SEA GRANT COLLEGE PROGRAM

TEXAS SHORES

Marine commerce 101

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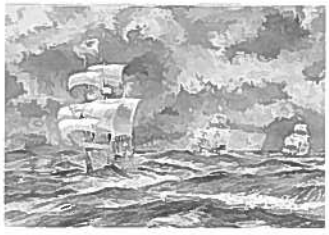

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COVERS— PHOTOS COURTESY OF TEXAS DEPARTMENT OF TRANSPORTATION

2 *LIQUID ASSETS*

Getting from here to there has been one of man's goals for countless millenia. Ship-borne commerce is so prevalent today that anyone who 'drives a car, drinks coffee, eats seafood, cereal, vegetables or fruit, wears clothes, or partakes of imported wine or fancy cheese' can thank Texas' ports.

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LETTERS

Letters to the editor should be limited to 300 words. *Texas Shores* reserves the right to edit letters for length and potentially libelous materials. All letters must be signed and include a daytime telephone number. Once received, letters become the property of *Texas Shores* and cannot be returned.

STAFF - Dr. Robert Stickney, *Director*; Amy Broussard and Ralph Rayburn, *Associate Directors*; TEXAS SHORES Staff-Jim Hiney, *Editor*; Mark Evans, *Assistant Editor*; Amy Broussard, *Design*; Eric Graham, *Webmaster*; Stephanie Wilborn, *Distribution*. Summaries of TEXAS SHORES are posted on http://texas-sea-grant.tamu.edu.

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HISTORY - 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.

SERVICE - The effort is aided by six county marine agents serving eight coastal counties of Texas. These individuals are backed by a group of specialists in marine education, fisheries and business management, as well as aquaculture, environmental quality and seafood technology.

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The Port of Houston's Barbours Cut container terminal is by far the busiest container terminal in the state. Nearly 1 million TEUs — one TEU is equal to one standard 20-foot long container — pass through the public and private wharves in Houston each year.

PHOTO COURTESY PORT OF HOUSTON AUTHORITY

Liquid Assets

By Jim Hiney

Man's early ancestors may have lashed together who knows what — logs, reeds or maybe even some buoyant and user-friendly wildlife — with but one mission in mind: Reach masses of land that lay within sight yet just out of reach across the great liquid barrier that was the primeval Pacific Ocean.

Who knows why they wanted to go there. For food, most likely. Perhaps they went because, like Mount Everest, it was there. Given their limited though expanding intellect, primitive humans most likely did not undertake such a treacherous journey in hopes of making a few bucks ... or ... clams, or whatever they traded at the time.

Ahhhhh, what a difference 700 millennia make.

Today, steel giants glide across watery highways between continents carrying all manner of goods to any number of places. The biggest bad boy in the ocean today, a crude oil carrying behemoth named the *Jahre Viking*, displaces about 565,000 tons of water when it is loaded with about 5 million barrels of oil. For those who skipped physics class, any watercraft will float so long as it displaces its weight in water. That puts the *Jahre Viking* at about 1.12 million pounds. The ship stretches almost one-third of a mile long and nearly a football field wide.

Crude oil carriers, chemical carriers, container ships and other cargo carrying, commerce minded ships call at U.S. ports every day. Cars, clothes, food, electronic equipment, tractors and even fighter jets get from one country to another by ship, and for a good reason. When you look at the world from the viewpoint of international trade, every continent is an island. True, we can bridge that distance by airplane now, but air transport is expensive and a fleet of airplanes can carry only a fraction of the goods that fit on just one ship.

Water transport has the additional advantages of having an excellent safety record, being able to transport extremely dangerous materials through relatively unpopulated areas and of being the least expensive mode of transportation. One study showed that one gallon of fuel will move one ton of materials 59 miles by truck, 200 miles by railcar, 250 miles by pipeline and 514 miles by a barge traveling an inland waterway like the Gulf Intracoastal Waterway. It is impossible to make a similar comparison between ocean going ships and other modes of transportation, like railroads, because no one has yet built a railroad from the United States to Europe.

Given the vast amount of cargo that travels by ship versus aircraft and the private sector's tendency to choose the most economical transportation method, it is obvious that marine transportation is still the least expensive manner of moving goods.

How goods get into stores is a study in complex logistics. The premise is simple, but the devil is in the details. In general, a company manufactures an item, puts it on a boat, which unloads the item in another city or country and then sends it to its final destination. What you need are trucks, railroads, ships, sometimes airplanes but always ports — air or sea — to make the whole thing work.

Nikes may allow you to "just do it," but even they cannot walk across water by themselves.

How much commerce spends at least some time at sea?

That figure is very hard to pin down. There are far too many corporate curtains to open in foreign and domestic markets to get a good handle on the worth of waterborne commerce. But the goods themselves are only a part of the story. There are entire companies contracted by manufacturers to make sure that products get to market. Those shipping companies pay people to make sure that products make it to market, thus resulting in employment and payroll dollars. The goods have to come and go through ports, which again employ people and generate payroll dollars to make sure that the shipping cycle continues until the product makes it to a consumer's self.

For a small measure of the importance of marine transportation, take a look at U.S. ports. Directly and indirectly, U.S. ports are responsible for more than 13 million jobs, nearly $500 billion in personal income, $1.5 trillion in business sales, about $743 billion to the nation's gross domestic product and almost $200 billion in federal, state and local taxes. "And that's just cargo," notes H. Thomas Kornegay, director of the Port of Houston Authority and until recently the chairman of the American Association of Port Authorities, during his presentation at a ports and waterways conference in Brownsville in August. "Passenger cruise lines bolster the economy by nearly $12 billion annually."

Pat Younger, government relations manager for the Port of Houston Authority and president of the Texas Port Association, put the importance of Texas ports in perspective during the same conference.

"If you drive a car; drink coffee; live in a house; dine on seafood, cereal, vegetables or fruit; wear clothes; drink imported wine and eat imported cheese, then you can thank your Texas ports," she said.

"Specifically, you can thank Freeport for your fruit; Harlingen, Port Isabel, Palacios and Port Mansfield for delicious Texas seafood; Beaumont for the wood used to build your house; Port Lavaca-Point Comfort for the convenience of plastics; Brownsville for the oil you use for cooking; Corpus Christi for much needed petroleum; Galveston for your breakfast cereal; Houston for your car and the steel needed for its tires; Orange for your vegetables; Port Arthur for the paper you use everyday; and Texas City for the chemicals used in so many products."

The Spanish, driven by the lure of economic prosperity, blazed the first watery trails to the New

The 28 ports in Texas contribute 1 million jobs and nearly $100 billion to the state's economy. What's just as remarkable about that to Younger is that 20 percent of the total tonnage of goods flowing through all U.S. ports moves through Texas ports.

"Think about that," Younger says in amazement "In a nation of 50 states, one-fifth of waterborne commerce moves through one state."

The impact of waterborne commerce and the ports themselves extend beyond the dollars they bring to a city or a state. For instance the port of Houston, which Kornegay describes as a "quasi-governmental body that runs more like a business," drew a cotton brokering entrepreneur to the city from Tennessee in 1907. The man and his company came to Houston in part for access to larger banks but also because of the port. At the time, the port had, at 18.5 feet, a relatively deep channel and was just seven years away from being 25 feet deep.

Under the gentleman's wise guidance and because of the company's access to a deepwater port, Anderson, Clayton & Co. became the world's largest cotton merchant.

The driving force behind Anderson, Clayton & Co. gave back to Houston in the form of a foundation that gained $19 million at his death. It was a foundation strongly driven in the direction of health care. Two years after the man's death in 1939, the Texas Legislature gave the University of Texas $500,000 to establish a cancer research hospital somewhere in the state. Anderson's foundation agreed to match that $500,000 if the hospital was built in Houston and named for its benefactor — M.D. Anderson.

As they say, the rest is history.

World in search of goods and valuables that they could ship back home.

Primitive beginnings

Humans and ships, or at least some form of watercraft, have been inextricably linked for thousands, perhaps hundreds of thousands of years. There is evidence, says nautical archaeologist Kevin Crisman, that 700,000 to 800,000 years ago our early ancestors lived on some of the islands that dot the ocean between Vietnam and Australia.

"Even if you take into account dropped sea levels due to ice ages and so forth, these islands would not be accessible unless they got there on some kind of watercraft," Crisman believes. "The distances were fairly great, so it wasn't a case of grab a log and float over. We don't have any idea how they got there, but clearly they didn't walk there. They had to float there somehow and they had to float several miles. It doesn't seem like something that would be a casual journey. There must have been some sort of concerted effort by these people. It's neat because it suggests that seafaring is one of the early, really complex organized activities that humans undertook."

Crisman, who teaches courses in both New World and Post Medieval seafaring at Texas A&M University, dismisses the notion that primitive humans took part in primitive Carnival cruises, although he chuckles at the thought of a prehistoric Kathy Lee Gifford dancing on the bow of a dugout canoe.

In truth, seafaring was a very dangerous business until the last 150 years or so. The invention of better aids to navigation, such as lighthouses, and self-propulsion made traveling by boat much, much safer than it had been.

Given the vast array of human technological advances, such as the airplane, cars, computers, radio and television, Crisman puts shipping and its advances as the single biggest factor influencing development of civilizations, although he admits his decision is a bit biased.

"Who knows if there would even be any humans in North and South America if no ships or boats had ever existed," he says.

The prevailing theory over the past few decades has been that people walked from Asia to North America across a land bridge exposed during an era of low sea levels. In Crisman's mind, "The problem with that theory is that this was during the Ice Age, so there were massive areas of glaciation that were covering up all of the logical spots where they would have been walking. What's now Alaska and northwestern Canada would have been covered by a large sheet of ice. If they walked over that, what would they have been subsisting on?"

There have been theories that from time to time little valleys opened in the ice, allowing man's ancestors to travel more easily across the ice and to find food. Crisman concedes that theory is possible "but more and more people are thinking that the earliest American's weren't stupid people. They were living adequately. There is nothing that would have prevented them from making boats and it would have been infinitely easier and faster to travel along the edge of these glaciers and there would have been all sorts of resources in the sea they could have eaten. The great majority of Paleo-Indian sites are right along what would have been the coastal zones, which is where the food was. I believe they built boats, probably skin boats like native Alaskans do today. However, we may never know because those kinds of boats don't last."

Without doubt, ships and waterborne commerce played a significant role in building early civilizations. Nearly all of the ancient Near Eastern civilizations began on or near waterways. Crisman points out that the Samarians lived on the Tigris and Euphrates rivers, the Egyptians lived on the Nile and the Greeks, whose empire included many small islands, were very dependent on water travel.

Shipping was not the sole reason the early great civilizations lived near water. Water is essential to all life, so naturally people gravitated toward good water sup-

plies. The water also brought animal life that served as a source of food and provided water for crop irrigation. "But clearly, the ability to move food and goods was very important particularly to the Egyptians who needed to move bulk items, like stones used to build their monuments," Crisman says.

A group of Texas A&M nautical archaeology students and teachers excavated a ship found in the southwest corner of Turkey in the early 1990s. The ship dated back to the 1300s and had valuable cargo on board. What was just as striking to the scientists is that they found evidence that cargo vessels had been in use for a long period of time prior to the 1300s.

"The consequences of ships and shipping are massive on human development if you think about where the world was 500 years ago with all of these cultures scattered throughout the world," Crisman marvels. "In some cases these cultures were aware of each other and maybe even had very limited contact. Marco Polo was in China in the 13th Century, so Europeans were aware of China, but all of a sudden Vasco de Gama sails around the southern tip of Africa and reaches India and then within a couple decades the Portuguese are in China and all of a sudden these groups are in constant contact with each other. Our world today is based on those ships and explorers. They opened up foreign markets and imports. It was a tremendous leap in our consciousness of ourselves and our world. Think about how much has been learned in the past 500 years."

It seems certain that economics and commerce were the major drivers behind most early globetrotting. More than mere pride and sense of adventure could persuade explorers to risk their lives in search of new lands or even venturing by sea to known lands far away. "I finds it fascinating what people were willing to put up with to travel by ship," Crisman marvels. "It was not a pleasure cruise. Reading accounts from people back then, to be on a ship for several months at a time with no place to go, does strange things to you. We were not designed to live in close proximity to others with no possibility of getting away from them.

"It was a terribly risky undertaking. We are so safety and health conscious now, relatively speaking. To undertake a voyage from Europe to China, I'm not sure I would have had the courage 300 years ago to do something like that. They faced diseases like rickets and scurvy, plus exotic diseases like Yellow Fever. Your chances of coming back were not very good."

But the economic picture in Europe was not good, either, and the prospect of wealth outweighed the prospect of death. The Portuguese, for example, saw their sworn enemies, the Muslims in North Africa, getting slaves and goods from the interior of Africa. The Portuguese, whose tiny nation is perched on the Atlantic Ocean, believed they could also exploit the gold and ivory found in Africa's interior by sailing down the African coast and marching inland.

The Portuguese were so successful that they kept pushing down the African coast until the 1480s when, ultimately, they reached the southern tip of the continent. They realized they could sail around Africa, opening up the Eastern Asia markets, particularly the very profitable spice market. The Portuguese discovered they could transport far greater amounts of spices by ship than by overland animal convoy, thus beginning the country's century-long domination of the spice trade in Europe.

As was the case with Europe and Asia, it is impossible to write the history of the New World over the past 500 years without including ships. The Spanish were the first to make it to the Americas and they found incredible wealth in the form of silver, gold, dyes, tobacco and plants like vanilla.

Crisman believes those early Spanish explorers, like Hernando Cortés in Mexico and Francisco Pizzaro in Peru, did a huge disservice to many Europeans for centuries by finding civilizations that were very rich and easy to conquer. By 1600, other European countries decided that they wanted to try their hands at plundering the New World. Later explorers wrote accounts of hoping to find the same riches that the Spanish were bringing home, but few did.

"It's the same urge that gets people to buy lottery tickets," says Crisman. "Your chance of winning is pretty infinitesimal, but why not take a gamble. You may be the lucky one."

American society has re-oriented itself away from the water in the past 150 years, once widespread use of trains gave people the ability to travel inland with relative ease. Today we see more cars, planes and trains than we do ships. Jump back 150 years or so, to the 1840s and earlier, before railroads became widespread, and any goods that had to move any real distance did so by ship.

Crisman refers to an equation he found in a book to describe the importance of marine transportation in the 19th Century. "One small sloop carrying 34 tons of cargo can be navigated by two men and a boy," says Crisman. "The same load put on horseback would require something on the order of 350 horses plus the people needed to tend the horses and the food for the horses. The equation is stacked pretty heavily in favor of a ship."

Even after railroads were established, people still relied heavily on the nation's waterways to move commerce. The Erie Canal reached its peak traffic in the 1880s, some 40 years after the railroad boom began. The trend continues today. Far more commerce moves by ship and barge than by any other form of transportation.

"And it all began with mariners who explored new lands in hopes of finding something and persuading others to settle there and reap the harvest," notes Crisman.

Big state, big business

Marine commerce in Texas centers primarily around the state's 12 deep draft ports. As of 1994, the last year for which figures are available, Texas had six ports ranked among the top 50 nationally in terms of the tonnage of goods they handled annually. Houston ranked 2nd, Corpus Christi was 6th, Port Arthur was 14th, Texas City was 16th, Beaumont was 30th and Freeport was 36th, according to a report on the value of Texas Ports done by Texas A&M's Texas Transportation Institute (TTI).

The same study showed that about 350 million tons of cargo, the vast majority of which was petroleum and related products, came through Texas ports between 1990 and 1994 and "those figures have increased steadily since then," says John Basilotto, director of TTI's Center for Ports and Waterways (CPW) based in Galveston and a co-author of the study. CPW, created by the Texas Legislature in 1995, comprises a consortium of coastal universities including Lamar University, Texas A&M-Corpus Christi, Texas A&M at Galveston, The University of Texas at Brownsville, TTI and the Center for Transportation Research, including the Lyndon B. Johnson School of Public Affairs at The University of Texas at Austin.

The port value study determined that if the amount of cargo flowing through Texas ports increased by 1 percent, more than 2,000 jobs would be created with an economic benefit of about $40 million.

The study demonstrates just how dramatically Texas ports contribute to the economy in terms of employment, income, sales and taxes going to local, state and federal governments as of 1994. A small sample of those figures shows that:

- The Port of Beaumont employed, both directly and indirectly, 26,850 people, generated $4.9 billion in sales, $57.4 million in local taxes, $80 million in state taxes and $258 million in federal taxes.
- The Port of Brownsville accounted for 5,200 jobs, $542 million in sales, $6.4 million in local taxes, $8.8 million in state taxes and $28.2 million in federal taxes.
- The Port of Corpus Christi was responsible for 55,067 jobs, has sales of $10 billion and generated $120 million in local taxes, $166 million in state taxes and $537 million in federal taxes.
- The Port of Galveston employed 7,392 people directly and indirectly and accounted for $942 million in sales, $11 million in local taxes, $15 million in state taxes and $49 million in federal taxes.

Basilotto, who became director of CPW after retiring from the U.S. Army Corps of Engineers, says the Texas ports' impressive cargo figures and rankings nationally are even more surprising when you consider that the ports receive no money from the state. Competing states like Louisiana, Mississippi and Alabama all receive state subsidies for capital improvement projects, like new facilities, that increase the ports' revenues.

The words "states" and "competing" are often used in the same sentence when talking about ports. Public ports may be governmental entities in theory, but they operate more like private businesses when it comes to maintaining the bottom line. The Port of Houston Authority's director, H. Thomas Kornegay, proudly points out that his massive complex of public and private wharves spanning 25 miles along the Houston Ship Channel is entirely self sufficient when it comes to operating funds. The port has not reached Kornegay's ultimate goal of generating enough revenue to pay for capital improvements, like the proposed Bayport container terminal. Instead, the Port of Houston Authority is asking Houston residents to vote for a $387 million bond proposal to fund the first phases of the Bayport project.

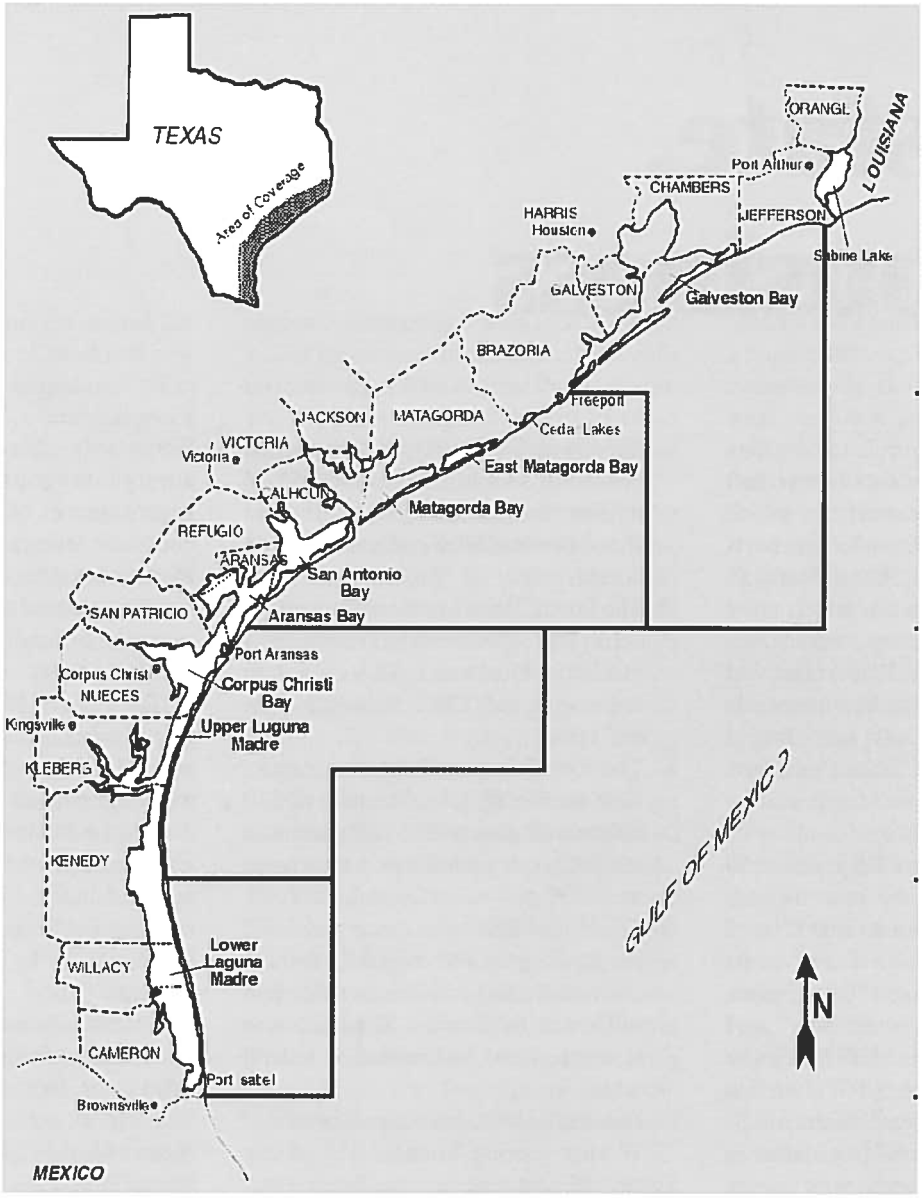
The Port of Houston has updated its own figures since TTI's 1994 study. As of 1997, the port's public and private marine terminals generate $7.7 billion dollars in business revenues annually compared to the $5.5 billion dollars reported in the 1994 study. The amount of cargo that flows through Houston's port has increased by 26 million tons during the same period.

Research shows the port also generates $525 million dollars annually in state and local taxes. Increases in cargo and vessel call activity are the primary contributing factors for the significant increase in the Port of Houston's economic impact status.

Numbers like that put a smile on Basilotto's face. The 74th Legislature gave Basilotto's group the mission of "supporting the state's role in the inland waterway and ports system in Texas," he says. "One of our big missions is to foster public awareness of the importance of ports and waterways to the economy of Texas while staying focused on the environmental conflicts and risks involved in water travel."

CPW has several other missions, like developing and testing new maritime technologies. For example, CPW is looking at ways to improve dredging so that it is more environmentally friendly.

The group is also charged with aiding transportation planners in preparing for future inland and coastal water transportation needs and assisting the state in defining the roles of marine and intermodal



transportation for sustainable development. The term "intermodal" is an old one of new significance. It refers to different modes of transportation working together to get cargo from one place to another. Without intermodal transportation there is no marine commerce. Freight needs some way of making it from manufacturers to ports and then to the customers. Intermodal transportation includes trucks, trains, pipelines and in some cases airplanes.

Landside access is becoming increasingly important as the percentage of cargo shipped in containers grows.

"Lanside access and ports are integral and must be viewed holistically," Basilotto explains. "Ports with the best intermodal access are the most likely to experience economic growth."

For the Port of Freeport, business is going bananas, literally. The port lured fruit processing giant Dole's banana business because Freeport offers a central location to ship bananas through the nation's heartland.

Freeport is one of the deepest ports in Texas, boasting a 45-foot channel, and it comprises a combination of public and private wharves. Ships on a par with the size of those entering Houston's port, on the order of 800 to 900 feet long, call on the private wharves at Freeport, says port director A.J. "Pete" Reixach Jr. Crude oil tankers call on Arco-Seaway; condensate ships head to the Phillips and Dow docks; and ammonia ships call on BASF. The public dock handles ships that are, on average, about 600 feet long.

The Port of Freeport, officially known as the Brazos River Harbor Navigation District, was created by legislature in the 1920s. It is a political subdivision of the state of Texas and, as such, has the power to tax and call bond elections. In that way it is similar to the Port of Houston.

An economic impact study done by an outside firm found that Freeport, although a small port, generates about $20 million to $25 million annually in customs duties. The port accounts for about 25 million tons of cargo per year passing through both public and private docks and the port directly employs 2,100 people.

MAP COURTESY OF TEXAS PARKS AND WILDLIFE DEPARTMENT

Cargo in a box

A roll-on, roll-off ship, commonly referred to as a RO/RO, drops its cargo of automobiles at the Port of Houston. RO/ROs are one of several types of specialized ships that make marine commerce possible.

By far the most dynamic change in marine commerce over the past 30 years has been in the area of containerized cargo. Shipping cargo in a big metal box seems like an obviously simple idea, but it is a relatively new concept in the centuries-old business of marine commerce.

A gentleman by the name of Malcolm McLean owned, among other things, a trucking company and a tanker ship called the *Ideal X*. One day in 1956 he decided to strap some of his loaded trailers to the top of the *Ideal X* and send it from New Jersey to Houston. That was the beginning of a steamship company that would later become Sea-Land, the nation's largest steamship company and one that specializes in container cargo.

By the end of 1956, McLean's company developed specialized cargo containers and by 1957 had built its first ship dedicated solely to carrying those containers. Today, the average container is 8 feet wide, 8.5 feet high and either 20 or 40 feet long. Container ships are rated by the number of 20-foot containers, or twenty-foot equivalent units (TEUs), they can carry. A 20-foot container is one TEU while a 40-foot container counts as two TEUs.

It is amazing that the simple expedient of placing cargo in containers has revolutionized marine commerce, but it has. Charlie Jenkins, container operations manager for the Port of Houston's Barbours Cut, Bayport and Galveston container terminals, likes to describe that impact in a lesson he refers to as "Containers 101."

Jenkins' example assumes a worst-case scenario, where there is no railroad access to a manufacturing plant. It also assumes that the factory manufactures an item that is easily stacked on pallets, like cases of soft drinks. Jenkins' example also assumes that this scenario includes 18 pallets of soft drinks because liquids are considered a heavy cargo and the standard container will accommodate 18 pallets of a heavy cargo.

Years ago, 18 pallets of soda came out of the factory and were put in a warehouse. Each pallet was handled individually by a forklift, requiring what Jenkins terms "18 labor units."

"When you handle a pallet with cargo you have the potential to damage that cargo and everyone sees what the cargo is, so you have the potential for theft, depending on the desirability of the product," says Jenkins.

Now, assume someone overseas wants to buy 18 pallets of soft drinks. A truck is dispatched to the warehouse, where the forklift repeats the same 18 cargo moves required to get the soft drinks into the warehouse. When the truck arrives at the railroad yard, it takes 18 more labor units to get the soft drinks into the warehouse there, and then another 18 labor units to get the sodas on the train headed for a port. Still another 18 labor units put the sodas in a warehouse at the port and 18 more forklift moves get the sodas from the warehouse onto a ship. Once aboard the ship, the pallets must be secured individually and they cannot be stacked very high because the weight of one pallet will crush another. When the ship reaches its destination, the whole process was repeated in reverse until the soft drinks reach the customer.

Today the soda company loads those 18 pallets into a container. "That container is now the warehouse, so those 18 pallets will be picked up at one time and transported," Jenkins says. "Assuming it is properly braced, the cargo won't be damaged because it is inside of a steel box. The box absorbs the damage. A limited number of people know what is in the container, so there is less theft if it is a desirable product. And every time you pick up the container you are moving 18 pallets at the same time. Moving one container or moving one pallet takes about the same amount of time, plus the containers can be stacked so ships can carry more cargo. Containers provide an economy of scale for the motor on the ship. The same motor now moves more cargo than it did before containerization."

Use of containers has helped the global economy, Jenkins contends, because the cost of shipping something internationally is now a small fraction of the total cost of the product, thus allowing for more competition among manufacturers.

Of all the vast variety of cargo that passes between continents aboard container ships, the most commonly shipped substance is air. That is because most containers are not completely filled with cargo and the ships usually carry many empty containers that the steamship company is moving from one terminal to another. The latter situation is readily ap-

PHOTO COURTESY PORT OF HOUSTON AUTHORITY

parent on shipping routes that include Asia and Japan, notes Jenkins. The U.S. trade imbalance with those markets means more empty containers leave the U.S. than arrive.

Most of the containers moving through Houston are either coming from or going to northern Europe, so the amount of imports and exports are fairly balanced.

Modern containerships are impressive. Their silhouettes are dominated by tall superstructures containing the bridges and by mountains of containers stacked in front, and sometimes behind, the superstructures. Container ships rarely carry their maximum number of TEUs but when they are what Jenkins refers to as "cubed out," they are spectacular pictures of taut symmetry.

Container ships have evolved immensely since the 1950s, going through several growth spurts termed "generations" by the industry. The first generation ships handled 1,000 or so TEUs and the second generation handled about 2,000 TEUs. For many years there was an unwritten rule in the shipping business that vessels could not be more than about 110 feet wide because otherwise they would not fit through the Panama Canal. By the end of the 1980s many shipping companies were part of vast transportation networks that allowed them to send goods from one coast to another by rail, truck or air quicker and less expensively than sending them by ship through the canal. The result was a class of vessels called "Post Panmax" that are 130 feet wide or wider. There are container ships roaming the ocean today that are capable of carrying 6,600 TEUs. These megaships are more than 1,100 feet long and 140 feet wide, but most likely future ships will be even bigger.

The shipping industry has done studies that show vessels capable of carrying 8,000 TEUs may be feasible. There are no ports on the Texas coast that can handle the largest container ships. They draft about 45 feet of water fully loaded and require channels that are at least 50 feet deep. Only the ports of Freeport and Corpus Christi are anywhere near that deep at 45 feet each. The Houston Ship Channel is 40 feet deep but it will be dredged to 45 feet by the year 2005. The channel will be widened from 400 to 600 feet at the same time, giving ships more room to pass. As it is now, large ships can barely pass in the landlocked part of the channel that extends to nearly downtown Houston. The close quarters forces port pilots to execute an odd maneuver officially known as the Suez maneuver, but more commonly called the "Texas Chicken."

When two large objects like ships pass close to each other at slow speeds, they create a low pressure area between them that draws the objects together. In order to defy physics, approaching ships head straight at each other at increasing speeds, building up mounds of foaming water in front of them. At the last second, the pilots steer right, trapping the built up water between them like a cushion, allowing them to pass without colliding.

While most goods are shipped in either 20 foot or 40 foot long containers, there are a number of container variations. Some, like the "high cube" container are as tall as 9.5 feet while others types are only 4 feet three inches tall. There are also very specialized containers, like those that carry chemical tanks. Chemicals and other liquids make up a very small percentage of container cargo but they pose a problem. How do you stack round tanks on top of each other or on top of regular containers?

The answer is sticking the round peg, as it were, into a square hole. In this case, the tanks are surrounded by square metal skeletons. The industry has even come up with a specialized container to ship F-18 fighter jets to buyers across the Atlantic Ocean. The planes go from Houston to Rotterdam in The Netherlands in containers that are 10 feet wide, 12 feet high and 40 feet long. "Every part of the plane, except the pilot and fuel, fits in that container," Jenkins says.

"Anything you can imagine gets shipped in containers," Jenkins continues. "We ship a lot of resin, paper products, cotton and Budweiser beer. We ship a lot of household goods, military tanks and parts to amusement park rides like roller coasters."

Sea-Land even shipped out the Ringling Brothers and Barnum & Bailey Circus from its terminal in south Florida.

The overriding idea is to pick a container that holds the most cargo without going over the container's weight limit. The average 20-foot container can hold about 53,000 pounds while a 40-foot container can hold about 67,000 pounds.

"There are two ways you can fill up a container," says Jenkins, continuing his dissertation on containerization. "You can weight it out and fill up the rest of the space with air, or you can cube it out by taking up all of the space without weighting it out. For instance, a shipment of Ping-Pong balls will cube out or fill a container without the container being too heavy. So the goal is to add more cubic volume to the container. The reason you use a 'high cube' container is because either the product is tall or you want more product in the box. If you are shipping lead bars, you will fill up only a small portion of a standard container, so you want to use a smaller container because it is less expensive to ship."

Containers bound for the U.S. are rarely filled to the weight limit, mainly because federal law prohibits traffic that heavy going across bridges, Jenkins adds. One reason rail is a popular shipping method is because shippers can load more weight on rails than they can on trucks. There are also some ports that do not have cranes powerful enough to lift fully loaded containers.

One thing all cargo containers have in common is the holes at every corner of the box. The holes allow cranes to grip the containers and they provide a place for the locking mechanisms that hold the containers together.

Houston's container facility is 300 acres of organized chaos choreographed in steel precision. There are 33 steamship lines doing business at Barbours Cut, the primary container facility in Houston right now. The Port of Houston owns all of the land, although it leases a portion to Sea-Land, which runs its own container terminal there. The Port of Houston and Sea-Land terminals service about 2,000 trucks per day and 1 million TEUs each year.

Freeport lays claim to being the second largest container terminal in Texas, moving 50,000 to 60,000 TEUS through the port annually. Reixach said his container business grows 5 percent to 7 percent each year and has so much potential for growth that the port is concentrating its resources and efforts on the container industry.

"We adopted a strategic master plan in 1993 or 1994 that called for conversion of Freeport to more of a container port," says Reixach. "At that time we were kind of a small sleepy little port that concentrated on bagged and palletized car-

goes, which over the years had been drying up because everything was going into containers. We felt that we needed to not only develop that part of our business but also find niches that would not necessarily compete with the likes of Houston and New Orleans. We did go after the banana business, which is containerized."

Freeport also does a bit of business with Barbours Cut, sending loads of containers by barge to Houston to "catch the mother ships," as Reixach puts it, headed across the Atlantic.

The master plan allowed Port of Freeport officials to buy a mobile container crane, renovate the docks to be more user friendly for the container industry, build a container yard and buy a new container handler. The port is in the process of building another dock to accommodate more ships. Since adopting the master plan, Reixach estimates the port has spent $15 million to $17 million to transform the port into a multi-purpose port focusing on containerization.

The City of Texas City wants to get into the container business and city leaders have visions of a megaport in their backyard. The most defining criteria for a megaport is one with a 50-foot channel, although one with a 45-foot channel might qualify. Typically, megaports handle large volumes of container cargo. Doug Hoover, chief of staff for the city of Texas City, says city officials view a new port as an economic development engine that will bring jobs and industry to Texas City.

Texas City already has permission to dredge a 50-foot channel — permission granted by Congress in 1986 — and is pursing the so-called Texas Gulf Coast Megaport under the auspices of the Texas City Foreign Trade Zone Corporation, a city-owned corporation.

The Port of Texas City as it exists now is a private port owned by the Union Pacific and Southern Pacific railroad companies. The port's sole purpose is to serve the city's petrochemical companies. City fathers have long thought about expanding the existing port to include public docks.

In the 1960s they bought Snake Island, now called Shoal Point, with the intention of someday using the land for port facilities. At the time, the island comprised about 375 acres of dredged material located immediately across the Texas City Channel from the private port. Since then, addition of dredged material has increased the island's size to about 1,000 acres, which Texas City is now trying to buy.

A crane aptly named "Big Arthur" offloads oilfield equipment at the Port of Port Arthur.

"That's the beauty of the island. It can continue to grow in years to come," says Hoover. In the 1980s, the city went to Congress to get permission for 50-foot channel to accommodate larger tankers being designed at the time. Texas City received congressional permission but the channel did not materialize because the trend of building large tankers ended. Talk of expanding the port died after that until a new city administration revived the idea in the mid-1990s.

Growth in the container market, Shoal Point's location and access to intermodal transportation — the railroads and trucks that are necessary to get cargo to and from ships — makes the island an ideal location for a container port, Hoover believes.

"Our forefathers conceived the idea of using that island to expand heavy industry. It was never conceived as a container port, but that really makes more sense and we like the idea," he adds.

The city hired a consulting firm to complete a feasibility study for the project. Among the study's findings was that since the city already has authorization for a 50-foot deep channel, it would be an ideal location for a container terminal that would accommodate the new generation of large container ships that require a 50-foot channel.

Hoover touts other selling points about the Shoal Island site, such as its advantage of being in an industrial zone, so there will be no adverse impact on residential subdivisions; an abundance of undeveloped landside property for development of satellite industries; it is much closer to the Gulf than Houston's facilities; there is access to one major interstate and three state highways; and there is access to two major railroad lines.

The project will cost about $300 million, which includes the cost of building a bridge from Shoal Point to the mainland. If the project goes according to plan, Galveston County residents will not have to bear the cost of dredging the channel or building the port. Texas City is seeking a private investor for the project, which Hoover said is an emerging trend in the port business.

PHOTOS COURTESY TEXAS DEPARTMENT OF TRANSPORTATION

A mobile container crane (left) sets a container on the back of a "mule," a specialized engine designed to move containers within a container terminal.

Containers are far as the eye can see (below) await transport out of the Port of Houston's Barbours Cut container terminal.

"People are waking up to the realization of why are we asking citizens to fund these things when the entrepreneurs should be taking the risk?" Hoover says. Port operations would be managed by the investor and Texas City would reap the benefits of increased tax revenues and increased money spent in the city by new businesses and their employees. "We're not asking the taxpayers to take the risk. We're asking private enterprise to do that. These are businessmen who are not going to make the investment unless they think it is worth it."

Hoover says Texas City has already talked with several interested investors. Once an investor is found, Hoover believes the new port could be seven to 10 years from completion.

At the gate to the Port of Houston's container terminal, the port authority controls cargo movement through the gates and port employees operate large mobile cranes that snatch containers off of incoming trucks or place them on outbound trucks. The port leases the giant wharf cranes — those used to load containers on ships —to stevedores. Stevedores are the people that the shipping companies hire to get cargo on and off of ships. The stevedores pay upwards of $500 per hour to use the cranes, which is a cost they pass on to the shipping companies.

"As terminal operator, we operate on behalf of the steamship lines that we represent," says Jeff Davis, assistant operations manager at the Barbours Cut container terminal. "For instance, we could be receiving a container from the Hapag-Lloyd steamship company. We receive it on behalf of Hapag-Lloyd. It is in our care and custody and we are responsible for its well being while it is in our possession."

Shipping companies drive the computerized tracking system that makes sure containers end up on the right ship or on the right truck. The process by which containers come and go is a logistical marvel.

"A maker of widgets comes to Hapag-Lloyd and says he has 500 boxes of widgets that he wants to ship to North Europe," begins Davis as he launches into an example of how containers move through the Port of Houston. "Hapag-Lloyd says, 'Okay, we'll put it in a 40-foot container and your booking number is ABC-1. We'll send you the containers and you get your trucker to bring it to the Port of Houston.' Hapag-Lloyd then enters the booking information on our computer system. The trucker brings the containers to the Port of Houston and when he checks in with us he says that he has a Hapag-Lloyd container going to North Europe on booking number ABC-1. When we bring the containers in, we verify that all of the information is correct."

If the booking information is correct, port employees note the day and time the shipment arrived, weigh the container and send the trucker to a specific site, or pad, to offload the container. Containers are grouped together by size, weight, their port of destination and by the particular ship that will pick them up. For instance, all of the containers bound for Rotterdam on a Hapag-Lloyd ship are kept together so they can be transferred to the ship quickly. Weight is extremely important in the container business because it determines how a ship is loaded. Heavy containers must be loaded first and as low in the ship as possible to give the vessel stability at sea.

The truck then drives to the specified pad and waits for a large gantry crane to pick up the container and place it on the pad. The gantry cranes roam the terminal like huge rubber-tired praying mantis' looking for a meal. Crane operators, who work for the Port of Houston, spend their days just looking for trucks to load and unload. Often, a truck dropping off a container will also pick up another container.

The container of widgets sits on the pad until, literally, its ship comes in. The steamship company, in this case Hapag-Lloyd, and the stevedores decide how best to load and unload the ship.

"Labor is the biggest cost when it comes to loading and unloading cargo, so the steamship companies want to load the ship in a way that is least labor intensive," Davis explains. "We try to stack containers in a way that will get them to the ship in the best order."

Continuing with Davis' example, when it's time for the widgets to leave the port, a gantry crane places the container on a specially designed truck, called a "mule," that takes the container to the ship. A wharf crane snatches the container off of the mule and places it on the ship. The whole process works in reverse with incoming containers.

With so many public and private entities involved, the container logistics process at Barbours Cut seems like a recipe for disaster because both public and private entities handle the same containers and they depend on a complex communications process to make sure that cargo moves efficiently through the port.

However, it is the symbiotic relationship, as Jenkins characterizes it, that makes the process work. The Port of Houston, steamship companies and stevedores realize that they rely on each other to make a profit, which is a mighty powerful incentive to work together because "their mistakes cost us money and our mistakes cost them money," Jenkins says.

Container logistics also rely heavily on the port's aging computer system — one that the port bought when Barbours Cut opened in 1976 and whose software has its roots in the 1960s. Jenkins freely acknowledges that the computer system is

The variety of cargo that passes through Texas ports is mind boggling. Almost any commodity imaginable spends some time on a ship before it gets to consumers. Crude oil and petrochemicals are the most common cargo on ships arriving and leaving Texas.

old but he says the software is continually updated so it keeps pace with the demands of business, for now. The Port of Houston is on the verge of spending several million dollars to install a new system, one that will basically operate like the current system only it will be "more efficient and user friendly," says Jenkins.

Given the complex logistics process, the question begs to be asked: How was it done before computers?

"Very slowly," laughs Davis.

"We like to joke about using stone tablets and chisels," adds Jenkins. If the computer system goes down, the port switches to a manual system that is "very time consuming and slow," he says. "It is very labor intensive and there are more chances for human error."

In truth, containerization grew up with computers. Although use of containers began in the late 1950s, containerization did not experience explosive growth until the late 1970s and early 1980s, which coincided with rapid growth in the computer industry.

Before computers entered the picture, ports kept track of cargo manually using paper and pencil. That may seem a difficult job by today's standards of cargo volume but it worked given the amount of cargo carried 40 years ago. As Sea-Land's Matt Hoag points out, a container ship docking in Houston may load and unload 1,000 to 2,000 containers before it leaves the dock. Back in 1950s, ships may have moved 200 to 300 pallets of cargo and that was considered a big job.

Steamship lines make regular service calls at deepwater ports. Most of the ships arriving in Houston are travel established routes between the U.S. and northern Europe. Ships on those routes generally take about a month to make a full tour. Enough ships are on the route that the six berths at Barbour's Cut are busy every day. Because of its banana business, Freeport receives many ships from the tropics and the port sends rice-laden ships to Asia.

Regardless of where the ships dock they share a common thread — they do not make money while they are in port. They make their money at sea because steamship companies are paid to get cargo from one place to another. One of the ways ports market themselves is by their ability to get ships in and out of the port quickly. At Barbours Cut, workers average loading and unloading about 30 containers per hour per wharf crane. Two cranes usually service one ship, so a job requiring moving 900 containers takes about 15 hours. The service is first-come, first-served.

Providing quick service is one part of what Jenkins calls "the package," or the combination of facilities, services and costs that attract business.

"When a steamship line is looking at its options of where it can dock ships to move cargo, they are looking at the package. First, ports have to have the facilities needed to handle the business— dock space, adequate cranes and general infrastructure to move the cargo. If you don't have that, you don't have the tools in your box and you can't work it," Jenkins explains.

"Then you look at the component costs — port costs, stevedoring cost, inland transportation cost for truck and rail, and the vessel cost. If I'm a steamship company and I'm sending stuff to Dallas, I might look at the ports of Houston and New Orleans. Both are equipped to do the job so I'm interested in which is least expensive. That doesn't depend on cheapest component. It depends on overall

TOP LEFT BY ROBERT R. STICKNEY; LOWER PHOTOS COURTESY PORT OF HOUSTON AUTHORITY

package. The port could be most expensive in the world and get all of the business it wants if the overall package cost is the lowest, and vice versa."

The Port of Houston tries to keep its costs as low as possible while also indirectly affecting the other component costs. For instance, the port indirectly controls stevedoring costs by the speed at which it can get containers to the wharf cranes, which are operated by stevedores. The quicker the containers get to the cranes, the less time it takes to load a ship. Since the stevedores rent the wharf cranes from the Port of Houston on an hourly basis, quick loading means the stevedores pay less in crane rental, which is a savings they pass on to the steamship companies. The port also indirectly affects trucking costs by cutting the amount of time the trucks stay in the terminal.

"We spend nickels to make others dollars because that will increase volume at the port. The port makes back its nickels through greater business," asserts Jenkins. "We are a governmental agency, but we have to make an operating return. We have to justify the use of every dollar. We run very much like a private business. We make a profit, but we rely on the tax base for building facilities like Bayport. Once we build it and use that money, the operations there will have to pay back the money to the port. It's not a black hole where the taxpayers put in money, and we get a huge advantage because we don't have to pay it back like a loan."

Instead, taxpayers get their money back through the economic opportunities that Bayport will provide over its life. The Port of Houston estimates that Bayport will create more than 28,000 new jobs.

The prospect of jobs and money at Bayport don't impress people living around the facility. About 2,500 people, most opposed to the project, showed up at a meeting on the terminal in August of this year, sending the message that the Port of Houston faces rough seas on the way to making Bayport a reality.

Ships travel deepwater channels, like the one through Aransas Pass on the Corpus Christi Ship Channel, to deliver their cargo at specialized docks, such as the bulk materials handling plant at the Port of Houston.

PHOTOS © STEPHAN MYERS

It's not always smooth sailing

Being a port often comes with baggage, usually of the political kind. All ports, or at least those that want to remain open and competitive, must deal with the environmentally charged issues of dredging and exotic species traveling in ballast water. Then there are proposed federal fees on cargo that could send business streaming from U.S. ports to Mexico and Canada.

The Port of Houston faces another political hurdle in the form of the proposed Bayport container terminal. Barbours Cut has experienced very quick growth. Between 1995 and 1997, the terminal had an annual growth of 17.4 percent in the number of containers it handled. The result was that the Port of Houston is now operating at near its maximum capacity of about 1 million TEUs per year. That meant the port had to look for another place to put a container terminal and Port officials picked Bayport, located about 5 miles from Barbours Cut and already home to a liquid cargo handling dock.

Estimates are that Bayport will handle 2 million containers per year by the time it is fully built out in about 20 years. Port officials plan to build Bayport in phases as business increases. "We won't go out and build a $1.2 billion facility and have it sit empty where it doesn't make any money," says Jenkins. "Our goal is to build facilities just in time for user demand so we don't run off business because we can't handle it but also so the facility is not sitting idle and being an expense with no revenue coming from it."

Knowing that Bayport would take some time to come online, the Port of Houston leased Galveston's container terminal and last fall got three steamship lines to call on the Galveston terminal. This year 60,000 TEUs will go through Galveston.

While Bayport may be good for the bottom line, it is not sitting well with residents of the area. The most common complaints aired at public meetings are that the new terminal is unnecessary, creates air, water and noise pollution, and will further increase traffic in the area because of the increased number of trucks that will call on the new terminal.

Jenkins believes the public outcry stems from residents fearful of "the industry that Bayport brings with it that creates jobs and makes our economy stronger. Everybody wants the golf courses but not the trucks carrying the boxes."

Kornegay characterizes the flap over Bayport as a "not-in-my-backyard" issue. "There are four petrochemical plants and a fifth planned for the industrial area surrounding Bayport. Yet I heard one of the citizens say he would rather have them build a chemical plant than a container terminal. I think that is emotion and not logic talking."

At the same time, Texas City officials are trying to make their dream of a megaport become a reality. Basilotto believes the Texas City location offers good highway and rail access and is closer to the Gulf of Mexico. "A megaport at Texas City is not out of the question. However, the Port of Houston's experience with container handling, its proximity to Houston and its tax base give it an inherent advantage."

Doug Hoover, chief of staff for the city of Texas City, believes the issue is one of power and control. Even before he became Texas City's mayor, Charles Doyle envisioned all of the Galveston Bay ports working together to form a regional port system, says Hoover. Doyle began his quest after taking office in 1994 but found Houston to be cool to the concept.

"Their definition of regionalization is a little different from ours," Hoover says. "Their definition is one of control and ownership, not just cooperation. They did make an offer to acquire and merge the facilities in Texas City and Galveston. Our concern was that the Port of Houston would acquire our property but put it in their land inventory and let it sit for years. Our objective is to use the site for economic development purposes and put it to use today, not 20 or 25 years from now."The ports of Houston, Galveston and Texsas Cityh held meedtings about three years ago, Kornegay remembers, but there was no talk of developing a regional port system. Instead, Texas City was interested in developing a joint mrketing program with the other two ports, an idea Kornegay declined.

"They wanted me to go out and do their marketing for them," he says. "It's tough for me to market for what at the time I considered to be my competitors."

Since that time, the ports of Houston and Galveston hav e made great strides in terms of cooperative ventures. Houston is leasing all of Galveston's container facilities and marketing the facility, and the two ports are talking about merging to form a regional port.

Kornegay has faced questions from Bayport area residents about why the Port of Houston will not consider establishing a new container terminal at Texas City. He answers by pointing out tht if he could build on a dredged material disposal site, then Spillman Island would be his first choice. Spillman Island is located immediatedly north of Barbours Cut. Its location makes it a far superior choice to even Bayport.

"Money aside, and you can never put money aside, but money aside, Spillman

Dredging of ship channels is an important, although environmentally controversial, part of keeping marine commerce moving in and out of the nation's ports.

Island is a great location. The location is wondrful," Kornegay says. "The problem is that it is a dredged material disposal site and I can't afforde to build on it."

Port of Houston engineers estimate that it costs about $250,000 an acre to build on what Kornegay calls "virgin land" like that at Bayport. The cost to build on a dredged materuial disposal site skyrockets to $850,00exas an acre because of extra ground preparation work needed to make the site stable.

"That is a substantial difference when you talk about building a 300-acre or larger container terminal," Kornegay says.

Texas City's Shoal Island site could pose the same problems as Spillman Island because it, too, is built of dredged material, Kornegay said, adding that he had not seen soil reports on Shoal Island at that time. He also said that Shoal Island, like Bayport and Spillman Island, has environmentally sensitive wetlands to worry about.

Texas City is still open to working with the Port of Houston to build a megaport, but it has to be on Texas City's terms, cautions Hoover. The city will go forward with the project regardless of what Houston does. "Our consultants tell us that there is room for two container terminals on the Gulf coast, each having its niche. Our niche is accommodating the larger ships and Houston can continue to have the smaller ships come in."

PHOTO BY STEPHAN MYERS

Small business

Sure, most people know about the deepwater ports of Houston, Galveston, Corpus Christi, Brownsville and the like, but more than half of the state's ports listed by the Texas Port Association are shallow draft ports, which can mean just as much economically to small communities as their larger cousins mean to the state's big cities.

There are ports like Anahuac, Liberty, Bay City and Sweeney.

The Port of Sweeney?

That one leaves Sweeney City Administrator Tim Moss scratching his head.

"There is not a Port of Sweeney," says Moss, who is listed as the port administrator but who is not sure how his city ended up on the list. "We're 20 miles from the water. I wish we did have one, but we've never had a port."

If Sweeney is a tale of what never was, then the Jackson County Navigation District is a tale of what could be. The district comprises a stretch of the Lavaca River, called Red Bluff Channel, from about Lolita to Lavaca Bay. At one time the channel supported barge traffic carrying oyster shells destined to be part of road building materials, a practice now outlawed in Texas.

"We're just sitting back in limbo," says William Stroman, the navigation district's general manager. "We have no port but we've kept the district active for the simple reason that we feel one of these days someone will come into the area and take advantage of navigable waters that tie into the Gulf Intracoastal Waterway. That means you can ship out of here all the way to the Great Lakes and Florida."

The district has some money saved from the days when it used to levy a tax. Stroman describes the idle tax dollars as seed money in case some future thinking company sees the benefits Red Bluff Channel offers. The seed money will allow the navigation district to pursue government funds to build a port.

The ports of Anahuac and Liberty find themselves in a similar situation to the Jackson County Navigation District. The Port of Liberty used to handle fertilizer and steel for industries there. Liberty also handled some molten sulfur from a now extinct sulfur mine that was located just north of the city, recalls George Wilcox, who as general manager of the Jefferson-Liberty Counties Navigation District oversees both ports.

Today, traffic through both ports is limited to pleasure craft, says Wilcox. Commerce may one day return to one or both. The navigation district is now negotiating with a company that disposes of saltwater from gas and oil wells to use the old sulfur company docks. That's not to say that Wilcox and the navigation district have not been busy.

The district is the primary supplier of irrigation water to rice farmers in Chambers County. It also supplies raw water to the city of Anahuac and it supplies water to a special utility district that has a water treatment plant that produces drinking water.

Wilcox is proud to say that the navigation district has established a waterborne education district. The navigation district has purchased two U.S. Coast Guard surplus buoy tenders that are being modified to make them floating classrooms for area school children.

The Port of Bay City is a little misleading because it is not in Bay City. The port is located on the Colorado River about 15 miles above the Colorado River locks. Its principle user is the Celanese Chemical Corp., whose plant is adjacent to the port. The company uses the port as a turning basin for its barges, which transport materials and products between the plant and the Port of Houston, says Harold Martin, port director.

The port and its 15 miles of barge channel were built in the 1960s, primarily to lure Celanese Chemical Corp. to the area, notes Martin.

PHOTO COURTESY TEXAS DEPARTMENT OF TRANSPORTATION

The Future

Will there ever be a time when ports are not needed?

"No way," answers Kornegay quickly, almost before the question is finished. He echoes the feelings of ports throughout the country. While ports will be around for many years to come, the way in which they deal with marine commerce will change because change is inevitable.

"In my 25 years with the Port of Houston Authority, the port has changed dramatically," Kornegay says. We handle so much more cargo in a lot fewer facilities than we used to because of containerization. When I came here, every dock was full of cargo every day. Now we have some docks that may not be full every day despite the fact that we are handling more cargo."

He admits that his crystal ball gets a bit fuzzy looking more than five years into the future, but it is a sure bet that containerization will continue to be the most dynamic segment of the marine shipping industry.

"We are beginning to put stuff in containers that 10 years ago people would have never dreamed that it would be economical to do, such as cotton and automobiles," says Kornegay enthusiastically. "I see containerization continuing in that direction. More and more and more cargo will be containerized. But I don't think we will ever see everything being containerized. There is too much cargo that just doesn't fit."

Steel pipes, plates and coils, chemicals, grains and oil are best shipped the way they are now, in bulk carriers.

Ports will also become even more business like, foresees Freeport's Reixach.

"I personally think that just as industry has seen the benefits of downsizing and rationalizing services and mergers and things like that, the public port industry will see the same benefits as we enter into this new century," predicts Reixach.

Many of the 140 or so deepwater ports, at least the ones along the Atlantic and Gulf coasts, will join together to form regional ports. Many medium and small ports that have created niches for themselves will align themselves with larger ports for the purposes of sharing equipment, marketing strategies and information, Reixach believes. In Texas, Reixach foresees the ports at Houston, Galveston, Freeport and perhaps one other joining to form a regional port.

Aside from the cost savings, a driving force behind regionalization is that federal funds earmarked for maintenance

PHOTO COURTESY TEXAS DEPARTMENT OF TRANSPORTATION

dredging of ports are drying up. More and more ports are vying for fewer dollars. "The smaller ports, the less productive ports are going to be competing with the more productive ports and it will be a tough fight when they go to Washington to ask for maintenance dollars for dredging to keep their channels open. Many of those small ports will be forced to close."

Two issues are the most pressing for the future in Kornegay's mind. One, steamship companies continue to build larger and larger container ships — ships that can fit in only the larger and deeper ports. As it stands right now, the Port of Houston cannot handle the larger ships, those carrying 6,000 TEUs or more, because those ships require a 50-foot channel. Even when the Houston Ship Channel dredging project is completed, Houston's channel will be 45 feet.

"The steamship lines build ships as big as they want to build them regardless of how many ports can handle them. Then they expect the ports to make the improvements to fit the ships," says a frustrated Kornegay. "This is the only industry I know that works that way. Can you imagine a car manufacturer building a car bigger than the roads and then saying to the government, 'Why don't you fix the roads?' It's just illogical."

It would seem an easy thing for the ports across the nation to link arms and refuse to make the expansions, thus giving the larger ships no place to load and unload cargo. A steamship company that cannot get its cargo on shore will not stay in business long. The process should be easy because ports are exempt from federal anti-trust laws. In theory, ports across the nation have the power and ability to set port prices nationwide but "we can't even link arms and agree on fixed prices, so I don't think there is any hope of us linking arms against the steamship lines."

The other issue is dredging, a controversial topic not limited to ports. Ports must not only dredge to keep their channels open, but they will have to widen and deepen channels, as Houston is doing now, to remain competitive. Any dredging project, particularly those that call for new dredging, bring loud protests from environmentalists concerned that the dredging will destroy marine habitats and increase salinity along the channel, possibly killing the life there as well.

"We must learn to dredge in a way where it is not an environmental issue," Kornegay believes. "Right now, people look at us and say that we are dredging up all of this bad material when in fact the laws and rules we had for years allowed people to put that bad material there. Now it is our problem because we have to move it out of the way. The ports, on the other hand, have to be more flexible and learn to use the non-contaminated material in beneficial ways like we did."

The Port of Houston's example of how to use dredged materials sits on Atkinson Island, which is situated next to the Houston Ship Channel in Tabbs Bay between Baytown and LaPorte. There, volunteers used dredged material to fill up a 200-acre site that had been underwater. Under the watchful eye of Eddie Seidensticker, a plant ecologist and range management specialist who is also coastal plant specialist for the U.S. National Resources Conservation Service, workers planted the newly formed wetland with marsh grasses. The constructed wetland has blossomed and offers a promising solution for what to do with the 30 million to 35 million cubic yards of material that results each year from dredging of federally authorized navigation channels in Texas. The dredging project planned for the Houston Ship is expected to create enough dredged material to build 25 to 30 cells of 175 to 250 acres each.

Kornegay is also concerned about the harbor use fee that is proposed by the federal government on imports to the U.S. He fears it will send business to Canadian and Mexican ports.

In about 1986, the federal government passed a harbor maintenance tax. Until that time, dredging of ports had been paid for by the federal government out of the country's general treasury. The harbor maintenance tax was assessed on both imports and exports at a level that was expected to pay for 40 percent of the maintenance dredging done on U.S. ports annually. Government number crunchers hit the 40 percent mark right on the head, collecting revenues that were almost exactly 40 percent of the country's dredging expenditures. But four years later, the government tripled the tax and collected 120 percent of the money it needed to pay for dredging. To this day, Kornegay says he has not heard any justification for increasing the tax.

Opponents of the tax challenged it in court on the grounds that the U.S. Constitution prohibits taxes on exports, a point that the U.S. Supreme Court upheld. After that decision, the federal government decided it needed another means to recoup dredging dollars. For reasons still unknown to Kornegay, the government decided it needed to replace the harbor maintenance tax revenue dollar for dollar, meaning the government again wants to collect 120 percent of the money it needs to dredge U.S. ports.

Kornegay remains optimistic about the harbor use fee, saying he believes the fee will ultimately be defeated.

Putting on his fortuneteller's hat, Kornegay foresees continued, if not overlooked, prosperity for the country's ports and for marine commerce in general. Ask average citizens how imports and exports, especially imports, affect their lives and they will be strapped for answers until someone points out that their cars, clothes, toothpaste and much of their food is brought by ships to the U.S. from the rest of the world, Kornegay contends.

"I think American ports are in great shape today and their future is bright," he says. "I think every person in the United States reaps the benefits of having great ports here. Unfortunately, the ports work so well that people don't understand how well they really work." ■

NOTES

Rayburn returns to his roots with Sea Grant Program

COLLEGE STATION – Twenty-one years ago, when Texas Sea Grant was still in its early years, Ralph Rayburn worked for the program as a county agent. Today, he returns to the program to help lead it into the next century.

Rayburn took over as Texas Sea Grant's associate director for outreach on Sept. 1. In this position, he will serve as head of Texas Sea Grant's Marine Advisory Service (MAS), which includes six marine agents, who are stationed in coastal counties, and seven marine specialists.

Rayburn said he looks forward to not only returning to the program but also to working alongside some of his mentors, many of whom are still with the program. He said he hopes to use some of his experiences working at the state level to draw attention to the program.

"The good that the Sea Grant staff and researchers are doing in service to the state has often gone unheralded," he said. "One of my objectives is to bring that into the focus of the state and The Texas A&M University System."

Throughout his career, Rayburn said, he has maintained close ties to user-groups along the coast. He also has a developed a background working with state legislators in Austin and the U.S. Congress on marine issues. Rayburn said his new position will give him the chance to take advantage of this background and help the Texas Sea Grant College Program.

"I saw the opportunity to take the experiences I've had and the contacts I've made to help the people in the program meet some of the goals they've set for it," he said.

Texas Sea Grant director Robert Stickney said Rayburn brings to his new job the experience, knowledge and ideas needed to effectively lead MAS into the 21st century. As head of MAS, he will not only direct the agents and specialists who work in the trenches but also make personal contacts with Texas Sea Grant's constituents, who share a common interest in and involvement with the marine resources of the state.

"I am convinced that Ralph Rayburn will provide dynamic leadership for MAS and, with the vision he will bring to the office, will help us expand our ability to deliver our products – information and education – to the public," Stickney said. "This is truly an exciting opportunity and I look forward to having Ralph on the team."

Rayburn moved to Texas Sea Grant from the Texas Parks and Wildlife Department where, for the past eight years, he served as the director of intergovernmental affairs. In this role, he acted as the agency's liaison with the Texas Legislature, U.S. Congress and other federal and state agencies. He has also served as director of coastal fisheries for the agency and was responsible for implementing the state's shrimp management and artificial reef programs.

Rayburn spent 12 years as executive director of the Texas Shrimp Association where he represented the association at the state and national levels and helped resolve the dispute between conservationists and shrimpers over sea turtles.

He holds a bachelor's degree in zoology as well as a master's degree in biological oceanography – both from Texas A&M. After graduating from Texas A&M in 1969, he served in the U.S. Army.

—Mark Evans

Gulf conference proceedings now available

COLLEGE STATION – Bringing together educators, scientists, policymakers and interested citizens, the Sharing Our Gulf conference offered valuable insights into the issues currently facing the Gulf of Mexico. These insignts have been assembled into a conference proceedings now available from Texas Sea Grant.

The three-day conference had an ambitious agenda. It covered a wide range of issues, including pollution and hypoxia, beach trash, marine education, sea turtles and the fisheries. Papers from these presentations are included in this book.

This proceedings was assembled not only as a record of the conference but also as a valuable resource to anyone interested in the Gulf of Mexico and the problems it faces. With this book, readers will come to understand some of the issues facing the gulf as well as some of the solutions offered by scientists.

"Sharing Our Gulf: A Challenge for Us All" is available for $20 from Texas Sea Grant. Books can be ordered from the program at: 1716 Briarcrest, Suite 603; Bryan, Texas, 77802. For more information, call (409) 845-3767.

O'Connell uses recirculating system for bait

COLLEGE STATION – Every fisherman knows what it feels like to finally reach that favorite fishing hole and pull out that rod and reel only to find a bag full of dead bait.

A Texas Sea Grant marine agent has found a solution to this age-old problem. Working with bait dealers along the coast, Calhoun County marine agent John O'Connell is using recirculating systems and oxygen to enhance water quality and bait survival.

O'Connell said he often hears complaints from bait dealers on the coast about losing as much as 50 to 80 percent of their bait overnight. This loss is often caused by a lack of oxygen in the water of bait tanks. By injecting oxygen into the water, he said, dealers can keep their bait alive longer.

"You can maintain oxygen levels well above air saturation," he said. "That's going to increase their bait survival and the amount of bait they can carry."

This translates to a big savings for dealers, he said. For example, if a dealer maintains a stock of 100 quarts of bait in a tank and sells it for $12/quart, the merchant can lose $600 in potential revenue overnight if 50 percent of his bait dies.

O'Connell also recommends a recirculating system for bait dealers who have problems with silt or varying salinity levels in water used in bait tanks. Typically, dealers draw the water for their bait tanks from a local waterway, such as a bay or marina. This can create problems, especially in times of heavy rainfall, which can dilute saltwater.

A recirculating system circulates the same water throughout the tank over and over. Filters used on the system remove waste and silt. These systems give dealers better control over water quality, O'Connell said.

"One of the advantages is that the bait dealer is going to have better control over some environmental factors that he may not have had control over in the past," he said.

Recirculating systems also help save water, he said, which is especially critical for inland bait dealers who sometimes depend on well or city water. By circulating the same water over and over for a few weeks, bait dealers use less water to maintain their tanks.

—Mark Evans

NOAA Offers improved access to Gulf of Mexico satellite images

Those who track ocean features now have near real-time, high-resolution data from the National Oceanic and Atmospheric Administration's polar-orbiting environmental satellites.

NOAA's CoastWatch program, which maps the coastal oceans daily, relocated a satellite antenna and installed enhanced hardware and software to ensure unobstructed near real-time access to high-resolution images of sea-surface temperatures. Images available from this location in Miami will cover the eastern tropical Pacific Ocean, northern South America and Central America, and the entire Gulf of Mexico and Caribbean.

The installation of the hardware and software was done by the SeaSpace Corporation of San Diego under contract with NOAA. "Daily sea surface temperature products will be available from the CoastWatch Caribbean Regional Node Web site within hours of acquisition," said Kent Hughes, manager of the CoastWatch program in Suitland, Md. "This information is used by a variety of people - meteorologists, fisheries scientists, environmental managers, and commercial and recreational fishermen. The improvements we've made means that they can routinely use these products to accurately detect and track ocean features."

The satellite data also are used by various NOAA agencies to support severe weather forecasting, fisheries research and management, and regional ocean and coastal science projects. Imagery will also be produced in coastal areas both before and after hurricane passage to assist in evaluating the impact of hurricanes at landfall. Future use could include studying wild fires, volcanoes and volcanic ash clouds.

The antenna and software were installed at NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, where scientists are studying hurricanes, ocean current and temperature structures, ocean/atmosphere chemical exchanges, and the coastal ocean. CoastWatch data will be used to supplement data collected by research ships and aircraft, volunteer observing ships, radar, acoustics, drifting buoys, and other types of instrumentation as well as numerical and statistical models.

NOAA's mission is to describe and predict changes in the Earth's environment and to conserve and manage wisely the nation's coastal and marine resources.

MARINE

BY MARK EVANS

Ten miles east of Corpus Christi a skinny, wind-swept island has become embroiled in a debate over the future of the local economy, the protection of the island's environment and whether people should develop on barrier islands.

North Padre Island separates the shallow Laguna Madre from the Gulf of Mexico. It's home to salty breezes, tall grasses and lots of sand. Rattlesnakes, coyotes, jackrabbits and seabirds make their homes on this barrier island. But like many barrier islands, North Padre Island is also home to a growing human population – 8,000 people at last count.

It is this human population, along with that of neighboring Corpus Christi, that has made the island the center of attention in recent months. Local county and federal officials have proposed reopening Packery Channel, a pass that separated Mustang and North Padre Islands until the opening of nearby Aransas Pass caused it to fill in with sand in the 1920s. But the project has met with opposition. In June, Nueces County residents voted down funding for the project in a bond election.

If the channel is reopened, proponents say the project will pump more than $750 million into the local economy over the next 18 years and create 3,500 jobs. Meanwhile, critics of the project charge the channel is ill-conceived, poorly designed, a public safety hazard and will not have nearly the economic impact that some people predict.

Reopening Packery Channel

The $30 million project calls for the reopening of the 3.5-mile pass from the Gulf Intracoastal Waterway at the Laguna Madre to the Gulf of Mexico. The channel would be dredged to a depth of seven to 11 feet, depending on the location, and 1,400-foot long jetties would be built to help keep the pass from again filling with sand. The project also allows for the construction of beach and picnic pavilions, bathhouses, concessions facilities, a public boat launch and marina, boardwalks and nature trails on the Gulf of Mexico end of the channel.

In 1996, the Nueces County Commissioners Court hired Corpus Christi's Naismith Engineering to plan the project. The company found the reopening of Packery Channel would not only pump money and jobs into the local economy but also promote economic development in the county.

The firm found that part of this development would come by providing amenities – bathhouses, parking, concessions, etc – to people visiting the county's beaches on North Padre Island. Currently, Corpus Christi ranks second behind San Antonio as the state's top tourist destination.

Nueces County Judge Richard Borchard says that since the oil and gas industry bottomed out in the 1980s, Corpus Christi has had to diversify its economy and bring in new money. Courting tourists is one of the ways the county has tried to diversify the local economy, he says. By opening the Texas State Aquarium and acquiring the USS Lexington, the county and city hope to draw more tourists to the area.

"We're trying to provide amenities for the people who come here," he says. "The number one tourist attraction to our area is the beaches, so we must provide something for tourists and also for the people who live here."

Although critics say the reopening of Packery Channel will only benefit people living on the island, Borchard says that's simply not true. Without growth, he says, a community becomes stagnant, and everybody pays.

"What benefits one community benefits all," he says. "If one part of the community goes down, it hurts the entire community. If we have an increase in value, and we bring in infrastructure that brings in tourism and construction, that creates jobs and increases the value of property. Therefore, it benefits the other part of the community by not increasing taxes."

In June, Nueces County voters rejected a $38.5 million bond package — $10.5 million designated to fund the county's share of the Packery project — that would have funded not only the reopening of a boat pass at Packery Channel but also the raising of the John F. Kennedy Causeway, which connects the island to the mainland, and a 200-acre county fairground in Robstown.

Borchard says the commissioners are still trying to figure out exactly what the voters were against – the tax increase, the packaging of the three projects on one ballot or the projects themselves.

"The public said it didn't want to pass bonds to finance these projects," he says. "We have to respect that. We're trying to find out what part of it the public did not want."

Opponents question project's design, environmental impact

Local Sierra Club representative Pat Suter says the county used the raising of the causeway, which is favored by many people, to get people to approve funding of two unpopular projects – reopening Packery Channel and building the Robstown fairground.

"By combining those three projects, they thought they could coerce the public to vote in favor," says Suter, also a member of Citizens Against Blackmail. "The public obviously didn't buy it."

Suter says she can't justify spending all of that money on a project that would benefit only those people who live adjacent to Packery Channel and who would see their property values jump.

"The Padre Islanders seem to think that the rest of Corpus Christi owes it to them to raise the John F. Kennedy causeway and to dig Packery Channel," she says. "The feeling against the Padre Islanders out there is fairly strong in Corpus Christi because most of those people have fairly expensive homes on those canals (on Padre Island)."

With Packery Channel, she says, community leaders are trying to create a tax base

ADVISOR

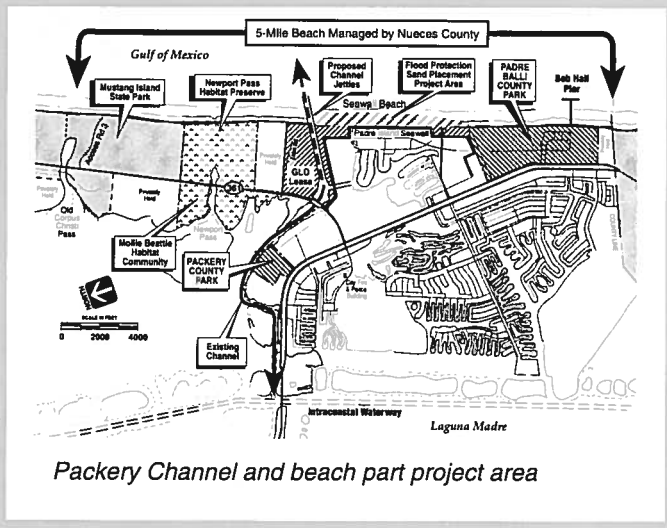
on Padre Island, but it is wrong for the county and the city to encourage development in an area in which the city has a hard time providing basic services such as streets and sewers. The city simply can't keep up, she says.

Besides the way in which the bond issue was handled, Suter says she's also opposed to the Packery Channel project for environmental reasons. Washover passes, such as Packery, are channels that are open only during times of extreme high water. In the case of a hurricane, they absorb the energy of the storm surge by opening and providing an outlet for the water. Reopening washover passes lessens this ability, Suter says.

These passes also fill in because many of Texas' rivers have been dammed so the flow of water along the coast is not enough to keep passes open without dredging, she says. Historically, Packery Channel connected the Gulf of Mexico to Corpus Christi Bay. However, as soon as Aransas Pass was opened by dredging, the pass slowly filled with sand because Aransas Pass had sapped the energy of the region's coastal water flow.

While Suter opposes Packery Channel, she says she would support opening a pass at another location, such as nearby Fish Pass or Yarborough Pass. These locations would have less negative impact on the environment and could even improve circulation in the Laguna Madre, helping to reduce its traditionally high salinity levels, she says.

Dr. Richard Watson, a coastal geologist out of Port Aransas, has been an outspoken critic of the Packery Channel project. In the 1970s, Watson spent three years studying Mustang Island's Fish Pass, which filled in soon after it was opened. Proponents of the Packery Channel project accuse Watson of being paid by the city of Port Aransas to kill the project, a charge Watson flatly denies.



Packery Channel and beach part project area

"If building the pass would work, I would be in favor of it, but with the short jetties and no natural water flow to keep it open, the maintenance costs would be absurdly high," he says.

Watson says project designers grossly underestimated the jetty length and the dredge maintenance costs needed to keep the pass from filling with sand. Currently, he says, Mansfield Pass has the shortest jetties – 2,300 feet – on the Texas coast. To keep the pass open, officials spend $537,000 a year on dredging. The jetties planned for Packery Channel are 1,400 feet long, and dredging costs are estimated at $400,000 a year.

The numbers don't add up, Watson says. Using shorter jetties than those at Mansfield Pass, Packery Channel planners arrive at a much lower cost for keeping the channel open. Mansfield Pass is a better pass and has more water flow than Packery, he says. This flow reduces dredging costs by helping flush out sand and keep the pass open.

"With the shortest jetties of any navigation inlet on the Texas coast by 900 feet and the shallowest channel, they were estimating dredge maintenance costs of less than half of that of any inlet along the Texas coast," he says. "You don't have to do any calculations to know that's just nuts."

Texas has too much sediment moving along the shoreline for Packery to stay open with 1,400-foot jetties, he says. Even if developers built longer jetties, he says, they would make the inlet navigationally safe but it would still have horrendous maintenance costs.

Watson says the most successful passes open into big, deep bays, have a straight, short channel, long jetties and a river running into the bay that forces water to flow out the channel. Packery meets none of these criteria, he says.

Some people pushing the project say the channel will improve salinity levels in the Laguna Madre. However, because the channel empties into a shallow portion of the Laguna, Watson says its effects on water circulation and salinity will be minimal and localized to an area near the mouth of the channel.

The channel also may pose a safety hazard to boaters who head out in the morning, when the water is calm, and return in the afternoon when they may find waves breaking in the channel's entrance, making it difficult to navigate safely, he says.

"The only real benefit to anybody is to the owners of the land where they can develop it east of the channel," Watson says. "I think the whole thing is so the developers can get rich. Frankly, even if they build it, it isn't going to work and they're probably going to end up letting it close because it's going to cost an absolute fortune to keep it open."

Watson says Padre Island landowners will still make a lot of money because they will sell land on the promise of having a good inlet.

"The developers may build big, fancy hotels, counting on having the good inlet, but they're going to be surprised when they turn out to have a very bad inlet or maybe even none at all," he says. "It'll certainly help sell land and raise the land prices out there. It may also help raise taxes."

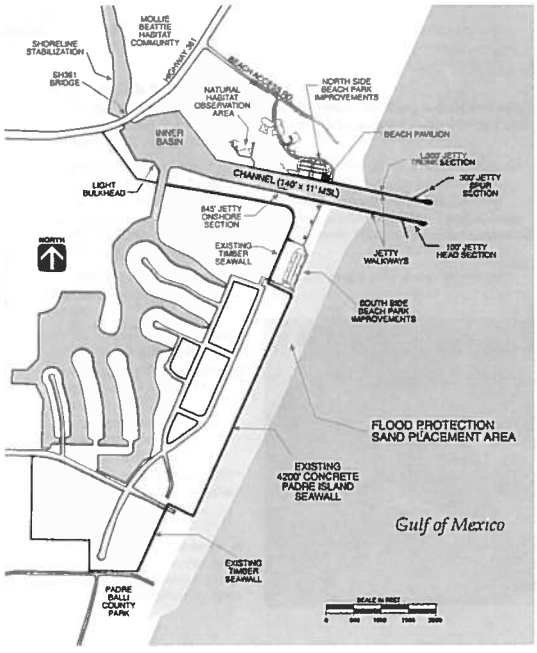
DRAWING COURTESY OF NAISMITH ENGINEERING, IN C.

Dr. Paul Montagna, a researcher at The University of Texas Marine Science Institute in Port Aransas, says history shows that successful channels look very different than the one proposed at Packery.

"I can't help but feel the whole thing is about development anyway," he says. "It has absolutely nothing to do with the environment. It has to do with the use of taxpayer dollars to subsidize development. If there's an ecological benefit, I can't imagine it being anything but very localized in that area."

Studies have shown that Aransas Pass has tied up most of the energy in the Corpus Christi Bay system, he says. Any pass that is opened will require a lot of expensive maintenance dredging to keep it open.

"The problem here is that in Texas the tidal range is only two or three feet on average," he says. "We just don't push a lot of water in and out of passes around here."



Proposed project components including Packery Channel, beach parks, renourished beach and habitat conservation areas.

Even with dredging to keep the proposed pass open, Montagna says he doesn't believe the project will stimulate so much development that the tax revenue will pay for the project as some people may hope.

"I was always astounded that someone was able to predict so much economic development a few miles away from an existing pass," he says. "That part just doesn't make sense to me. If that could happen, why wouldn't it have already happened at Port Aransas. It's not like we're completely inaccessible."

Dr. John Tunnell, director of the Center for Coastal Studies at Texas A&M University-Corpus Christi, says that while Packery Channel may attract some new development, the boat pass won't have nearly the impact that people are projecting.

"I don't think it's the pie in the sky that the people who are on the economic end of things are proposing for it," he says.

The western Gulf of Mexico is a rough place for boats, not at all like the calmer waters around places such as Miami, he says. He says he is also leery of the project because plans call for it to accommodate mainly small boats, such as those with outboard motors.

"As long as this is a small channel in Packery, I think it's going to wind up being a chain around the neck of the people because they're going to have to dredge it every year or every three years, depending on who you talk to," he says.

Tunnell says he doesn't necessarily see any adverse effects – positive or negative – on the environment as a result of the project. But, he says he disagrees with using public money to fund a project that will benefit just a few people.

"If the developers were willing to put up the money for it, then I would say let them do it," he says.

Encouraging any development on barrier islands is unwise because they are so susceptible to storms and environmental changes, he says. When storms do come along and damage homes and property, taxpayers are expected to help pay for that damage. In effect, he says, people living thousands of miles away from the coast, such as in Ohio or Utah, pay for people to live on the beach through federally funded insurance plans.

"My philosophy comes from my scientific standpoint of not developing these barrier islands beyond what they are capable of sustaining," Tunnell says. "They are dynamic ecosystems, and you can't stabilize a dynamic ecosystem. We've seen that with the erosion that has taken place along the Texas coast."

Supporters say project good for community

John Michael, project engineer for Naismith Engineering Inc., says Packery Channel was designed with Mother Nature in mind. They're reopening a channel that was created by nature and only closed after humans intervened by constructing Aransas Pass, he says.

"From an ecological standpoint, we're reestablishing a natural pattern to the Laguna Madre and Corpus Christi Bay system," he says.

He counters criticism of the project by saying the project was thoroughly examined in a peer review conducted by the Texas General Land Office. To ensure the channel's success, he says his firm hired a leading coastal engineer to determine the technical feasibility of the project — jetty length, width and orientation.

Michael admits the channel will eventually fill with sand if not maintained. Every inlet on the Texas coast eventually fills in if not dredged, he says, except for those inlets with sufficient flow of freshwater to the Gulf of Mexico.

"It's the nature of the beast," he says. "All inlets will silt in with sand if not maintained. Packery Channel is no different."

The one question that remains is how much money Nueces County needs to set aside annually to pay for maintenance dredging of the channel, he says. Sand from this dredging will be used to renourish the beach in front of the Padre Island seawall on the island's Gulf side.

Contrary to claims made by some supporters of the project, Michael says the channel will have only minor effects on the salinity in the Laguna Madre, but if anything, these effects would be positive.

As far as safety concerns, he says any navigational structure can be dangerous just like any freeway can be dangerous. The responsibility falls on the boat's captain to keep track of weather conditions, make sure they have safety devices onboard and make the best decisions possible, he says. This responsibility is not unique to people who would use Packery Channel. It applies to boaters everywhere, he says.

"Commercial and recreational fishing comes with a lot of responsibilities and those responsibilities fall on you as the captain," Michael says.

Naismith Engineering and the county

have worked hard to put together a plan that balances development with the environment, he says. The county needs to spur development or it's going to have problems, he says. By opening Packery Channel and creating recreational amenities for the county's beaches, he says, the county can better compete for the tourist dollar.

Plans call for limiting development to the south side of the jetties protecting Packery Channel. Land on the north side would be set aside for habitat protection and environmental education programs.

Packery Channel

"We worked on putting together a land that would set aside habitat on public lands," Michael says. "We budgeted monies to purchase private property so we could increase the overall holding of land set aside for habitat protection."

However, on the south side of the jetties, he says officials want to encourage development at the highest dollar per square foot, attracting resort hotels such as Hyatt or Hilton rather than mid-range chain motels. Michael says the area is missing the convention- and tourism-related development seen in many coastal communities.

Michael says he would like to see Packery Channel built because it's important for the community. It will take Corpus Christi to the next level, the level it needs to be to compete in the tourism market. It also will provide some first-class beachfront, recreational amenities that the city currently does not have, he says.

"Having said that, I don't want to wake up some day in 15 years and realize we look like Houston-Galveston," he says. "I grew up in Houston, and I don't want that for this town."

John Trice, a member of the board of directors of the Padre Island Business Association, says that even with the opening of Packery Channel, North Padre Island will never become a Miami Beach, or even a South Padre Island, because of the tight controls and limited land available for development. Eighty-two percent of the land between the Padre Island National Seashore and Port Aransas is either in state or federal trust and not available, he says.

"We have a very limited amount of space on Padre Island that can be developed," he says. "With Packery Channel, the quality of that development will be much higher because the types of people who will want to come here and develop will be of a caliber that they will do a much higher quality of development."

The island is going to develop at some point, he says. It's inevitable. Texas has only a limited amount of coastline available for development, he says, and some of that coastline is at North Padre Island. A reopened Packery Channel will attract developers who have the money to build a higher quality, more environmentally sensitive development than would occur otherwise, he says.

South Texas also needs to create jobs and a tax base, he says. Packery Channel can help with that.

One of the charges leveled against the project by critics is that the land immediately adjacent to and near Packery Channel is owned by one corporation – Asset Development Corp. – that has the most to gain if the Packery Channel project moves forward.

However, Trice says this is a blessing and not a curse. Asset has the money to do the project right and in a way that will benefit the entire community and protect the environment, he says.

"We are fortunate that a good portion of the land out here is in the control of a single entity because we can do master planning and do things much better than if you had 500 property owners," Trice says. "The blessing is we have a property owner who is sensitive to the needs of the community, environmentally sensitive and has the capacity to control enough land to do it properly."

People have their priorities out of whack, Trice says. Just because somebody makes money does not make the person "evil and bad." That money goes back into the community in the form of taxes and jobs, he says.

Trice says he also does not see North Padre taking money away from Port Aransas as some people have said. Packery Channel will open up new business opportunities for Port Aransas merchants by creating a new venue for them, he says. If anything, Packery Channel will provide people with more choices on how to spend their vacations and will complement, not compete, with the offerings 15 miles away in Port Aransas.

"I think we all realize that the more people we bring to this area the better chance we all have in terms of economic development," he says.

Gene Knight, executive coordinator of the Padre Isles Property Owners Association on North Padre Island, says the opening of Packery Channel would prove a boon to people living on the island.

The channel sits on the east side of the island, which is built around the beaches, seasonal tourists and condominiums. Most of the island's homeowners live on the west side of the island. Knight says

the reopening of Packery Channel could finally bring these services to islanders.

"There's just not the momentum without further development to cause the infrastructure to grow very rapidly," he says.

The island has few stores or services available, so homeowners must travel 15 miles to the mainland to shop for groceries, get the oil changed in their cars or take their children to school. Most homeowners are in favor of the project because of the services it might bring, he says.

Ten years ago, Knight says, North Padre Island consisted mainly of winter Texans – people who flocked to the relative warmth of the coast during the cold winter months. Five years ago, the island started to draw younger, working-class families looking for a good place to raise their children.

"These are exciting times for the island whether Packery happens or not," he says. "The community has developed to the point of becoming a stable entity."

Knight says the proposed development of Packery Channel would be good for the island. It's a good compromise. It's far less than developers would like, he says, yet more than what environmentalists want.

"Perhaps, this is as good as we can do, given that we have an expanding population and people who want the ability to go to the beach," he says. "Perhaps having a community that has well-defined boundaries, that has public recreational facilities on three sides of it and that has people in a well-defined development is just about as good of a compromise as we can manage."

Master planning a barrier island

Dr. Jennifer Prouty, chair of the Nueces County Beach Management Committee, says reopening Packery Channel involves a lot more than just digging a ditch. The project will allow the county to put into action a comprehensive master plan for developing the area south of the channel, controlling development in a unified manner, she says.

"I've been in this community for 16 years, and I've seen Padre Island develop and develop and develop," says Prouty, a coastal geologist who also chairs the environmental science program at Texas A&M University-Corpus Christi. "Some of it has been developed in a master-planned manner but much of it is now developing in a piecemeal manner, particularly on Mustang Island. There is no master plan for Mustang or Padre Island."

In master planning a community, some areas of land are designated for development while others may be set aside as green space or as habitat for animals. Master planning promotes development in the safest manner to prevent risk to property owners, she says.

Asset Development Corp. has the ability to create a comprehensive, coherent community that has greenbelts, walking trails, businesses and landscaping with a unified style, Prouty says. Lots of individual property owners developing their lands separately would not be able to create such a community, she says.

A master-planned community like the one she suggests would be impossible to carry out in many coastal areas because of the lack of availability of large tracts of land, such as those on Mustang and North Padre Islands, she says.

Prouty says she understands the view of environmentalists and her environmental science colleagues who oppose development on barrier islands. In an ideal world, she would like to see barrier islands not developed. But, she says, the reality is people have developed on this barrier island.

"I think we're now seeing individual development as property owners have the right to do," she says. "We're beyond preventing development. We're now into managing the resource that we have."

Like many people nowadays, Prouty says she has her own vision for the future of North Padre and Mustang Islands. And, she says, it's a real vision and not one that's a "pie in the sky."

Prouty says she would like to see large areas of the islands remaining protected and pristine as wetlands and wildlife habitat, so that some of the original functions of the barrier island can be enjoyed by visitors. In between these areas, she wants high-quality development of resorts that are built with a barrier island in mind and protective of its fragile ecosystems.

"My vision and that of a lot of other environmentalists is to try to conserve some lands there and ensure we get visitor amenities that link those properties," she says.

Even if the Packery Channel project does not move forward, Prouty says no one can stop the eventual development of the island. With or without Packery, it's not a question of whether the island develops, only how quickly, she says.

"A lot of people have stopped paying attention to the island now that they think the Packery Channel issue has been voted down," she says. "This is a pressing issue and a hot area that is continuing to develop. It's the challenge of this community to ensure the area develops in a way they would like to see it develop.

Prouty encourages people to pay attention to what's happening on the island and to create their own visions for the future.

"Voting down Packery Channel has not in any way stopped development on Padre and Mustang Islands," she says. "It is continuing day in and day out.

"The moment to move is now. If we wait any longer, it is going to be too late. Development is continuing, and there'll soon be nothing left, Packery Channel or not."

Channel faces uncertain future

Despite the rejection of the bond issue, the Packery Channel project continues to move forward. In August, President Clinton signed a bill allowing the federal government to spend $19.5 million on the Packery Channel project if Nueces County can come up with the remaining $10.5 million needed to fund the project. This $10.5 million was rejected by county voters in June. While the federal government has authorized spending the money on the project, it still must appropriate the money.

Meanwhile, the U.S. Army Corps of Engineers is conducting a feasibility study of the reopening Packery Channel as a federal environmental project. This study is scheduled for completion this fall.

Because voters said they did not want to pass bonds to finance the project, Borchard says the county must now look towards finding other sources of funding. Until that happens or if it happens, Borchard says he does not know what will happen with the project.

But for Trice, the Packery Channel issue has not been killed. Though, he says, supporters of the project did take note of the results of the bond election.

"For the Padre Island Business Association and a lot of people in this community, Packery Channel is not a dead issue, but we have learned a lot from that bond election," he says. ■

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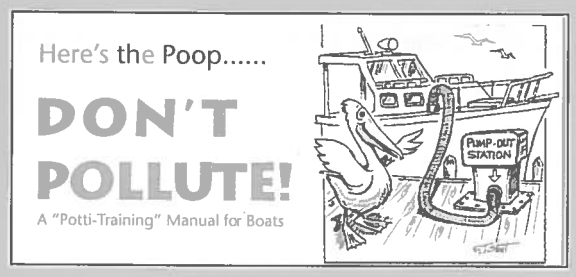

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