

S E A G R A N T C O L L E G E P R O G R A M

TEXAS SHORES



Texas Shores is filled with thousands of words that describe, illuminate, project and evoke emotions, so you'll get the full impact of each story and how it affects your life. But our pages are also filled with great photography. Pictures that take you to the heart of the Texas coast.

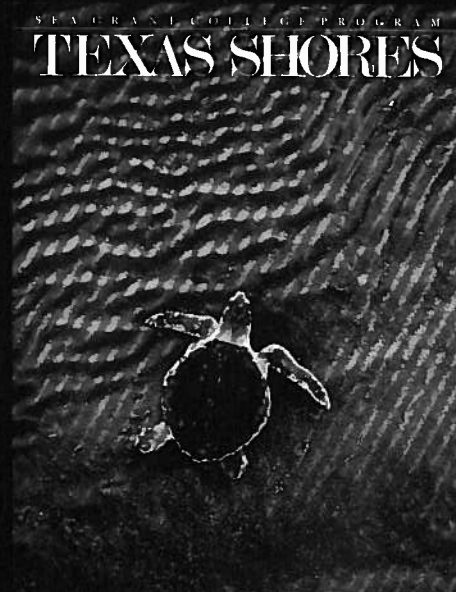
This year Texas Sea Grant editors Norman Martin, Amy Broussard and Rhonda Snider won six Brazos Valley International Association of Business Communicator Awards, including best magazine. Texas Shores also won a special award for writing from the Council for the Advancement and Support of Education.

With this kind of commitment to both the printed word and the photograph, we give our readers exactly what they deserve. The whole story.

Texas Shores

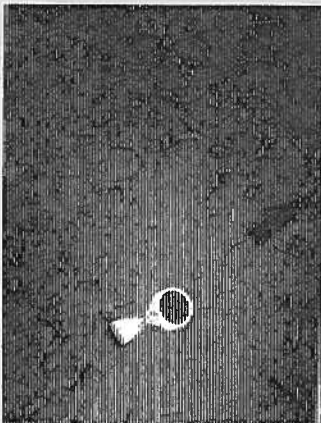
Texas Sea Grant

AN ORGANIZATION OF PROFESSIONALS DEDICATED TO THE BETTER UNDERSTANDING OF OUR MARINE ENVIRONMENT.



I N S I D E

VOLUME 20 - NUMBER 02



COVER PHOTO BY NORMAN MARTIN

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HISTORY – In 1968 Texas A&M 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 seven county marine extension agents serving the nine coastal counties of Texas. These individuals are backed by a group of specialists in marine recreation, fisheries and business management, as well as seafood marketing and consumer education.

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Pollutant level low in Gulf, but additional study required

Oceanographers who recently analyzed Gulf of Mexico sediments and oysters say they did not find any extreme levels of pollutants, but added that final conclusions about effects of certain pollutants would be made when they are able to compare data of future samples.

Texas A&M University researchers say the 1986 research marks the end of the first year of the multi-year National Status and Trends (NST) program to determine the current status and long-term trends of environmental contaminants in the nation's coastal waters.

As part of the NST program, Texas A&M has collected sediment and oyster samples from 50 estuarine sites in the Gulf and analyzed them for toxic metals such as lead, synthetic organic compounds such as pesticides, and polynuclear aromatic hydrocarbons, which occur in petroleum and are produced by combustion.

The sites ranged geographically from lower Laguna Madre, Texas, through the Everglades in Florida. At each site, three stations were operated and at each station a sediment sample and 20 individual oysters were collected. The questions the Texas A&M scientists are helping to answer are what the current conditions of the nation's coastal zone are and whether these conditions are getting better or worse.

Trace metal levels in oysters were high in some places and low in others. Silver concentration was high at Copano Bay, Texas, and at nearby San Antonio and Matagorda Bays, Vermillion Bay in Louisiana, and Pass Christian in Mississippi, says Dr. Bobby Presley, professor of oceanography.

"We're trying to understand why silver was so high in those areas of Texas because they have low population density and little commercial activity. And why downstream of the Mississippi River, which is usually considered to be a major source of pollutants to the Gulf, the concentrations of silver and most other trace metals are so low," Presley says. He speculates that perhaps the muddy, frequently stirred Louisiana bays produce oysters low in some trace metals because fine-grained mud is a good absorber of trace metals. ■

—Kathie Krause



NORMAN MARTIN

Texas Sea Grant selects Hightower for new post

Noted environmental specialist Mike Hightower of Austin has been appointed deputy director of the Texas A&M University Sea Grant College Program.

Dr. Thomas Bright, director of the Texas Sea Grant, says Hightower's experience in state government and understanding of the issues affecting the Texas marine scene make him a welcome addition to the administrative staff in College Station. Hightower has seven years' experience with the Texas General Land Office as a program manager and as an assistant land commissioner responsible for the management of state-owned land programs. Before joining Texas Sea Grant, he was president/owner of Hightower & Associates in Austin. The consulting firm provided services to municipalities, industry and the private sector relevant to environmental, regulatory and land management issues.

Hightower received his B.S. in zoology in 1971, and his M.S. in biology in 1973, both from Texas A&M University.

Meanwhile, Dr. Lauriston King, who previously served as deputy director of Texas Sea Grant, has been named deputy director of the Office of University Research Services at Texas A&M.

King is a member of the graduate faculty and adjunct associate professor of political science. In his Sea Grant position, King was involved in the development of marine education programs and research involving the social, political and legal aspects of marine resource development and management. ■

—Norman Martin

Air currents carry pollution to distant Pacific Ocean area

When it comes to pollution, what goes around comes around, according to researchers in a multi-university study of the transfer of chemicals between continents, the ocean and the atmosphere. After completing a nine-year study in the Pacific, scientists with the Sea-Air Exchange (SEAREX) Project now are transferring their attention to the Atlantic Ocean.

The Pacific study, sponsored by the National Science Foundation, showed that air currents carry airborne pollution from industrialized nations to areas of the Pacific Ocean thousands of miles away.

Dr. Elliot Atlas, an associate research scientist at Texas A&M University and a member of SEAREX, says the potential for problems in sea-air exchange of pollutants is much greater in the Atlantic. "The main theme is that the chemicals used by man are easily and quickly moved around the environment and to far away places. It is not just a local or regional problem — it is a global problem."

The transfer of the study to the Atlantic from the Pacific, a relatively clean ocean in comparison, will allow scientists to study the process of atmospheric transfer and deposition in greater detail, Atlas says. Some pollutants like lead from gasoline or certain organic compounds can be traced to source regions.

Atlas says it is possible that as tracing techniques are refined, other countries may find themselves in a similar predicament to the United States. The United States has agreed to pay part of the cost of clean-up for Canada's acid-rain problem because scientific studies suggest that U.S. industrial and auto emissions may contribute to the formation of acid rain in Canada.

"Given what has now been discovered about long-range transport there is the possibility that some pollutants with sources from the United States and Europe can cross an entire ocean," Atlas says.

In other words, pollutants from the United States could end up in Europe and European pollutants could end up in the U.S., Atlas says. A NATO-sponsored workshop on the subject is being planned that will bring together experts from the allied countries to discuss the problem. ■

—Tricia Morgan

NOAA recommendations focus on funding increase

The National Advisory Committee on Oceans and Atmosphere (NACOA), a presidential committee that died from lack of funding in the 1987 federal budget, has left behind a set of recommendations for far-reaching changes in the National Oceanic and Atmospheric Administration (NOAA).

Recommendations that would require dramatic revision of program priorities include technology development by the National Weather Service, improved maintenance and expanded use of the NOAA fleet and upgrading the computer capabilities of the National Environmental Satellite, Data and Information Service data centers.

John Flipse, associate deputy chancellor and associate dean of engineering at Texas A&M University, chaired the committee during its final year and completed and published the report to the President and the Congress. It contains results of more than a year of study, hearings, drafts and deliberation by the 18-member group.

Areas of greatest concern within NOAA, Flipse says, include "Robbing Peter to pay Paul," where Peter is the ocean and Paul is the atmospheric satellite program; the devastation of a once-proud oceanographic fleet; and "trashing" of important environmental data being acquired now while developing systems to collect even more data.

"Originally a scientific and service-oriented agency, NOAA has shifted to greater emphasis on regulatory roles such as responsibilities for the Coastal Zone Management Act and the Marine Protection Research and Sanctuaries Act," Flipse says. NACOA recommended that NOAA "reassess and emphasize its scientific mission as the civilian oceanic and atmospheric agency."

The group further recommended that a central objective of NOAA be a global oceanic and atmospheric monitoring and prediction capability that would grow from an ocean-based observation system, including remote sensing from space.

NACOA also recommended that NOAA be assigned to the same Office of Management and Budget division. ■

— Jane Mills Smith



NOBMAN MAESTRI

Sea turtles getting head start in special Galveston program

More than 1,600 endangered Kemp's ridleys sea turtles who got a head start on life in a Galveston laboratory, were set free off Mustang Island this spring to fend for themselves in the wild.

The group is the ninth since 1979 raised from hatchlings in Galveston National Marine Fisheries Service laboratories and released into the Gulf of Mexico. The spring release brought to about 12,000 the number of ridleys hatched on North Padre Island and raised for almost a year in captivity in hope that they'll have better chances of survival in the wild and that they'll establish a nesting ground on protected beaches in South Texas.

The turtles were trucked six to a box from Galveston and loaded aboard the University of Texas research vessel Longhorn for their ride to freedom, according to the Houston Chronicle. This year's batch of ridley hatchlings made history of sorts in the program with a 98.6 percent survival rate during the time period between hatching and release.

The survival rate has averaged about 86 percent in years past, with a 93 percent rate last year. Normally, the turtles are released in May. Last year, scientists dropped 963 ridleys into the Gulf in May and 553 into Copano Bay around Rockport.

The theory, developed at Texas A&M, is that hatching on the Texas beach — and never having been allowed to touch Mexican sand, even in the egg — will cause the turtles to return to Texas to nest when they reach maturity. ■

— Kevin Moran

Ancient sediment record recovered by Resolution

More than a mile of sediment cores containing a 90-million-year record of the South Atlantic region's hostile climate, oceanography and geology have been retrieved by an international team of researchers.

Findings should help scientists determine what transformed the continent into the cold, barren land of today. They also can document how cold Antarctic waters have changed the world's climatic history over time.

Researchers aboard the JOIDES Resolution, drillship for the Ocean Drilling Program (ODP) headquartered at Texas A&M University, recently focused on movement of the Earth's crust that caused the Drake Passage to open and an underwater ridge to swing open like a giant gate to allow ocean waters to mix, affecting worldwide climate.

The mid-ocean ridge, an enormous underwater mountain chain, snakes down the middle of the Atlantic, branching off abruptly at the Weddell Sea in the Antarctic.

In the South Atlantic, off the tip of South America, an abnormally high rate of volcanic activity occurred at the ridge, lasting until about 65 million years ago. The activity built a huge underwater rise perpendicular to the ridge that acted as a barrier to any deep-water exchange between the Weddell Basin and the Atlantic Ocean.

The rise began to split about 38 million years ago, and the resulting gateway allowed cold, dense water from the Weddell Sea to flow north into the Atlantic Oceans. These waters today extend as far north as New Jersey.

Mingling of the cold bottom waters and the less dense waters at the equator represent an important mechanism of heat exchange that directly affects the Earth's climate.

The Resolution, by drilling deep holes beneath the seafloor, can recover records of complete geologic events to which scientists can assign geologic dates. The cores drilled on one of the rises indicate a gap in the fossil record, occurring about 40 million years ago and lasting for the next 2 to 5 million years. ■

— Rebecca Adair

TEXAS

HOUSTON

CORPUS CHRISTI

GULF OF MEXICO

MEXICO



ON THE EDGE

TEXAS' COAST IS AWASH IN TRASH. AN ARMADA OF SHIPS IS USING OUR BEACHES AS A GARBAGE DUMP. HOW DID WE LET THIS TRASHY BEHAVIOR GO SO FAR?

FORGET ABOUT NOT MESSING WITH TEXAS beaches. The Texas shore is already a mess. As you lie on the raked and sifted sand of a Corpus Christi beach, glistening with suntan oil and sweat, the beach doesn't look too messy. Just some trash here and there — a plastic six-pack holder, a garbage bag and a diaper. But multiply that trashy scene a million times, and only then do you begin to get some inkling of the garbage dump some Texas beaches have become.

The problem is huge, say government officials and environmental advocates. On any given day, tons of beer cans, soft drink bottles, plastic wrappers and drums containing hazardous chemicals can be seen strewn across the 370 miles of beaches on the Texas Gulf Coast. Bill Lukens, the superintendent of the nearby Padre Island National Seashore, has called his 67-mile stretch of beach among the dirtiest national parks in the country.

Linda Maraniss, director of the Texas Center for Environmental Education in Austin, adds that data collected from a 1986 coastal cleanup told an incredible tale about marine debris in Texas. Almost 56 percent of the 171,496 items collected in one day were made of plastic. Plastic bottles, bags, caps and lids were the most abundant items found. Beverage cans, six-pack holders, pull-tabs and glass bottles made up 23 percent of the material.

The Texas Coastal and Marine Council estimates 75 percent to 90 percent of that beach trash comes from offshore sources. Of the 73,000 ships that docked at U.S. ports last year, only 3 percent left garbage at the ports. "That means they're dumping it offshore," says Texas Land Commissioner Garry Mauro. Three types of litter, in particular, have be-

Texas is a natural dumping ground for the Gulf of Mexico current complex. These currents sweep a considerable portion of the western Gulf of Mexico and converge on a shifting section of the state's coastline.

STORY AND PHOTOGRAPHY BY NORMAN MARTIN

come the focus of growing concern:

- Long-lasting plastic items, such as bags, nets, six-pack rings, computer tape rings, fishing lines, and pellets, many of which are hazardous to marine life and shore birds.
- Drums of hazardous chemicals either illegally dumped or accidentally dropped into the sea.
- Styrofoam, glass, metals, and other man-made, non-biodegradable items.

Tony Amos, an oceanographer at The University of Texas Marine Science Institute at Port Aransas, has become an unwilling authority of sorts on the state of trash along Texas beaches. Amos is examining the long-term physical processes along a 7.5-mile stretch of Mustang Island. But over the last nine years he has also been witness to a tremendous onslaught of marine-based litter.

Amos has seen an amazing array of objects on his beach treks — arm chairs, milk jugs, commode seats, chemical drums, heavy-duty plastic sheeting and hard hats. “This isn’t rare at all. These things are out there every day.”

Judging from markings and labels, the material comes from all over the Gulf, he says. Currents seem to converge on the central Texas coast, bringing trash that flowed down the Mississippi, litter from offshore oil rigs, and garbage from ships of many nationalities.

By and large Texans are not responsible for most of the trash. The vast majority of it comes from the Gulf itself. Ships coming into Texas ports frequently dump their debris before steaming into port. The Gulf currents will take garbage dropped in waters anywhere from Florida to Mexico and deposit it on Texas shores. Marine experts say that unlike the Pacific and Atlantic, the Gulf is like a giant bathtub where every discarded thing heads toward Texas. Start with the thousands of vessels and add to that the disincentive for foreign ships to use port garbage-handling facilities because of strict U.S. Department of Agriculture regulations, and the problem becomes massive.

The reason the beach garbage problem is so acute in Texas is that the state’s coast is the natural dumping ground for the northern and southern longshore current complex. These currents sweep a considerable portion of the western Gulf of Mexico and converge on a shifting section of the state’s coastline from Mexico to near Galveston, depending on the time of year and wind direction. These currents transport and deposit both floating and subsurface suspended debris all along Texas beaches north and south of the convergence zone. The currents also ensure that solid waste discharged from oil and gas platforms off Louisiana or from shipping throughout the Gulf of Mexico has a good chance of ending up on a Texas beach.

Ironically, Amos says, many of the items he finds strewn on the Mustang Island sands are containers that once held cleaning materials, like bottles for French and Italian toilet cleanser. He knows currents are southerly when green Mexican bleach bottles show up. On almost any day Tony Amos counts beer cans by the dozen, foam cups by the hundreds, egg cartons, light bulbs, gallon milk jugs, glass bottles, plastic sheeting, fishermen’s floats and dozens of other items.

But the litter war isn’t over. Texas has several beach clean-up fronts underway, and they are part of





a much wider range of concern all along U.S. coasts. For instance, a fishing group, the Highliners Association in Seattle, is helping the federal government warn of plastic pollution along the West Coast. In Newport, Ore., the federal government is underwriting a model project on how to get rid of waste plastic, including miles of fishing nets. Bills have been introduced in Congress requiring six-pack yokes be biodegradable or photodegradable, and the United States is considering an international treaty provision that would prohibit the disposal of plastics on the high seas.

A wide variety of long-lasting plastic items — bags, nets, six-pack rings, fishing lines, pellets and others — have been found to snare, choke and clog marine wildlife. The threat that plastic trash poses to wildlife is largely a result of the qualities it is prized for — it is lightweight, strong and durable.

Kathryn O'Hara, a marine biologist with the Center for Environmental Education in Washington, says several pieces of national legislation are under consideration to reduce marine litter and international garbage dumping. Sen. John Chafee of Rhode Island has introduced a plastic waste reduction act in the Senate. The bill calls for the plastic rings that hold a six-pack of cans together to be made from a photodegradable material in the future so that they break down after long exposure to sunlight. Current plastic can holders have an estimated life of more than 450 years, O'Hara says. They cause problems when animals become tangled in them and cannot hunt food anymore, and the animals eventually starve.

Chafee's act also calls for the Environmental Protection Agency to look closely at the plastic debris problem with the help of federal agencies and private industry and to make suggestions of solutions within 18 months of the bill's passage. Officials of the plastics industry point out that making plastics degradable could cause problems, especially with shelf life of some products and with products that buyers expect to be durable, such as fishing nets.

Environmentalists certainly aren't the only ones who care about marine pollution. State and national policy makers are moving toward strengthening existing laws regarding beach litter and considering ways to eliminate trash from the coastline. "We must recognize that our beaches are nature's gift to us, and that we must be responsible and protect them for generations to come," says State Sen. Carlos Truan.

Some Texas politicians realize Texas' coastline simply cannot withstand a high level of abuse and maintain the appearance that beachcombers envision. "Many people think the ocean is so big it can't be polluted, but it can," says Texas Attorney General Jim Maddox. "The Gulf of Mexico is an international lake. It can be polluted. It is being polluted and we need to find ways to control this pollution." Land Commissioner Mauro adds, "Texas doesn't have a litter problem. We've got a garbage problem on our beaches."

Still, in the past, state support for beach garbage clean-up has not been overwhelming. One of the more effective means for monitoring and proposing solutions for Texas beach litter was a small state agency, the Texas Coastal and Marine Council, but the council was eliminated by the Legislature in an austerity move two years ago. All too often, says the editorial board



Of the 73,000 ships that docked at U.S. ports last year, only 3 percent left garbage. Policy makers are moving toward strengthening existing laws regarding beach litter and considering ways to eliminate trash from the coastline. Meanwhile, a wide variety of long-lasting plastic items have been found to snare, choke and clog marine wildlife.



for the San Antonio Light, “beaches are an environmental resource that too many Texans take for granted. Many people think of beaches as nothing more than places to party. By day, it’s a combination drag strip and trash dump, with waves and offshore breezes thrown in as a sideshow. By night, the hits keep on coming as bonfires are lit and the party continues. Add to the resulting mess a mix of offshore-generated garbage — the refuse of fishermen, oil companies and others — and you come up with a sorry sight.”

Critics contend that Texas beaches have become a garbage dump of the international shipping industry, the U.S. Navy, the oil and gas platform workers off the coast of Texas and Louisiana, the shrimp boat operators, pleasure boat owners, coastal residents and beach vacationers. One of the reasons a solution has been so hard to reach is that no one government body is in charge. The responsibility for policing the polluters lies with a confusing mix of local, state and federal agencies as diverse as the garbage. Governmental agencies that play a role in this controversial issue are the U.S. Department of Agriculture, the Department of Energy, the Department of Interior, the Environmental Protection Agency, the U.S. Coast Guard, the Customs Service, the Army Corps of Engineers, the Department of Commerce, the U.S. Navy, the State Department, the Texas Parks and Wildlife Commission and the Texas General Land Office. That roll call does not include efforts of numerous environmental organizations, the foremost being the Center for Environmental Education, a non-profit marine conservation organization based in Washington D.C., with a regional office in Austin.

Land Commissioner Mauro has taken the lead on the issue through his authority to regulate oil and gas leases within state waters off the coast, including the discharge of solid wastes. He also has started an “Adopt-A-Beach” program, encouraging major oil companies, resort communities, hotel and motel owners, civic organizations and others to select a one-mile stretch of beach and keep it clean.

Among the most difficult questions concerning marine litter is how to accomplish the U.S. Department of Agriculture’s legitimate goal of keeping

harmful foreign insects and germs out of this country without encouraging ships to dump their garbage in the Gulf before entering U.S. waters. Dumping at sea to avoid USDA requirements obviously mars Texas beaches and may also be allowing some of those bugs and germs to wash ashore. That must change, say state officials, to protect state beaches and still guarantee that foreign bugs and germs are not invading the nation.

Any vessel entering a U.S. port from a foreign destination and seeking to dispose of solid waste becomes subject to the regulations of USDA, whose officials are responsible for supervising the offloading and transporting of solid waste and materials. Because the U.S. Department of Agriculture fears fruit flies and other disease-bearing insects, the federal agency does not allow ships from foreign ports to dispose of waste in the U.S. unless it is steam-sterilized or burned, and conveyed to appropriate landfills. But there are few waste-sterilization disposal facilities in the country, such as the one in Baltimore and the smaller one in Galveston. So the merchant ships as a matter of course dump their waste in the Gulf. The result of all the dumping in the Gulf is that most of the trash on Texas beaches comes from offshore, beyond the jurisdiction of state laws.

A report by the Texas Land Office suggests that facilities must be provided to steam or incinerate ship garbage. The question is how. Many possibilities for such garbage processing exist. For example, ships could be required to provide shipboard facilities for steaming. Since nearly all ships have boilers, conversion to allow such steam processing of garbage can be accomplished cheaply.

Another possibility is the provision of onshore steaming or incineration facilities at all ports. If direct federal or state funds are not available, as would seem likely given the current status of fiscal affairs at both levels, bonding authority could be provided for construction funds with application of user fees to pay off the bonds. Special taxes or user fees could be imposed on shipping to provide funds, as well. Also, any new port facilities could be required to provide garbage disposal capability. For instance, planning for the Navy homeport facilities in both Corpus Christi and

Galveston could include provisions for dealing with the garbage for all ships based there and could include facilities to deal with other ship garbage as well.

Meanwhile, disincentives to ocean dumping could be provided. There are several proposed solutions to the garbage problem. One, ships that have been in Texas waters for three to four days would be required to turn in that many days' rubbish upon entering a Texas port. The ports would then dispose of the refuse at on-site facilities. Ships that fail to turn in their solid wastes would be fined accordingly.

Private shipping firms, maritime organizations, port authorities, the Coast Guard, and coastal city and county governments could be provided with the incentive and the tools to eradicate the problem. The plan would include provision of facilities for onshore disposal of shipboard waste and penalties for those who fail to utilize such facilities.

Texas beaches have been garbage-strewn for years. The problem was worse, in fact, when the offshore oil rigs were working at capacity, before the bottom fell out of the oil and gas market. Then, metal drums, some of them containing toxic materials, were washing ashore by the hundreds. The vast majority of Gulf platforms are off the Louisiana coast but the Gulf currents sweep that debris onto Texas beaches, too.

Because of the large number of oil and gas platforms off its coast, Mauro says Texas must work closely with officials from Louisiana to strengthen their efforts to prohibit such discharges in their state waters. "Working together with their state officials, with the federal government, and with the energy companies, we must devise ways to protect both the Texas and Louisiana coasts."

The Texas General Land Office has recently revised its regulations and its lease contracts governing submerged lands off the Texas coast to prohibit discharges of solid wastes from oil and gas drilling and production platforms and from seismic vessels operating in state waters. Companies engaged in offshore energy activity may now expect to have their state operating permits or leases canceled if they dump solid wastes into the Gulf of Mexico. Texas General Land Office inspectors will routinely inspect offshore operations to ensure that no garbage dumping is occurring.

A report by the National Academy of Sciences indicates that the vast majority of offshore debris originates from passenger vessels, merchant ships, recreational boats, commercial fishing boats and military vessels. Only a small portion originates from oil rigs and platforms, and miscellaneous dumping accounts for the remainder.

Sometimes the marine debris comes from surprising sources. The U.S. Navy — according to its own commanders who commented recently on the Soviet practice of searching floating Navy garbage bags for possible military data — apparently has a policy of putting its ship wastes in bags and punching holes in them before dumping them overboard so the bags will sink.

But the Navy indicated in June that it would work with Texas officials to come up with a plan to regulate future Navy trash dumping in the Gulf of Mexico. The issue was brought up in anticipation of the Navy's

more frequent naval use of Gulf shipping lanes after the building of new homeports along the Gulf Coast, including Naval Station Ingleside near Corpus Christi. Navy deputy assistant secretary Keith Eastin says that part of a potential future trash problem "will be taken care of" by incinerators that are being installed in new naval vessels. The Navy also is working on a new trash compacting system for ships.

Provisions for the Navy's homeport plans in the Gulf of Mexico — which call for the berthing of some 40 warships in the Corpus Christi and Galveston areas — do not include any ban against garbage-dumping in Gulf waters, Mauro says. "The Navy tells us that life aboard its ships creates 3 pounds-per-day of trash per person," Mauro says. About 1,500 people would be serving on just one of those fighting vessels, the battleship Wisconsin.

Although a number of laws and treaties exist at the international, national, and state level affecting ocean dumping and littering, they have failed to deal with the problem adequately. Considerable gaps exist in defining litter and in addressing various jurisdictional and enforcement problems. For example, the Resource Conservation and Recovery Act deals with hazardous wastes, but does not define as hazardous many problem-causing materials. The act, which prohibits ocean dumping of hazardous materials, allows a state to take over its enforcement with approval of the Environmental Protection Agency. The Texas Water Commission has assumed this responsibility. Texas, through the Texas Department of Health and Texas Water Commission, also administers programs for non-hazardous municipal and industrial solid waste disposal.

The Clean Water Act, through use of a permit system, regulates the discharge of pollutants from offshore platforms. The Act prohibits the discharge of floating solids and other solid wastes from offshore platforms. Also, the Department of Interior, Minerals Management Service lease contracts require companies to clean debris from ocean floors around offshore platforms. While solid waste near a platform can often be removed without difficulty, buoyant solid wastes tend to drift away from platform areas and eventually surface on beaches.

In addition, the U.S. Coast Guard plays an important role in preventing pollution in coastal waters, in addition to its responsibilities for marine safety, search and rescue missions, and surveillance and apprehension of those engaged in illegal activities. Through direct action or by notifying appropriate agencies, the Coast Guard initiates antipollution enforcement actions related to offshore platforms and vessels in coastal waters.

The Marine Protection Research and Sanctuaries Act of 1973 (Ocean Dumping Act) placed restrictions on the disposal of wastes in ocean waters and required permits to be obtained from the Environmental Protection Agency "for the purpose of dumping ... in ocean waters." However, that act has had little effect on indiscriminate garbage dumping and littering from many disparate sources. Adding to the litter law equation is the fact that the Ocean Dumping Act is only applicable to U.S. vessels. The act does not apply to foreign vessels operating beyond the 12-mile limit.

The vast majority of offshore debris originates from passenger vessels, merchant ships, recreational boats, commercial fishing boats and military vessels. One clean-up effort is working, though. The Texas Adopt-A-Beach program is designed to encourage private businesses, environmental and civic groups and other organizations to assume responsibility for the maintenance of Texas beaches.



Indiscriminate dumping and littering from such sources is not regulated. One tack is working, though. The Texas Adopt-A-Beach program is designed to encourage private businesses, environmental and civic groups and other organizations to assume responsibility for the maintenance of Texas beaches.

Last September, a volunteer cleanup campaign sponsored by the Center for Environmental Education collected 124 tons of debris in three hours over 122 miles of beach — more than a ton per mile. No other beach cleanup in the country even came close. During the cleanup, debris recorded on data cards included plastic bags, bottles, buckets, six-pack holder, sheeting, strapping bands and milk jugs, along with cigarette lighters, rope, rubber gloves and jars with markings identifying them as coming from Mexico, West Germany, Holland and France.

In addition, the Highway Department, in conjunction with Keep Texas Beautiful, Inc., has launched a high-profile and highly successful “Don’t Mess With Texas” public relations campaign. That campaign has been credited with a 29-percent reduction in highway litter since its inception and has dramatically raised the public consciousness of litter problems in general. As a part of the “Don’t Mess With Texas” campaign, one public service television advertisement was filmed on a Texas beach to focus specific attention on the beach litter problem.

“We’re pleased with the initial response to both our new regulations regarding offshore oil and gas activity and to the Adopt-A-Beach program,” Mauro says. However, even if completely successful, these programs can only deal with about 20 to 40 percent of the garbage on Texas beaches. The remaining 60 to 80 percent can only be dealt with by federal and international action.

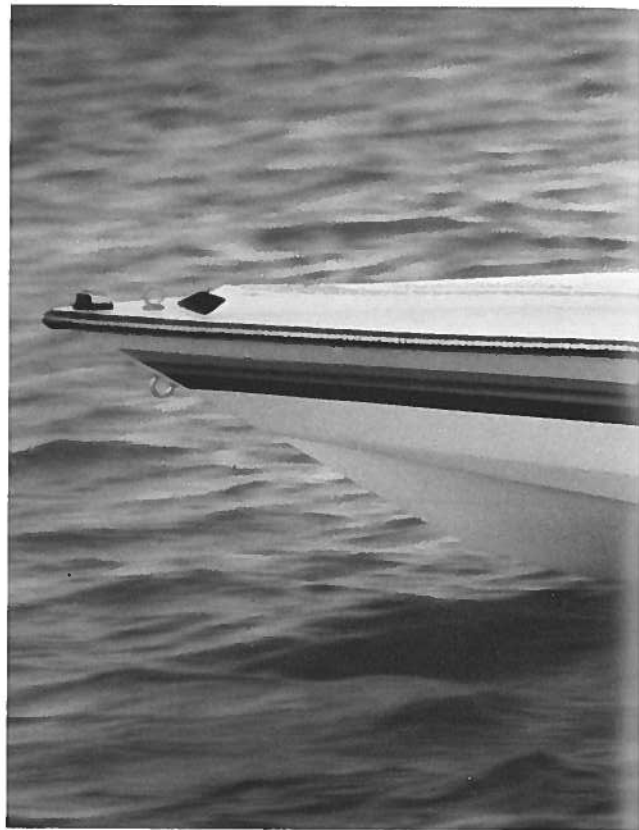
Texas’ tourist industry is closely watching the litter war. “It’s going to affect tourism whether you talk about it or not,” says Lukens of the Padre Island National Seashore. “People just flat don’t like dirty beaches.”

Tourism is the state’s second-largest revenue producer, and roughly a third of those who vacation in the state do so on the state’s Gulf coastline. Larry Todd, executive director of the Texas Tourist Development Agency, says, “Texas beaches are one of the state’s top attractions and they must remain unspoiled for future generations of Texans and Texas tourists.”

“Beach garbage is not just an aesthetic problem,” Mauro adds. “It is a dollars and cents problem also. Beaches are the state’s number one tourist attraction. This garbage problem has serious environmental, as well as economic, consequences.”

Some coastal communities are fighting back. Both Nueces County and the city of Port Aransas have vigorous clean-up campaigns. In fact, Port Aransas charges \$5 for a yearly beach parking fee, and part of those funds provide seven-days-a-week garbage pick-up on the beach.

Texas coastal cities and counties currently spend in excess of \$14 million annually just to pick garbage from the beaches. And despite the best efforts of local officials, some tourists leave our state beaches disgusted by the filth they find. There is a lot to lose. Tourists spent more than \$13 billion in Texas last



year. Over one-third — approximately \$4.5 billion — of that was spent in the coastal counties. Officials say, about one-third of the state’s tourism jobs are located here.

For the moment, Texas cannot do much about the dumping far offshore. Those campaigning to save the beaches and the waters of the Gulf say there is a solution, but bringing it about will take education and public awareness, the ratification of international treaties, the policing of ships entering port and the imposition of stiff penalties for dumping.

One part of the beach cleanup plan involves international negotiations. The United States, working with the International Maritime Organization, is promoting new rules to regulate international shipping. The International Maritime Organization was set up as a watchdog to prevent dangerous garbage dumping in certain waters and has banned the dumping of plastics and other toxic flotsam.

One agreement is an annex to the International Convention for the Prevention of Pollution from Ships treaty, known internationally as MARPOL. The changes will be a major step toward a long-term solution, particularly if the international organization designates the Gulf of Mexico as a special area where garbage disposal at sea would be prohibited. Special area designations have already been granted to the Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea and the Persian/Oman Gulf, and U.S. representatives remain optimistic about getting a similar designation for the Gulf of Mexico. Edward Wolfe, deputy assistant secretary of state for oceans and fisheries affairs, told the Associated Press in June that the State Department would support the effort to include the Gulf among the bodies of water with no trash dumping. The White House is also expected to





Texas beaches are one of the state's top attractions and they must remain unspoiled for future generations of Texans and Texas tourists, say tourism experts. Beach garbage is not just an aesthetic problem. It is a dollars and cents problem also. One agreement that could help the litter problem is an annex to the International Convention for the Prevention of Pollution from Ships treaty, known internationally as MARPOL.

urge the U.S. Senate to ratify the international agreement. Meanwhile, the Texas General Land Office has funded Center for Environmental Education researchers in a study that examines the possibility of designating the Gulf a "special area" under MARPOL. CEE marine biologist O'Hara says, "There is no reason why it can't be classified as a special area because it has currents that direct all trash right onto the shoreline, and also it has such heavy traffic of maritime vessels."

The proposal was one of 29 recommendations issued by the Washington-based conservation organization in a 52-page report on the 1986 Texas Coastal Cleanup, held last fall. Among the center's other recommendations to the state were:

- The General Land Office conduct a feasibility study on providing disposal facilities at Texas ports.
- Creation of a central, lead agency in Texas to be in charge of coastal issues.
- Enhancement of a Coast Guard program to remove drums of hazardous materials from the coastline.
- House Bill 210, which calls for container-deposit legislation, and the ban of pull-tabs and non-degradable six-pack holders, be an important consideration of the Texas Legislature.

In addition, oil and gas operators could be required to mark all barrels and drums bound for offshore platforms and, if those were later found washed up on Texas beaches, the companies could be charged with the cleanup costs. Tom Henderson, a spokesman for Mauro's office, adds that bills have been introduced to ban glass containers and to increase the penalties for littering. In addition, he says, there has been discussion about county and city governments putting together a uniform beach ordinance for consideration by

the Legislature. Among suggestions from other organizations are:

- Establishment of inter-county discussion groups to explore ideas on how counties can work together to develop long-range land-use plans for the coast.
- Legislative lobbying among Gulf lawmakers.
- Getting local business and civic leaders even more involved in the coastal development-protection business.
- Town meetings to find ways of dealing with litter, coastal development and environmental protection.

Mauro, who has been leading the fight to clean up the beaches, concedes it could take three years just to get all those regulations in place, even if all goes well.

Meanwhile, not only the beaches, but also the coastal wetlands, where thousands of migratory birds make their winter homes, will remain awash with garbage.

"Beach litter is a serious problem worldwide, and we've got to work toward solutions to stop it — for example, by having better disposal facilities at ports, public education efforts, degradable plastic when possible and preventing disposal of litter at sea," adds Maraniss, who also serves as state coordinator for the Texas Coastal Cleanup.

Commercial fishing boats and recreational boaters contribute to the problem, Maraniss says. "A lot of times boaters want to clean out their boats by the time they reach the shore. So they'll throw their beer cans, lunch and plastic wrappers overboard. The very people who enjoy the Gulf of Mexico are the ones who contribute to the problem." Despite the scope of the problem, Maraniss is optimistic the coastline will be saved. "People are not going to sit and watch Texas' beaches turn into a junkyard. We can all work together to protect the beauty of the Texas coast." ■



NORMAN MARTIN

A major congressional legislative effort, known as the MARPOL treaty for Marine Pollution, is moving forward to reduce beach litter and debris in Texas.

Don't mess with MARPOL

Remember those slobes at the beach. The ones that threw wienie wrappers and beer cans all about while squealing back and forth from the water. Well, as bad as those litter bugs were, their worst trashing of the Texas beach pales in comparison to the junk tossed over the side by ships passing far out of sight of land.

A significant portion of the litter on Texas beaches is garbage from international shipping. Foreign ships that come into Texas ports are supposed to burn wet trash to kill germs. Very frequently captains come up with an alternative approach. The debris goes over the rail, into the Gulf and eventually onto the beach.

Now a major legislative effort is moving forward to reduce beach litter. The international treaty provision is part of the International Convention for the Prevention of Pollution by Ships, known as the MARPOL treaty for Marine Pollution. The treaty now stops ships from tossing oil and chemicals overboard, but a section banning garbage

dumping has not been approved by the required number of countries.

The U.S. Senate currently has under consideration ratification of MARPOL 73/78. The treaty basically does three things:

- prohibits the ocean disposal of all plastics;
- prohibits the disposal of other floating garbage within 25 miles of the nearest coastline.

- designates certain "special areas" where no garbage dumping is allowed.

Presently designated "special areas" are the Mediterranean, Red, Black and Baltic Seas and the Persian/Oman Gulfs, all shallow, closed basins with heavy shipping traffic.

The Gulf of Mexico, which shares these same characteristics, is not currently designated a "special area."

The treaty, passed in 1973 with some changes in 1978, has five clauses, involving pollution issues from oil and hazardous chemical dumping to solid waste disposal at sea. Annex V, concerning the dumping of plastic debris by ships, has to be ratified by at least 15 of the countries and equal at least 50 percent of

the shipping fleet tonnage of the world. Kathryn O'Hara, a biologist with the Center for Environmental Education in Washington, D.C., says 27 countries have ratified Annex V, but they only equal 41.85 percent of the world's tonnage.

Lobbying efforts are underway to persuade the United States to ratify the clause. Although that would only bring the tonnage up to 46 percent, she says, it is thought that the force of having the United States on the anti-dumping side would persuade other nations to also ratify the clause and give it the force of law.

The cruise of the MARPOL legislation has not been smooth. Congressional testimony concerning MARPOL before the U.S. House Merchant Marine and Fisheries Committee in the past has brought forth a war of finger-pointing among state and federal agencies.

For example, the USDA concedes that its regulations contribute to the problem of offshore dumping but denies that they are the main cause. The department believes that the use of degradable containers would help solve the problem.

Meanwhile the U.S. Coast Guard supports U.S. ratification of Annex V to MARPOL, which would require ports to provide adequate garbage disposal facilities, but believes that any garbage disposal regulation will be difficult to enforce. The U.S. Navy does not believe that Annex V should be extended to Navy vessels, claiming that it would be difficult for Navy personnel to discontinue the disposal of plastic materials at sea. At the present time, the Navy is already automatically exempted by the law.

And, finally, port authorities in general have the opinion that if waste reception facilities are required with the ratification of Annex V, then the federal government should solve the problem of financing the facilities.

Despite the political infighting, Texas Land Commissioner Garry Mauro believes the problem can only be solved at the national and international level. Mauro has called for prompt U.S. ratification of Annex V of MARPOL; passage by Congress of enforceable implementation legislation for Annex V with some type of garbage presentation and off-

loading requirement as a precondition for port entry; and support for designation of the Gulf of Mexico as a "special area" under MARPOL 73/78 by the International Maritime Organization.

Seconding the call has been a demand by environmental groups for more stringent and enforceable anti-dumping regulations. The groups are strongly in support of Annex V of the MARPOL treaty, since it would greatly reduce the number of U.S. ships disposing solid wastes at sea and prohibit foreign vessels from dumping in American waters. The annex banning oil pollution took effect in 1983, and another concerning chemicals was ratified only last year.

The ban on dumping garbage has been approved by President Reagan and is in the Senate for final ratification. But even with U.S. approval that clause will be short of the 50 percent of world tonnage figure needed to ratify it.

Rear Adm. J. William Kime of the Coast Guard, the U.S. representative to the international Marine Environmental Protection Agency, says he hopes that American ratification will persuade other countries to do likewise. "I am very optimistic about this going through," he says. "Once ratified, that will be almost enough tonnage to bring it into force."

But Mauro believes that still more regulation is needed. He wants to stop dumping in the Gulf altogether. Under the international treaty, that would require that the Gulf be designated a "special area," like the Mediterranean Sea. As relatively shallow water bodies, those seas are less

likely to swallow garbage to their floors than are the oceans.

If that happened — and there is no guarantee that it will — only food waste could be dumped overboard, and that 12 miles out at sea. Mauro also wants to set up a ship inspection system at Texas ports and to fine or deny docking rights to ships that do not have all their trash aboard.

Mauro says a problem may arise when Congress decides how to enforce the treaty. Mauro recommends inspecting ships when they dock to see whether they are garbage-free, as they often are now, which indicates that they have dumped at sea. The overboard disposal of trash and garbage by ships at sea is widely believed to be the major source of beach litter.

Any vessel entering a U.S. port from a foreign destination and seeking to dispose of solid waste becomes subject to USDA regulations that require waste to be either incinerated or steam-sterilized and conveyed to a USDA-approved landfill.

These regulations are intended to prevent importation of harmful insects or diseases.

But few U.S. ports have adequate disposal facilities and most ships dump their garbage offshore.

The land commissioner said he learned the Gulf of Mexico was not included in special protection banning all garbage dumping, although the Mediterranean, Black, Red and Baltic seas were.

In the meantime, Mauro says he plans to keep Texas beaches litter-free this summer through a campaign for voluntary cleanups. ■



Hundreds of barrels of toxic and less dangerous substances have washed ashore.

Drum count on the decline

Sometimes the boom of the Texas surf carries with it more than saltwater. Drums of hazardous chemicals that were illegally dumped or accidentally dropped into the Gulf of Mexico have piled up on shore in startling numbers in recent years.

Ironically, because of Gulf currents, many of the toxic drums have washed ashore at the Padre Island National Seashore, considered the most beautiful of Texas' beaches. "They create the greatest

potential danger to human beings of any Gulf litter," says Bill Lukens, superintendent of the Padre Island National Seashore. "You just never know what's in those drums. We have had some very bad stuff in a few."

At the national seashore alone, hundreds of barrels of toxic, flammable and less dangerous substances have washed ashore. The problem became apparent in 1982, when 170 barrels were counted. Cleanup operations in 1984 removed 260 drums from Port Aransas, north of the seashore's north bound-

ary, to the Mexico border, south of its southern limit. In 1985, 152 drums and in 1986, 110 drums were removed. This year, 16 drums had arrived through June.

"The number is down considerably, compared to recent years," Lukens says.

Many of these toxic chemicals like those washing up on Padre Island are dangerous to marine creatures and humans alike. The problem is extremely complex, officials say, and laws and regulations can only be part of a solution, especially when it comes to enforcement offshore." It's a big Gulf, and it's very difficult to catch anybody littering because you have to be there and you have to observe it," says Lukens. "The ships on the ocean just don't travel that close together."

So many drums were found to contain dangerous substances that cleanup crews' protective gear includes self-contained breathing apparatus.

Officials have developed a detailed program for routinely patrolling the national seashore for drums, picking them up and dealing safely with the materials they contain.

"It's a very good system, but the drums keep coming in," Lukens says.

Since some dangerous toxic wastes do wash ashore in unlabeled drums, beach clean-up volunteers are warned to stay away from 30- and 55-gallon drums, adds Linda Maraniss, director of the Texas office of the Center for Environmental Education in Austin.

Maraniss says, "Drums left on the beach will rust and who knows what chemicals are leaking into the sand." ■



During CEE's 1986 clean-up, volunteer "Beach Buddies" picked up 124 tons of garbage in just three short hours.

Make your day, Adopt-a-beach

Help win the war against beach garbage by making a commitment to help keep Texas beaches clean.

The Texas Adopt-A-Beach Program is asking civic groups, corporations and individuals to assist in cleaning up the hundreds of tons of garbage currently covering state beaches by "adopting" a particular segment of beach and agreeing to clean it a minimum of three times a year.

In the Adopt-a-Beach program, which is among the first of its kind nationally, "adoption" certificates are issued, plus a certificate of recognition for each individual who actually participates in the beach cleanup. The program, started by the Texas Land Office and operated at the local level through volunteer county coordinators, will not only go a long way toward cleaning up the existing garbage on Texas beaches but also in dealing with the debris that continues to wash ashore daily.

The program is designed to put an end to Texas beaches being used as garbage dumps, with the strategy being to battle beach pollution at its many sources, says Texas

Land Commissioner Garry Mauro. Mauro estimates that as much as 80 percent of the beach trash comes from offshore sources such as international shipping. The remaining trash is the result of recreational boaters, beach visitors, offshore seismic operations, and oil and gas platforms.

Mauro says, the program will save the state more than \$100,000 and local governments more than \$250,000 annually.

Texas had a major beach cleanup on April 25, in conjunction with the Great Texas Trash Off and Keep America Beautiful Week. A second cleanup is set for September 19 to coincide with Coast Weeks (September 19 - October 3), which will be coordinated by the Center for Environmental Education. During CEE's 1986 Texas Coastal Cleanup, volunteer "Beach Buddies" picked up more than 124 tons of garbage in just three hours.

Anyone interested in participating in the upcoming Texas coastal cleanup should call Linda Maraniss, state coordinator for the Adopt-a-Beach program at 512-477-6424. "Beach buddies are needed from Boca Chica to Beaumont to collect data and debris," she says. "Already 30 hotels have offered beach

buddy discounts to encourage Texans to come to the coast for a few hours of work and a weekend of fun." Last year's cleanup was the most detailed analysis of any beach cleanup in the nation. The data collected is a very important aspect of the cleanup effort.

In March, Texas students from more than a dozen state colleges and universities picked more than five tons of garbage on Texas beaches during Texas Collegiate Challenge Spring Break Cleanup.

Meanwhile, the Adopt-a-Beach Task Force has joined with the Texas Congressional delegation, including U.S. Sen. Lloyd Bentsen and U.S. Reps. Kika de la Garza and Solomon Ortiz to eliminate the sources of beach garbage on the federal and international levels. Contacts aimed at curbing this garbage problem have already been made with the other states, the U.S. Department of Agriculture, the U.S. Coast Guard, the Texas Legislature and national environmental groups.

Want to Adopt-A-Beach? Start by calling 1-800-85-BEACH, the toll-free number to provide information on the Texas Adopt-A-Beach program. Of course, all those who wish to participate may not actually be able to go

down to the beach to pick up garbage on the beach, but there is a role for those who cannot be there. Contributions, from providing equipment to supplies to money, are needed to make the program a success. The Texas Conservation Foundation, P.O. Box 12845, Capitol Station, Austin, Texas 78711, is accepting donations to the Texas Beach Cleanup Fund.

Any group, corporation or individual willing to assume responsibility for cleaning up and maintaining a section of beach in a manner consistent with Adopt-A-Beach guidelines is encouraged to participate. Some general rules are:

- The adopted beach section will generally be one mile in length.

- The adoption period is one year. Adopters will be encouraged to re-adopt at the end of the year.

- Data cards will be supplied to adopters to record information on garbage collected.

- Collected data will be forwarded to the Center for Environmental Education for analysis.

- All cleanup efforts must be coordinated with appropriate local governments and local cleanup groups.

State officials point out that the Adopt-a-Beach effort is one of those rare problems in government where both the causes and the solutions are known, and, therefore, participants have a reasonable chance of achieving a practical resolution. The statewide Adopt-A-Beach program and an anti-litter plan, is an extension of the Highway Department's "Don't Mess with Texas" anti-litter campaign. ■

Offshore rigs blamed for litter

Texas' offshore oil and gas industry has erroneously been targeted by beachgoers as the principal source of tons of marine litter that pile up on Texas beaches each day, says a new Texas A&M University study.

A three-month survey of visitors and fishermen at Padre Island National Seashore indicates that offshore platforms and rigs were perceived as the prime source of marine debris on the island, says Dr. Robert Ditton, a tourism expert in Texas A&M's Department of Recreation and Parks.

That assessment runs exactly counter to reality, Ditton says. While the Texas Coastal and Marine Council in 1985 estimated that 75 to 90 percent of the garbage on the state's beaches comes from offshore sources, the vast majority of the trash came from international shipping.

Even though the public's view is wrong, the study authors suggest that the state's offshore oil industry not ignore the issue. In this case, the perception, though false, could damage industry

initiatives in the future. Ditton believes the litter source perception is simply a visual connection between the sight of offshore petroleum platforms on the Texas coast and the source of the litter.

State environmental officials, as well as the offshore oil industry itself, must be "sensitive to the fact that people think those platforms are responsible for the litter problem," Ditton says.

The litter source results are part of a much larger visitor use examination called, "A Survey of Down Island Visitors and Their Use Patterns at Padre Island National Seashore," by Ditton and his Texas A&M co-researcher, Dr. Jim Gramann. The study was conducted for the Natural Resources Management Division of the National Park Service. Two groups of beach users were questioned - 517 individuals who were just on the beach doing a variety of normal summer activities and 198 fishermen.

Other aspects of the Texas A&M study were how visitors perceive beach cleanliness at Padre Island; whether they thought the beaches were clean or not; how important a clean beach

was to them; and, finally, the effect of several general policy and management actions. Ditton says there was no major difference between the two groups' reactions to beach litter and cleanliness of the beach. Overall, park visitors felt that the beach was only "somewhat clean." The scale ranged from "not at all clean" to "very clean."

"So, it (beach area) didn't get high marks, but it didn't get low marks either," Ditton says. On the other hand, though, when asked how important a clean beach was, beach visitors ranked cleanliness as "very important" in their decision on where they go to a beach. In addition, a majority felt that debris washing ashore and litter already on the beach is something that should be cleaned up as soon as possible.

Another study area under consideration was whether beachgoers considered debris washing ashore as part of the beach experience. "This idea didn't receive a lot of support," Ditton says.

"The vast majority of beach users again rejected the idea that the debris washing ashore is part of the adventure of going to the beach." ■



Visitors to Padre Island National Seashore felt that the beach was only "somewhat clean," says a new report.

TONY ANGOS

T H E T I E S T H A T B I N D

Plastic outlasts everything, and that's why it's devastating Texas' marine life. Millions of pounds are dumped in the ocean each year, and experts warn the synthetic tide is still on the rise.

A GUST OF WIND CAME SINGING IN OFF THE surf on Mustang Island, and the one-legged gull teetered on his good limb like a dancing peg-leg pirate.

No one saw the gray bird's leg fall off. For weeks it was there, swollen, ghastly. Then, after slowly atrophying, it was just a stump. The tough plastic fishing line that had repeatedly looped its way around the ring-billed gull's foot finally closed the noose.

"After that right leg went gangrenous, I thought surely it would die from massive infection," says Tony Amos, a University of Texas oceanographer who has been studying this part of South Padre Island for more than nine years. "The bird's okay now. It's even come back two years in a row, but it's one of the lucky ones. A lot of them don't make it."

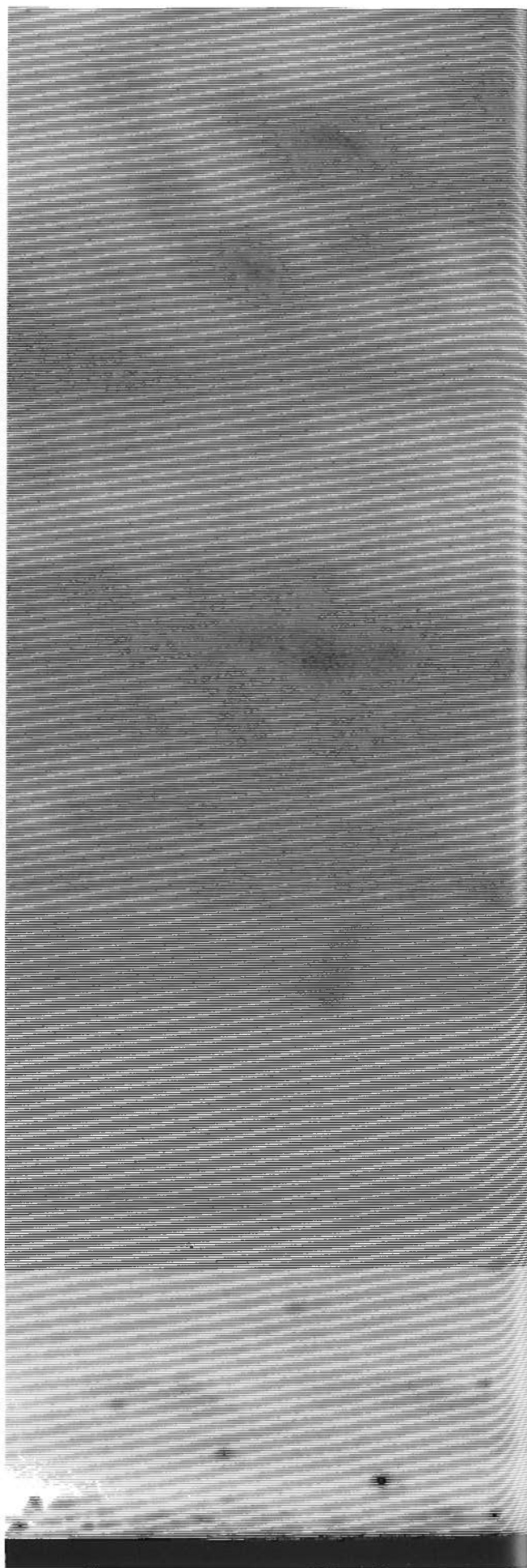
Today in Texas there are thousands of other casualties like the one-legged bird in this age of plastics. And, it's not just our feathered friends paying the toll for see-through, zip-lock convenience. Rare, endangered sea turtles have been known to wolf down floating plastic bags, mistaking them for their normal entree of fresh jellyfish.

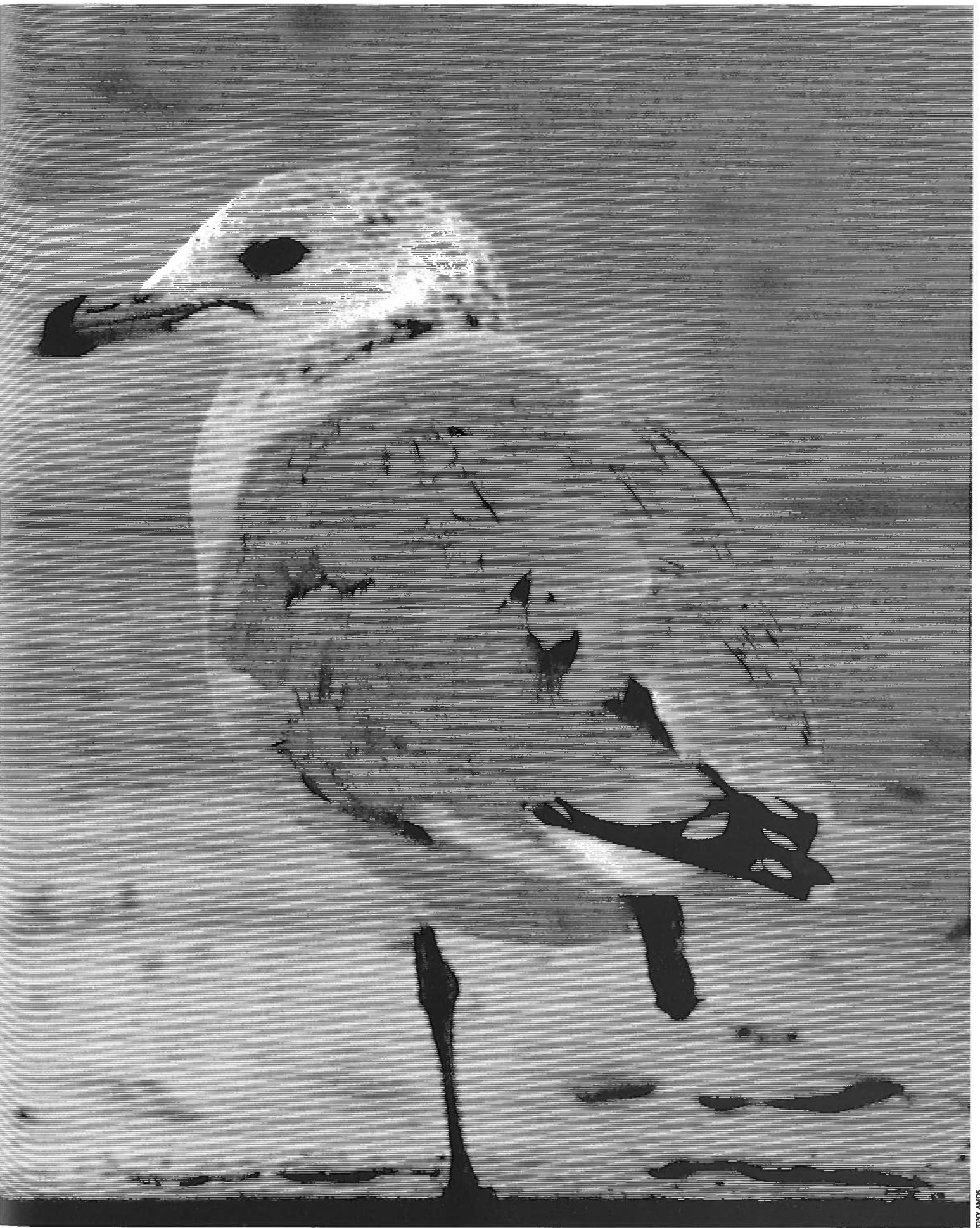
And fish have been found floating belly-up in the grip of a virtually indestructible trap, the plastic six-pack holder. Plastic has become a persistent marine pollutant here in America's throw-away society. Today the Gulf of Mexico is littered with the plastic sheeting, bags and containers dumped by merchant ships, commercial fishermen, pleasure boats, offshore drilling rigs — even the Coast Guard and Navy.

There are plenty of other sad tales of plastic-related death here in Texas. For instance, on New Year's Day 1984, a pygmy sperm whale calf and its dying mother beached on Galveston Island. They were taken to SeaArama-Marineworld in Galveston, where the mother, losing gallons of blood, died three days later. Doctors found her stomach badly ulcerated. But there was hope for the calf, named Jean LaFitte by its rescuers. The whale showed signs of good health, even eating some squid. Suddenly, it stopped eating and died Jan. 11.

The young whale's stomach was a modern-day trash can. An autopsy showed several pieces of plastic obstructing two of the whale's stomachs, including a plastic garbage can liner, a plastic bread wrapper and a corn chip bag, says Dr. Raymond Tarpley, a veterinary anatomist at Texas A&M University and

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TONY AMOS

Endangered sea turtles have been known to wolf down floating plastic bags, mistaking them for their normal entree of fresh jellyfish. Doctors have also found plastic strapping restricting growth of limbs, such as this recently released turtle.

director of the Texas Marine Mammal Stranding Network. The cause of death, he says, was severe infection of the abdominal cavity.

"It seems hard to imagine a tiny whale would come to ingest so much plastic," Tarpley says. "It would take a lot of work.

"People believe water pollution means sewage, chemical run-off or oil spills," he adds. "They never consider that the plastic bag they casually toss into the surf is a killer, but it is. That bag, and others like it, killed that baby whale."

During the past two years, Dr. Andre Landry, a marine biologist at Texas A&M University at Galveston, has conducted autopsies on some 94 sea turtles as part of a major study of marine litter. That figure is the largest number of sea turtles ever examined this closely along any one coast.

"We're finding plastics in these turtles in three general categories. One, random sizes of plastic sheets such as those used in plastic bags or containers. Two, small plastic pellets or multi-colored beads in the gut. And, three, milk jug ring caps."

Anecdotal evidence from other areas of the nation is equally gruesome. In 1984, a young 11-pound hawksbill sea turtle died two days after it was found stranded on a Hawaiian beach. It was found emaciated and unable to dive.

George Balazs, a National Marine Fisheries Service sea turtle biologist, told officials of the University of Hawaii Sea Grant Program that a mass of plastic garbage was found in the turtle, including a golf tee, shreds of bags and sheeting, bits and pieces of monofilament line, a plastic flower, part of a bottle cap, a comb, chips of Styrofoam and hard plastic, and dozens of small round pieces. "The intestine was completely blocked with this stuff," he says.

The buoyancy of the material had the same effect as a life preserver. Unfortunately for the turtle, this meant it could not reach the sea floor to sleep. Balazs says numerous sea turtles have been found with plastic bags hanging from their mouths, lining or totally blocking their intestinal tracts, and extending from their excretory orifices.

A major factor is that plastic outlasts everything, and that's why it's devastating the state's marine life. While dumping trash in the Gulf isn't new, the percentage of garbage made of plastic has grown steadily. Unfortunately, the very qualities that give the synthetics most favorable status in manufacturing and packaging — light weight, strength, durability — also make it a terror on the high seas.

Exact estimates of the amount of plastic garbage floating around the Gulf are difficult to determine, but the Center for Environmental Education (CEE) in Washington estimates that some 14 billion pounds of trash are discarded at sea annually. The merchant fleet alone tosses more than 639,000 plastic containers over the side daily, and fishermen lose or cut loose tons of netting each year. During CEE's Texas Coastal Cleanup last fall, volunteers hauled in 124 tons of trash along 122 miles of coastline. Fifty-six percent of the litter was made of plastic.

At present, no international or U.S. law prohibits ships from dumping garbage beyond the three-mile limit of territorial waters, says Coast Guard Rear Adm.

John Kime. Even the Coast Guard, responsible for enforcing anti-dumping laws in the U.S. coastal waters, still dumps its shipboard garbage on the high seas — like most of the world's navy, merchant and recreational fleets.

But a garbage problem on Texas beaches is not exactly startling news. Anyone who's walked the surf can tell of areas littered with plastic diapers, bottles, bags and other similar debris. And while thousands of ships sail the Gulf of Mexico each year, very few Texas ports provide adequate facilities for collecting ship-generated garbage. So, it's not surprising to find the Gulf serving as a giant dump.

The trashy mess certainly isn't centered in the Gulf. Worldwide more than 5 million plastic, metal and glass containers are chucked overboard every day. Plastic cargo nets, sheeting used to protect cargo, strapping bands and utensils all get the same treatment. The National Academy of Sciences estimates that commercial fishermen alone dump more than 50 million pounds of plastic packaging into the ocean each year and lose some 300 million pounds of plastic nets, lines and buoys.

Plastic particles like pellets and beads find their way into the Gulf by being spilled as they are loaded for shipping, or by being dumped off the decks of ships. The beads are also flushed with factory wastes into sewage treatment plants or fall out of trucks and rail cars, and eventually reach bodies of water. The resin pellets can confuse seabirds, who mistake them for floating fish eggs. The plastic beads accumulate in the bird's gizzards, causing intestinal blockage, ulceration and often death, experts say.

The use of plastics in the United States dates to the Civil War, but it took World War II to spur large-scale production of the synthetic as a substitute for scarce natural resources, such as rubber. Increased demand substantially reduced production costs, and plastics began replacing wood, metal, leather and glass as the favored material of the postwar era. Last year, 50 billion pounds of plastic were produced in the United States, nearly double the combined output of steel, aluminum and copper.

The tide of plastic garbage began to rise even faster after the war when disposable, durable, inexpensive polymer materials came into wide use. The 1960s brought a tremendous increase in commercial fishing, with a corresponding loss of gear. But unlike the old-time fishing nets of hemp or flax, unlike tin cans and cardboard containers, which sink and eventually disintegrate, plastic garbage remained buoyant and almost indestructible.

Marine experts say the plastics collect in huge masses wherever wind and currents take them. Tides and currents tend to concentrate food items. If it's where food is supposed to be, it gets eaten. In the open seas, plastic debris is blown by prevailing winds into long rows called drift lines, which become virtual highways of concentrated floating waste.

These persistent, buoyant masses become a target for sea animals who are attracted to the naturally occurring organic material present there. The plastic itself often has some marine growth on it, possibly making it appear to be food and increasing the likelihood of its being eaten. It is unknown what chemicals

or polymers may be released by the plastic as an animal attempts to digest it, or what their effect may be on the animal's health.

To make marine debris matters worse, each year brings new and improved plastics and yet more uses such as plastic containers tough enough to be reheated after packing perishable foods. Unfortunately, products made more durable are also more durable after disposal. But upscale convenience products continue to replace bottles and cans because plastic containers are lighter and take less energy than metals to manufacture. Packaging experts predict that almost everything that's in other packaging now is likely to find itself in plastic eventually.

So, what's to be done about plastic debris in the marine environment? Although there are laws and treaties prohibiting disposal of plastics at sea, they are not binding on all ships, and detection and enforcement are not high on anyone's priority list. The unintentional loss of fishing gear is not criminal.

"Regulations are no better than the teeth they have from a standpoint of enforcement," Landry of Texas A&M at Galveston says.

"Debris studies are going to give us a good idea of just the quantities and types of debris are out there," Landry says. "But it's just telling us what's going on. Unless we can do something to prohibit what's going on, then I see this as a continuing problem."

Among the solutions environmental groups suggest are:

- Broaden the scope of research on marine debris' effect on the environment.

- Enforce current laws and begin educational programs to minimize ocean dumping.

- Development of more degradable plastics should be encouraged.

- And, finally, international treaties could be brought into force.

Two treaties currently regulate the dumping of plastics at sea: the London Dumping Convention (implemented in the United States by the Ocean Dumping Act) and MARPOL, diplomatic shorthand for the 1973 Marine Pollution Convention. The former regulates trash-hauling ships, the latter other vessels. MARPOL's prohibition against dumping persistent plastics, though, is contained in an "optional" section known as Annex V. The appendix prohibits disposal of "all plastics, including but not limited to synthetic ropes, synthetic fishing nets and plastic garbage bags."

Twenty-seven nations have ratified the plastics provision, representing 41.85 percent of the world's gross tonnage in ships. Fifty percent is required before the provision would become law. Neither the United States, which has 4 percent of the world's gross tonnage, has ratified the 13-year-old provision, nor has the Soviet Union, which has 5.8 percent of the total. Still, even the most optimistic of supporters admit that enforcement of Annex V provisions and related laws and regulations in vast ocean areas clearly will pose a difficult challenge.

The Center for Environmental Education adds that more than a dozen international conventions and U.S. laws include provisions to limit or ban marine dumping. None of them, however, applies to plastic pollu-

tion, a problem that governments around the world are just starting to recognize. The Environmental Protection Agency has no program to control plastics.

Today ocean disposal not only is unregulated, the Center for Environmental Education in Washington says, it is, in effect, encouraged by a federal requirement that ships from foreign shores sanitize their garbage before entering U.S. ports. Because the sanitation process is costly, captains simply dump their trash, including plastics.

There are a number of laws enacted for other purposes that might be brought to bear, assuming a creative and aggressive desire on the part of agencies to address the entanglement problem. For example, the Endangered Species Act, Migratory Bird Treaty Act, and Marine Mammal Protection Act prohibit the killing of marine birds, turtles, and mammals.

Another tack would be to encourage development of new plastic manufacturing processes capable of recycling old fishing nets, net fragments or line. For certain other plastic items commonly associated with marine debris, particularly plastic cups, plastic bags and plastic packaging materials that are made to be used briefly and then discarded, development of plastic materials that degrade over predetermined periods of time when exposed to light or other natural elements in the marine environment might be encouraged as a partial solution to the problem of plastic debris.

In addition, negotiations with fishermen might produce agreements on precautionary measures to be taken in return for immunity from prosecution for accidental kills. Then there are programs that compensate fishermen for lost gear. Fishermen who wished to participate in those programs could be required to mark their gear, dispose of it safely, report inventories and disposition of all gear, and notify authorities when they spotted concentrations of debris.

Sen. John Chafee, D-R.I., says, "The plastic pollution problem has grown to such a point that we cannot walk to our nation's beaches and parks without encountering plastic litter." The Environmental Protection Agency recently commissioned a study entitled "Use and Disposal of Nonbiodegradable Plastics in the Marine and Great Lakes Environment," which points to a growing body of evidence that plastic, when improperly disposed of, harms the oceans and its inhabitants in a multitude of ways.

Some states have made attempts to attack the problem at its source, enacting laws and creating incentives for the use of degradable plastics. Eleven states now require plastic yokes that bind six-packs to be made of degradable materials. They are Rhode Island, Connecticut, Delaware, Maine, Massachusetts, New York, New Jersey, Oregon, Vermont, California and Alaska.

Scientists say these plastics remain strong while kept inside stores and homes but become brittle and decompose into tiny flakes when exposed to sunlight. Since the ultraviolet rays that do the job don't penetrate seawater, a different tack would have to be taken for plastics used by ships — perhaps disintegration when exposed to saltwater.

While making plastics photodegradable or biodegradable sounds like a reasonably simple solution, it is



NORMAN MAURTY



The very qualities that give plastics most favorable status in manufacturing and packaging — light weight, strength, durability — also make it a problem on the beach and on the high seas.



NORMAN MARTIN



TONY AMOS

The Gulf is littered with plastic sheeting, bags and containers dumped by merchant ships, commercial fishermen, pleasure boats, offshore drilling rigs. Critics say ocean disposal not only is unregulated, it is, in effect, encouraged.

not, says Susan Vadney, a spokesman for The Society of the Plastics Industry, an industry trade group in Washington. The plastics commonly manufactured and used today are long-chain polymers that resist the effects of natural environmental degradation. The problem, she says, is that as the chemical structure is changed to provide degradation, the physical and mechanical properties may be altered to the point that the basic polymer is no longer suitable for the intended application. In addition, degradability may be counterproductive to recycling efforts, and may present other, as yet unknown, environmental risks.

"The key is education," says Vadney. "It's a behavioral problem for the most part. Plastics are not the only material that are littered—everything gets dropped by someone at some point.

"Our responsibility is to educate the plastics industry about the dangers of any possible pellet escape-ment, to educate the fishermen not to toss their nets, the commercial maritime industry not to throw their used food packaging overboard," she says.

Vadney points out that there is a real technical difference between photodegradability and biodegradability. Six-pack loops, for instance, are not biodegradable. They're photodegradable.

Degradability is fine where feasible, she says, and that's the key word, where feasible. "People are calling for degradability where it really may not be appropriate. They don't understand what it means to have a food package that is going to start falling apart before you're finished using it."

But despite these difficulties, there have been some successes. One chemically modified photodegradable polyethylene resin is being used to make six-pack beverage ring connectors. Photodegradable means the polymer chain breaks down over a period of time when subjected to sunlight. Another commercial application of degradable plastics currently in use is in agricultural mulch for growing vegetables.

Vadney admits to the irony associated with plastics pollution in the oceans is that the very properties that make plastics ideal for so many uses — namely, their durability and light weight — are the ones that ultimately pose a threat to the marine environment when plastic products are disposed of improperly. In each instance, however, it is not plastics themselves — but their improper disposal — that is at the root of the problem, she says.

"First and foremost," SPI President Chuck O'Connell says, "SPI supports the responsible use of our industry's materials and the proper disposal of these products...We are committed to reducing the likelihood of plastic pellets finding their way into the marine environment, increasing the level of plastics recycling, and educating decision-makers and the public about the options for properly disposing of all municipal waste."

Vadney points out that some in the plastics industry have reacted to the marine pollution issue by identifying it as a litter issue or a "people problem" that doesn't warrant concern. However, she says, neither the news media nor the public makes this distinction, and the plastics industry is increasingly being held accountable for the disposal of its products. Because marine pollution is an emotional subject — starving birds,

strangled seals — any reference to plastics in this context ultimately fuels negative perceptions of plastics generally.

If the plastics industry ignores the marine pollution issue, legislative and regulatory attempts to restrict plastics will only increase as public perception worsens, she says. By recognizing the significance of the problem and working to find solutions, the plastics industry can demonstrate its concern for the environment.

Michael Bean, chairman of the Environmental Defense Fund's wildlife program, adds, "Before environmentalists join a headlong rush to embrace degradability as a solution to the problem of plastics in the environment, two key questions need to be answered. The first is whether the products of degradation are themselves environmentally safe; the second is whether the process of degradation is likely to be rapid enough to reduce significantly the hazards posed by undegraded plastics. Is degradability consistent with the intended function of the product and its likely shelf-life?"

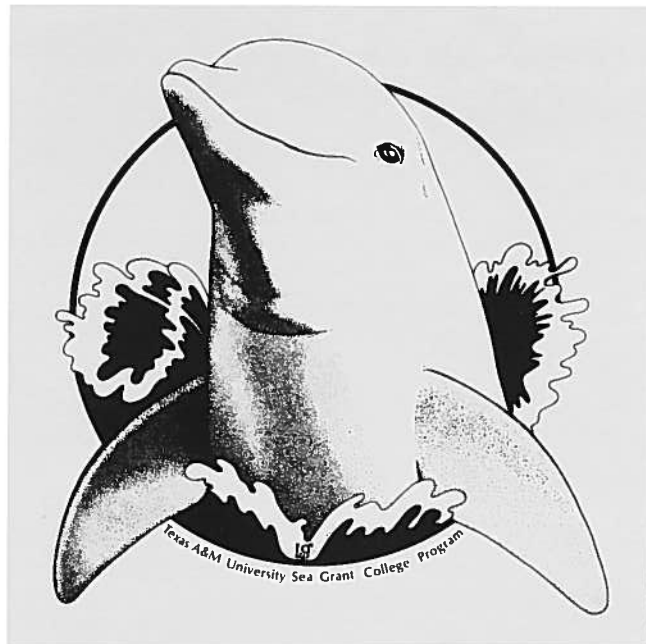
A large part of the impetus for restricting use of plastics in the marine environment is the unnecessary death of marine animals. Among the greatest threats to marine animals and seabirds is plastic fish line cut off by commercial and recreational fishermen. Unlike natural fiber lines used before the popularization of plastic, the synthetic substitutes are translucent in water, and they are nonbiodegradable. They don't break down in the environment. Birds diving for fish cannot see the lines and, like Amos' one-legged gull, become tangled in them.

In other parts of the world, another killer of sea birds is plastic fish net stretched for miles across the ocean floor by commercial fisheries. Unable to see the translucent plastic netting, birds dive for fish trapped in the nets laid by Japanese salmon fishermen. Another major problem tied to plastic debris is "ghost fishing," or the tendency of lost or discarded nets to continue to catch fish indefinitely. Because these nets are made from durable plastics, they trap and kill sealife for decades. Sea birds, attracted to the netted fish, and sea turtles, which are possibly attracted to marine life encrusted on the netting, become further victims of the ghost nets as they remain awash or snagged on rocks or coral reefs.

Consumption of plastic articles kills more than birds. Playful seals, sea lions and sea otters are easy prey for plastic nets and packing straps used to bind ship cargo. At least 30,000 northern fur seals, which congregate on the Pribilof Islands of the Bering Sea west of Alaska, die each year from plastic entanglement, Charles Fowler, a biologist at the National Marine Mammal Laboratory in Seattle told the Washington Post. Naturally curious, the seals play with net fragments and straps, often catching their necks in the webbing. They drown, die of starvation or exhaustion, or perish from deep, infected wounds caused by the tightening of the material around their necks and backs, he says.

The death of marine animals is not the fault of plastic. The material possesses what its designers expect of it — durability. The answer to Texas' plastic litter, more likely, lies with the users of plastic. ■

DISCOVER TEXAS' MARINE MAMMAL STRANDING NETWORK



THERE IS SOMETHING ABOUT THE SIGHT OF A DOLPHIN or whale swimming freely in front of a ship or jumping through the waves that sparks an immediate response from most people.

For all the fascination, however, marine mammals remain among the least understood of all species. Since their natural habitat is deep water, an environment that man is only beginning to explore, these animals are difficult to study. With so much still to learn about even their basic biology, a system capable of expanding this knowledge can contribute both to education and to research.

The Texas Marine Mammal Stranding Network, a volunteer organization dedicated to the understanding and conservation of marine mammals, represents just such a system. By providing a coordinated response to marine mammal strandings along the Texas coast, the Network not only administers to the needs of these animals, but also provides vital data of biological and veterinary importance.

PLEASE TURN TO PAGE 28

BY AMY BROUSSARD



Texas Sea Grant's Charles Moss believes there are three basic reasons that people litter. First is the "Mother" syndrome. People rationalize, "If I throw this stuff down, somebody else will pick it up. After all, isn't that what those county workers are paid for?" Second is the "It belongs" syndrome. Folks tell themselves, "Litter is here already. It must belong here." Third is the "Who cares?" syndrome. The rationalization is, "It's not my place. I don't have any stake in this. Who cares if I throw this down."



**BY
RHONDA
SNIDER**



Talking Trash

Don't mess with Charles Moss. This soft-spoken marine agent takes a tough attitude toward beach litter, and has spent the past ten years cleaning up his stretch of the Texas coastline.

FOR YEARS, SEA GRANT'S COUNTY MARINE AGENTS have been getting down and dirty and talking trash. Few seemed to notice, much less care. But, finally, one agent says, people are not only listening, but doing something about an ugly, dangerous problem.

The problem: marine litter and debris. Officials estimate that as much as 140 tons of trash and debris can be found on Texas beaches at any given time.

Since the mid-1970s, Charles Moss has been preaching the gospel of clean, safe, healthy beaches. This Brazoria County Marine Agent and part-time preacher has been exhorting litterbugs to repent of their ugly habits and imploring people to remember the scourge that afflicts marine life as a result of their trashy behavior.

"The number one attraction in Brazoria County is our beaches," Moss says. "We don't have Astroworld or Six Flags. We have Surfside. And we have to keep it in shape."

As part of his marine evangelistic endeavors, Moss, in 1978, helped initiate a project to reconstruct a line of dunes that had been flattened by hurricane and storm damage. Since then, he and a small band of followers have made regular pilgrimages to the local beaches to build up more dunes, maintain the existing ones and plant stabilizing grasses. Moss and the other beach believers also began concurrent beach cleanup activities during their dunes days.

Moss says that in addition to acting as a buffer to storms and erosion and creating a habitat for coastal critters, the dunes are an essential element in controlling beach litter and marine debris. The dunes establish a boundary that keeps beachgoers in a narrow strip of beach near the shoreline. The dunes also act as a buffer to block the wind from blowing trash farther inland. Thus the majority of the litter and debris stays isolated within the front beach area, making cleanup easier and meaning less hazards to nearshore birds and other wildlife.

Despite the success of his dune reconstruction and cleanup efforts, Moss says it's not enough. Recently, he has focused even more of his efforts on the quest to improve his beaches. As an employee of the Texas Agricultural Extension Service, he is required each year to declare an in-depth program – a specific area in which he will concentrate the majority of his time. For the past few years, Moss's in-depth program has been to improve the health and



HOUSTON CHRONICLE

appearance of the local beaches.

And, with all the vigor of an old-time tent revival preacher, he's taken his beach improvement sermon on the road. More important than getting out to the beach every weekend to remove the garbage is making people aware of the problem. "Education is definitely the key," he says. "Otherwise, you're nothing but a garbageman."

Educating the public can be a tool to accomplish tasks that one person can't do on his own, Moss explains. When he first started working for a dune protection ordinance, he met a stone wall. No one understood the value of the dunes to the ecological balance of the shorelines.

"But after four or five years of talks to service clubs and organizations, what happens? You end up with a new mind set, a new way of thinking," he says. These local movers and shakers, who began to understand the need for a dune line on the beaches, in 1983 passed a dune protection ordinance.

"Education sometimes wins when you don't have the authority or the ability to do something yourself," he says. He extends this theory to the marine litter and debris issue via repeated lectures on the harmful effects of plastics in the environment.

Through a local school enrichment program Moss gives a regular talk called "It's a Water World." He discusses various aspects of the marine environment to all grades and the adult education classes. He also is asked regularly to give presentations to community environmental and service organizations. In all of his estimated 140 presentations per year he will purposely bring in the marine litter aspect.

Moss believes there are three basic reasons that people litter and teaching them why those are illogical reasons will reduce the littering.

First is the "Mother" syndrome. People rationalize, "If I throw this stuff down, somebody else will pick it up. After all, isn't that what those county workers are paid for?"

Second is the "It belongs" syndrome. Folks tell themselves, "Litter is here already. It must belong here."

Third is the "Who cares?" syndrome. The rationalization is, "It's not my place. I don't have any stake in this. Who cares if I throw this down."

Moss says, "I see people who don't mind at all putting trash on the beach. But those same people wouldn't dare throw it in their own backyard." He says that what these people don't realize is that because of the public access law, the beaches are their property, and it's their taxes that pay for its cleanup.

Moss admits that regular beach cleanups may actually reinforce the "Mother" syndrome. "It's the same problem a mother has in teaching her teenage son to clean up his room," Moss comments. However, the cleanups do remove the "litter is already here" image, and make people more aware that the beaches belong to them and are, therefore, their responsibility.

Many people also take the attitude that one little item will surely not hurt the environment to a great extent. "One man dropping a beer can on the beach is no problem," Moss says, "but multiply that times the hundreds of thousands of people who visit Brazoria County beaches each year, and you have a big prob-

lem.” A group of Brazoria County’s faithful who understand the extent of the problem and want to attack it head-on have formed an anti-litter beach patrol. “We are attempting to develop a covert beach patrol whose concept is non-confrontational,” Moss says. “Instead of approaching beach litterers (when seen littering), we’d like to identify them, contact them and tell them the consequences of their actions.”

He says the beach patrol members are just ordinary folks who care about the local beaches. They cruise the beach front seeking out litterbugs. When offenses are discovered, these volunteers will track down the violators’ addresses through bits of trash or license plates. All offenders receive letters reminding them that litter kills fish and wildlife, and costs local taxpayers \$150,000 per year.

Moss says they would like to be able to tell the offenders that a fine will be assessed if they are caught littering again. However, there are two problems with this.

First, the justice of the peace precincts, which are responsible for these types of fines, are not courts of record, meaning they don’t keep up with an offense after it’s been taken care of. If a first litter offense is a warning, the courts would not keep a record of that offense. Therefore, when someone is caught littering again, the judge would have no way of knowing that it is a second offense, as there would be no record of a prior violation.

The second problem, Moss says, is that some judges are reluctant to lay a heavy fine on a local citizen, just because he threw one item on the beach. With so many worse offenses than littering being committed every day, fining someone for a “petty” crime is often perceived as a waste of time.

Although he would like to see stricter penalties levied on those who litter, Moss notes that officials estimate that 75 percent to 90 percent of the debris arriving on Texas beaches comes from offshore.

Moss estimates that the 19-mile stretch of beach in his area receives 1.5 tons of trash from offshore each day. He gets this estimate from a recent beach cleanup effort on Surfside Beach, near San Luis Pass.

All organizations that had adopted a mile of beach in Brazoria County were asked to participate in the September statewide beach cleanup day. Because of a prior commitment on that day, one group decided to clean their portion of the beach the evening before. The next morning, during the scheduled cleanup activities, Moss picked up freshly washed-ashore trash on that same mile of beach. In one night, 167 pounds of non-biodegradable trash had washed ashore.

Moss says the new debris could not be attributed to beachgoers. The group completed their cleanup at dusk, and the second cleanup began at 8 a.m. the next morning. It’s unlikely that anyone even visited the beach that night, much less contributed a significant amount of the trash on this portion of the beach.

With this in mind, Moss is working with several groups to promote proper disposal of non-biodegradable trash by offshore workers and boat operators. The first step in this mission is to document how they currently dispose of it and how much is generated by each polluting segment. He has had meetings with the Keep Brazoria County Beautiful Association, the

Marine/Offshore Subcommittee of the Brazosport Chamber of Commerce, the Brazos River Harbor Navigation District and the Port of Freeport to solicit their support in quantifying garbage.

Moss says he has also persuaded a couple of fishing tournaments to distribute “Don’t Mess With Texas” trash bags to all participants and ask the fishermen to save all their non-biodegradable trash. In addition to Moss’s many efforts on a local level concerning marine litter and debris, he has also been called to missionary service on a state and national basis.

In 1985, Moss and Brazoria County Parks Director Kim McAdams began planning a beach adoption program whereby groups were encouraged to adopt a one-mile segment of beach. The groups were then responsible for maintaining the dunes and keeping the stretch of beach clean. Moss says the Center for Environmental Education’s anti-litter campaign and publicity of the dangers of plastics to fish and marine animals helped get Brazoria County’s program off the ground.

When the Texas General Land Office expressed an interest in a statewide beach adoption program, McAdams and Moss were asked to be on the task force to develop the now popular Adopt-A-Beach Program. Moss says he and McAdams learned much by participating on the task force, and shortly after the announcement of the state program, all of Brazoria County’s 19 miles of beaches were adopted.

Statewide 133 miles of beaches have been adopted as of July 1. Brazoria County was the first county to have every mile of its beaches adopted, and currently is still the only one to have all its beaches adopted.

Evangelizing and counseling other counties’ officials on the potential of Adopt-A-Beach programs in their areas has also been a task for Moss in recent months. He gave a presentation to the Texas Recreation and Parks Society annual meeting, which he says was well received. He also participated along with representatives from Galveston and Matagorda Counties in a press conference that the Land Office coordinated to promote the Adopt-A-Beach program.

Moss has been asked to be on the steering committee of the Center for Environmental Education following the statewide September Coastal Cleanup Day, in which he was a zone coordinator. The committee was instrumental in developing the 1986 Texas Coastal Cleanup Report.

Recently Moss got a pat on the back for all his efforts toward keeping Brazoria County beaches clean and healthy. His local 4-H clubs, which have contributed the majority of the manpower for the dune reconstruction and cleanup efforts, received the “Youth Conservationist Club of the Year” award from the Sportsmen’s Clubs of Texas.

Beaming like a proud pastor pleased with the growth of his congregation, Moss says this kind of award makes all the preaching worthwhile. “Clean, safe beaches: That’s what it’s all about,” Moss says.

It’s been said, “Preach not because you have to say something, but because you have something to say.” With the results that this preacher has garnered, it’s obvious the Rev. Moss has something to say. “A clean beach is within reach,” Moss says. “That’s what I always say.”



NORMAN MARTIN



NORMAN MARTIN



TONY AMOS

The key is making people aware of Texas’ beach litter problem, especially in congested areas. Signs help, but education is definitely important, Moss believes. One person dropping a beer can on the beach is no problem, but multiply that times the hundreds of thousands of people who visit Brazoria County beaches each year, and you have a big problem.

Experts warn against going overboard with aquaculture

Aquaculture is often heralded as the next big industry for Texas. More and more, people are requesting information and assistance from the Texas Marine Advisory Service on how to start up and maintain an aquaculture operation.

The demand for information has been so great that it has spawned such ventures as the recent Red Drum Aquaculture Conference and the forthcoming Shrimp Farming Short Course, a 10-day in-depth course on the culture of shrimp.

More than 300 people turned out for the joint research symposium and production short course June 22-25. The successful conference was coordinated by Mariculture Specialist George Chamberlain and University of Texas Aquaculture Researcher Dr. Connie R. Arnold.

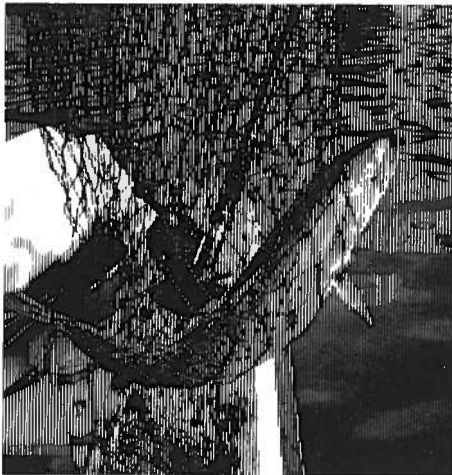
The Shrimp Farming Short Course is being presented for the second year in a row for those actively involved in shrimp farming and for those aquaculture entrepreneurs and potential investors who are considering opportunities in the commercial culture of shrimp. The conference will be presented at the University of Texas Marine Science Institute at Port Aransas Sept. 21-30.

The short course is designed to give both in-depth technical information and practical hands-on training in the latest techniques of culturing penaeid shrimp. For more information on the course contact Granvil Treece, course coordinator, at (409) 845-8557.

Fish, shrimp and crawfish farming may well be the next boon to the Texas economy, but several marine agents, who often assist potential aquaculturists, say they advise people to proceed cautiously.

Matagorda County Marine Agent Willie Younger says he has given direction and guidance to people in his county who have started crawfish and redfish operations. He has helped them develop business plans, design facilities, handle financial management and has assisted in trouble shooting.

But Younger says his biggest contribution in the mariculture area has been to dissuade people who were ill-prepared



NORMAN MARTIN

from going into the business. Younger estimates he has saved folks in his county \$15 million to \$20 million in losses from operations that probably would have failed.

Rich Tillman, marine agent for Aransas and San Patricio Counties, agrees with Younger that much of his mariculture advisory work is in the form of "negative education." Tillman says he cautions people that while mariculture may be a potentially profitable investment for some people, it's not a way to make a fast buck.

"I want to give people the opportunity to see that they aren't going to make a lot of money fast," Tillman says. "It takes a big capital investment and the return is very slow."

He says when people ask about starting a mariculture operation, he sends them information on how to conduct a financial analysis of an aquaculture operation and how to put together a profit/loss projection. "That's the first thing I send them, and a lot of times I never hear from them again," he says.

Tillman says a few entrepreneurs who've been up to the challenge have started fish and shrimp hatcheries and growout facilities in his area. In addition to providing information and referrals, he has assisted these operators in collecting brood fish, going through the proper permitting channels, locating operating money in the form of low interest loans and following wise management techniques.

Bob Nailon, marine agent for Jefferson

and Chambers Counties, says people often call his office or come by wanting information on getting into the aquaculture business. "We have lots of interest in crawfish, especially from the rice farmers," Nailon says.

The rice farmers, he says, have a better chance of getting a crawfish farming operation off the ground because they already have the right kind of land available. However, he insists, "I tell them it's a high risk venture." He says he tells those serious about getting into the business that they should get temporary commitments from several markets before they take the plunge.

For those in his area that are already in the crawfish business, Nailon has helped them evaluate alternative crawfish baits for their traps, assisted with judging water quality and timing of floodings, and has directed them with basic management techniques. One entrepreneur in Nailon's area went into the mudminnow-raising business. Nailon has helped this aquaculturist with water quality assessments, disease control, weed control and pond construction.

Treece, a mariculture specialist, has been working with one farm in a shrimp head-start project designed to give young shrimp greater protection in the early stages of their life cycle to increase their chance of survival in the growout ponds. The success of this project has prompted Treece and the operator to submit a title to the World Aquaculture Society's call for papers to be presented at their January meeting. Treece says there is also talk of a larger head-start project for the future since this one has progressed so well. ■

Seafood course draws interest from educators

Seafood Specialists Annette Reddell Hegen and Mike Haby are about to present their second seafood products course for seafood educators. Twenty-five participants are scheduled to attend the July 20-24 seafood education course.

Texas' first seafood products course, coordinated by the two, was April 13-17 at

Port Aransas. Twenty-three participants attended the week-long course that was offered to individuals in the Gulf and South Atlantic region who are responsible for seafood education and marketing and who would use the seafood-related information in their ongoing media efforts.

Participants included county extension agents, high school home economics teachers, personnel from agencies that deal with seafood and professional home economics consultants. The course incorporated a variety of hands-on lab work, lectures and field trips. The classes covered product identification and selection, processing, marketing, storage, preparation, seafood nutrition, edibility factors and promoting seafood.

The upcoming course will be exclusively for vocational home economics teachers and will additionally cover curriculum development. The number of participants will be limited to 25.

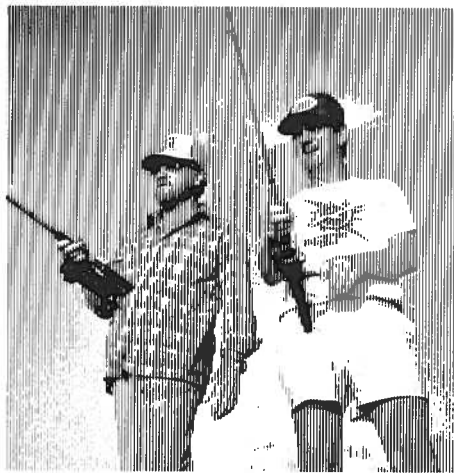
Hegen says the participants have a wide variety of teaching areas including home economics cooperative education, food production management and service, family and individual health, and others. Course participants will be coming from across the state, and two will attend from Louisiana.

The course was approved for 15 units of advanced academic training credit from the Texas Education Agency and for 15 professional developmental units from the American Home Economics Association.

Grants from the Gulf and South Atlantic Development Foundation have made the two courses possible, Hegen says. The financial support helped pay for the travel and accommodations of the participants and for equipment necessary to teach the courses. ■

Advisory specialist updates fishermen on IRS changes

Acting as a liaison between the Internal Revenue Service and marine user groups is a task Marine Business Specialist Dewayne Hollin has been at for several years. "The main thing is to give the commercial fishermen a chance to be heard through the advisory program," Hollin says.



sory program," Hollin says.

One way of doing this is through his advisory role to the IRS in its preparation of tax guidelines for commercial fishermen. Hollin says the IRS asks Sea Grant business specialists to regularly keep them updated on the complaints they receive about its tax guide and suggestions for changes.

Due to the extensive changes in the tax laws for 1987, Hollin and Sea Grant personnel from Florida and the national office were asked to come to Washington, D.C. this year for a meeting with IRS personnel. The IRS asked him and the others for suggestions on revising and updating the publication, "Tax Guide for Commercial Fishermen," and for input on how the new tax laws will affect fishermen.

At the same meeting, he and the others began planning a workshop to train other Sea Grant personnel in the ins and outs of the new tax laws as they apply to various marine industries.

The workshop is scheduled for Sept. 1-3 in Orlando, FL.

Hollin says they have lined up IRS representatives, a member of the U.S. House Ways and Means Committee, several certified public accountants and other marine business specialists to explain the implications of the new tax laws. In addition to providing the tax code information, Hollin says the meeting is designed to get input from the Sea Grant participants on the tax-related priorities that need to be addressed by the various Sea Grant advisory groups. ■

Waterfowl conference set for September in Bay City

A conference on the business of waterfowl hunting on private lands will be presented Sept. 25-26 in Bay City.

This unique program on the development and enhancement of commercial duck and goose hunting in the Southeastern United States is being coordinated by Matagorda County Marine Agent Willie Younger and Dr. Jack Payne, a wildlife specialist with Texas Agricultural Extension Service.

This workshop will take an in-depth look at two of the most essential elements for successful hunting operations – property management and business management, Younger says. One full day will be dedicated to renowned waterfowl and land/water resources specialists who will detail the effective development and management of sites for waterfowl and waterfowl hunting. This will be followed by a day of discussions and presentations focusing on the business management aspects of starting and operating a profitable commercial hunting venture.

Younger says this type of program is necessary due to the demand for more waterfowl hunting operations. Texas is "pretty limited," Younger says, in its public lands available for duck and goose hunting.

"It's much like deer hunting was a few years back," Younger says. "There's not much public hunting opportunity. So the private sector picked it up and turned deer hunting into a lucrative industry." He says he sees this same potential for waterfowl hunting, especially in Texas and Louisiana.

Developing a commercial waterfowl hunting industry can also increase the tourism dollars being brought into the southeastern states, Younger says.

Recreation/tourism is a multi-billion dollar industry in the United States, and some see it as the answer to Texas' depressed economy.

For more information on the workshop, call Younger at (409) 244-7650 or send for registration materials at the following address: County Marine Agent, Room 326 Courthouse, Bay City, TX 77414. ■

A sick dolphin, regardless of the cause of its illness, cannot rest on the ocean bottom in an attempt to recover. The constant need to breathe continues to weaken the animal until it follows the course of least resistance, allowing itself to be pushed onto the beach by wind, waves and water current.

Cetaceans — dolphins, porpoises and whales — are the only marine mammals found off the Texas coast. Since its formation in 1980, the Network has responded to a variety of strandings, ranging from the Atlantic bottlenose dolphin (*Tursiops truncatus*), the most common cetacean in Texas waters, to the rarely seen pygmy killer whale (*Feresa attenuata*). Network volunteers in five regions along the coast from the Texas-Louisiana border to Corpus Christi go to work when a stranding is reported. Those near Sabine Pass are investigated by the U.S. Fish and Wildlife Service, while those in the Galveston-Freeport region are coordinated through the Department of Marine Biology at Texas A&M University at Galveston.

A 24-hour answering machine is available there since most strandings have been reported in this area. Volunteers farther south include representatives of the Texas Parks and Wildlife Department in Port O'Connor and Rockport, The University of Texas Marine Science Institute in Port Aransas, and the National Marine Fisheries Service and National Parks Service in Corpus Christi.

If the stranded animal is alive, first aid is administered and an attempt is made to move it to a treatment facility. Live animals along the upper coast are taken to SeaArama Marineworld in Galveston, while those along the lower coast are moved to the Marine Science Institute. Treatment, which attempts to reverse the effects of exposure, combat infection and provide nourishment, is directed by an authorized veterinarian. A live stranding is a time-consuming and energy-demanding event. The animal is placed under 24-hour observation at the holding facility where its respiration and behavior can be monitored and it can be given medication. A schedule of force feedings is begun if the animal survives the first few hours. Every action requires extreme care. Stranded animals are very weak and even transport can prove too stressful.

Unfortunately, live strandings are the exception rather than the rule, but even those animals that are found dead, or that die soon after discovery, are still valuable to education and research. When called to the site, the stranding team collects such valuable data as length, sex, weight, evidence of external injuries, tissue samples and teeth. If the stranding is recent, they may move the animal to a laboratory for further study; if not, the animal is buried behind the dune line.

The data collected by the Network can help fill the void of basic information about the life and biology of cetaceans, and particularly about dolphins. Data files stored at Texas A&M University now contain information on age, reproductive condition, parasite invasion, food preferences, distribution and cause of death that is difficult, if not impossible, to achieve by other means. All marine mammals, alive or dead, are guarded by the federal Marine Mammal Protection Act of 1972. The Network has received both state and federal permits to collect beached animals for research.

Copies of the Network's data are sent to the Southeastern Regional Stranding Network headquarters in Florida, and, from there, to the Smithsonian Institu-

tion in Washington, D.C., which serves as the collection point for information on strandings from throughout the United States.

The information also supplements classwork at Texas A&M's College of Veterinary Medicine and in the Department of Marine Biology at Texas A&M at Galveston. Veterinary students are increasingly interested in exotic animals, and there is more demand for their services among the nation's zoological parks and oceanaria. At the same time, many marine biology students indicate that their attraction to the field began with an interest in marine mammals.

Why do marine mammals strand? Although frequently asked, there are no concise answers to this question. Basically, there are two types of strandings—mass strandings involving large numbers of animals and individual strandings.

Mass strandings are truly mysterious in that many of the animals appear to be healthy. These group strandings seem to occur more frequently in deep-water social species, such as pilot whales, false killer whales and great sperm whales, and usually revolve around one animal that beaches for some unknown reason, perhaps illness or disorientation. Several theories have been proposed, such as error in echolocation or escape from predators, but none of these theories is accepted fully.

Most strandings along the Texas coast seem to result from an animal either being injured or so severely ill that it can no longer function in deep water. Being a mammal, a dolphin or whale breathes air and must have enough strength to rise to the surface to breathe.

A sick dolphin, regardless of the cause of its illness, cannot rest on the ocean bottom in an attempt to recover. The constant need to breathe continues to weaken the animal until it follows the course of least resistance, allowing itself to be pushed onto the beach by wind, waves and water current.

There are many reasons for illness in an individual dolphin or whale. Necropsies have revealed such causes as bacterial infections, parasites and eating foreign objects. Occasionally, the cause can be traced back to human pollution.

The public is a vital force in the Network. Strandings are investigated most efficiently when the Network is notified immediately, so it is particularly important that the community at large know there is an organization interested in beached mammals.

Public support is necessary, but the continued growth of the Network requires financial support as well. The Harris and Eliza Kempner Fund, a private foundation in Galveston, awarded a grant through May 1985 that was used for supplies.

The National Marine Fisheries Service, parent organization for all U.S. stranding networks, reimburses gasoline expenses incurred in responding to a stranding. Other than these monies, support has come from Brundrett Taxidermy in Port Aransas, which provides a walk-in freezer for interim specimen storage, the Texas A&M Department of Veterinary Anatomy, which provides office and laboratory facilities, and the Texas A&M Sea Grant College Program, which has provided all publicity releases and printed materials.

P R E S S

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