAN WOLFE

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SUMMER 2004
VOL. 37 NO. 2

TEXAS SHORES is published quarterly by the Texas Sea Grant College Program in an effort to promote a better understanding of the Texas marine environment. Sea Grant is a partnership of university, government and industry focusing on marine research, education and outreach. Nationally, Sea Grant began in 1966 with the passage of the Sea Grant Program and College Act. Patterned after the Land Grant Act of the 1860s, the Sea Grant concept is a broad-based scientific effort to better the world for all those living in and out of the sea.

In 1968, Texas A&M University received the distinction of being named among the nation's first six institutional award recipients. Three years later the school was designated a Sea Grant College. The university has a rich heritage of oceanography research dating back to 1949 when the program began. In addition, there is an ongoing program to get marine information to the public.

Sea Grant is a matching funds program. The Texas Sea Grant College Program itself 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.

TEXAS SHORES STAFF — Jim Hiney, *Editor;* Cindie Powell, *Assistant Editor*; Amy Broussard, *Design*; Eric Graham, *Webmaster*; Crispin Morin II, *Distribution*. **SEA GRANT ADMINISTRATION** — Dr. Robert Stickney, *Director;* Amy Broussard, *Associate Director*; Ralph Rayburn, *Associate Director.*

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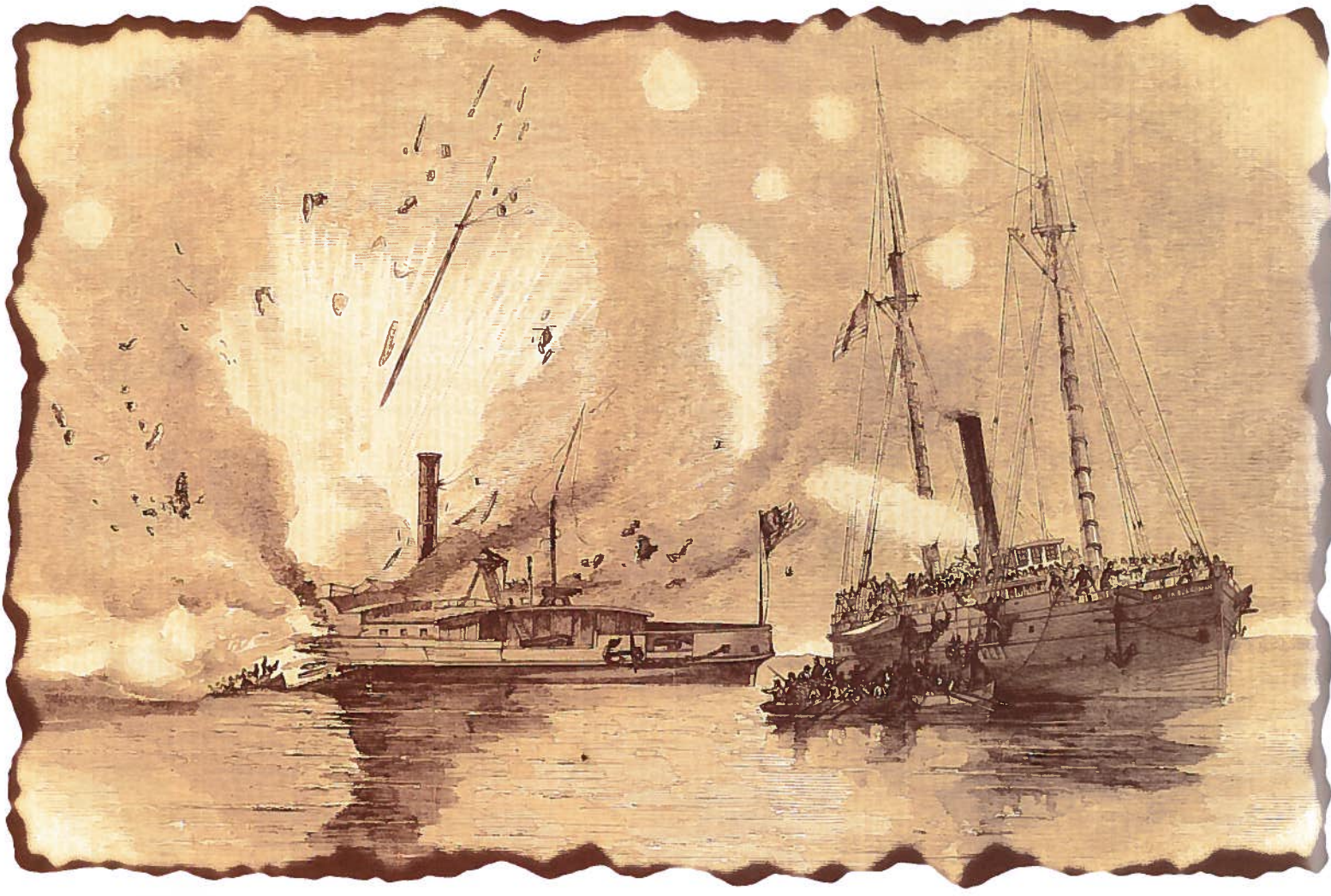


The tides of war

By Jim Hiney

Imagine the intense sense of pride Texans might feel, then and today, if the outcome of the Civil War had hinged on the battles fought here. ✺ Historians would recall that Confederate forces in Texas, out-manned and under-equipped, gave Union forces all they wanted and more. Pitched battles lasted for days, sometimes weeks, and whichever army had the last man standing claimed victory. ✺ Texas forces were heroic to the end but they just could not overcome the Union's advantage in men and materiel. After the last shot of what seemed like the hundredth — or even thousandth — skirmish, the Union finally claimed victory in Texas. As Texas fell, so did the Confederacy. ✺ It might be nice to say that capturing Texas was critical to winning the Civil War, but quite the opposite was true. The battles waged in Texas did not change anything about the way the war ended. ✺ Had the Union enjoyed the same kind of success in every theater of battle as it did in Texas, Grammy Award-winning artists now would most likely sing *Dixie* before the Super Bowl and grits might be the national dish. ✺ To say that the Union performed poorly in its mainly coastal efforts here is an understatement. Over the course of the war, which came to Texas' shores in the spring of 1861, federal soldiers and sailors experienced what southerners call buzzard's luck: They couldn't kill nothin' and couldn't find nothin' dead. ✺ Union armies occupied both Galveston and Brownsville briefly before losing one to an unlikely counter-attack and withdrawing of their own free will from the other. They tried to gain launching pads to the state's interior through invasions at Corpus Christi and Sabine Pass, but they were turned away both times — in the latter battle by just 47 Confederate soldiers.

ARTWORK COURTESY ROSENBERG LIBRARY

In the war's last action, at Palmito Ranch near Brownsville, Union troops sought out and confronted a Confederate Army that had been content to sit out the waning days of the conflict. Federal soldiers managed to lose that fight as well and, adding to the indignity, the defeat came two months after Gen. Robert E. Lee signed the Confederate surrender at Appomattox Courthouse. Don't get the wrong impression. Texas was an important prize to the federal leadership, as evidenced by the Union's above-mentioned attempts to occupy various parts of the state. When the war began, the federal government wanted to shut down the Confederacy's economic engine and keep Southern troops from getting vitally needed supplies. Cotton was the currency of the South and much of it was produced in and shipped from Texas.

By most accounts, the Union — mainly through a naval blockade — was only moderately successful at interrupting the flow of cotton and supplies flowing through Texas ports.

Texas was also a big psychological prize. The Union wanted to occupy Texas and use it to send the message that the federal reach could make it to the furthest parts of the Confederacy — similar to the effect the United States achieved in World War II when Gen. James Doolittle led American bombers in what the Japanese considered an impossible attack on their homeland.

"The North never fully achieved this psychological goal, but it was part of their plan," says Dr. Joseph Dawson, professor of history at Texas A&M University.

"There was also widespread agreement in the North that part of the war effort was to destroy slavery, and there were a lot of slaves in Texas — about 30 percent of the state's population were slaves," he says. "If federal forces could get over onto the mainland and start moving through Texas, then obviously there would be an opportunity to confirm the emancipation proclamation there."

Southerners wanted to keep Texas and other states on the Confederacy's western edge out of Union hands for the same psychological reason. President Jefferson Davis wanted to be able to announce during his annual speech to the Confederate Congress that "they were holding firm, doing well and that the Confederate states were not coming under Union control," says Dawson. "So even though these states were a great distance from the two capitols, a great portion of Louisiana — maybe two-thirds of the state — was still in Southern hands as was about half of Arkansas. It was a plus factor for President Davis to be able to say that Union forces had not been able to gain control or take over entirely Arkansas, Louisiana and Texas."

As the conflict continued, the threat of foreign interference from the French lent an air of urgency to the Union's quest for a Texas stronghold. Ironically, the Confederate government came to fear the French influence as much as its Union foe.

In 1862, the French consul in Texas sent a letter to Gov. Edward Clark suggesting that reestablishing the old Republic of Texas, which was tantamount to encouraging the state to secede from the Confederacy, would greatly benefit the state.

The letter resulted in the Texas consul, as well as the French consul in the Confederate capitol of Richmond, Va. — who had also been meddling in Texas' affairs — being expelled from the Confederacy.

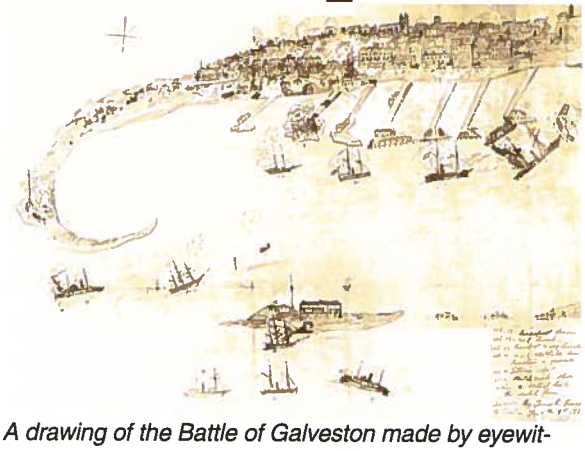
By 1864, the French Army under Emperor Napoleon III had entered Mexico City and installed Maximilian as emperor.

Had the Union not already been involved in dealing with a rebellion of its own, Lincoln might have committed his armies to helping oust Maximilian and returning Benito Juarez to the Mexican presidency.

As it was, the Union had more than it could handle in Texas — a surprising state of affairs that had begun quietly enough three years earlier with the appearance of the United States flag off the coast of Galveston.

The water-borne squeeze

Texas Gov. Sam Houston opposed secession, but he could not avoid or overcome his citizens' outrage at attacks by Northern politicians on Southern institutions — most notably slavery. ✺ Texans were strongly attached to the Union that they had spilt so much blood to join less than 20 years before, and only one Texas family in four owned slaves, but the majority of Texans believed slavery was necessary for the continued growth of the state. ✺ They saw the 1860 election of Abraham Lincoln, who was an outspoken opponent of slavery, as the latest and greatest threat to their economic well being. When South Carolina seceded from the Union in December 1860 and Mississippi, Florida, Alabama, Georgia and Louisiana called secession conventions in January 1861, Texans urged Houston to call a convention to determine what course of action the state should take. ✺ Houston, himself devoted to both Texas and the Union, initially paid little attention the requests, refusing to take any step that might aid secession. He could not, however, ignore a call by a group of prominent citizens to consider the state's federal relations. One of these citizens who helped push Texas toward the Civil War was John S. "Rip" Ford, who later figured prominently in the Battle of Palmito Ranch. ✺ Houston attempted to forestall the convention by calling a special session of the legislature and recommending that it refuse to recognize the convention. Instead, the legislature gave approval to the convention, on the condition that the people ratify its outcome by a final vote. ✺ By the overwhelming margin of 152 to six, delegates to the convention passed a resolution in early February 1861 stating that Texas should secede from the Union, mirroring action already taken by the states of South Carolina, Mississippi, Florida, Georgia, Louisiana and Alabama.



A drawing of the Battle of Galveston made by eyewitness James E. Bourke.

DRAWING COURTESY ROSENBERG LIBRARY

A few weeks later, Texas voters ratified a secession ordinance that took effect March 2, 1861 — exactly 25 years after Texas declared its independence from Mexico — and convention delegates voted to unite with the newly formed Confederate States of America.

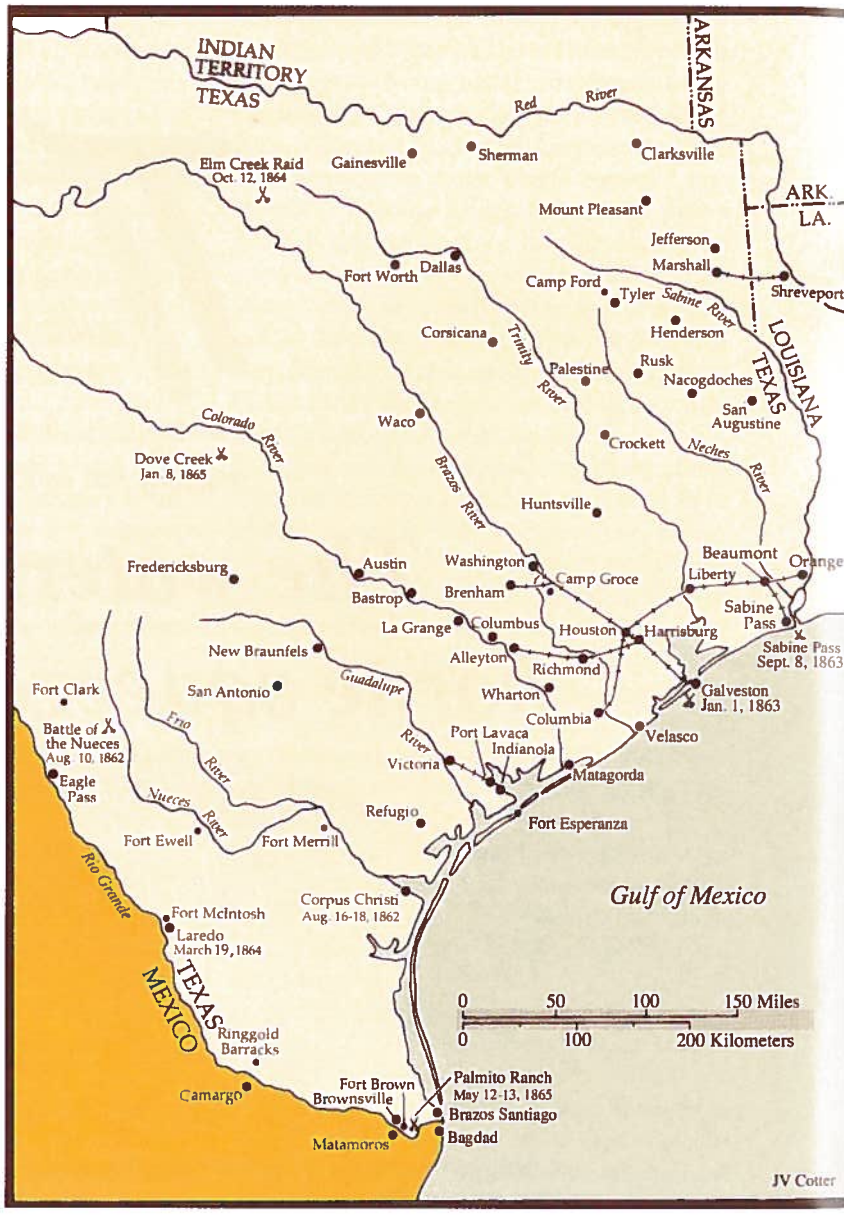
Houston believed the delegates lacked the authority to make Texas part of the Confederacy. After he refused to take an oath of allegiance to the fledgling rebel nation, convention delegates removed Houston from office and replaced him with his lieutenant governor, Edward Clark.

President Lincoln offered to send troops to assist Houston if he would resist the convention, but Houston rejected the offer rather than risk civil conflict in Texas. He retired to his home in Huntsville and never saw the end of the bloody conflict between states that he had hoped to avoid. He died at home on July 26, 1863.

The first skirmish on the way to war in Texas really wasn't much of a clash at all. Members of the Committee of Public Safety, a group created by the convention, sought to capture federal property within the state. At the time there were probably more federal forces in Texas, in part because of its size, than there were in any other state. Soldiers were stationed in several forts stretching west from Dallas and their job was guarding the state's frontier from the recently vanquished Mexican government and protecting settlers and stagecoach trails from Comanche Indians.

The Spanish and later the Mexicans had maintained a large depot in San Antonio, so it was only natural that the federal government did the same as its influence in the state moved further westward. San Antonio eventually became the headquarters for Brig. Gen. David Twiggs, commander of all federal troops in Texas.

Shortly after convention delegates voted to secede, the Committee of Public Safety sent representatives to San Antonio to negotiate with Twiggs the surrender of federal property there. Negotiations failed and an army of several hundred Texas volunteers moved into the city to take the property by force. Twiggs, a Georgian by birth who harbored sympathy for the South, decided to concede the property rather than risk bloodshed.



A map showing the major Civil War battles along the Texas coast.

His actions earned him praise and admiration from Texans and a reprimand from his federal superiors. Twiggs later resigned his commission in the Union Army — and with it almost 50 years of military service — to take a commission as a Confederate officer.

The Civil War came to Texas' shores in the early summer of 1861, when one part of the Union's Anaconda Plan finally reached the western Gulf of Mexico.

Senior Union general Winfield Scott proposed the Anaconda Plan as a low-violence means of dealing with the secessionist states, and it comprised three tactics: blockading Confederate ports from Virginia to Texas, controlling the Mississippi River and assembling the largest single army the nation had ever known to, in effect, scare the Confederacy into surrender.

The plan was designed to squeeze the Confederacy into submission, thus its descriptive comparison to the well-known constrictor, coined by newspapers of the day, not by Scott.

"It was an excellent concept strategically," Dawson believes. "Gen. Scott was elderly and in poor health at the time, but from the Union standpoint the plan demonstrated that his mind still worked well."

Scott explained his plan to Union Maj. Gen. George B. McClellan in a letter dated May 3, 1861:

Sir,

I have read and carefully considered your plan for a campaign, and now send you confidentially my own views, supported by certain facts of which you should be advised.

First. It is the design of the Government to raise 25,000 additional regular troops, and 60,000 volunteers for three years. It will be inexpedient either to rely on the three-months' volunteers (men who had signed up for just three months of service) for extensive operations or to put in their hands the best class of arms we have in store. The term of service would expire by the commencement of a regular campaign, and the arms not lost be returned mostly in a damaged condition. Hence I must strongly urge upon you to confine yourself strictly to the quota of three-months' men called for by the War Department.

MAP COURTESY TEXAS STATE HISTORICAL ASSOCIATION

Second. We rely greatly on the sure operation of a complete blockade of the Atlantic and Gulf ports soon to commence. In connection with such blockade we propose a powerful movement down the Mississippi to the ocean, with a cordon of posts at proper points, and the capture of Forts Jackson and Saint Philip; the object being to clear out and keep open this great line of communication in connection with the strict blockade of the seaboard, so as to envelop the insurgent States and bring them to terms with less bloodshed than by any other plan. I suppose there will be needed from twelve to twenty steam gun-boats, and a sufficient number of steam transports (say forty) to carry all the personnel (say 60,000 men) and material of the expedition; most of the gunboats to be in advance to open the way, and the remainder to follow and protect the rear of the expedition, &c. This army, in which it is not improbable you may be invited to take an important part, should be composed of our best regulars for the advance and of three-years' volunteers (men who signed up for three years of service), all well officered, and with four months and a half of instruction in camps prior to (say) November 10. In the progress down the river all the enemy's batteries on its banks we of course would turn and capture, leaving a sufficient number of posts with complete garrisons to keep the river open behind the expedition. Finally, it will be necessary that New Orleans should be strongly occupied and securely held until the present difficulties are composed.

Third. A word now as to the greatest obstacle in the way of this plan — the great danger now pressing upon us — the impatience of our patriotic and loyal Union friends. They will urge instant and vigorous action, regardless, I fear, of consequences — that is, unwilling to wait for the slow instruction of (say) twelve or fifteen camps, for the rise of rivers, and the return of frosts to kill the virus of malignant fevers below Memphis. I fear this; but impress right views, on every proper occasion, upon the brave men who are hastening to the support of their Government. Lose no time, while necessary preparations for the great expedition are in progress, in organizing, drilling, and disciplining your three-months' men, many of whom, it is hoped, will be ultimately found enrolled under the call for three-years' volunteers. Should an urgent and immediate occasion arise meantime for their services, they will be the more effective. I commend these views to your consideration, and shall be happy to hear the result.

With great respect, yours, truly,
Winfield Scott

Scott's desire to coerce the southerners' capitulation instead of taking it by force was due to the fact that he was born in Virginia and he had a great deal of empathy for the South. Many of his family and friends lived in the newly formed Confederacy.

But he had been in the federal army almost his entire life, so he was absolutely devoted to the Union.

"Lincoln immediately seized upon the first two objectives (the blockade and gaining control of the Mississippi) as being plausible and workable," says Dawson.

Scott and Lincoln realized early on that controlling the Mississippi would take a coordinated effort between land forces and the Union's riverine navy. They eventually agreed on achieving their goal by using two armies — one moving from Illinois south and the other capturing New Orleans before moving north.

"Using two armies was good in concept because it would have been more difficult for the Confederates to respond to both threats simultaneously," says Dawson.

Lincoln did not like the third point in Scott's plan — the idea of using a large army in threatening mode.

"He wanted an army that he could use and deploy right away," Dawson notes. "Understanding that they were going to have the two forces along the Mississippi, Lincoln proposed to Scott having two or three other smaller armies to fight in other theaters."

Lincoln vetoed Scott's plans for one large army in favor of his own multiple army approach. His unwillingness to follow Scott's advice caused most of the Union's senior generals to worry about the president's sanity, says Dawson, despite the fact that Scott's proposed force was of a staggeringly unconventional size.

"Keep in mind that the largest armies in American history before 1861 were led by George Washington, who commanded an army of about 14,000 early in the Revolutionary War, and Winfield Scott, who commanded an army of about the same size in the war against Mexico," notes Dawson

In retrospect, Lincoln's decision was probably the better strategic plan. Multiple federal armies in action at the same time in different places made it difficult for the Confederacy to respond to all of the threats.

Throughout the war, the Union sought to exploit its naval and manpower superiority by putting troops around the perimeter of the Confederacy. Federal troops made a half dozen landings in 1862, says Dawson, including one of many attempts to invade Charleston, the capture of Roanoke Island off North Carolina and the fall of New Orleans. Two years later, a very large amphibious Union force laid siege to Mobile Bay (during which Adm. David Farragut uttered the immortal line, "Damn the torpedoes, full speed ahead.")

"Those examples demonstrated the Union's will to deprive the South of sea ports, including Galveston," says Dawson.

By 1860, Galveston was one of the three largest cities in Texas and the state's biggest port. It was also extremely vulnerable to attack because its island location allowed for naval approaches from both the Gulf of Mexico and Galveston Bay. The city's vulnerability apparently escaped the notice of Union leaders in late 1862, after federal troops first occupied Galveston. It was an oversight that proved costly a few months later, during the Battle of Galveston.

As the war began in the spring of 1861, a group of volunteers stationed themselves inside a small wooden cupola on top of the city's tallest structure, the Hendley Building located at 20th and Strand streets, so they could observe activity both in the Gulf and in the bay.

In a log entry dated July 2 of that year, they noted that the first blockading Union vessel, the USS *South Carolina*, had taken up position to intercept merchant ships making runs in and out of the bay.

Just two days later, the *South Carolina* captured six schooners — the *Dart, Shark, Louisa, McCanfield, Venus* and *Ann Ryan*. Within the next six days, Capt. James Alden and his crew captured six more ships, including the *Falcon, Caroline, George G. Baker, Sam Houston, Tom Hicks* and *General T.J. Chambers*.

Alden armed three of his prizes — *Dart, Shark* and *Sam Houston* — manned them with members of the *South Carolina*'s crew and operated the four ships as a blockading task force focusing

on shipping in Galveston Bay and Sabine Pass.

The *Dart* was on its way to rendezvous with the *South Carolina* in Galveston Bay on Aug. 3, 1861, when it passed near the Confederates' South Battery. Rebel gunners opened fire, prompting the *Dart*'s crew to return the favor. The short exchange marked the first shots of the war between a Union ship and Confederate defenders in Texas.

Alden watched the exchange from aboard the *South Carolina* and determined that some form of retaliation against the upstart rebels was in order. He moved his ship to within a mile of the South Battery, hoping to again provoke the shore gunners into firing so he could test the effectiveness of the rebel guns.

Alden got what he wanted, resulting in an 30-minute exchange of shells between the battery and the Union ship before the *South Carolina* moved back to blockading position. The short fight might well have been relegated to the scrapheap of history had not one of the *South Carolina*'s shells exploded near a group of civilians who had gathered to watch the duel. One of the civilians, a Portuguese man named Fisher, had the dubious distinction of becoming the first casualty of the war in Galveston and his death touched off a minor international incident.

The British consul, Arthur Lynn, penned a letter to Alden protesting his bombardment of the city without giving non-combatants time to flee. Eight other foreign consular officers signed Lynn's letter.

Alden responded to Lynn's letter with one of his own, expressing regret for Fisher's death and explaining his reasons for firing on Galveston. He ended his letter a bit sarcastically, writing that he was unaware that Galveston's non-combatants "were under the protection of foreign consuls."

The Union blockade in Texas comprised small blockading actions that stretched from Sabine Pass to the Rio Grande. While the *South Carolina* enjoyed some initial success capturing merchant vessels, the blockade as a whole was not terribly successful, says noted Texas historian Dr. Ralph Wooster.

Kuhn's Wharf pictured in 1861.

"None of those blockades were 100 percent successful in part because the Texas coastline is so long. That worked to the Confederacy's advantage," says Wooster, professor of history at Lamar University. "Overall, the blockade in Texas was in between effective and ineffective, with a little more emphasis on the 'in between' than on 'effective.' If I had to put a number on it, I'd say the blockade was about 40 percent effective. The entire blockade was largely symbolic, but it did affect some of the larger ports because that is where the Union concentrated its efforts."

Blockading ships in Texas hampered the Confederates' ability to move goods to the extent that the Union "forced a lot of cotton to be shipped through South Texas by wagon train, across the Rio Grande to Matamoros, and once it got there it was pretty easy to get out because there was no Union blockade of Mexico," says Wooster.

PHOTO COURTESY ROSENBERG LIBRARY

Corpus Christi: The Union rebuffed

In August 1862, four shallow-draft Union vessels under the command of Lt. J.W. Kittredge sailed into Corpus Christi Bay, beginning one of the more bizarre and comical actions of the war. ✺ Corpus Christi was a small town of about 1,300 whose only real significance was as a hub for agricultural commodities such as wool and cattle. As the Union blockade grew near Galveston and interfered with shipping, Corpus Christi became an import way station for cotton destined to be shipped from Mexico. ✺ It is pure speculation, but perhaps Kittredge intended to stop the flow of cotton through Corpus Christi when he came ashore under a white flag on Aug. 13 to meet with Maj. Alfred M. Hobby, commander of Corpus Christi's defenses. ✺ For reasons lost in history, Kittredge demanded that he be allowed to inspect U.S. government buildings within the town. Hobby, noting that Texas had seceded from the Union, told Kittredge that the United States did not own any buildings in Corpus Christi. ✺ Outraged at Hobby's affront, Kittredge said his forces would attack the town and he gave Hobby 48 hours to evacuate civilians. Hobby did not know it at the time, but Kittredge lacked sufficient troops to hold the town in the event Union forces prevailed, making his threatened attack all the more peculiar. ✺ The Confederate's waterfront battery comprised just two guns, a 12-pounder and an 18-pounder, positioned behind old breastworks built by Zachary Taylor's army during the 1840s. ✺ Kittredge, who was aboard the USS *Corypheus*, viewed the battery as enough of a threat that he sent a landing party comprising 30 men with a 12-pounder of their own to flank the rebel artillery. In an omen of things to come, the flanking force was turned back by a cavalry charge of 25 men led by Hobby. ✺ The Union flotilla moved out of range of the battery's smooth bore guns and opened fire with its rifled guns, which provided more accurate, longer-range firepower. ✺ In a January 2000 article about the battle, writer Murphy Givens recounted that a Union shell hit a warehouse storing animal hides near the waterfront. The explosion sent pieces of hides flying into the air, prompting a man fleeing the scene to yell, "My God, they're shooting goat skins at us!"

On Aug. 18, the Union flotilla sailed south along the shoreline firing random shots as it left. Casualties numbered one rebel soldier killed and one Union sailor injured — by a wooden splinter.

Civilians who had heeded Kittridge's warning to leave Corpus Christi returned to find the town pretty well shot up. As Givens wrote, "The Corpus Christi Lighthouse on the bluff was demolished. Cornices were knocked off buildings. Exploding shells killed a cow, a Newfoundland dog and a mule named Sweetheart. One resident found his old gray tomcat with his head swollen to twice its natural size and one side of it skinned like he had rubbed up against a buzz saw. A cuckoo clock from Germany owned by the Petzels was ruined and a cannonball had whizzed along the shelf of a saloon, breaking its whiskey bottles."

Givens also dug up what has to be considered one of the more remarkable stories that emerged from the battle. Following the fight, Corpus Christi residents found unexploded cannonballs all over the city. Since the Confederacy was short of gunpowder, they tried to salvage the explosive inside the shells.

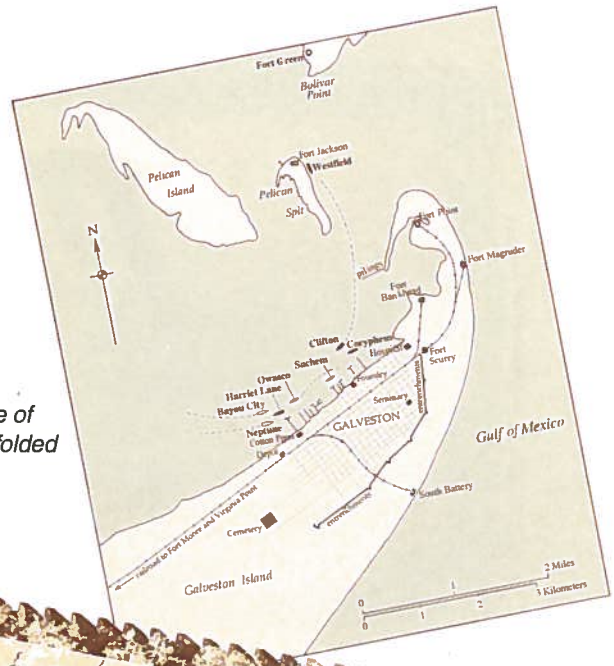
"But to their surprise they found what smelled like bourbon in some of the shells," Givens wrote. "They thought it was a trick; perhaps the diabolical Yankees had poisoned the whiskey. But after a few cautious sips, they began to drain all the cannonballs that had liquid contents.

"Some weeks later, on Sept. 12, Kittredge was captured at Flour Bluff. He made the mistake of going ashore to trade coffee and sugar for buttermilk. When he was brought to Corpus Christi, the town he had so recently shot up, he met Maj. Hobby and was told about the whiskey-filled shells.

"Kittredge, it was said, told Hobby that a barrel of bourbon kept for the captain's mess had been stolen; he had been unable to find where it was hidden, but men coming off the dogwatch sometimes smelled like they were returning from a tavern. The sailors, he said, must have emptied some of the cannonballs of gunpowder and refilled them with whiskey, to await their turn at night duty. When the bombardment started, they had been sadly forced to fire their whiskey-filled shells at the Confederates."

Other accounts of the battle's aftermath report that Kittredge and the *Corypheus* were patrolling the Upper Laguna Madre on Sept. 14 when he noticed activity onshore at Flour Bluff. Kittredge and seven men went ashore to investigate and were captured by a rebel force led by Capt. John Ireland.

Kittredge and his men were eventually paroled by their captors and returned to the North. The *Corypheus*, on the other hand, had another date with failure in Galveston Bay.



A map of the Battle of Galveston as it unfolded on Jan. 1, 1863.

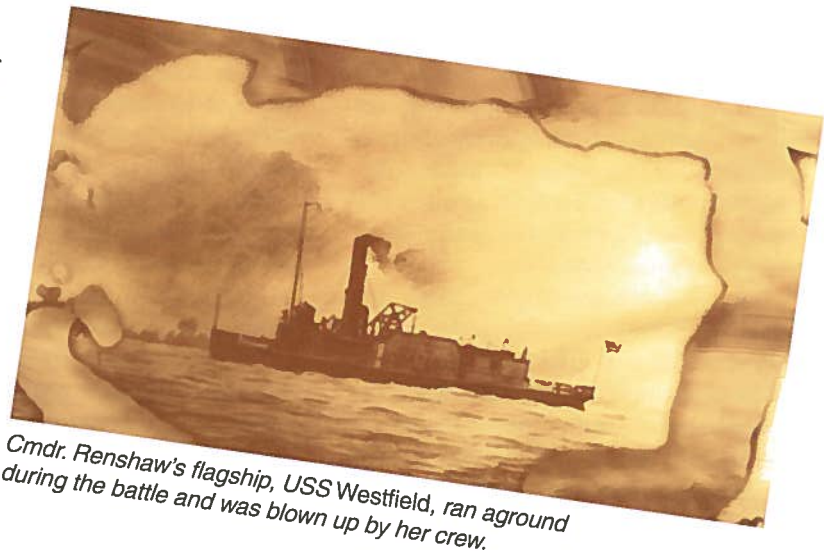
A chart of Galveston Bay originally printed in Harper's Weekly in June 1863.

Union ships fire on rebel positions.

TOP MAP COURTESY TEXAS STATE HISTORICAL ASSOCIATION; CENTER MAP COURTESY U.S. NAVAL HISTORICAL CENTER; DRAWING COURTESY ROSENBERG LIBRARY

Battle of Galveston

Galveston's shore batteries and the Union blockaders exchanged volleys from time to time during the first year of the blockade, but the Union made no attempt to capture the city. ✺ That changed in May 1862, when Capt. Henry Eagle of the USS *Santee* sought to probe the rebel defenses by sailing into Galveston harbor and demanding the city's surrender. ✺ Maj. Gen. Paul Hebért, commander of Texas' Confederate forces, believed the demand to be a bluff, calculating that Eagle did not have sufficient troops to take the town. He rejected Eagle's call, but not before taking the precaution of ordering the city's civilians, livestock and surplus supplies evacuated. ✺ Herbért's intuition proved correct, but Eagle's threat proved a wake-up call for state leaders. New Gov. Francis Lubbock wanted Texas' second largest city prepared to ward off a Union invasion, but Hebért knew that Galveston's island location — exposed to naval bombardment from two sides — made the city indefensible to a concerted Union attack. ✺ Hebért eventually ordered most of his army and all but one of his heavy cannons removed to the Texas mainland, leaving the island very lightly defended. ✺ On Sept. 19, Rear Adm. Farragut ordered Cmdr. William B. Renshaw of the USS *Westfield* to lead a flotilla down the Texas coast and, where possible, gain control of inland navigation. ✺ The flotilla arrived off Galveston in early October 1862 and, on Oct. 4, Renshaw dispatched Cmdr. Jonathan M. Wainwright and the USS *Harriet Lane* to secure the city's surrender. Flying under a flag of truce, the *Harriet Lane* entered Galveston Bay and dropped anchor so Wainwright could go ashore and deliver an ultimatum: Either the rebels surrender within the hour or the Union Navy would attack the city. ✺ The rebels either did not see or purposely ignored Wainwright's signal for a boat from shore to come out to meet his ship. Seeing the lack of progress, Renshaw ordered the USS *Clifton* and *Owasco* to accompany the *Westfield* to the *Harriet Lane*'s anchorage. As the three ships entered the bay, the rebel battery at Fort Point (on the extreme northern end of the island) opened fire.



Cmdr. Renshaw's flagship, USS Westfield, ran aground during the battle and was blown up by her crew.

RENDERING COURTESY U.S. NAVAL HISTORICAL CENTER

The Westfield *is blown up as most of her crew rows to safety. Cmdr. Renshaw was killed when the ship exploded prematurely.*

The three Union gunboats answered with heavy fire of their own, sending the rebel gunners fleeing from their position.

The *Westfield* anchored near the *Harriet Lane* and raised a second flag of truce. This time, two Confederate officers sent by the rebel commander, Col. Joseph J. Cook, sailed out to meet Renshaw, who demanded the city's unconditional surrender within the hour.

The rebels countered by requesting a four-day truce so they could evacuate all of the women and children to the mainland. After that, they would surrender the city. Renshaw agreed so long as the rebels promised not to increase their defenses and to leave the city just as it was at that time.

Both sides appeared happy with the terms, but Renshaw failed to put anything into writing. That came back to haunt him as the rebels proceeded to remove a few more pieces of artillery before turning the city over to the Union.

When confronted by Renshaw, the Confederates claimed they were acting in good faith and had misunderstood Renshaw's instructions. Renshaw gave the rebels the benefit of the doubt in part because a yellow fever epidemic was spreading through Galveston and he did not want to risk exposing his troops by sending them ashore to seize the weapons.

As the American flag was raised over the Galveston customs house, Renshaw withdrew his forces from the bay. In truth, he had too few troops to occupy the city. Before leaving, Renshaw and the rebel leaders reached a gentlemen's agreement that neither side would try to occupy the city, thus sparing the remaining citizens from gunfire and protecting troops from yellow fever.

Both Renshaw and Cook knew the situation was temporary at best.

Less than a week later, Gen. John B. Magruder took command of Confederate troops in Texas, including Cook and his now displaced force. Magruder's first priority was to wrest control of Galveston harbor from the Union, and to reoccupy the city and its port.

Union ships held Galveston Harbor until three companies comprising 264 men of the 42nd Massachusetts Infantry, led by Col. I. S. Burrell, arrived on Christmas Day 1862. The soldiers were the first part of a larger force that been dispatched to Galveston by Gen. Nathaniel P. Banks to protect citizens who were still loyal to the Union and to recruit soldiers there.

Renshaw suggested that Burrell land his men at Kuhn's Wharf, located near what is now Pier 16, and quartered them in a warehouse.

The remaining seven companies of the 42nd Massachusetts, a cavalry outfit and an artillery battery were scheduled to arrive in Galveston sometime after the New Year. Even counting the expected reinforcements, the Union "made a serious error by not realizing that the island was so vulnerable," Dawson contends. "It continued to be vulnerable and was too lightly protected after the federal forces had their initial success there. This weakness heightened the island's vulnerability and encouraged the southerners to make a really remarkable and determined effort to regain control of the island, which they did.

"A force of 2,000 men, hypothetically, would have appeared formidable and I think would have greatly discouraged the Southerners from even trying to recapture the city," Dawson believes.

The Union was well aware of Galveston's importance as a port and a jumping off point for sending troops into the state's interior. About 44 years earlier, in 1818, U.S. Secretary of War George Graham had visited Galveston (for the purpose of expelling the pirate Jean Laffitte) and wrote of the island's strategic significance to then-

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Rebel troops aboard the cottonclad CSS Bayou City *(at right) prepare to ram and capture the USS* Harriet Lane.

Secretary of State John Quincy Adams.

"Galveston is in a position of much more importance than the government has hitherto supposed," Graham wrote Adams. "It is the key to the greatest and best part of the province of Texas and the possession of it is indispensably necessary for the suppression of the most extensive system of smuggling that has ever been carried on in the United States, and which from the nature of the adjacent country can never be checked while Galveston is occupied by any other authority than that of the United States."

Dawson believes that in addition to underestimating Galveston's vulnerability, federal leaders also underestimated the rebels' drive and determination.

Magruder knew his forces could not retake Galveston without the support of Confederate gunboats but none were available, so he made his own. He bought two small river steamers, the *Neptune* and *Bayou City*, and ordered them converted to warships in the shipyards at Houston.

Both boats were too light to carry heavy metal armor, which was also expensive and hard to find in Texas, so Magruder decided to armor his ships with 500-pound bales of cotton stacked on the decks, earning them the nickname "cottonclads." The densely packed bales could stop most small arms fire and offer moderate protection to the crew.

The ships were fitted with a few army field artillery pieces, but their most important modifications turned out to be firing platforms constructed for sharpshooters. Magruder found expert marksmen for both ships among the ranks of Sibley's Brigade. Gen. Henry H. Sibley had commanded the brigade on a mission to extend the Confederacy all the way to the Pacific Ocean.

The campaign did not make it past New Mexico.

Following two battles and two dismal defeats, Sibley's brigade returned to San Antonio humiliated. Not surprisingly, the brigade's leaders jumped at the chance to let their men redeem themselves in battle.

By New Year's Eve 1862, the USS *Sachem* and *Corypheus* had left Corpus Christi and joined the blockade at Galveston, giving the Union a vastly superior naval advantage over the Confederacy.

The rebels owned the advantage on land. Magruder had amassed about 2,000 men and, knowing of the expected Union reinforcements, decided to attack before the troops arrived.

Magruder moved his infantry across a railroad bridge that linked the island to mainland Texas and positioned them just outside the city. In the early morning hours of Jan. 1, 1863, the two rebel gunboats — sharpshooters in place — left Houston for Galveston harbor.

At about 4 a.m., Magruder's artillery opened fire on the Union fleet while a portion of his infantry attacked the federal troops at Kuhn's Wharf. The *Westfield*, the most heavily armed of the Union gunboats, steamed up the channel to support the ships that had already begun to return fire, but she ran aground on Pelican Island and remained there throughout the battle.

The rebels' ground attack was not going as planned and might have been lost had it not been for the Confederate cottonclads.

"The ground attack seemed to be floundering when the two Confederate warships sailed into the bay and opened fire," Wooster explains. "That caused so much panic among the Union forces that the Union Navy pulled out, leaving the ground troops stranded.

"There were only two Confederate gunboats used against the Union Navy but the men on them were pretty audacious," says Wooster. "They had some good luck in some of their shots against the Union vessels. And there was no coordination

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between the Union naval force commander and the army commander, and it showed when the attack came. They didn't fight a very coordinated defense.

"The Union leaders had a system of signals they could have used to coordinate their defense. It was not highly sophisticated but it was still workable. As far as I can determine, they didn't really have any plans as to what they were going to do if they were attacked. I don't believe they seriously thought they were going to be attacked."

The *Neptune* and *Bayou City* engaged the closest Union warship — the *Harriet Lane* — and attempted to ram her from each side. *Bayou City*, which was slightly ahead of *Neptune*, managed only a glancing blow on the *Harriet Lane* as the Union vessel maneuvered to take the blow head-on. The *Bayou City* took the worst of the collision, losing part of its wheelhouse and damaging its propulsion system.

Amidst the confusion of the attack, the *Harriet Lane* ran aground in the mud and was forced to set anchor. The *Neptune* continued its charge and, despite taking a hit from the *Harriet Lane*'s guns that scattered cotton bales and killed a number of sharpshooters, rammed the Union ship hard.

The *Neptune* then came under heavy fire from other Union gunboats and took several crippling hits. With water pouring in through the numerous holes in her hull, the *Neptune* headed for shallow water near the port and sank.

Seeing one Confederate ship sinking and the other crippled, the crew of the *Harriet Lane* let out a cheer. Perhaps angered by the premature celebration, the crew of the *Bayou City* cleared her damage and again charged the Union ship.

Bayou City's sharpshooters laid down blistering fire that drove the *Harriet Lane*'s crew below decks. With a deafening crunch, the *Bayou City* hit the *Harriet Lane* in the port paddle wheel with so much force that the Union ship heeled over.

Rebel sharpshooters quickly boarded the ship, overpowered the remaining crew (including killing Cmdr. Wainwright) and claimed the *Harriet Lane* as a Confederate prize.

The remaining Union ships, particularly the *Owasco*, tried to recapture the *Harriet Lane*, but the rebel sharpshooters again opened up with withering gunfire. His gun crews dropping left and right, the captain of the *Owasco* ordered the ship's engines reversed and he backed out of the sharpshooters' range.

With the *Westfield* grounded, the *Harriet Lane* captured and the rest of the fleet in retreat, an eerie silence settled over Galveston Bay. Bold rebel leaders seized upon the opportunity and called for the surrender of the rest of the Union fleet.

The naval portion of the battle had lasted a little more than an hour.

Both sides agreed to a three-hour truce ostensibly so Renshaw and his subordinates could consider the rebel demand, but the Union commander had no intention of surrendering his fleet. He ordered his remaining ships to leave the bay as quickly as possible and then he set about blowing up his disabled flagship to keep it out of enemy hands.

As the truce period came to an end, several Confederate officers boarded an open boat and set off toward the Union fleet to close the surrender negotiations. They never got the chance to speak with Renshaw or any other Union officer. At about 10 a.m., the charges that Renshaw ordered placed on the *Westfield* exploded prematurely — before Renshaw and several members of his crew could row clear of the vessel. They were all killed.

The rest of the Union fleet escaped in the ensuing chaos, although the ships did not need the diversion. The rebels had no vessels capable of chasing them down and capturing them.

At Kuhn's Wharf, the Union infantry had been doomed by the navy's pullout. Burrell surrendered and quietly led his men down the Strand and into town.

The Confederacy had recaptured Galveston at a cost of 26 dead and 117 wounded. Union losses were about twice that.

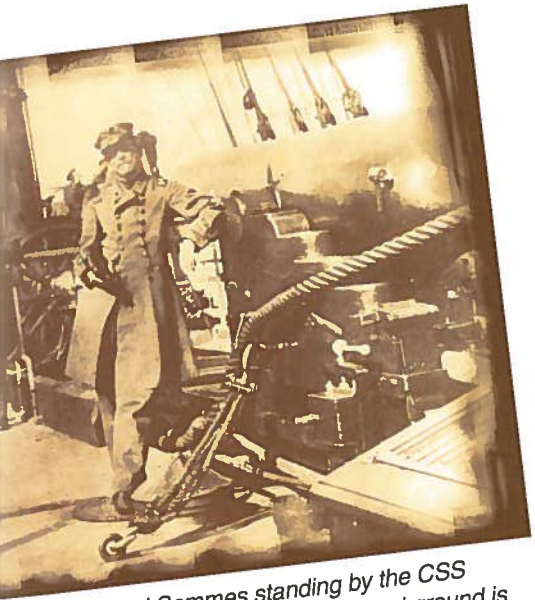
After the federal government lost control of Galveston, they essentially wrote it off, although they resumed the blockade a week later. The newest blockading fleet was led by the 24-gun steamer USS *Brooklyn* and included battle survivor *Owasco* and the five-gun side-wheel paddleboat USS *Hatteras*.

Just three days later, the *Hatteras* would lie at the bottom of the Gulf of Mexico.

CSS Alabama as drawn by RADM J.W. Schmidt

CSS Alabama vs. USS Hatteras

During the late afternoon of Jan. 11, 1863, Commodore Henry Bell aboard the *Brooklyn* received a report that a merchant ship was cruising toward his fleet's position. ✺ Believing the ship to be a blockade-runner bound for Galveston, Bell sent Capt. H.C. Blake and the *Hatteras* to investigate. ✺ The sun began to set as the *Hatteras* sailed from Galveston Bay into the Gulf of Mexico. At the site of the *Hatteras*, the mystery ship turned tail and fled into the approaching darkness. The Union crew steeled themselves for a prolonged chase. They could tell by their prey's sleek lines and trimmed rigging that it was fast and might be difficult to catch. ✺ The crew had no way of knowing that by pursuing the ship they were doing exactly what the captain of the Confederacy's greatest commerce raider wanted them to do. ✺ The CSS *Alabama* was a purpose-built warship designed to hunt commercial ships, and she did it in devastating fashion. During her 22-month commission, the *Alabama* traveled 75,000 miles and captured 66 Union merchant ships worth more than $6.5 million. ✺ The *Alabama* was a 1,050-ton steam sloop-of-war built for the Confederate Navy in 1862 by John Laird Sons and Co. in Liverpool, England. Launched as the *Enrica*, she left England disguised as a merchant ship. At sea under Capt. Raphael Semmes, she rendezvoused with supply ships, was outfitted as a gunboat and commissioned on Aug. 24, 1862, as CSS *Alabama*. ✺ The *Hatteras* was a 1,126-ton side-wheel steamer that was constructed at Harland & Hollingsworth Co. in Wilmington, Del., in 1861 as a civilian merchant vessel named the *St. Mary's*. She was purchased by the U.S. Navy in September 1861 and converted into a gunboat during the same year. ✺ She was commissioned in October 1861 and during the next 15 months she enjoyed relative success against rebel blockade runners. In early January 1862, the *Hatteras* raided Cedar Keys, Fla., destroying seven Confederate blockade runners and part of the harbor's facilities.



Capt. Raphael Semmes standing by the CSS Alabama's 100-pdr rifle gun. In the background is Lt. J.M. Kell.

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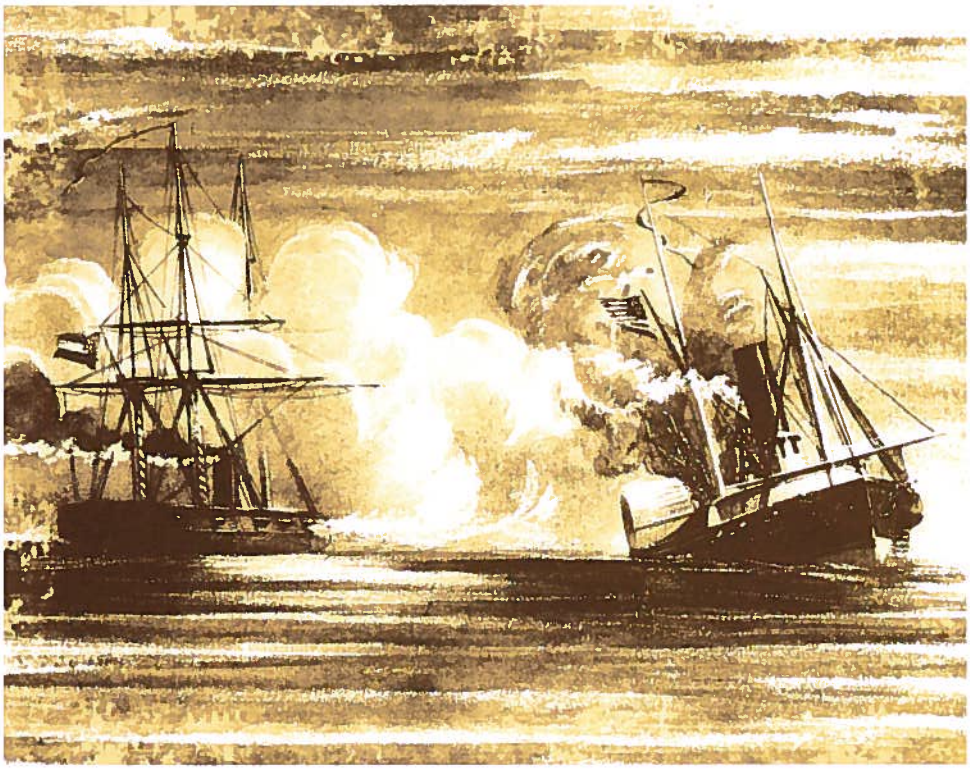
Throughout that year she successfully captured several Confederate steamers and sailing vessels including the *Poody*, which was taken as a prize and renamed the USS *Hatteras Jr.*

The *Alabama* was raiding commercial ships near the coast of South America in December 1862 when Semmes read a newspaper account of a planned Union invasion of Texas through Galveston.



The CSS Alabama *(left) fires on the already mortally wounded USS* Hatteras *off the coast of Galveston.*

Semmes figured that the Union troop transports would reach Galveston about Jan. 10. Seizing a chance to use his vessel as a true warship, he set sail for Texas on a schedule that he hoped would find the transports lightly guarded in Galveston Bay the next day.

As the *Alabama* approached Galveston, a lookout aboard the *Brooklyn* spotted her and sounded the alarm.

One of the *Alabama*'s boarding officers, George Townley Fullam, described in his journal how his ship then lured the *Hatteras* away from the Union fleet and sank her:

Sunday. 11th. [January 1863] Fine moderate breeze from the eastward. Read Articles of War. Noon. 18 miles from Galveston. As I write this, some are discussing the probabilities of a fight before morning. 2.25 p.m. Light breeze. Sail discovered by the lookout on lee bow shortly after three, and at last five vessels were seen, two of which were reported to be steamers. Everyone delighted at the prospect of a fight . . . 4 p.m. A steamer reported standing out from the fleet towards us. Backed maintopsail and lowered propeller. 4.50 Everything reported ready for action. Chase bearing N.N.E. dist. 10 miles. Twilight set in about 5.45. Took in all sails. At 6.20 beat to quarters, manned the starboard battery, and loaded with five-second shell, turned round and stood for the steamer, having previously made her out to be a two masted side wheel steamer of apparently 1200 tons, tho (sic) at the distance she was just before dark, we could not form any correct estimate of her size. At 6.30 the strange steamer hailed and asked "What steamer is that?" We replied, (in order to be certain who he was) Her Majesty's Steamer "Petrel!" *"What steamer is that?" Two or three times were asked the question, until we heard "This is the United States Steamer ..., not hearing the name. However, United States was sufficient. As no doubt existed as to his character, we said at 6.35 that this was the "Confederate States Steamer* 'Alabama'" *accompanying the last syllable of our name with a shell fired over him. The signal being given, the other guns took up the refrain, and a tremendous volley from our whole broadside given to him, every shell striking his side, it, the shot, striking being distinctly heard on board our vessel, and thus found that she was iron. The enemy replied, and the action became general. A most sharp spirited firing was kept up on both sides, our fellows peppering away as though the action depended upon each individual. And so it did. Pistols & rifles were continually firing from our quarterdeck, messengers most deadly. The distance during the hottest of the fight, not being more than 40 yards! Twas a grand though fearful sight to see the guns belching forth, in the darkness of the night, sheets of living flame, the deadly missiles striking the enemy with a force that we could feel. Then, when the shells struck her side, and especially the percussion ones, her whole side was lit up and showing rents of five or six feet in length. One shot had just struck our smokestack and wounding one man in the cheek, when the enemy eased his firing, and fired a lee gun, then a second, and a third, the order was then given to "Cease firing." This was at 6.52. A tremendous cheering commenced and it was not until everybody had cleared his throat to his own satisfaction that silence could be obtained. We then hailed him, and in reply, he stated that he had surrendered was on fire and also that he was in a sinking condition. He then sent a boat on board and surrendered the U.S. Gunboat Hatteras, 9 guns, Lieut. Commr. Blake, 140 men.*

The *Hatteras* had pursued the *Alabama* for four hours before being ambushed. The battle lasted a frantic 40 minutes. As the *Hatteras* began to sink, her crew was taken prisoner aboard the *Alabama* and then released at Port Royal, Jamaica.

After sinking the *Hatteras*, the *Alabama* moved into the South Atlantic, stopped at Cape Town, South Africa, and went on to the East Indies, where she seized almost 40 more merchantmen during the remainder of the year.

Admired among Confederates for his daring, Semmes was viewed as a pirate

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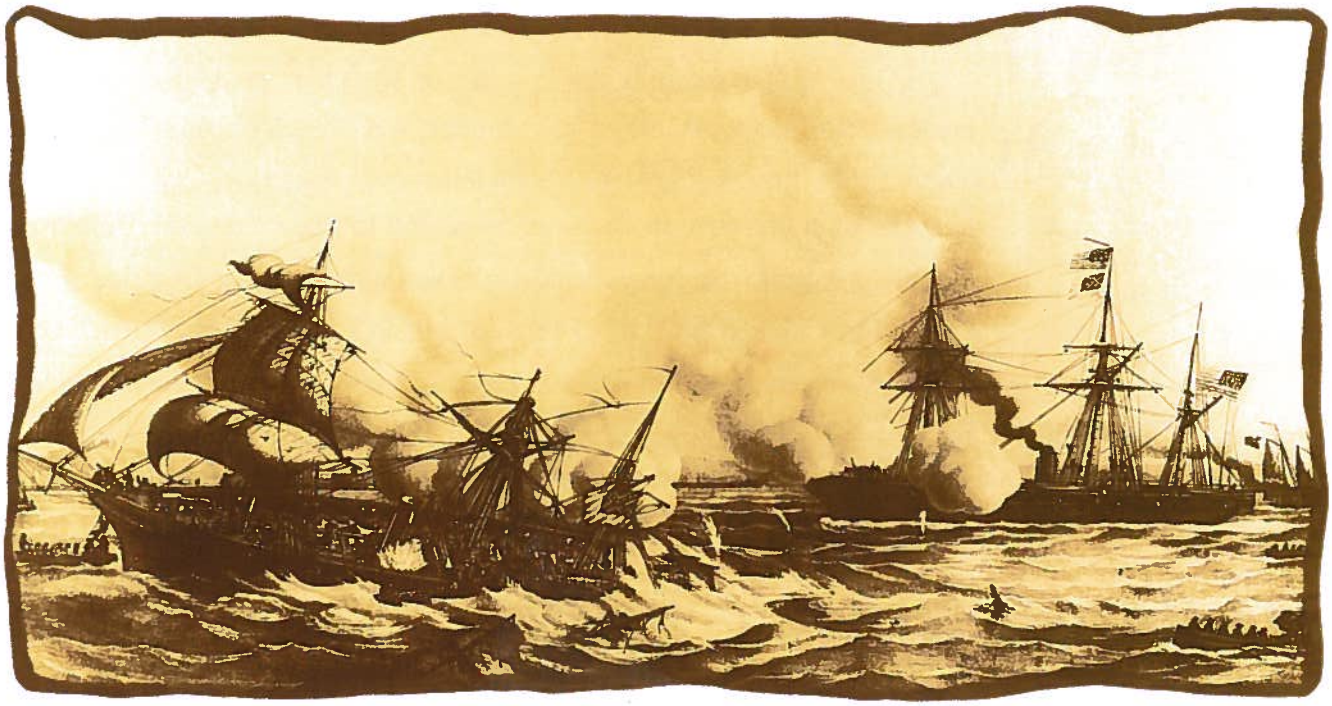


The USS Kearsage *(right) fires a volley during her victorious battle with the* Alabama *off the coast of Cherbourg, France, on June 19, 1864.*

by the Union. U.S. Navy Secretary Gideon Welles made his capture a top priority.

On June 11, 1864, the *Alabama* arrived in Cherbourg, France, and Semmes requested permission to dock and overhaul his ship. The United States' minister to France learned of the *Alabama*'s arrival and quickly sent a telegraph to Captain John A. Winslow aboard the warship USS *Kearsage*, which was lying at anchor in the Scheldt, off Flushing, Holland.

The *Kearsage* arrived outside Cherbourg Harbor three days later and took up patrol, her intentions clear to all. She was there to sink the *Alabama*.

The crew of the *Kearsage* believed that the *Alabama* would attempt an escape. She was built to take on merchant ships, not well-armed warships, and during the past two years she had made a reputation escaping Union foes.

Perhaps emboldened by his victory over the *Hatteras*, Semmes sent a message to the Confederacy's representative in France, asking him to let the United States' representative know that Semmes had no thoughts of running:

SIR: I hear that you were informed by the U.S. Consul that the Kearsage *was to come to this port solely for the prisoners landed by me, and that she was to depart in twenty-four hours. I desire you to say to the U.S. Consul that my intention is to fight the Kearsarge as soon as I can make the necessary arrangements. I hope these will not detain me more than until tomorrow evening, or after the morrow morning at furthest. I beg she will not depart before I am ready to go out.*

I have the honor to be, very respectfully,

Your obedient servant,
R. SEMMES, Captain

On the morning of June 19, the *Alabama* steamed out of Cherbourg Harbor escorted by the French ironclad *Couronne*, which remained in the area to ensure that the combat remained in international waters. As the *Alabama* approached, the *Kearsarge* steamed further to sea, to ensure that her foe could not easily return to port.

At about 11 a.m., Winslow turned the *Kearsage* around and set a course for his opponent. The *Alabama* opened fire a few minutes later, at a distance of about a mile, and continued to fire as the ships moved closer. The *Kearsage* began firing when she closed to within about a half-mile of the *Alabama*. Through a series of maneuvers, both ships tried to gain the best firing position.

The *Kearsage*'s gunners proved to be superior to the *Alabama*'s, and after an hour-long battle the rebel raider began to sink. Semmes tried to run back toward Cherbourg, but Winslow cut off the retreat. Rising water eventually stopped the *Alabama*'s engines, and Semmes struck his flag, signaling an end to the fight.

As the *Alabama* sank, most of her crew was rescued by the *Kearsage* and by the British yacht *Deerhound*. Those saved by the *Deerhound*, including Semmes and most of his officers, were taken to England.

Once more, Semmes had escaped federal capture.

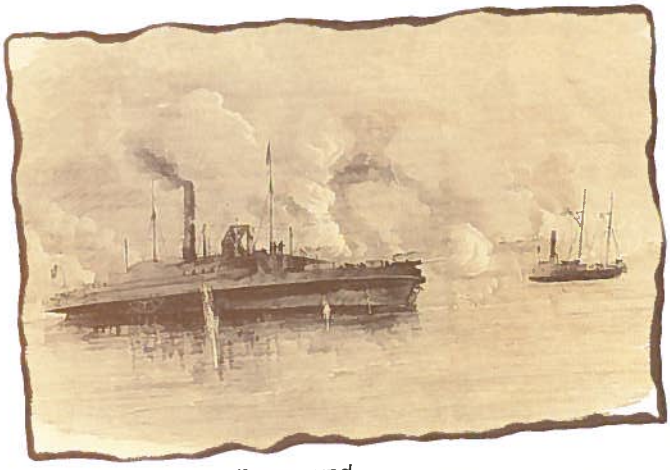
In an interesting footnote to history, the *Alabama* did not enter a single Confederate port during her nearly two years afloat, which may have doomed her in the end. She was in desperate need of an overhaul and her hull needed to be scraped. Much of her gunpowder was wet or old and she suffered from other problems that prevented her from fighting as well as she could in her prime.

The *Alabama* was at sea for 534 of the 657 days of her life and her crew took 2,000 prisoners with no loss of life.

A number of Confederate and Union ships were lost in state coastal waters during the war, but the *Hatteras* has the distinction of being the only U.S. warship sunk in the open Gulf of Mexico.

The loss of Galveston on the first day of 1863 hurt the Union more than its leaders could know. Within a few months, the French occupied Mexico with about 35,000 troops. President Abraham Lincoln desperately wanted the Union to establish a presence in Texas as a warning to France that the United States would not tolerate the European power violating the Monroe Doctrine. ✺ Union General-in-Chief Henry Halleck related Lincoln's wishes to Maj. Gen. Nathaniel P. Banks in New Orleans in a letter dated Aug. 6, 1863: ✺ *There are important reasons why our flag should be restored at some point of Texas with the least possible delay. Do this by land at Galveston, at Indianola, or at any other point you may deem preferable.* ✺ Banks wasted no time in developing a plan that called for a joint navy-army force to sail up Sabine Pass — the lightly guarded Gulf outlet for the Sabine River that also serves as the boundary between Louisiana and Texas. ✺ The pass was divided into two distinct channels by an oyster reef in the middle of the pass. ✺ Under Banks' plan, the Union Navy would provide artillery fire against any Confederate defenses while infantry units established a foothold at Sabine City, on the western side of the pass. From there the infantry would take control of the railroad lines that ran from Sabine City to Beaumont and from Beaumont to Houston. ✺ The Union Army could use the railroad lines to push into Houston and then capture Galveston with an attack from the mainland. Caught between blockading ships in the bay and advancing troops on the mainland, Galveston would be squeezed into submission by a miniature version of the Anaconda Plan. ✺ With control of Houston, Galveston and Beaumont, Union forces could launch a campaign up the Sabine River against cotton-rich East Texas and western Louisiana, effectively isolating Texas from the rest of the Confederacy. ✺ Banks and other Union leaders did not expect much resistance from rebel defenders at old Fort Sabine, overlooking Sabine Pass. One year earlier, in September 1862, a federal raiding party led by Acting Master Frederick Crocker easily bypassed the fort and terrorized Sabine City. The soldiers destroyed the town's steam sawmill and burned the railroad bridge to Beaumont over Taylor's Bayou before returning to their boats. ✺ "I think that raid played a part in making them feel that they could easily overpower the fort," Wooster says.

Battle of Sabine Pass



The USS Sachem *(foreground and the USS* Clifton *return cannon fire during the Union's futile attempt to invade Sabine Pass. Both ships were put out of commission and captured by rebel forces.*

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Between March and August 1863, Confederate engineer Maj. Julius Kellersberger directed construction of Fort Griffin upriver from the site of old Fort Sabine. Triangular in shape with slanted walls 12 feet high and 100 feet long, the new fort guarded the Pass with six cannons manned by Company F of the First Texas Heavy Artillery, better known as the "Davis Guard." The unit comprised 46 men, all of them Irish dockworkers from Houston.

They were led by a popular Houston saloonkeeper, Lt. Richard W. "Dick" Dowling.

Confederate engineers drove marker posts in the oyster reefs 1,200 yards from Fort Griffin to mark the guns' maximum range. During the month of August, Dowling used a sunken schooner as a target to further hone his gunners' skills.

Back in New Orleans, Banks authorized Gen. William B. Franklin to load 4,000 men, various artillery pieces and cavalry onto 18 transports under the escort of four gunboats commanded by the aforementioned Frederick Crocker, now a lieutenant.

The fleet set sail on Sept. 5 accompanied by the gunboats *Arizona*, *Granite City* and — as if an omen of things to come — Battle of Galveston survivors *Sachem* and *Clifton*.

Of the four, the *Clifton* was the most heavily armed vessel. Lightly armed or not, the other three ships were the only ones available with draughts small enough to cross the bar into Sabine Pass.

The task force arrived just off Sabine Pass on Sept. 7. At about 8 a.m. the next morning, the four gunboats crossed the bar and entered Sabine Pass. For the next 90 minutes they bombarded Fort Griffin from a distance of three miles, testing the rebel defenses.

Dowling and his men waited out the initial bombardment inside a type of bomb shelter called a "bomb proof" under the fort. The rebel artillery could not match the range of the Union guns, so Dowling had decided in advance that his men would play possum to lure the gunboats closer.

Crocker was uncertain how to interpret the lack of return fire from the fort, so the gunboats held their position through the morning and into the early afternoon.

Dowling's men remained secreted in their bomb proof throughout the day. Only Dowling, armed with a spyglass to keep track of Union activity, was above ground.

At about 2:30 p.m., Dowling spotted black smoke pouring out of the gunboats' smokestacks, indicating that they were getting under way. The *Sachem* led the advance up the eastern channel on the Louisiana side of the pass, followed by the *Arizona*. The *Clifton* made its way up the western side of the pass, abreast and a little behind the *Sachem*, and the *Granite City* followed. All four gunboats fired their weapons at Fort Griffin as they approached, but the Davis Guard held their fire until the *Sachem* passed the 1,200 yard markers in the oyster reef.

Dowling's men had prepared their guns well. Each one was already loaded and primed and there was a good supply of premade powder charges and cannonballs at each battery. When all six guns finally opened fire on the *Sachem*, they pummeled the Union gunboat with astoundingly accurate shots that were matched in effect only by their frequency.

The *Sachem* soon took a direct hit to her boiler and ran aground. Fort Griffin's guns then trained on the *Clifton* with similar result. Rebel gunners continued to pound the two ships until their captains struck their flags and surrendered.

The *Arizona* and *Granite City* fled the pass. Gen. Franklin decided the defenses at Fort Griffin were too formidable to risk landing his troops, so he ordered his fleet to return to New Orleans.

The surrender of the *Clifton* and *Sachem* left Dowling with a big problem: There were just 47 Confederate soldiers available to accept and guard 350 prisoners. His problem was complicated by the fact that his men were exhausted. In the span of 40 minutes they had managed to fire about 135 shells.

Fortunately, Gen. John Magruder had dispatched reinforcements to Sabine Pass hours earlier when he first learned of the Union fleet's presence.

As a result of the rebel victory, the ports of Houston and Beaumont escaped destruction and Union forces never penetrated the Texas interior during the Civil War. In recognition of their effort, the Confederate States' Congress authorized a special medal to be given to each man in the Davis Guard. Paid for and cast by the citizens of Houston, these were the only medals presented to Confederate soldiers during the war.

Their heroics led Confederate President Jefferson Davis to observe, "There is no parallel in ancient or modern warfare to the victory of Dowling and his men at Sabine Pass considering the great odds against which they had to contend."

What was the point?

The entirety of Union losses in Texas were damaging to the Union when they happened, says Wooster.

"It meant that they were not going to occupy Texas," he says.

The impacts on both sides were probably greater from a psychological standpoint at the time, but they've faded greatly during the past 140 years.

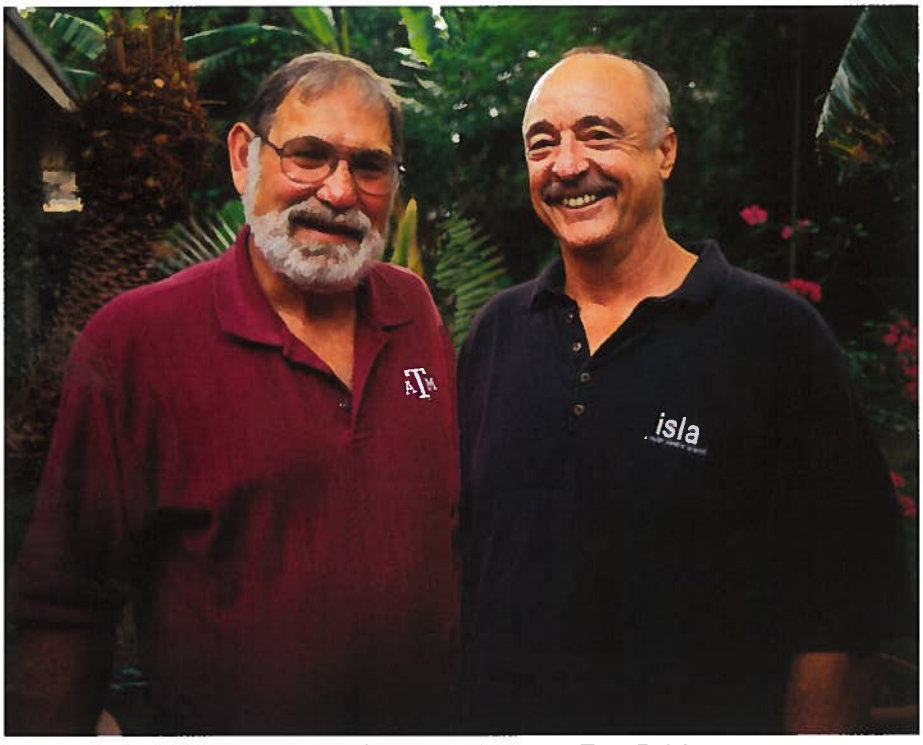
"The Battle of Sabine Pass apparently had an affect on the New York Stock Market, or at least it was so reported in Northern newspapers," says Wooster. "Anytime you lose it has some psychological impact on you, but I would not be honest if I tried to pretend that Texas was part of the main theater in the war.

"It made Texans feel good that they could repel the Union, but whether that really had significant bearing on our culture today is certainly questionable."

Why, then, do libraries dedicate shelf space to books that take hundreds of pages to examine Texas' Civil War battles in great detail?

Because they tell stories that go to the core of the indomitable human spirit.

"There may be a theme there if you look at Rip Ford, Dick Dowling and John Magruder, who redeemed himself at Galveston. He had been sort of a black sheep of the Confederate officers corps but he came through in his design of a counterattack at Galveston," says Dawson. "Part of that theme might be the extraordinary leadership, effort and determination — inspirational qualities that drove the Texas forces to go beyond what the Union expected of them." ■



Gary Graham (left) and Cameron County marine agent Tony Reisinger.

Coastal Legend: Gary Graham

An Attitude of Gratitude

By Jim Hiney

Almost 10 years ago, the specialists and county marine agents of the Texas Marine Advisory Service were sitting around a conference table in Galveston taking turns talking about their accomplishments during the past year and the projects they planned to tackle in the coming 12 months.

The man leading the discussion, Dr. Russ Miget, nodded toward a mostly gray bearded figure seated near the center of the table and simply said, "Graham."

Fisheries specialist Gary Graham arose slowly and his stern look made it clear that he was not pleased.

"Look," he said firmly, "my name is not 'Graham.'"

"I'm sorry, Gary," Miget said apologetically. "What should I call you?"

"Professor," said Graham, who remained straight faced for a few moments longer while the rest of the group broke into laughter.

The remark was vintage Graham and captured well two sides of a man who has spent more than three decades absorbed in Texas' commercial fishing industry.

His legendary sense of humor let him make light of his recently earned elevation in status to a title coveted and sometimes treated as hallowed by academicians. The title itself — professor of wildlife and fisheries sciences at Texas A&M University in College Station — is a testament to Graham's high standing and respect within the academic community, and the expertise he has gained through a lifetime dedicated to coastal fisheries.

As far as anyone can determine, Graham is the only full professor at Texas A&M who has earned only a bachelor's degree.

"It is a remarkable thing that Gary has developed respect in his field as a fishery biologist without the usual academic trappings," says Dr. Sammy Ray, Graham's longtime friend, hunting buddy and himself a professor emeritus of marine biology at Texas A&M-Galveston.

"Gary is a highly respected fisheries specialist based on actual experience — his knowledge of the fishery and his knowledge of the culture of the fisherman — and he has done all of this by learning it through being immersed in the industry and not through academic training. He learned it the hard way," continues Ray, a member of the Texas Science Hall of Fame. "It is hard to gain respect without academic titles. In this country we don't believe you can do anything without some sort of damn title hanging off your name."

Graham, 58, is so well respected in his field that he has received federal appointments to Gulf of Mexico Fisheries Management Council committees, the National Academy of Science (NAS) Committee on Sea Turtle Conservation and the NAS Committee on Cooperative Research — where he serves now.

More important to Graham, he has earned the respect of shrimpers across the Gulf of Mexico and South Atlantic states.

"He is sincere in his job. He is one of the industry's best friends and we all highly respect him," says Wilma Anderson, executive director of the Texas Shrimp Association, an offshore shrimping trade group.

Anyone who knows shrimpers knows that they do not confer their respect easily. Graham earned the industry's trust one fisherman at a time, beginning almost from the day he joined the Marine Advisory Service (MAS), a cooperative effort between the Texas Sea Grant College Program, Texas Cooperative Extension and commissioners' courts in participating counties.

"He is amiable and easy to get along with, and he stands up for what he believes in," says Tony Reisinger, who is the MAS' Cameron County marine agent. "He is not wishy-washy. If he believes in something, he will tell you and he will take a risk — he will go out on a limb for what he believes. I think the industry respects that."

As a new MAS fisheries specialist, Graham visited ports from Sabine Pass to Port Isabel, climbed aboard commercial fishing boats and started talking.

PHOTO BY JIM HINEY

"Back in those days they had not heard of Sea Grant or Extension," says Graham. "For several years there I had a hard time convincing people I wasn't a game wardden because that was the type of state official they usually interacted with."

By comparison, he recently returned from a tour of Gulf and South Atlantic states — North Carolina to Brownsville — where he conducted workshops on newly mandated shrimping gear. Hundreds of miles from home, he was still at home.

"It makes me feel good to go into a port in Alabama or Florida and it is like being with family," says Graham. "There are people who are glad to see you, want to shoot the bull with you and want to know what you are doing. It's a far cry from being mistaken for an enforcement person.

"The relationships I've made to me are my biggest accomplishment. You've got to understand where I started. I challenge somebody to walk into a new program and walk onto a shrimp boat and meet fishermen and tell them, 'I'm here to help.'"

Graham's trademark — his key to success, really — is his one-on-one working relationship with the commercial fishing industry. It is an approach he learned from his mentor, friend and fellow fisheries specialist, the late Dave Harrington.

Graham spends weeks at a time aboard shrimp boats testing gear and trawling techniques, searching for the combination that yields the best catch for the least cost — both in terms of dollars and environmental impact.

He was also instrumental in developing turtle and bycatch reduction devices (TEDs and BRDs) required in commercial shrimp nets by federal law. More importantly, he is widely credited with easing the industry's transition to using the unpopular devices.

Without Graham's involvement, particularly in the TED issue, "There probably would have been a war going on," believes Walt Zimmerman, owner of a shrimping fleet. "Nobody likes to change, I don't care if you're fishing or doing anything else, especially when it starts costing you money. All of these items have cost us money. With his experience we know he has been able to develop gear we can get by with."

"He has made a real contribution to the ability of the industry to hold things together," says Dr. Benny Gallaway, president of LGL Ecological Research Associates. "The industry is on the verge of collapse now and he has made a real and tangible contribution to the fact that it hasn't collapsed."

By his own reckoning, Graham's research trips have totaled five or six years on the water. His willingness to work side by side with shrimpers and his unflinching dedication to integrity have earned him legions of admirers.

"He's done a heck of a lot of good for us as far as trying to prove how equipment will work and distributing that information back to the industry," says Zimmerman. "When he tells you something is the truth, he is not exaggerating. In fact, he may be a little conservative. We have learned to depend on him."

Graham believes he was drawn to commercial fishermen because they were "as close as I could imagine to being American cowboys on the open range. They were independent, colorful people, hard-working, but they were as close to modern-day cowboys as I think you could come. Over the past four decades, the fences have come up — that's what I tell the kids when I'm lecturing. That way of life is changing and undergoing a lot of transition."

The fences, says Graham, are increased government regulations and dwindling profits, making it very difficult for shrimpers to earn a living.

His dedication to commercial fishermen is obvious. It is the first trait most fishermen cite when asked to describe Graham, although honesty and integrity are close seconds.

He is also incredibly intuitive, says Gallaway, who first met Graham when he was doing research aboard a shrimp boat owned by Graham's father-in-law and run by Graham in the late 1970s. On several occasions, Gallaway found that he and Graham had similar viewpoints about Gulf of Mexico biology that differed "from what the accepted dogma was."

"My views were developed primarily from doing research and looking at the research of others. Gary's views were developed from being on the water a lot as a commercial fisherman, a research vessel captain and later as a Sea Grant employee," says Gallaway. "What I was finding was that Gary's views, based on personal observation and opinion, were highly consistent with what I spent lots of research dollars on and we came up with similar views independently from a different approach."

Gary Graham ducks away from a NMFS TED being pulled aboard a shrimp boat during trials in 1983.

Gary Graham inspects an expanded mesh fish excluder prior to BRD testing.

Graham believes much of his success is due to the tremendous amount of support he receives from the commercial industry and from the Gulf and South Atlantic Fisheries Foundation, a private, nonprofit research and development organization serving the commercial fishery industry. The Foundation has given Graham several large grants that have aided greatly in his work during the past 25 years.

He also credits part of his success to the fact that "I'm one of these people who

PHOTOS COURTESY TONY REISINGER

was always in the right place at the right time," he says, before agreeing to the notion that he is akin to Forrest Gump with an IQ.

Graham Lynn Graham was born in Wharton, Texas, the first child of a housewife and an oil industry worker. He and his family moved to Saudi Arabia when he was 4 after his father took a job as superintendent of a small oil pumping station that sent oil from the Persian Gulf to the Mediterranean Sea.

"We lived in the middle of the desert," he laughs now.

Graham spent the next seven years relatively isolated from other children and being taught by tutors. By the age of 11, he had gone as far academically as he could in such a remote part of the world.

"I had my choice of going to Switzerland to go to school or come back to the States to live with my grandparents," he says. "I chose to come back to Texas and become part of American society again. I was raised with hardly any children around. I wanted to play sports and do that sort of thing."

What Graham knew of sports he had learned mostly through movies. There was no television in his small Saudi Arabian camp.

The transition between secluded desert life and public school in West Columbia, Texas, was difficult, Graham admits. His tutors had prepared him well — he was more advanced scholastically than his classmates — and his great desire to compete in sports did not immediately compensate for his lack of actual playing time.

"It was a tough adjustment for an 11-year-old boy," Graham remembers. "What sixth grader knows a lot about Greek mythology? Then you want to pick up a baseball bat but you've never played baseball before. Try that sometime under peer pressure. Of course, playing sports was all I had dreamed about."

By the time he was in high school, Graham had realized his dream. He was captain of his football team, playing offensive guard and defensive end, and he was an All-County selection.

With the exception of the seven years he spent in the Middle East, Graham has lived on or near the Texas coast all of his life. Saltwater permeated his being, creating an attraction for him that he cannot explain to this day.

"My father had an old skiff and I would use it to go shrimping," says Graham. "I don't know why I thought about it, but I was always interested in that sort of thing. My grandparents would vacation at a fish camp and we would go saltwater fishing for a week or two. There was a fellow there named Bullington who let me go on his bait boat and I would help catch the bait sometimes. I really enjoyed it. I thought nets were so cool.

Gary Graham plugs a fisheye with a float in 1999 during BRD trials off the Texas coast.

"I paid for a small shrimp net when I was still in high school. I bought an old cotton net and I'll never forget that it cost me $50, which was a lot of money back then. I used to go out and catch shrimp in that."

Graham lived with his grandparents for about four years, until his parents moved back to Texas. Through his parents he met a man who would have a great impact on his life. Jim McMurrey was a family friend, shrimp fisherman and the father of a girl who went to school with Graham.

"Capt. McMurrey came to see my parents at one point and I had just come in from shrimping," Graham says with a far-away look, replaying the scene in his mind. "I was washing that old net over a fence. He took the time to come over and explain things to me — how to set the doors — and he helped me patch a hole.

"I lost my dad my first semester at Texas A&M," he continues. "I became very close with Capt. McMurrey. He was a unique individual as far as fishermen go. He was an extremely intelligent man and he did a lot of experimenting. There are not many shrimp fishermen who have gone to Princeton. He never graduated because he was called (to World War II). He didn't have a son so he sort of adopted me."

Graham later became McMurrey's son legally, when he married McMurrey's daughter, Candy.

Graham began fishing with McMurrey and his crew during the summers and was impressed by the way McMurrey would tinker with the design and arrangement of his nets, record data about the catches he made and then compare it with previous gear experiments.

McMurrey was, in essence, performing the same kind of work that dominates Graham's job today.

Shrimpers at sea lead solitary lives. The captain and crew are the sole inhabitants of a small, bobbing island floating in a vast sea. Aboard McMurrey's boat, Graham once again found himself in a desert of sorts, isolated from society. This time, the crew was his tutor.

"In commercial fishing there is an unwritten apprentice system," Graham explains. "You get on a boat and you learn from the other people. If you get on a boat with the right kind of crew, they will teach you if you take an interest.

"I was really fortunate along those lines. I came up with some unique individuals who taught me how to sew nets and make a catch, and about the gear. Although I was going to college during the regular semesters, back then there was some good money to be made in shrimping. I worked my way up to where I was making so much money that it was tempting to drop out of college. But Capt. Jim kept me convinced that I needed to get a degree.

"It was another one of those things in life where I was in the right place at the right time," says Graham.

During his college years, Graham also worked as a deck hand aboard a shrimp boat owned by the late Hollis Forrester in Freeport. Forrester took credit for teaching Graham about many of the superstitions surrounding fishing, like the belief that it is bad luck to say "alligator." Graham occasionally trains people, usually students, to ride aboard shrimp boats as observers to count and characterize the sea life that ends up as bycatch. Part of his training program includes a course on boat etiquette that includes a section on superstitions. His fear of the "A" word is evident because he refuses to use it at all — anywhere.

Instead he refers to them by a number of euphemisms, like "bumpy backs" or "swamp lizards."

PHOTO COURTESY TONY REISINGER

Gary Graham (right) works with TPWD to test BRDs in the bay.

Forrester, who died earlier this year, laughed during an interview in 2002 when he recounted an incident involving Graham and the "A" word. It happened during one of the summers Graham worked as a deck hand and Forrester was the boat's captain.

"We had a guy on the boat who was one of those who liked to needle somebody he knew was superstitious. He and Gary had a conversation going and I got in on the tail end of it but I heard it was about the word alligator and I said, 'Oh, Lord.' About that time the boat swung hard to one side and liked to take the outrigger off. We had hung up on good, clean bottom."

Terrie Looney, the Marine Advisory Service's Jefferson-Chambers County Marine Agent, keeps an alligator skull — a gift from a local alligator farmer — on her desk. Graham will not enter her office until she puts the skull in a drawer.

Reminded of that fact, Graham just smiles.

"I was raised on the water with some superstitions," he says. "A lot of the fishermen coming on today don't have those superstitions.

"I just built a new house and I wouldn't close on a Friday. The papers were ready but I wouldn't close on a Friday," he says as his look turns more serious. "You don't start a fishing trip on a Friday. I've had people at the dock need me to do some work with them and we crank the boat up at a few minutes past midnight on Saturday morning, but I don't start trips on Friday.

"I don't like black bags. If I could find a different color computer bag, I'd use it. I don't take that computer bag on a boat," he says before throwing his hands in the air. "People laugh at me, but I don't care."

After graduating from Texas A&M, all Graham wanted to do was get on a boat, he admits. "All I wanted to do was fish."

His decision led to trouble at home.

"Candy said she never had a father, and she planned on having a husband," Graham says. "We had a bad falling-out over me pursuing commercial fishing as a living."

While still in high school, Graham met a fisheries specialist named Dave Harrington. Harrington became Graham's friend and mentor. It was Harrington who told Graham that the fledgling MAS (Texas Sea Grant had been in existence just two years) was searching for a fisheries specialist.

Graham's scientific mind and commercial fishing experience made him perfect for the job. He also had great role models in McMurrey and Harrington. In fact, McMurrey suggested the project that introduced Graham and Sea Grant to the commercial industry.

Shrimpers were — and still are — very secretive about their best fishing grounds. They note in great detail the locations where they catch the most shrimp, but they also record places where they catch their nets on sea floor obstructions, or "hangs." One good hang can destroy thousands of dollars' worth of trawling gear.

In the early 1970s, shrimpers rarely exchanged any coordinates, including the locations of hangs.

"Capt. Jim, in all his wisdom, said, 'You are in a unique position. Why don't you try to convince the industry to share their information and compile a catalog of these hangs? It's not doing anyone any good to keep this stuff a secret,'" says Graham.

He accepted McMurrey's challenge and the project turned into one of Texas Sea Grant's best selling publications, *Hangs and Bottom Obstructions of the Texas/Louisiana Coast.*

"Back in those early days I would sit on a boat for hours writing a captain's numbers down and then turn around and give him other people's numbers. It snowballed from there," says Graham. "It turned into a very dynamic project and one that let fishermen know who I was. I made so many contacts because I'd go around to hundreds of fishermen every year, introduce myself and tell them what I was doing."

At last count, the two-book set comprises 12,000 coordinates pinpointing hangs from the mouth of the Rio Grande to the Mississippi River. One of the most famous is a brown Datsun station wagon in 300 feet of water off the coast of Louisiana.

Throughout the 1970s and early 1980s, Graham and Harrington (who was by then working for the Georgia Sea Grant Program) collaborated to refine commercial fishing gear. They took ideas suggested by fishermen and developed them into prototype rigs, then tested them aboard volunteered boats.

In 1985, members of the commercial fishing industry in Texas approached Graham about helping them solve a problem. Fishermen were catching too many sea turtles in their nets and the federal government was about to get involved.

"It became apparent that this was going to be a significant issue in the Gulf," Graham remembers.

The National Marine Fisheries Service (NMFS) was in the process of developing a TED that was most likely going to be required to be installed in commercial fishing nets. The first NMFS-designed TEDs were bulky and sometimes required two people to handle. Graham felt a better solution was to get the industry thinking about devices that might be more acceptable.

He and Harrington took a device that was already being used by shrimpers to cut down on the number of cannonball jellyfish in their nets and tweaked it so it would also exclude turtles.

"Although there was a lot of criticism

(Continued on page 28)

PHOTO BY STEPHAN MYERS

Pigment may show the way for easier red tide algae monitoring

The characteristics of a full-blown red tide are easy to spot – an algal bloom that discolors or clouds the water, kills fish and can cause respiratory problems in people who are near areas where the cells are broken up in the surf. At that level, the concentration of *Karenia brevis,* the microscopic algae that cause red tides along the Texas shoreline, is in the hundreds or even thousands of cells per milliliter of water.

However, *K. brevis* is a threat at far lower concentrations. The U.S. Food and Drug Administration mandates that shellfish beds be closed when *K. brevis* concentrations reach levels of only five cells per milliliter, since filter feeders accumulate the organism's brevetoxin in their tissues. Obviously this standard requires careful monitoring of cell concentrations in the water long before the bloom is visible to the naked eye.

Two scientists at Texas A&M University have developed a new method of detecting the presence and concentrations of the algae. Working under a grant from the National Sea Grant Gulf Oyster Industry Initiative, Dr. Tammi Richardson and Dr. James Pinckney of the Department of Oceanography have created and tested a procedure that uses high-performance liquid chromatography (HPLC) to screen coastal waters for a pigment found in the red tide dinoflagellate, which was formerly known as *Gymnodinium breve*.

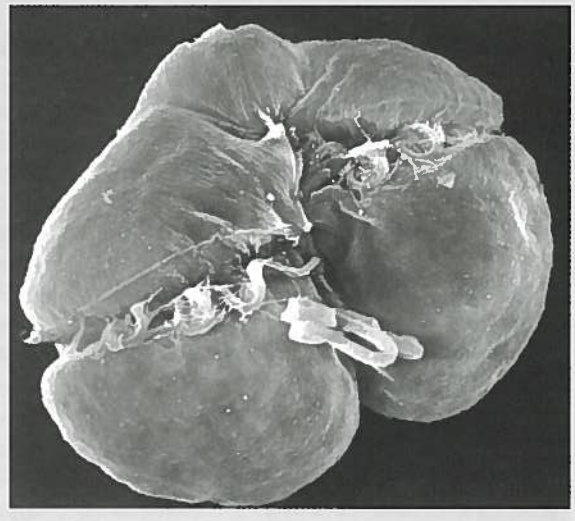
Current FDA-approved monitoring for *K. brevis* requires identification through a microscope and a careful counting of the cells – a time-consuming and often tedious process that requires taxonomic expertise on the part of the person doing the analysis.

"We wanted to develop a method that would be easier to use for continuous monitoring," Richardson says. "You have to have some expertise in doing this HPLC technique, you have to have some baseline scientific ability, but it doesn't really require an extensive background in phytoplankton taxonomy. Instead, the operator only needs to identify a peak on a chromatogram."

The key to the new technique is a pigment called gyroxanthin-diester. Previous research by Richardson and Pinckney and others has shown that gyroxanthin, a carotenoid whose role in the organism is still uncertain, is a reliable indicator of *K. brevis* abundance in coastal waters. Could the pigment be used as an accurate and reliable measurement of the levels of cell concentration? Especially at concentrations below five cells per milliliter?

If the first stroke of luck was the existence of the pigment, which is found in the Gulf of Mexico only in *K. brevis* and related *Karenia* species, the second lucky break was that the pigment is relatively easy to separate from others in a sample.

High-performance liquid chromatography is an analytical chemistry technique that separates individual compounds from a mixture of compounds. The mixture is forced through the apparatus under very high pressure (2500 psi) and into a metal column, where the compounds in the mixture "stick" to powder-like particles in the column. The HPLC slowly changes the solvent mixture passing through the column, and the compounds come "unglued" at different times based on their chemical structure. The solvent flows out of the column and into a detector



Karenia brevis

SEA GRANT FILE PHOTO

that measures the absorption spectra at two-second intervals. The compounds can then be identified and quantified based on their absorbance characteristics.

"With our standard approach to analyzing phytoplankton pigments, it takes about 55 minutes to run a sample, which means that you can only do 24 in a day," Pinckney says. "If we're confronted with a red tide outbreak, we'd like to be able to process more than 24 samples in a day, because ideally there would be samples coming in from many locations in and around the affected area. So there might be 75 or 100 samples, and state officials would want to know on the next day how big the bloom is so they could determine which areas need to be closed. They would need as rapid a turnaround time as we can possibly give them."

Tammi Richardson (above) and James Pinckney (right) prepare samples for the high-performance liquid chromatograph.

To shorten the time needed to analyze each sample, Pinckney sped up the flow rate through the HPLC for the first several minutes of the analysis – a step that was only possible because of the characteristics of gyroxanthin on the chromatogram.

"The peak in *Karenia brevis* for gyroxanthin comes out at a nice place where there's nothing else around it," Pinckney says.

"In the 55-minute run, we're interested in all of the peaks that are there," he says. "Since in this case we're only interested in this one particular peak, we can squeeze all the others together, because we don't have to worry about quantifying them. We were able to modify our protocol to do an analysis in about 22 minutes."

Another advantage of the HPLC method is the fewer man-hours needed for the process.

"The preparation is relatively easy, it's just a matter of collecting your sample on a filter and extracting the pigments contained in that sample using acetone," Richardson says. "The technical part comes more from putting the instrument together and troubleshooting when something goes wrong.

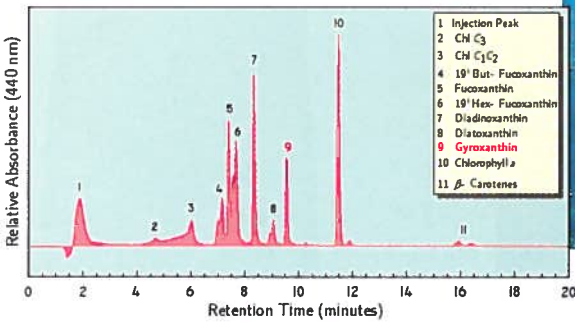
"The system is automated, so you can load it up, go away, and you can let the samples run overnight," she says. "I can run it for 24 hours straight, where I certainly couldn't count cells for 24 hours straight."

The chromatography process begins by filtering water samples collected in the field. Because filtering is an integral part of the process, chromatography allows a much broader sample to be tested. With cell count testing in a microscope, a one-liter sample might be collected in the field and brought back to the laboratory, from which a one-milliliter sample would be placed in a counting chamber and inspected directly for *K. brevis*. With chromatography, the entire one-liter sample is filtered, and then the results of the test can be divided by the volume of water to determine the average amount in each milliliter of water.

"With the pigment-based monitoring, you have to filter a lot more water, so you get a more integrated and representative sample of what's out there," Richardson says. "That means you have a better chance of finding the *K. brevis* cells in the same sample than if you do microscopy."

Part of Richardson and Pinckney's study involved determining the most efficient filter size for collecting *K. brevis* from a water sample. The screens of the different filter sizes are not uniform like the screen on a strainer – pore sizes are based on an average of the gaps between the fibers in the

PHOTOS BY CINDIE POWELL



A chromatogram of K. brevis *shows a peak for the pigment gyroxanthin-diester.*

A red tide approaches the shore.

filters. Their investigations led to an unexpected discovery: the assumption that has been made for years – that the smallest filter pore size, or nominal particle retention, captures the greatest percentage of particles – is untrue. The larger pore size filters captured cells more efficiently than filters with smaller pore size.

"We had been using glass fiber filters with the smallest average pore size, thinking that with them we'd catch all *K. brevis* cells," Richardson says. "But because some of these gaps are so small, and especially if you're using water that has a lot of sediment in it, they clog easily and the cells burst, resulting in loss of pigment."

The results of their study have been accepted for publication as an article in the *Journal of Applied Phycology*. As part of their research project and to aid any agencies that might adopt their new technique, Richardson and Pinckney wrote up a detailed protocol that includes all the steps from sample collection and storage to instructions on converting the pigment concentrations from the chromatogram into the number of cells per milliliter. The researchers checked their results from the chromatograms against microscope cell counts done on the same samples, and found that the concentrations of gyroxanthin in the cells varies with changes in environmental conditions like turbidity. Because of this, they recommend that anyone using the protocol confirm their results for a particular geographic area, or use a conservative value for the proportion of gyroxanthin per cell that they developed after studying samples collected from several locations.

The protocol, and a list of all equipment and their settings, is available on the web at www-ocean.tamu.edu/~pinckney/PDF_files/Protocols/Gyrox_method.pdf.

"We identified the pieces of equipment needed if somebody wanted to do this, such as a state agency," Pinckney says. "Here's what they would need to buy, here's how the system is set up and what substitutions you could make if on a limited budget. Basically it's what we would recommend getting to be set up to do it."

The HPLC equipment they used costs about $60,000, but Pinckney says he believes the apparatus to do the testing they describe could be purchased new for about $30,000, and he adds that several state agencies and academic institutions already have much of the equipment.

The Texas Parks and Wildlife Department (TPWD) funded an earlier study Pinckney did using gyroxanthin as an indicator for the presence of *K. brevis*. TPWD follows up on suspected harmful algae blooms (HABs), taking samples from areas where there have been reported fish kills, discolored water or respiratory irritation. That is also the technique used by the Texas Department of Health, which investigates reports from TPWD as well as the U.S. Coast Guard, commercial and sport fishermen, scientists and the public.

As the agency responsible for monitoring the safety of the state's shellfish beds, TDH is concerned with the *K. brevis* counts at five cells per milliliter – well below the counts found in a visible red tide.

"At five cells per mil it looks just like swimming pool water," says Mike Ordner, program manager in the Corpus Christi Field Office of TDH's Seafood Safety Division. "You can't really see it until cell numbers are well above the point that oysters will be toxic to humans."

TDH maintains several set sampling stations in Texas bays, but sampling is primarily contingent on reports of a red tide in the area.

"We don't routinely go out and sample unless we get a reason to go out, and from 1986 to the present we haven't been caught unaware," Ordner says. "So far it's worked, and to my knowledge we've never had a situation in Texas

CHROMATOGRAM COURTESY JAMES PINCKNEY; PHOTO COURTESY TEXAS DEPARTMENT OF HEALTH

where we had to close an area because we have illnesses."

Tracy Villareal, associate professor of marine science at The University of Texas Marine Science Institute in Port Aransas, has been studying red tides for several years, including under a current National Oceanic and Atmospheric Administration-funded project that is attempting to adapt a Florida-based model that uses satellite images

Filter feeders like oysters accumulate the brevetoxin in K. brevis.

showing rapid chlorophyll changes – one sign of a HAB – to pinpoint possible red tides in Texas' Gulf waters.

"Right now there's no one doing routine monitoring for *K. brevis* in the bay side waters," Villareal says. "TDH, if they get an alert that there's dead fish or have reason to believe from other sorts of sampling that there's *K. brevis*, then they'll come out and do a lot of analysis, but it's pretty much a reactionary mode, which is of course because of the funding issue — it's pretty expensive to do.

"These blooms seem to start offshore and as they move in, usually there's a lot of warning that they're moving towards areas where they have to be concerned about the oysters, or at least enough warning for them to get out there and react to it," he says. "Occasionally after a big bloom there will be some remnant populations floating around in the bays, but that's a different type of scenario, that's remnants from a pre-existing bloom, and usually they're (TDH) pretty good about finding that. The oysters take a significant amount of time to get rid of the brevetoxin, so the beds are not normally opened for weeks to months after a bloom."

Ordner has been doing cell counts for TDH for more than 15 years and has been involved with every major red tide in Texas since the late 1980s. The last red tide, and one of the longest seasonal red tide blooms, occurred as recently as 2002 in parts of Aransas, Corpus Christi and Nueces bays and the upper Laguna Madre. Ordner speculates that the higher precipitation that coastal Texas has received since then, and the resulting decreased salinity in Texas bays, may have made the environment less hospitable to the harmful algae blooms. However, the average of two and a half to three years between blooms that Texas has experienced in recent decades may mean another red tide will be along within the next year.

One bloom in 2000 ranged up most of the Texas coast.

"Texas is blessed and cursed," Ordner says. "We're blessed in that we've got barrier islands so there's really only a few places that the red tide can get into our bay system — they have to come in through the passes.

"But the curse side is that, since they normally live in the Gulf of Mexico and they thrive out there with hardly any kind of food, once they get in the bays it's a really calm environment for them with tons of nutrients, so they just go crazy. And once they're in there, they can virtually go up and down the coast through the bays because they're connected from the Colorado River south down to Brownsville," he says, adding that the Gulf Intracoastal Waterway also connects the bays of the entire state.

Current regulations require a visual cell count to determine the presence and concentration – or absence – of *K. brevis*. The Interstate Shellfish Sanitation Conference (ISSC) is an organization of state shellfish control agencies, the shellfish industry and federal agencies. It is responsible for the adoption of uniform standards, rules, regulations and procedures by state shellfish control agencies. These standards become the requirements of the National Shellfish Sanitation Program, which is coordinated and administered by the FDA.

Kirk Wiles, director of TDH's Seafood Safety Division, says the protocol developed by Richardson and Pinckney could eventually be added to the currently approved monitoring methods.

"With further validation, this type of methodology could be considered for incorporation into the National Shellfish Sanitation Program," he says. "When someone thinks they have a process that could be useful in determining shellfish toxicity, or at least toxicity in the water, then the process can be submitted for evaluation to the ISSC and the FDA. We'd be interested in seeing if we could incorporate this method to replace the required cell counts, which are costly and slow and not very effective in determining what's really out there — the individual grab samples with cell counts represent a snapshot of a small area.

"I think it could certainly serve as an early warning system that would initiate additional sampling on our part," he says. "At this point, we couldn't really use it much beyond that because of regulatory constraints, but it would be very useful in that regard."

Which was what Richardson and Pinckney had in mind when they developed the new protocol.

"Our idea behind this is to use it as a broad-scale monitoring tool," Richardson says.

"If they're facing having to count 150 samples, and our technique can tell them, 'Here are the 25 you need to focus on, the rest of them don't look like they have much in them,' then they know which ones to check with microscopy," Pinckney notes.

"We're trying to make things easier and more cost effective for the folks who are working for these state agencies," Richardson says. ■

SEA GRANT FILE PHOTO

Dave Harrington (foreground) and Gary Graham used underwater videos to document, at various time, the efficiency of both TEDs and BRDs.

(Continued from page 23)

from the industry, using that design gave fishermen some ownership of the gear," says Graham. "Sea Grant played a major role in conducting workshops on TEDs, going aboard vessels and providing one-on-one contact, which is still very important in the industry. I took a lot of abuse but — and this is a big but — because of my previous experience in the fishery and the contacts I had established, it was a little more palatable coming from me than it was some guy new off the street."

During the 1990s the specter arose of another federally required hole in shrimp nets. The government, concerned about the volume of sea life other than shrimp that was being caught in trawl nets, proposed mandating that BRDs be sewn into shrimp gear.

Graham and Harrington tackled BRDs much the same way they did TEDs and they achieved similar results. They tweaked a device already used by shrimpers and developed a solution that was not popular with the industry but was at least workable.

As the new century began, TEDs again became an issue. Shrimpers along the Atlantic coast began finding larger turtles in their nets, turtles that were too big to escape through the current TEDs. The federal government wanted all shrimpers to use devices that could exclude larger turtles, and that meant drastically redesigning conventional TEDs and then teaching shrimpers how to use them.

"The 1980s and early 1990s were not fun because of the TED, but it had to be done and nobody was better at that job than Sea Grant. I was not looking forward to doing it again. I sat down with my friend, Dave Harrington, with whom I have collaborated on so many projects during the years, and we decided that we would do this one more time — we were a team," says Graham before his voice softens. "We developed a proposal and submitted it to the (Gulf and South Atlantic Fisheries) foundation to do outreach throughout the Southeast. Dave was always pulling stunts on me and he nailed me on this one. He passed away the year before (2003) we had a chance to go out in the field and do this work."

Graham counters his serious business side with a well-known penchant for practical jokes and bizarre behavior. As Gallaway puts it, "Gary has a good sense of humor, which he practices religiously."

"He's mischievous," adds Reisinger. "He gets that twinkle in his eye and you know he is up to something."

If Graham is around a net full of freshly caught sea critters, it's a pretty good bet that he'll wind up with a small squid in his nose. Scores of school children have groaned and howled as Graham sorted through the catch from a seine net and talked about the sea's bounty — all the time with tiny tentacles hanging out of one nostril.

When his sons were young, Graham struck awe into the neighborhood kids because he almost caught Santa Claus on his roof several years in a row.

"He used to set up these elaborate snares on his roof every Christmas when his boys were growing up," laughs Reisinger. "Then his brother would come over in the middle of the night, climb up on the roof and start shaking the snares and traps. One year they came close to catching Santa because a boot was in the trap the next morning. I think he tried to catch Rudolph one year."

Graham's proudest caper was one he pulled on a visiting Kuwaiti scientist in 1979. Graham had taken time off from his MAS duties to run McMurrey's boat while it was being used for fisheries research on shrimp. The Kuwaiti scientist was aboard to observe various research techniques and procedures.

As sometimes happens when shrimp boats are working, several sharks appeared to dine on whatever animals escaped the nets or were washed off the deck. The visiting scientist and all but one of the crew were eating lunch inside the boat's cabin when Graham and the other crewman landed one of the sharks so they could employ an old fisherman's trick — using its liver to make a repellant that would keep other sharks away from the nets.

The practice was common at the time but is now prohibited by law, and Graham stresses that he has not used the technique in many, many years.

The two men pulled the shark out of the water and secured it with ropes against the side and toward the front of the boat, where it was visible only if someone peered over the ship's rail. Both men went on about their business and forgot the shark was there.

Sometime later, Graham walked out of the boat's wheelhouse and noticed the Kuwaiti scientist sitting on the back deck by himself, almost as if he was meditating. Graham had already bewildered the man by talking to him in Arabic, something he didn't expect from an American shrimp boat captain.

Busy completing a task near the rail, Graham glanced overboard and saw the shark hanging there. He gently eased the shark into the water and then went back into the cabin to alert his audience.

Emerging back on deck, Graham walked to the railing, looked over the side and uttered a rather loud expletive.

"I put a knife in my mouth and I jumped overboard. I cut that shark loose — the (Kuwaiti scientist) didn't know what was happening because he was on the other side of the boat — and I grabbed that shark and started wallering (sic) with it, acting like I was fighting it," Graham says, laughing like it had just happened. "He came over the rail and I'm down there with the knife, wallering with the shark and splashing around. I yelled, 'throw me

PHOTO COURTESY TONY REISINGER

a line,' and my buddy threw me a line. I got back on the boat and walked over to the Kuwaiti gentleman and said, 'If you see any more sharks, you let me know.'"

Graham walked back into the wheelhouse, leaving his foreign guest stunned and speechless. "I just know he went back home and told people about what this crazy American had done."

For reasons Graham declines to talk about, he and Candy eventually divorced, although they remain close friends and take pride in their sons, Jeremy and Teal. Both boys went to sea aboard shrimp boats with their father when they were growing up, but neither wanted to make shrimping a career — even if Graham had let them.

"Both of those boys are avid outdoorsmen — fishermen and hunters," Graham says with obvious pride. "As far as commercial fisheries go, there is no way. I redirected them away from that a long time ago. Both boys got their college degrees and they are out in the world."

Jeremy and Teal are both in sales — Jeremy sells insurance and Teal sells electrical equipment.

Teal owes his unusual name to his father's love of nature and an observation Graham made when his second son was born.

"The Green Wing Teal is the smallest North American duck," Graham says. "I was in the delivery room with him and that is what he looked like. When he was born he looked like a little teal bird."

Professor Graham's class schedule these days is limited to occasional groups of Aggies who travel from College Station to Galveston to learn at his knee on a Saturday. He lectures them on fisheries management and the commercial fishing industry while sprinkling in a few bits of wisdom he calls "Grahamisms."

"Be grateful for all things as they occur," he says, quoting a life philosophy he calls the "attitude of gratitude."

Another one is, "You do the legwork but let the spirit of the universe, whom I choose to call God, determine the outcome. It sure does take a lot of pressure off of me."

Asked to reflect on his life, Graham is silent for a few moments as he stares down into his lap. Slowly he looks up, his smile broadening and his eyes twinkling as he shakes his head, "What a trip, and what a reward."

"I honestly believe that God wanted me to be involved with TEDs and those sorts of things. It's mighty hard to know God's will, but I feel that inside," says Graham, his expression turned serious and his head tilted forward slightly — unmistakable body language that says he wants his point to be perfectly clear. "I don't talk much about it and I don't talk much about God, but... yeah. Too many things have happened. You look back over my career and you can say I was lucky or that I am Forrest Gump with an IQ, but I am where God wanted me to be." ■

State meets new coastal water quality regulations

Texas was one of only 11 beach states and territories to meet an April deadline from the U.S. Environmental Protection Agency (EPA) to adopt new federal guidelines for monitoring coastal water quality and notifying the public when the water fails the U.S. standards.

The BEACH (Beaches Environmental Assessment and Coastal Health) Act of 2000 requires states to adopt EPA-approved indicator organisms *E. coli* or enterococci in their water quality regulations, and to implement plans both to monitor coastal recreation waters adjacent to beaches used by the public and to advise the public when concentrations of indicator bacteria are too high.

Because many pathogens are not easily detected, indicator organisms are used to measure both changes in water quality or conditions and the potential presence of hard-to-detect target pathogenic organisms. EPA studies have found that enterococci and *E. coli* are the best available indicators for predicting the presence of gastrointestinal illness-causing pathogens, and for marine waters, enterococci is the most appropriate.

State regulations, which are managed by the Texas Commission on Environmental Quality, have included the EPA recommendations since the TCEQ revised its standards in 2000, says Jim Davenport, team leader of TCEQ's Water Quality Standards Team.

"When we revised the standards in 2000, we went ahead and pushed a little harder to make that change to enterococci for Texas coastal waters," he says. That was one of the key changes that the EPA wanted to see. A lot of states haven't done that yet."

In Texas, the General Land Office (GLO) has been charged with meeting the monitoring and notification portions of the BEACH Act.

"The General Land Office was designated the lead state agency because it already had its own Beach Watch Program in place," says Blake Traudt, Texas Beach Watch coordinator at the GLO. "The implementation of the BEACH Act is a continuation and expansion of the General Land Office's program."

Before the BEACH Act requirements, the GLO's program monitored 14 beaches with 75 monitoring stations. Beginning in October 2003, the Beach Watch Program expanded its beach water quality sampling to 143 stations, and funds from a 2003 EPA grant will be used to bring the total monitoring stations to 157 by later this summer.

Water quality is monitored by local contractors and the data forwarded to the GLO. Traudt says the Beach Watch Program is currently developing a database that will put the information into the EPA-required format and building a web site that will contain real-time data about all monitored beaches. The web site will include any advisories for the public about those beaches that exceed the standards for enterococci. The plan also calls for the local contractors, if they are governmental agencies, to place advisory signs on the beaches, or if they are not local governments, to alert them so advisories can be posted.

"Since the posting of advisories on the beach is the purview of local governments, the GLO has been working with local governments on the coast to get their agreement to post signs and issue advisories," Traudt says.

He said the database and web site (www.TexasBeachWatch.com) should be ready this summer, and new Beach Watch signs are expected to be up by mid-July.

Every year since 2001, the EPA has awarded grants to 35 coastal states, tribes and territories to support the beach program. The nationwide grant total for 2004 is $9.9 million. Texas' share is $387,910, which Traudt says will likely reach the state in August. The funds will be used to maintain monitoring of the current and planned 157 stations.

For more information about the Texas Beach Watch Program and a list of monitored beaches, access the General Land Office's Beach Watch web site at www.glo.state.tx.us/coastal/beachwatch. More information about the BEACH Act is available at www.epa.gov/beaches.

— *Cindie Powell*

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