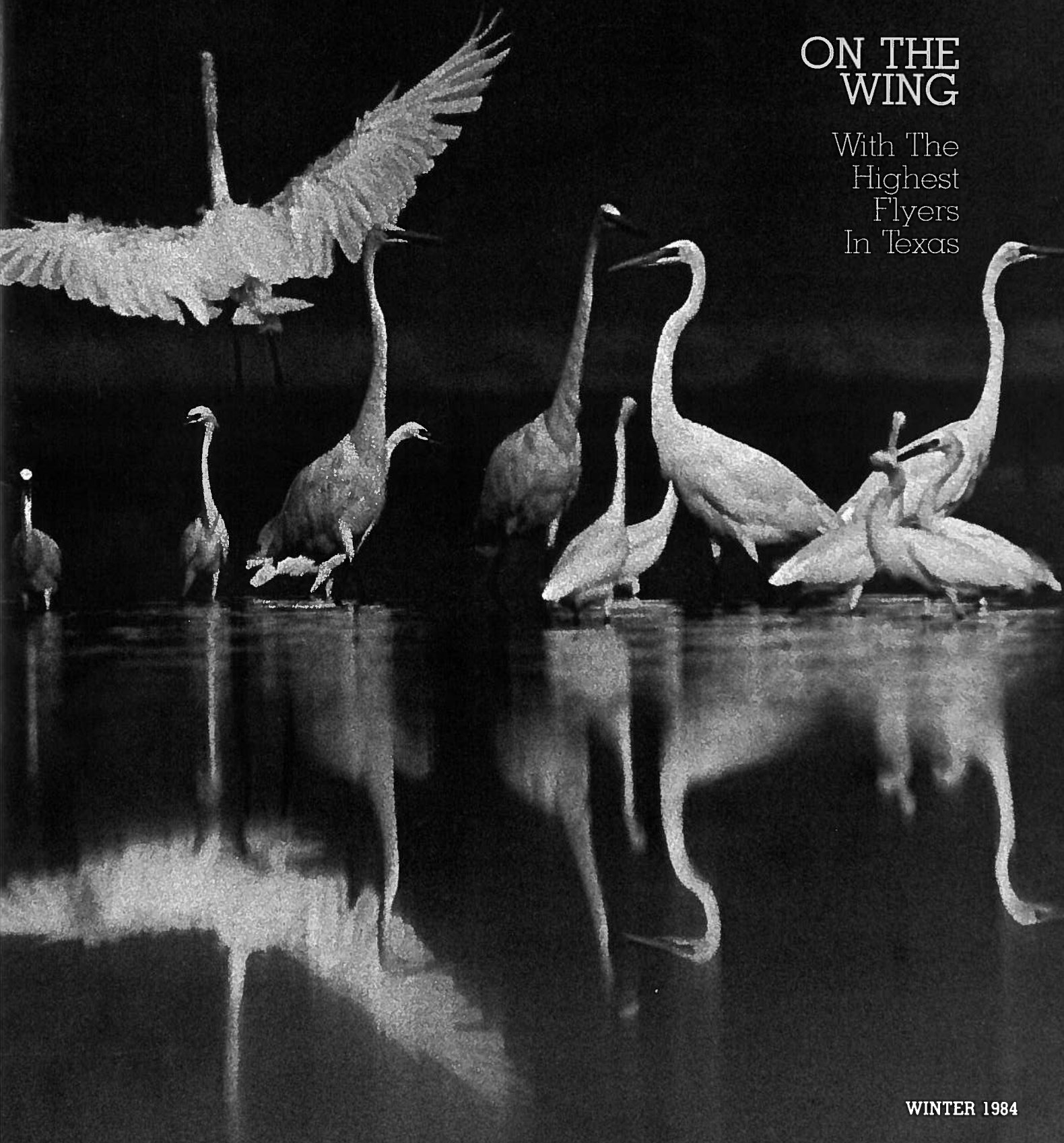


# Texas Shores

## ON THE WING

With The  
Highest  
Flyers  
In Texas





Official Memorandum

GREETINGS:

AUSTIN, TEXAS

The ocean is one of our greatest natural resources. It is imperative that a balance be reached between the need to develop its potential with the responsibility of preserving its resources. The "Year of the Ocean" focuses public attention on the wise use and management of our resources for the present generation of Americans and for future generations.

Many noteworthy events have occurred along the vast shoreline of Texas, some natural, others manmade. The coastal and offshore waters provide a wealth of knowledge and activities.

A significant portion of the population and industry in Texas is within the climatic influence of the Gulf of Mexico. Such diverse activities as oil and gas drilling and production, transportation, construction, commercial and sport fishing, pleasure and recreation, as well as scientific research and education combine to make Texas a true "ocean state" and Texans Ocean-dependent people.

It is fitting and proper that we recognize the importance of the ocean to the health, economy and safety of our state.

THEREFORE, I, as Governor of Texas, hereby proclaim the period of July 1, 1984-85, as

YEAR OF THE OCEAN

and July 1, 1984, as

OCEAN DAY

in Texas.



In official recognition whereof, I hereby affix my signature this 28th day of June, 1984

Mark White

# Down in Black and White

It's official. With a signature and handshake with Texas Sea Grant Director, Feenan D. Jennings (left), Gov. Mark White proclaimed July 1, 1984 to July 1, 1985 as the "Year of the Ocean." Texas is a great state and part of that greatness is due to its abundant coastal resources. From wildlife on-shore to oil offshore, we're all a little better off because of a continuing commitment by Texas officials to promote, protect and preserve our riches from the sea. Celebrate the ocean and remember its gifts.



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Texas is the bird capital of the United States.

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The business of birdwatching is a social affair.

The Texas shorebirds aren't simply models for front yard statuary. They are a symbol of our untamable past. Recognition, appreciation and reverence for their place in our high-tech world has placed them in the pages of this Texas Shores edition. Most people don't realize that Texas is the bird capital of the United States. Dotty Curtsinger examines the factors that have brought the Gulf Coast to the top of the roost. In addition we take a look at those who look at birds — the Texas birdwatchers. There is also an examination of those birds which weren't long for this world only a decade ago. Finally, the world of the Texas shorebirds would not be nearly as dramatic in this issue without the efforts of Anthony Amos at the University of Texas Marine Science Institute. His photography was used on the cover and our birds article.

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*Texas Shores* is published quarterly by the Sea Grant College Program at Texas A&M University in an effort to promote a better understanding of the Texas marine environment.

Feenan D. Jennings, *Texas A&M Sea Grant Director*; Norman Martin and Laura Colunga, *Editors*; Celia Jeter, *Art Director*,

Sea Grant is a partnership of university, government and industry focusing on marine research, education and advisory service. Nationally, Sea Grant began in 1966 with the passage of the Sea Grant Program and College Act. Patterned after the Land Grant Act of the 1860s, the Sea Grant concept is a practical, broad-based scientific effort to better the world for all those living in and out of the sea.

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 on-going program to get marine information to the public.

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 sea food marketing and consumer education.

Sea Grant is a matching funds program. The Texas A&M Sea Grant College Program itself is made possible through an institutional award from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and appropriations from the Texas Legislature and local governments.

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# MARINE ADVISOR

## Marine safety seminar scheduled March 14-15

An overview of current safety practices, equipment and training for the marine and offshore industries will be the topic of an upcoming seminar sponsored by the Marine Services Association of Texas (MSAT) and the Texas A&M University Sea Grant College Program.

Representatives from various segments of the industry will speak on the use and maintenance of safety equipment, prevailing industry attitudes toward safety training, the development of offshore evacuation plans, drug abuse prevention and detection among crews and state-of-the-art firefighting operations.

The two-day program, scheduled for March 14-15 in Corpus Christi, will also feature an in-the-water demonstration of safety and survival equipment.

The registration fee for each participant is \$60, which includes seminar materials, two luncheons and an evening shrimp boil.

For more information, write: Marine Safety Seminar, Sea Grant College Program, Texas A&M University, College Station, Texas, 77843-4115, or call (409) 845-3854.

## Trawl film to premier at New Orleans boat show

Final edits are being made on a joint film production of the National Marine Fisheries Services (NMFS) and the Southeastern Marine Advisory Service (SEMAS) which will show shrimp gear and net configurations currently used by America's shrimp industry.

"The last film of this kind was produced by NMFS in 1958, and there have been a tremendous number of changes in shrimp net designs since then, especially in the last 10 or 15 years," says production coordinator Mac Rawson of the University of Georgia Sea Grant Program.

Four hours of raw footage will be condensed into about a 45-minute final product, according to Rawson.

The work was filmed off Bimini in the Bahamas because of the area's

BY DOTTY CURTSINGER



crystal clear water and smooth seabed.

Texas A&M marine advisory members Tony Reisinger and Gary Graham participated in the filming, and advisory personnel from the SEMAS network, an association of advisory services in eight coastal states and Puerto Rico, provided technical assistance.

Presently untitled, the film will premier at the New Orleans Work Boat Show January 24-27, 1985. It should be available shortly thereafter in both English and Spanish versions through the marine advisory services of participating states, Rawson says.

## Slow Texas crab market looks for turnaround soon

A good production year and large holdings of meat in storage have contributed to low prices for crab all along the eastern seaboard and the Gulf Coast, but one Texas crab expert says increased demand will turn the market around within the next few months.

As winter sets in along the East Coast, and crab catches drop there, demand for Gulf Coast crab meat should pick up, according to Charles Moss, marine county extension agent for Brazoria County. That's good news for Texas crab producers, who depend on East Coast appetites consuming the majority of their catch.

Unfortunately, Moss says, the low prices crab fishermen are getting for their catches at the dock are seldom

reflected in lower wholesale and retail prices. Processors regulate the amount of crab meat on the market by restricting fishing days and catches, or by holding excesses in frozen storage.

Moss said the Houston, San Antonio and Corpus Christi areas are the major state markets for Texas crab meat. Methods of opening new markets in Dallas, Fort Worth and other areas farther north of the coast are being studied to create a greater in-state demand, thereby alleviating the seasonal fluctuation Texas crab fishermen must now endure.

## Alvenus oil spill damage minimal to coastal marsh

Even though an estimated 2 million gallons of oil spilled onto Galveston's beaches this summer, costing island residents millions of dollars in lost revenues, the area is showing no permanent signs of biological damage, according to a Texas A&M marine biologist.

Fortunately the oil from the grounded tanker Alvenus came ashore on the beaches and not in the estuaries or salt marshes, says Dr. Steve Alexander, assistant professor of marine biology at Texas A&M-Galveston. "The only real visible traces of oil are on the rocks and the seawall, particularly on the West Beach. From the diggings I've done, there is still some evidence of oil as much as a foot deep in the sand, but most of that will be washed out to sea by the wave action this winter," Alexander said.

## Decompression sickness more severe than thought

While fewer than 500 of the nation's estimated 1.5 million sport divers are treated for decompression sickness each year, a recent study concludes that divers face a greater risk of paralysis and death from decompression sickness than was once believed.

Under certain conditions, sport divers risk paralyzing blockages of blood to the central nervous system and lung congestion if they surface from deep water too quickly, according to a University of Wisconsin Sea

Grant medical research team.

Decompression sickness, commonly known as "the bends," is caused when divers surface too rapidly and breathe air at less pressure. As a result, nitrogen bubbles form in their blood stream and tissues, occasionally causing numb or weak limbs and breathing difficulty in general. Using sheep and goats in their experiments, Wisconsin researchers uncovered some incidence of spinal cord injuries caused by the deep, short-duration dives that sport divers often make.

According to the Divers Alert Network at the Duke University Medical Center, 444 divers were treated for the bends in hyperbaric chambers in 1983. There are approximately 150 diving deaths annually, but most are the result of drownings. Air embolisms, the obstruction of a blood vessel by an air bubble, account for the next highest rate, network figures say.

Dr. William Fife, a Texas A&M professor of biology and director of the University's hyperbaric laboratory, has pioneered much of the research on decompression sickness, and thinks the risk of the bends is often overstated. "Diving accidents are rare, and in virtually all cases avoidable," Fife said.

## **Coral in Gulf protected now under federal law**

Coral in the East and West Flower Garden Banks off the Texas shore is now federally protected and no longer legal for the taking.

Regulations implemented in August prohibit the taking or damaging of coral in federal waters in the Gulf of Mexico and the South Atlantic. Officials say the Flower Gardens, located 110 nautical miles off the coast of Galveston, are particularly unusual because the coral species which comprise the reefs are generally not found this far north. They are, as one spokesman for the National Marine Fisheries Service said, the "north-westernmost" reefs in the Gulf.

Surface fishing will be allowed over the reefs, but fishing with longlines, fish traps or pots, and bottom trawls will not due to the damage it causes

the structures. Reaching heights up to 200 feet, the reefs are composed of numerous species of corals, which are live organisms. Because many species are slow growing, they would not recover for many years if damaged, according to the NMFS.

Flower Garden corals are further stressed from the climatic conditions of the northern Gulf. Regeneration would be hampered by the corals' isolation from another gene pool, biologists say.

Also falling under the regulations' protection are corals in the Florida Middle Grounds off the west coast of Florida, and the Oculina Bank off Fort Pierce, Florida.

Information on permits and current regulations on corals can be obtained by writing: Fishery Operations Branch, National Marine Fisheries Service, 9450 Koger Boulevard, St. Petersburg, Florida, 33702; or calling (813) 893-3723.

## **Anglers set new fishing records in state books**

A 1,010-pound tiger shark caught during 1983 off Port Aransas has been certified as a state record, beating the mark set in 1982 by 143 pounds. Ira Loveday of Lampasas, using a 100-pound test line, boated the 12-foot, 8-inch shark on August 26, 1983.

The state record blue marlin was snared September 1 off South Padre Island by John F. Etier of Weslaco. Etier used an 80-pound class rod and 130 micron line to land the 824-pound marlin, which measured 14 feet, 4 inches in length and 69 inches in girth. It bettered the two-year-old record by 102 pounds.

John Robert Jensen of Port Aransas landed the state record amberjack, a 95.25-pound fish measuring 68 inches and 40 inches in girth. Jensen's record was caught offshore June 13, and bettered the previous mark set in 1979 by 1.25 pounds.

A 3.19-pound pompano dolphin is the record in a new state saltwater fish category. The fish was caught July 6 out of Matagorda by Roland J. Castanie II of Texas City, and measured

22 5/8 inches long, and 13 7/8 inches in girth. Castanie also holds the state record with a 3.75-pound gag he hooked July 7 while snapper fishing 30 miles south of Matagorda.

A 33.5-pound tripletail earned Edie Porter of Spring the state record June 29. The fish was caught at West Matagorda Bay, and measured 34 inches in length, 30 1/2 inches in girth. A 29-pound tripletail caught in 1982 was the previous record.

In the unrestricted division of the state fish records book, which includes fish caught by legal means other than rod and reel, David Fotorny of Houston made the first entry of a cubera snapper with a 151-pound catch. He hooked the fish June 23 on a handline near Freeport.

A father-and-son team from Hitchcock set three state records in a single day of fishing out of Galveston on July 3. Ken Stepchinski landed a 1.88-pound lane snapper and a 2.69-pound Atlantic bonito. His father, Nick, caught a 2.94-pound gray triggerfish. Each of the three fish opens a new category in the state record book.

The bluefish state record was set with an 11.43-pound bluefish caught by Jerry Hobbs of Fairview, Oklahoma, on August 5 out of Port Aransas. It bettered the previous record of 10.78-pounds, which had stood since 1978.

Harry Hoffman of Corpus Christi landed a 1.06-pound barred grunt from the Port Aransas ship channel on July 14.

## **Alligator alley season fares well for hunters**

In Texas' first controlled alligator hunting season September 7-23, hunters bagged 437 of the reptiles, representing a 92 percent hunter success rate for the 474 tags issued.

Alligators were taken from all 11 Southeast Texas counties where tags were issued, although the final harvest fell far short of the 780 quota the Texas Parks and Wildlife had established.

The largest animal taken measured 13 feet, 4 inches. Four feet was the minimum bag length.

What does high-tech Texas have besides oil, cotton  
and computers?

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# BIRDS

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The Lone Star is the mecca of birdom. It has its own bird book and plenty of wide open spaces along the coast to watch our feathered friends.

**I**n her rush to excel in everything from fullbacks to factories, Texas has long overlooked one of her wealthiest if not most beautiful assets — birds.

No other state in the Union approaches her in variety or number, or even comes close. No other state commands its own field guide from America's venerated naturalist, Roger Tory Peterson. And no other state is home, at least part-time, for a breeding, wild flock of the nation's most famous endangered species, the whooping crane.

The credit for the superlatives is due in large part to the state's size and unusual geographic positioning, according to Dr. Keith Arnold, president of the Texas Ornithological Society (TOS) and a professor in the Department of Wildlife and Fisheries Sciences at Texas A&M University. Its 267,000 square miles sprawl nearly evenly over what's considered to be the continent's east-west divider, the 100th meridian. Moreover, the America's north-south demarcation, the Rio Grande River, is the state's southern border.

"Another factor is the tremendous diversity of habitat in the state," Arnold said. "You have deserts, mountain ranges, seacoasts, piney forests, plains, deciduous forests, — all types."

From the noisy grackle to the stately bald eagle, 556 species have been recorded in the state. California is second with 531.

Of course, birders don't expect to see all 556 on any one day or even within a lifetime. Some are "accidentals," birds that are wayward wanderers usually blown far off course, especially by strong Gulf storm winds. Others are migrants that winter in Texas or funnel through the state en route to Central and South America. A few are rare or nearly extinct.

"But that's true of any state. Texas is the only state that has its own Peterson field guide," Arnold said, evidence of the state's pre-eminence and something of a coup in birding worldwide.

**BY DOTTY CURTSINGER**  
**PHOTOGRAPHY BY ANTHONY AMOS**



WILLET

To facilitate the search for birds, the TOS has subdivided the state into eight sections — the Panhandle-South Plains, North-Central Texas, East Texas, Trans-Pecos, Edwards Plateau, Central Prairie, Rio Grande Brushland and the Upper Texas Coast. Each region exhibits different landforms, climate and vegetation, thereby determining the species of birds which call it home. Although the adaptable mockingbird, the state bird of Texas, can be found throughout the state, most species have more selective needs and are generally constrained to a specific area.

In south Texas, especially in and around the Santa Anna National Wildlife Refuge, you'll often find the birds of the Mexican tropics. "Many tropical forms reach their northern limit in Texas," Arnold said. "The chachalaca (a chicken-like bird of the jungles) occurs in the United States only in South Texas, as does the ringed kingfisher, and the greater kiskadee (a flycatcher). In that same area is the only U.S. breeding population of the brown jay."

Some species are unique to Texas. The golden-cheeked warbler lives and breeds only in the eastern half of the Edwards Plateau. While fewer than 2,000 are thought to exist, birders have a fair chance of locating it since its populations are concentrated in a few preserves.

Also unique to Texas is the endangered Attwater's prairie chicken, a prairie bird renowned among birders for its unusual courtship rituals. "We used to share it with Louisiana but now it's found only on the coastal prairie in Texas," Arnold said.

Easily the most resplendent of all Texas birds are those inhabiting the

Gulf Coast. They appear in all shapes, sizes and colors — long-legged waders, stubby-tailed ducks, fleet-of-foot sandpipers, slow-moving pelicans. Along the coast, it's not uncommon to see a roseate spoonbill, with its unique, flat-tipped bill and bright pink plummage. A birder may perchance see the striking reddish egret, noted for its comedic, almost drunken behavior as it flaps about, searching for food. A glance out to the bay and he may spy the dramatic flight of the black skimmer, sailing along the water's surface with its scissor-like bill cutting the waves, snatching up food.

"Hotspots" of coastal bird concentrations have developed that attract birders from not only within Texas but across the United States and world as well. "There are more than 350 species of birds which spend all or part of their lifetime on the Texas coast," according to Dr. Doug Slack, a Texas A&M avian ecologist specializing in coastal wildlife.

"Many of our continental populations of migratory birds pass through Texas on their way to Central and South America, and apparently use certain locales to beef up before going on." The state's estuaries, bays and Gulf coastal prairies which are often sown in rice also tend to congregate snow geese, Canada geese and large numbers of wintering waterfowl, he added.

Even more dramatic than the fall migrations are the birders' much hoped-for "drop-outs," or "fall-outs" of the spring return trips. These unexpected visits occur if the flocks encounter stormy fronts or weather as they near the coast. Binocular-toting and slicker-clad birders happily wait in a steady drizzle or all-out down-

pour for the chance to see one, Arnold said.

"The Rockport and High Island areas are famous for their fall-outs," he said. "There are a tremendous number of birds migrating over the Gulf, and if there's a storm sitting just off the coast, the birds can't fly any further. They're exhausted and drop to the nearest vegetation. You can just sit there and watch them fall out of the sky."

Another hotspot is the Bolivar Peninsula near Galveston. "In the winter, you can have tens of thousands of shorebirds in the Bolivar Flats marine lagoon, roosting, feeding, living within pecking distance of each other," Slack said. "You'll have pelicans, cormorants, avocets, herons, egrets, roseate spoonbills, all the sandpipers, gulls, terns — total pandemonium."

Another popular coastal attraction is a wintertime sight only, drawing thousands of birders annually to the Aransas National Wildlife Refuge near Corpus Christi. They come to see the whooping crane, one of the world's rarest birds. From their breeding grounds in Northwest Canada's Wood Buffalo National Park, the cranes brave a 2,600-mile migratory flight to Aransas, arriving in late October and staying until the end of April.

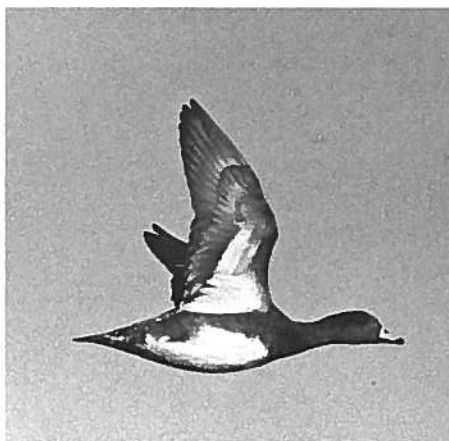
For many years, Texas' abundant avian resource was enjoyed by relatively few. Only ardent birders were privy to the riches which could be found in places other than oil fields. Of late, though, many Texans have opened their eyes to embrace the state's natural wealth. What they've discovered is troubling.

Due to chemical poisonings, indis-

LONG-BILLED CURLEW



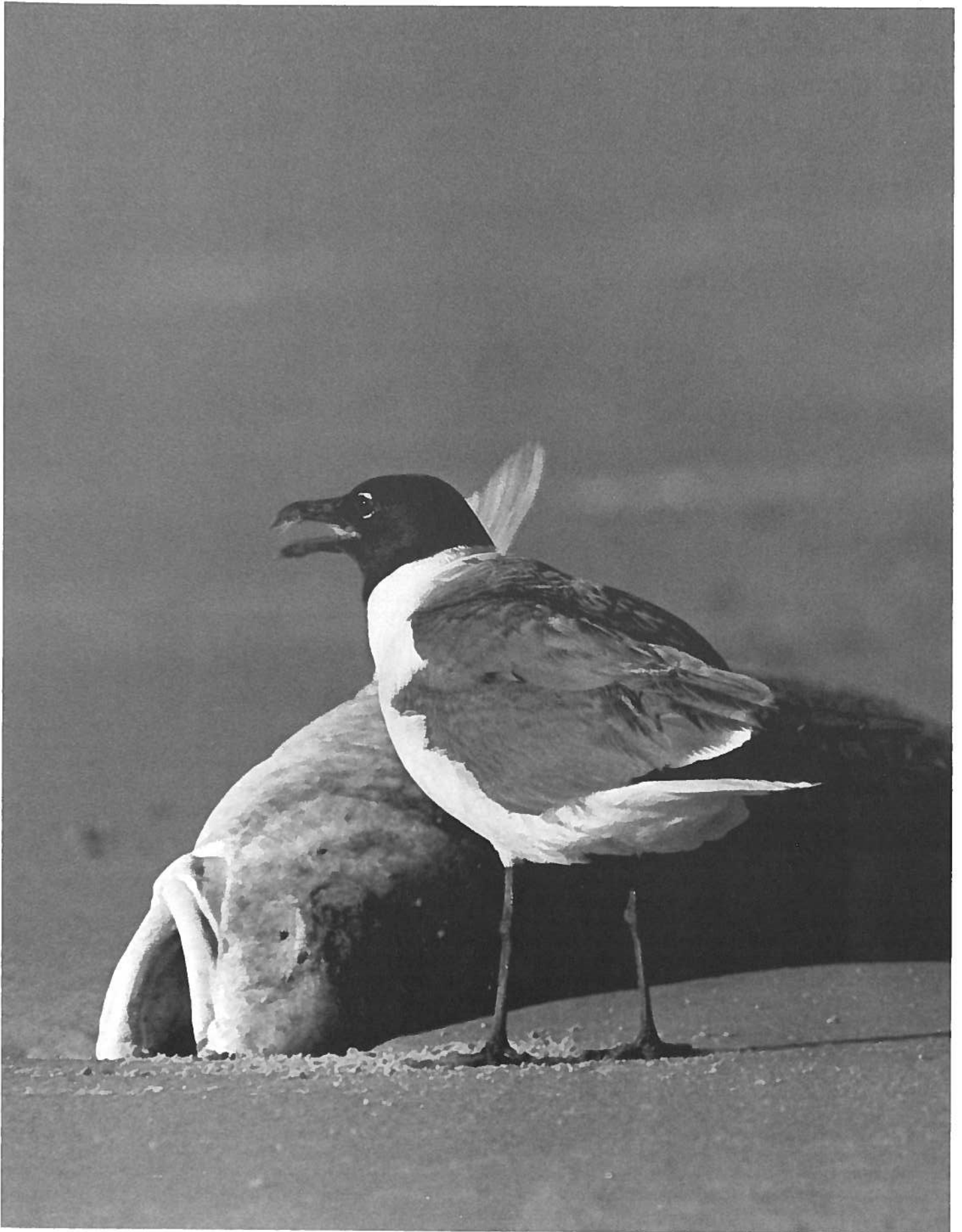
AMERICAN WIGEON



TRICOLORED HERON







LAUGHING GULL

criminate killings and most significantly, loss of suitable habitat, many bird species in Texas were threatened with extinction.

As public concern for the environment's plight has grown, so have the populations of the threatened species. But while some appear to be well on the way to re-establishing healthy numbers, others have only a tenuous hold on survival.

Biologists are especially concerned with wetland species.

"It is well documented that the major cause of the decline of bird populations across the board is habitat loss. And in coastal environments, habitat loss is advancing at a rather rapid rate," Slack said.

Arnold agrees. Industrial and residential developments along the coast are filling in the marshlands, he says. Dams on the rivers which feed the marshes have interrupted normal waterflow and runoff. Texas has few water quality studies on its coastal marshes, but research on similar coastlines in Louisiana and other states has shown that waterflow is critically linked to a marshland's productivity.

"If you change the waterflow, that changes the marsh salinities, that changes water patterns in the estuaries, and that makes a heck of a difference as to how productive they are," Arnold said. "A number of organisms depend upon the flow of water to disperse the eggs from where they're hatched to where they're going to mature. If they don't have that flow, they stay where they are and never survive.

"It's a very complex situation, and it's not just on the coast where the problems are located."

#### WHITE PELICAN



Biologically, birds are one of the earliest indicators of changes in the environment, according to Arnold. Civilization quickly brings an increase in house sparrows, starlings, and pigeons, while the larger raptors (birds of prey) decrease, he said.

"Along the coast, when you put in a development, you lose your shorebirds that nest on the open beaches or vegetation areas. You will not have colonies of herons and egrets nearby unless developers maintain adequate feeding and resting sites in nearby marshes — which is very rare."

A novel conservation program may help change the bleak outlook. The brainchild of the Audubon Council of Texas, the initiative will more than double the budget of the Texas Parks and Wildlife Department's non-game and endangered species research, and may raise as much as half a million dollars annually.

The fund-raising program is patterned after the highly successful federal and Texas state duck stamp, which waterfowl hunters must purchase to legally hunt. Sales of the stamps contribute substantial sums for waterfowl research, management and acquisition of habitat. Texas Parks and Wildlife is now selling to the public a voluntary Nongame Stamp and Decal, and a corresponding limited edition print. The stamps and decals sell for \$5 each, and the print for \$135.

Regardless of how well the sales go, the Department is guaranteed \$250,000 from the print's publishers, or a 60 percent royalty on the wholesale price of the print and \$4.50 from each stamp and decal, whichever is greater. Appropriately, the image depicted is a pair of whooping cranes.

#### DUNLIN



Revenue from the nongame stamp will be placed in a Special Nongame and Endangered Species Conservation Fund, which may only be used for nongame species research and conservation; development and acquisition of their habitat; and dissemination of information pertaining to them.

While birds are only one of several animal populations targeted for research dollars (others include the river otter, alligator, sea turtle and various types of fish), Slack says the program is a big step in the right direction.

Persons interested in learning more about birding or conservation efforts in Texas have the option of joining several conservation organizations in Texas, including local chapters of the National Audubon Society or the Texas Ornithological Society.

Field guides for birding can usually be purchased in paperback form for under \$15. Recommended titles include:

"A Guide to Field Identification: Birds of North America," by Chandler S. Robbins, Bertel Bruun, and Herbert S. Zim;

"Field Guide to the Birds of North America," by the National Geographic Society;

"A Field Guide to the Birds of Texas and Adjacent States," by Roger Tory Peterson;

"A Bird Finding and Naturalist's Guide for the Austin, Texas, Area," by Ed Kutac;

"Texas Birds — Where They Are and How to Find Them," also by Kutac;

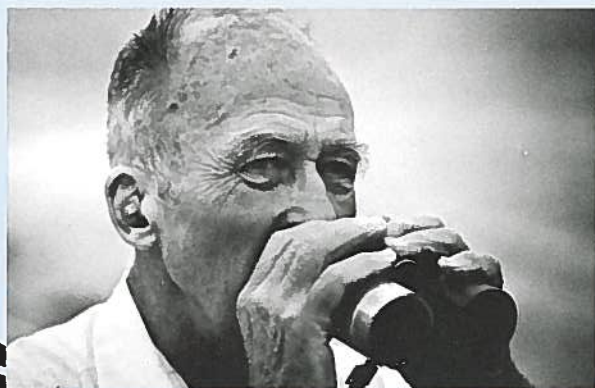
and "A Birder's Guide to the Texas Coast," by James Lane and John Tveten. ■

#### ROSEATE SPOONBILL

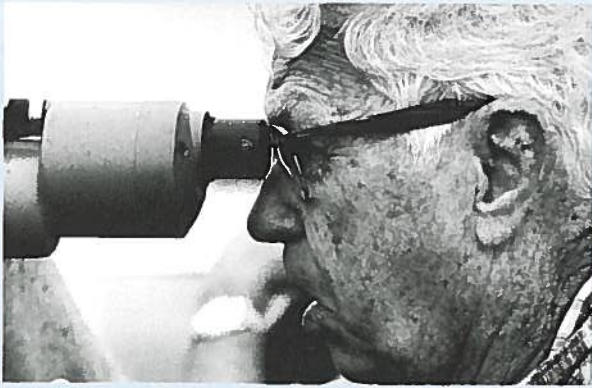




AMERICAN AVOCETS



Photography by Norman Martin



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# Skywatchers

It's a bird, it's a plane, it's those Texas birdwatchers

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**T**wenty pair of binoculars and two high-powered telescopes zero in on what appears to the unaided eye a red and black dot one hundred yards away.

As the little shorebird pecks at a shell on the marshy flats next to Corpus Christi Bay, field guides are whipped out from pockets and packs. The race to identify the stranger has begun.

Subtle indicators of the bird's species are analyzed — the color, the eyes, the beak — in clipped sentences. In the business of birdwatching nothing but an absolutely accurate identification will do.

The bird is, yes, an American oystercatcher. Back near the water, the oystercatcher walks around a bit more and suddenly flutters off, sailing out of sight with the wind. For the expert birders in the group the sighting is routine, but two novices now have a new entry for their life list, a personal collection of bird sightings.

Another bird soon piques the interest of the watchers. And so it goes, hour after hour on almost any weekend of the year along the state's coastline.

In the big spectrum of life, a bird, any bird, may not figure prominently. But for thousands of Texans, the birds along the Gulf shore offer an unmatched world of beauty, grace and style.

"People that are really into birding have a big time," says David Blankinship, staff biologist for the National Audubon Society in Rockport.

Birdwatchers do not call themselves birdwatchers. They are simply birders.

And there is no average birder, says Kay McCracken, president of the 200-member Audubon Outdoor Club of Corpus Christi. "They come in all ages and from all walks of life — all the way from kids in high school to professional people."

Luckily for Texas birders, this state is one of the best places in the country to practice their hobby. Approximately 560 species make their home here at least part of the year.

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BY NORMAN MARTIN

"This spot is one of the prime areas in the United States for birding," McCracken says. "The whole coast of Texas is for that matter."

Wildlife experts say the Rockport/Port Aransas area and the lower Rio Grande Valley are two of the top birding spots in North America. Several of the nation's birdwatching magazines feature bird tours of Texas each month. Audubon groups from New England and Canada will often visit Texas to add to their collections of sightings.

Due to its size, central geographic location and difference in habitat types, Texas has more bird species than any other state in the Union. Part of the reason is that the state falls in a migratory path which narrows along the coast.

Birders represent a significant economic boost for the coastal area. True enough, many birdwatchers are "pocket-poor," but a good many are relatively affluent, says Dr. Keith Arnold, president of the Texas Ornithological Society (TOS) and a professor in the Department Wildlife and Fisheries Sciences at Texas A&M University.

"They want comfort. They want good meals, good lodging and they're willing to pay for it. We have no handle on the economic value of birdwatching in Texas, but it must be tremendous," Arnold says. "It's probably the most important industry for High Island, for Rockport and for a number of the communities in the Rio Grande Valley."

Texas birders are concentrated in two areas — Houston and Corpus Christi.

There are two birding clubs in the Corpus Christi area. They are the Audubon Outdoor Club of Corpus Christi and the Coastal Bend Audubon Society.

While both groups are interested in birds, it is the Outdoor Club that does most of the birdwatching. The group takes field trips at least every two weeks, primarily in the Corpus area. Sometimes they venture into the hill country or up the coast, however.

A field trip with a group of birdwatchers may not sound like the most scintillating way to spend a day, but by and large they are fun trips. What most people do not understand is that birdwatching is akin to coin or stamp collecting. But rather than hoarding



*Sometimes it's easier for birdwatchers to identify other birdwatchers (top) than to spot that special bird needed for a life list (above).*

the object itself, the birders collect sightings of the birds they see.

Many participants work on what is called their life list, a list of the number of bird species they have identified. In addition to the life list, others may keep North American, state, county and even a backyard list.

Asked what they do on a normal outing, McCracken says simply, "We look at the birds, identify them, watch them. They're just interesting."

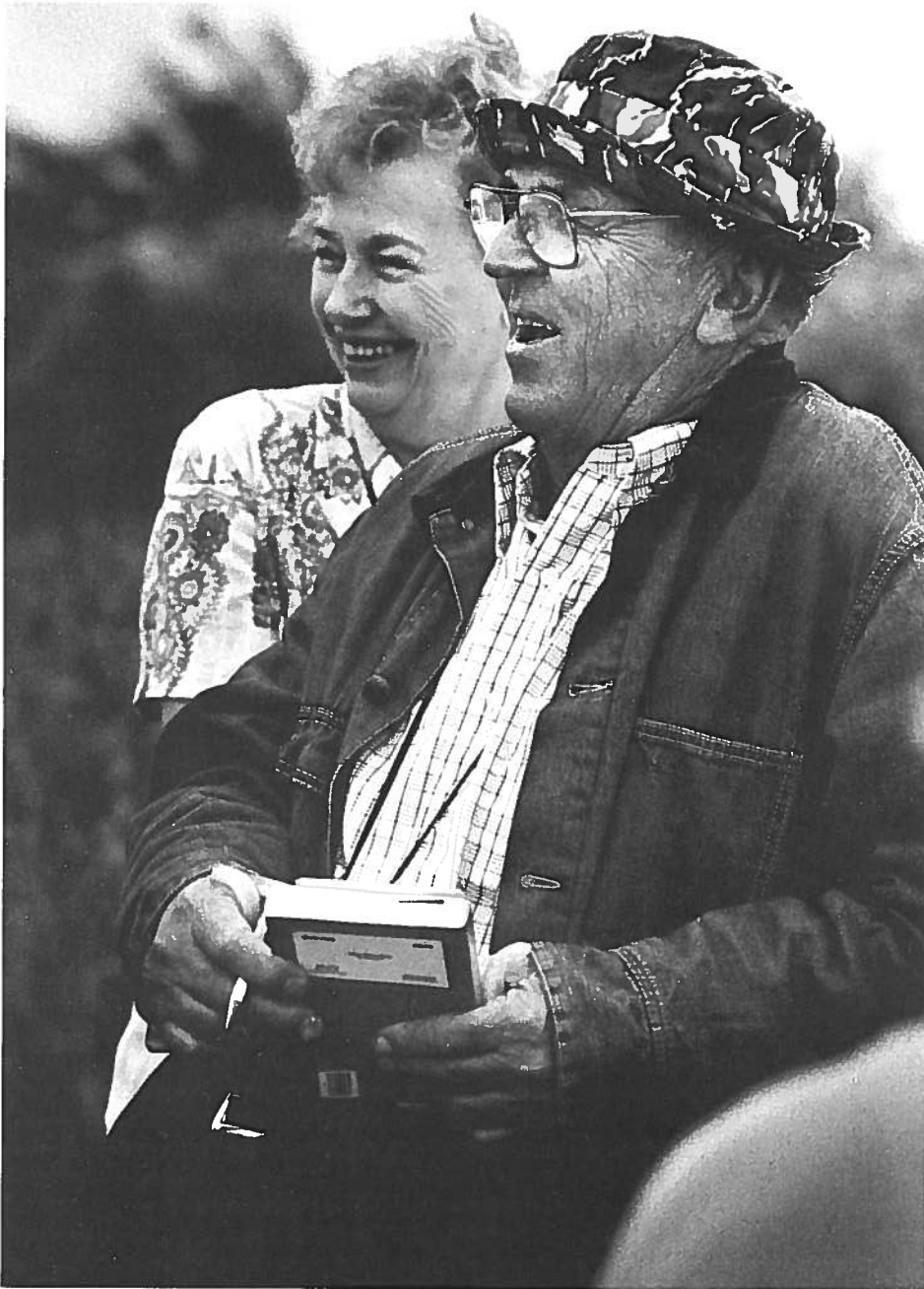
"Usually we start early in the morning and go to about mid-afternoon. Sometimes, if it's real good, we're not

dragged in until after dark."

Wildlife officials estimate that there are more than 1,500 active birders in the Houston metro-area. An active birder is one who goes into the field at least six times a year.

"Interest varies depending on the season," says Fred Collins, president of the 3,400-member Houston Audubon Society. Most birders are not good at shorebird identification. As a result they are not as actively pursued as the warblers in the spring or the ducks in the winter.

Still, he says, many members like to



*One of the rituals of birding is the telling of tall tales and rare finds discovered along the Texas coast.*

hit the Houston area shorebird "hot spots" during the year. These areas include Bolivar flats, the east jetty area of Galveston Island, and west Harris county.

There is a personal side of birdwatching. While expertise and equipment of the individuals may vary, the congeniality of the participants is almost always evident.

"There is no such thing as a bad day because you're learning about the web of life and the part birds play in our own welfare," McCracken says.

Still, the challenge is identification.

"Sometimes we'll get into heated arguments," she laughs. "Nobody has any trouble identifying a Ruddy Turnstone, but some of the sandpipers are very difficult."

Just as in any sport some individuals are quite avid, especially during what is known as a rare bird alert. "If a rare bird shows up, word goes out and some of these people will drop everything and fly all the way across the United States just to see a rare species," Blankinship says.

The cost of entering the sport of birdwatching can vary considerably.

The equipment itself ranges from a simple pair of \$50 binoculars to high-powered telescopes that run several thousand dollars.

One essential piece of equipment is a field guide, something even the most expert birder wouldn't be caught in the wild without. The books give a description of the birds and either a color drawing or photograph of the different bird species.

Surprisingly, the majority of birders are not particularly outdoor oriented. There aren't many hikers or backpackers among the birdwatching set.

"That's not to say they won't hike," Collins says. "If there's a rare bird at the end of the trail, they'll run all the way." Texas birdwatchers do more than watch birds, though. Many are involved in promoting environmental issues and assisting in keeping track of the number of bird species coming to the state.

In conservation battles, the birders have been among the first to enter the fray. A good example, Blankinship says, was when the Nueces County Navigation District proposed to dredge Corpus Christi Harbor and place the material in Nueces Bay. The Audubon groups were extremely active in combatting the measure both by requesting public hearings and in presenting detailed testimony at them.

"They really brought together all the interested parties that wanted to oppose this," Blankinship says.

Frequently the amateur ornithologists serve as volunteers in the annual Texas Colonial Waterbird Survey, a cooperative effort of state, federal and private agencies to count the number of waterbirds in the state.

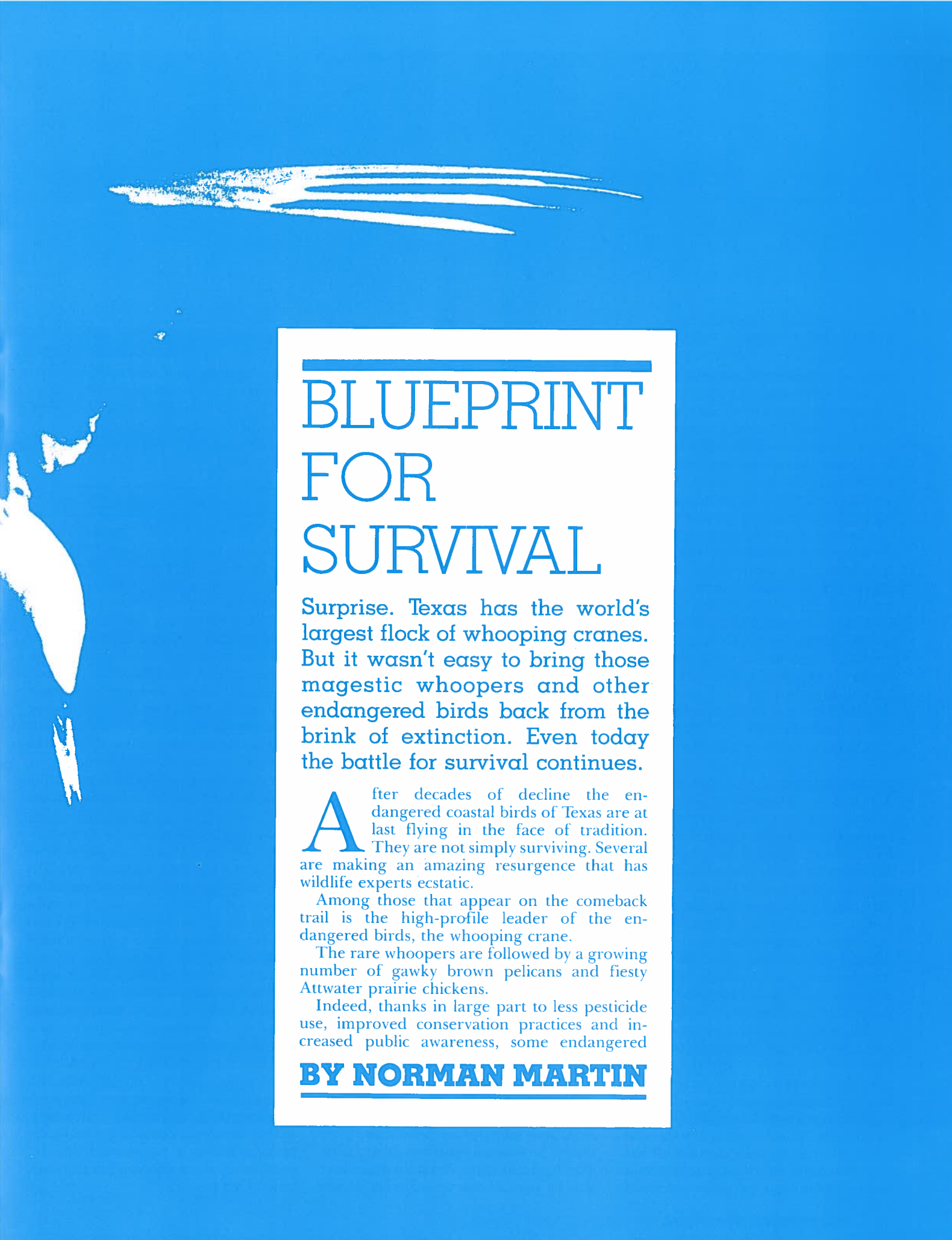
The data generated from the survey is used by government agencies in granting permits for construction of new projects, as well as by conservation groups.

During the nesting season the birders assist in making counts, particularly on the Texas coast. "We really have one of the most extensive surveys in the United States," says Blankinship.

In addition, birdwatching organizations frequently are involved in development of education projects and displays. "They try to make people aware of issues in the area, the things that may affect the environment," Blankinship says. ■







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# BLUEPRINT FOR SURVIVAL

Surprise. Texas has the world's largest flock of whooping cranes. But it wasn't easy to bring those majestic whoopers and other endangered birds back from the brink of extinction. Even today the battle for survival continues.

**A**fter decades of decline the endangered coastal birds of Texas are at last flying in the face of tradition. They are not simply surviving. Several are making an amazing resurgence that has wildlife experts ecstatic.

Among those that appear on the comeback trail is the high-profile leader of the endangered birds, the whooping crane.

The rare whoopers are followed by a growing number of gawky brown pelicans and fiesty Attwater prairie chickens.

Indeed, thanks in large part to less pesticide use, improved conservation practices and increased public awareness, some endangered

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**BY NORMAN MARTIN**

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U.S. Fish & Wildlife Service

## WHOOPING CRANE

birds are turning away from the brink of extinction.

The whooping crane is a good example. Frank Johnson, manager of the Aransas National Wildlife Refuge, 45 miles north of Corpus Christi, says last year 75 cranes wintered in Texas and conservation officials are expecting the largest flock of whooper chicks in this century to fly back with their parents from Canada this winter.

Standing at a height of five feet, the cranes are the tallest birds in North America. In addition the species, which dates back a half million years, is one of the world's rarest. Their population peaked during the mid-1800s at between 1,300 and 1,800. The all-time low for birds was probably in 1941 when there were less than 20 counted.

Today more about half the world's 137 cranes live part of the year at the refuge northeast of Corpus Christi on the Gulf of Mexico.

Brown pelicans are also making a strong showing after near extinction. In 1960 there were fewer than 150 in Texas and none nesting that year. In contrast, this year's Texas Colonial Waterbird Census, conducted in May and June, showed the largest number of brown pelicans since 1950. An estimated 115 nests fledged 230 young. And the only white pelican colony in Texas, located in the Laguna Madre, fledged 350 young.

Still, even with some signs of success, wildlife officials worry over the future of the birds as the Texas coast continues to develop as a center for business, industry and tourism.

"Habitat destruction, or perhaps better, alteration, is probably the single most important factor that affects the presence of these birds," says Bruce Thompson, program leader of

endangered species with the Texas Parks and Wildlife Department in Austin.

This is true not only in Texas, but nationwide, he says.

High on the list of threats to the endangered birds is interruption of the breeding cycle. Interruptions can vary from the simple presence of people to more subtle factors such as the presence of chemicals in the environment.

Certainly the bird's habitat doesn't have to be destroyed or altered significantly to cause a problem, Thompson says. The unseen presence of chemicals can radically affect the existence of these special birds.

"I'm not painting a bad picture about chemicals," Thompson emphasizes. "There are certainly cases where chemicals are a problem, but there are tremendous areas on the coast which are not necessarily influenced by chemicals."

The endangered species list of Texas birds includes the brown pelican, bald eagle, peregrine falcon, whooping crane, eskimo curlew, Attwater prairie chicken, least tern (interior form), red-cockaded woodpecker, ivory-billed woodpecker and Bachman's warbler.

Those named on the threatened list are the reddish egret, aplomado falcon, black falcon, gray falcon, white-tailed falcon, zone tailed hawk, swallow-tailed kite, osprey, ferruginous owl, white-faced ibis, wood stork, golden-cheeked warbler and least tern (coastal form).

There is a difference between the state endangered list and the federal endangered species lists. For one thing the federal list is much smaller. The birds on the federal list that stay at least part of the year on the Texas

coast include the whooping crane, Attwater prairie chicken and peregrine falcon. Two others, the least tern (interior form) and the piping plover, are under consideration for inclusion on the list.

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## MAKING THE LIST

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In order for a bird or other animal to make the federal endangered species list, and receive the protections thereof, a complicated series of procedures must be followed.

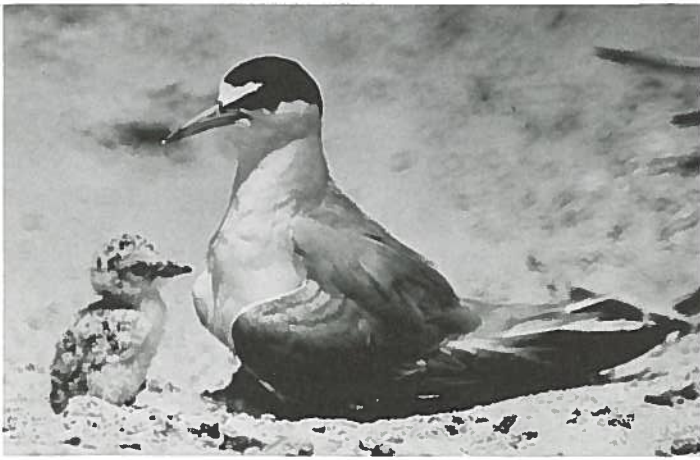
"In the early days they (the federal government) didn't have a very sound procedure," says Dave Langowski of the U.S. Fish and Wildlife Service Office of Endangered Species. "Right now we have a fairly decent process set up to list species."

Officials at the Fish and Wildlife Service normally start off with a list of species called candidates. Frequently, there is little current information on the status of the candidate species. So the agency begins a process known as a staff survey to determine population status and receive public comment on any changes to the endangered species list.

"It's a fairly lengthy process," Langowski admits. "It takes about two years to do this."

But once on the federal list, he says, the species are protected in a number of ways. For example, through Section 7 of the Endangered Species Act, any federal agency that is funding, authorizing or permitting a construction project has to consult with the U.S. Fish and Wildlife Service.

"Essentially we make a determination if the action is going to be severe enough to jeopardize the species' continued existence," Langowski says.



LEAST TERN



ATTWATER PRAIRIE CHICKEN

Texas Parks and Wildlife Dept.  
Larry Marcy

"If it doesn't, the project may proceed. But," he adds, "we do offer suggested modifications to the design of the project in many instances to benefit or alleviate minor impacts to the species."

Another means by which endangered species are protected under the Act is in Section 9. This portion of the Act prohibits "taking" which is very broadly defined and includes such things as harassment and harm, as well as the physical killing or injuring of the birds.

The act also authorizes and directs federal agencies to do whatever they can to help the species recover. Once a species is listed, the endangered species office develops a recovery plan. The plan includes a list of the steps that various groups should take to improve conditions for the species. The ultimate objective, of course, is to get the species to the point where it can be taken off the endangered list.

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## ANCIENT PELICANS

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If success of a species is gauged by its ability to survive, the pelican is a winner. Its ancestry dates back to the early Miocene Epoch, 15 to 22.5 million years ago. But hard times fell on the brown pelican in the 1960s. Their number dwindled, but improved monitoring and use of pesticides has aided in increasing the bird's population.

In appearance, the brown pelican is a bizarre bird. Its long neck and bill contrast sharply with its heavy body, short tail and short legs. Despite its appearance, the pelican is an airborne beauty. In the wild, the birds fly in graceful formations and can be seen plunging earthward on frequent fishing dives.

Actually, it's ironic that after all this time the ancient pelican is now threatened. There are several reasons, though. One, pelicans are specialized feeders, taking fish only at certain times and in certain ways. Some wildlife experts believe commercial fishing has disrupted natural conditions and upset the pelican's traditional feeding process.

Two, pelicans have not evolved mechanisms to adequately detoxify synthetic chemicals. Pelicans are especially vulnerable to certain pesticides. James Keith, a U.S. Fish and Wildlife Service biologist, says one of these was endrin.

At one time the Gulf Coast had more than 5,000 pelicans. By 1964, only 50 birds were counted. Only a remnant population remained in Texas. In 1968, conservation agencies began cooperative efforts to re-establish pelicans.

Another factor during the 1960's was exposure to residue from the pesticide DDT (dichloro-diphenyl-trichloro-ethane) through the fish the birds ate. One result was that female pelicans laid eggs with very thin shells. Most of these eggs were too fragile, and collapsed after being laid.

"Pretty much everyone accepts the fact that the brown pelican was a victim of pesticide," Thompson, of the Texas Parks and Wildlife Department, says. "Its recovery has been in large part due to restricted use of certain pesticides, particularly DDT."

Still, he says, their survival hinges on the availability of suitable nest sites. Finding a good nest isn't always an easy task. Thompson says there must still be suitable substrates available which are sufficiently remote from routine human disturbance to allow the birds to begin populating.

Adult pelicans breed annually for 8 to 10 years. A pair can produce 8 to 10 young in a lifetime, but the death rate for young birds is high. Only about 20 percent of the young survive to breed.

Nevertheless, the brown pelican is making a stunning comeback. Indeed, the federal government is considering totally de-listing the bird in the Carolinas and Florida, and maintaining the Texas-Mexico group of birds on the list until it establishes a larger population level.

Today wildlife officials estimate there are in the neighborhood of 100 breeding pairs in Texas. Just 10 years ago there were estimates of only a few pairs and no reproduction whatsoever.

"They're cranking out in the neighborhood of 200 young a year," says Langowski, of the Albuquerque Office of Endangered Species.

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## WHOOPING IT UP

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Another success story is the growing number of whooping cranes. Only about 21 whooping cranes existed in the wild when scientists began monitoring North America's biggest bird in 1941. Fish and Wildlife Service geologist Tom Stehn estimates that about 137 whooping cranes remain worldwide since their nesting grounds in Iowa, Minnesota and the Dakotas were turned into farms. Their wintering areas in the Southwest also were displaced by agriculture and industry.

The stately crane with 2 1/2-foot legs and a 7 1/2-foot wingspan had fallen victim to land developers, illegal hunters and egg collectors. But now the bird is a symbol of attempts to save all endangered species. The whoopers are something of a regional tourist



Anthony Amos

## REDDISH EGRET

attraction. Johnson, manager of the Aransas National Wildlife Refuge, says about 80,000 people annually visit the refuge and about 60 percent of the visitors come during the whooping crane season.

The rare whooping cranes share the Aransas Wildlife Refuge with at least 10 other endangered species, including the peregrine falcon, Attwater's prairie chicken, brown pelican and five species of sea turtles.

The 20-pound birds have silken, snowy plumage and black-tipped wings, black facial feathers and a bare, red crown and feet the size of human hands. They live in family groups or pairs and stake out a 400-acre territory on the 55,000-acre refuge on marshland, tidal pools and salt flats.

After spending six months in Texas, the birds go back to Canada's Wood Buffalo National Park in April to build nests and start raising chicks. The 19 chicks born this year are the largest flock of hatchlings reported since scientists began monitoring the

species 43 years ago. Six chicks were hatched last year and only two chicks in 1982.

Howard Hunt, a Texas A&M University doctoral student who is studying the birds' upland habitat, said the birds don't fly in one flock as geese do, but in family groups or pairs depending on whether the family produced young during the previous spring.

"They take advantage of the wind and can cover 300 miles or more in a day. Families travel alone but they use similar routes and stay over in different places depending on what the weather is like or the availability of food and water," Hunt says.

The effort to rejuvenate the whooping crane is at times cosmic. For example, in recent years tiny solar-powered transmitters were attached to some of the young cranes, and biologists from the U.S. Fish and Wildlife Service and Texas A&M University followed their signals by air and land along their 2,600-mile route to Canada's Wood Buffalo National Park.

Still, not all of the chicks survive the 16-day migratory flight from the park in Canada's Northwest Territories to the Texas coast. Officials remain hopeful, however, that the number of whoopers will increase.

Another group of 16 whoopers live with their relatives, the sandhill crane, in an experimental flock at the Bosque del Apache National Wildlife Refuge in New Mexico. About 24 cranes are part of an experimental breeding program at the Patuxent Wildlife Research Center in Maryland.

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## COME BACK CHICKEN

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One endangered bird that won't survive without the assistance of private landowners along the Texas Gulf Coast is the Attwater prairie chicken.

"These birds need help," says Dr. Nova Silvy, of Texas A&M's Department of Wildlife and Fisheries Sciences and head of a federal recovery plan for the endangered chickens.

*Please turn to page 24*



Anthony Amos

## Great Moments in **TEXAS CONSERVATION**

To understand the present status of conservation in Texas, it is important to know some of the legislation enacted in this field and some of the events in Texas history which affected the state's natural resources.

These are some of the highlights of conservation history in Texas. This list is not intended to be complete, but merely a background for more intelligent consideration of the present status of Texas' natural resources.

**1821** — Stephen F. Austin founds the 300-family colony, San Felipe de Austin, on banks of Brazos—wildlife here for the taking.

**1844-53** — Shortly after Texas becomes a part of the United States, one trading post near Waco ships more than 75,000 deer hides and numerous bear and bison pelts to New York in one 10-year period.

**1861** — First game law in Texas. Two-year closed season on bobwhite quail on Galveston Island.

**1874** — First law protecting fish (restrictions on coastal seining and netting).

**1879** — U.S. Fish Commission stocking shad, California salmon and rainbow trout in Texas waters, plus German carp.

**1881** — Texas' first fish hatchery—Barton Springs—propagation of German carp.

**1883** — 130 counties claim exemption from ALL game laws.

**1887** — Fishing is restricted in bay areas due to destruction of spawn by seines.

**1895** — Fish and Oyster Commission established.

**1897** — Made illegal to catch fish or turtles in public waters by use of poison, lime or explosives.

**1907** — Game Department added to Fish and Oyster Commission provided it could sell enough licenses to pay its own way.

**1909** — Legal shell size of oysters is raised.

**1911** — Game, Fish and Oyster Commission given charge of shell, marl and sand management.

**1926** — Director of Education, Publicity and Research says that the people of Texas are "natural conservationists."

**1927** — First conviction for stream pollution.

**1931** — Goose Island, containing approximately 300 acres, is set aside as a park.

**1935** — Texas Wildlife Research Unit established in cooperation with Texas A&M University.

**1936** — Department of Wildlife Management established at Texas A&M University.

**1937** — Coastal Division added to Texas Game and Fish Commission.

**1938** — Texas has first wildlife project approved under Pittman-Robertson Act.

**1948** — Dedication of Marine Laboratory at Rockport.

**1949** — Control and custody of most historic sites and parks transferred from the State Board of Control to the State Parks Board.

**1951** — "Oyster" dropped from department name.

**1953** — First transplants of saltwater fish into fresh water.

**1956** — Economic survey (Crossly) shows \$165,054,000 spent by Texas sportsmen in hunting and fishing.

**1957** — Saltwater fishermen licensed.

**1958** — Field laboratory established at Seabrook.

**1960** — Bureau of the Census Survey reports sportsmen spend \$382 million for hunting and fishing in 1960.

**1961** — Game and Fish Commission reorganized under plan proposed by Texas Research League; nine-man commission, executive secretary, Austin staff and five regional headquarters.

**1962** — 129 counties under full or partial Regulatory Authority, a complete reversal from 1883 when 130 counties claimed exemptions from all game laws.

**1963** — Controlled dredging program approved.

**1964** — 150 counties under Regulatory Authority.

**1971** — Registration of motorboats required under Water Safety Act.

**1972** — Hunter Safety Program initiated to train Texans in the safe handling of firearms.

**1973** — Texas Endangered Species Act adopted.

**1974** — First state list of endangered species published—lists five mammals, nine birds, two reptiles, five amphibians and five fishes.

**1975** — Research at Port Aransas laboratory results in first successful redfish natural reproductions in captivity.

**1976** — 53 oyster reefs marked by buoys or pilings to designate location for marine sport fishermen.

**1977** — 46 species listed as endangered, 81 additional non-game species are protected.

**1978** — Shrimp tagging program is initiated in cooperation with the National Marine Fisheries Service in Galveston, to provide data on migration, growth and mortality of brown shrimp in Gulf waters.

**1979** — Movement study of white pelicans initiated in Laguna Madre—only coastal nesting area of this species in the U.S.

**1980** — A second 65-foot offshore patrol vessel, the Captain Murchison, is purchased by the Law Enforcement Division and home-ported at Freeport.

**1981** — House Bill 1000, prohibiting the sale of redfish and spotted seatrout caught in Texas waters becomes law. Attempt to overturn the law in federal court by commercial fishermen unsuccessful.

**1982** — Gulf Coast Conservation Association donates a \$1.2 million red drum hatchery to the department to raise fingerlings to stock Texas bays.

**1983** — Wildlife Conservation Act is passed by the Texas Legislature, placing authority for managing fish and wildlife resources in all Texas counties in the hands of the Parks and Wildlife Commission.

**1984** — Portions of 1984-1985 are designated "Year of the Ocean" by state and federal authorities. ■

## Conversion moves ahead on ocean drilling ship

Conversion has begun on the SEDCO/BP 471, the drillship that will take scientists around the world to retrieve and study core samples from beneath the oceans' floors for the National Science Foundation's Ocean Drilling Program. Plans are being made for December shakedown cruises, say program directors at Texas A&M University.

Texas A&M is science operator for the five-year program managed by the Joint Oceanographic Institutions Inc. (JOI), a consortium of major oceanographic institutions.

Dr. Philip Rabinowitz, professor of oceanography at Texas A&M and project director, said conversion of the 470-foot ship began in mid-September at shipyards in Pascagoula, Miss.

The ship's conversion is to be completed in early December and the first scientific leg of the program starts in January with a drilling site in the Bahamas.

Rabinowitz said the ship's derrick is being dismantled and reinforced before it is re-erected so that it can handle heavier drilling equipment. A main laboratory structure is being constructed on the starboard side of the vessel with three levels below decks and four stories of laboratories installed on the main deck.

Other modifications include a downhole measurements lab overlooking the rig floor, a library and study area on the main deck, a geophysics lab under the helicopter deck and additional scientific and storage space. "Only minor revisions are being made to the ship's power, propulsion and service systems. However, major revisions are being made to the position reference and control system and drilling systems," Rabinowitz said.

The ship is to be moved into dry dock soon, he said, as final work is done on the conversion being directed by SEDCO.

As that work is progressing, Texas A&M officials are assembling the scientific team that will be responsible for the first cruises.



## John Calhoun presented annual Sea Grant Award

Dr. John C. Calhoun, a long-time Texas A&M University administrator, has won the 1984 Sea Grant Award in recognition of his outstanding contributions to the development of marine education and science in America.

Deputy Chancellor for Engineering Emeritus at Texas A&M, Calhoun was presented the award during ceremonies at Minneapolis by Dr. James Jones, president of the Sea Grant Association.

Calhoun twice directed the Sea Grant Program at Texas A&M. He also served as president of the Marine Technology Society, chairman of the National Academy of Sciences Committee on Oceanography and was a member of the National Council on Oceans and Atmosphere.

During his 27 years at Texas A&M, Calhoun has served as dean of engineering, director of both the Texas Engineering Experiment Station and Texas Engineering Extension Service, director of the Center for Marine Resources, vice president for programs, dean of geosciences, distinguished professor of petroleum engineer.

## Sea Grant leader given marine advisory plaque

Willis Clark, an administrator with Texas A&M University Sea Grant College Program since its inception in 1968, has been honored by officials of the Southeast Marine Advisory Service and the National Marine Fisheries Service.

Clark, associate director of the Texas A&M Sea Grant Program, was presented a "Special Award" plaque during ceremonies in Minneapolis, Minn., at Sea Grant Week, the annual meeting of Sea Grant programs across the nation.

The award was in recognition for Clark's efforts in establishing an eight-state cooperative marine program known as the Southeast Marine Advisory Service Network.

The group, formed in 1982, attempts to address fishery and other marine-related issues on a regional basis.

The organization includes marine advisory service program leaders in Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, North Carolina, South Carolina and most recently Puerto Rico.

## Researchers investigate new ocean energy source

Texas A&M University oceanographers have reported the discovery of gas hydrates, an icelike formation of methane and water that some feel could be an alternative energy source, under the ocean floor in the Green Canyon area of the Gulf of Mexico.

Drs. James Brooks, Mahlon Kennicutt II, Roger R. Fay and others report the occurrence of thermogenic gas hydrates in ocean sediments retrieved during geochemical surveys in the northwestern area of the gulf. The gases that form these hydrates have seeped up from much deeper reservoirs, Kennicutt said.

The samples are the result of temperature and pressure under the ocean floor, he says.

The temperature and pressure ranges in the sediments where the hydrates were recovered are very close to the stability limit of methane hydrates, Kennicutt says.

## Scientists try to crack trough's rocky history

Japanese and French expeditions are closely examining the Okinawa Trough in the East China Sea to learn how the basin developed.

The international team includes Texas A&M University geophysicist, Dr. Thomas W.C. Hilde.

Hilde, director of the Texas A&M Geodynamics Research Program of the College of Geosciences, says the basin adjacent to the Ryukyn Island Arc south of Japan "apparently developed rapidly in the last one-half million years" as the seafloor spread behind island arcs as a result of plate convergence and subduction (moving of one geological plate under another) of the Earth's crust.

Hilde and other scientists who participated in the September and October expeditions believe the history of the region is contained in an "expanded geological record" locked within the sediments and rocks of the trough.

## Huge sales no illusion for fake crab exporters

Steadily climbing exports to the American market of imitation crab meat probably are indicative of only the tip of the iceberg where shipments of fake food items from Japan to the United States are concerned, in the opinion of Japanese trade analysts.

The Journal of Commerce reports that a number of Japanese companies have managed to carve out significant sales volumes for a frozen crab meat substitute that both looks and tastes like the real product but that sells for just a fraction of the cost.

The experts point out that the item, being marketed in the United States either in the form of sticks or in shredded form, is made from cheap pollock, a finfish. These specialists estimate that sales this year of imitation crab meat will top \$100 million.

Another \$250,000 worth of the fake Japanese crab meat is being exported each year to Britain, Australia and several other countries, according to these sources.



## New study finds ancient shipwreck not the Pinta

A 16th century Caribbean shipwreck some had claimed was the Pinta actually was a Spanish exploration or cargo ship which may have sunk less than 30 years after Columbus sailed to the New World, say nautical archaeologists from Texas A&M University.

An unusually large complement of shipboard cannon, other arms and the Spartan-like quality of artifacts leads researchers to conclude the vessel was on a voyage of exploration, cargo-hauling or perhaps even salvage, says project director Don Keith of the Institute of Nautical Archaeology (INA).

Fragments of ceramics from the wreck, the design of the artillery pieces and the ship's location helped confirm the vessel as Spanish, Keith says.

It sank off the Turks and Caicos Islands, probably in the first quarter of the 16th century, he says.

Although no INA or Texas A&M researcher has ever described the wreck as that of the Pinta, the claim was made by other parties interested in salvaging what could be the earliest known New World shipwreck.

## Jumbo size shrimp farms have economic advantage

Smaller shrimp-farming operations don't have as great a chance for survival as the larger ones, says a Texas A&M agricultural economist who is evaluating the economics of shrimp farming along the Texas Gulf Coast.

"The operations can be profitable, but they must be large," says Dr. Wade L. Griffin of Texas A&M's College of Agriculture. "Smaller operations aren't economically feasible based on the assumptions in my research."

"Shrimp farming is a potential new industry for Texas and is attracting a lot of new interest.

"It's not just landowners who are interested in converting their ranges into ponds, but entrepreneurs who don't own any land," he says.

Griffin and other Texas A&M researchers are developing a simulation model which can provide prospective shrimp farmers estimates of output, per-unit costs of production and profits given certain knowns, such as the size of their facilities, stocking rates and sizes, and the stage in the growing season.

## Deep sea trenches could prove safe for disposal

Deep sea trenches created by converging plates in the Earth's crust may be used to dispose of waste materials, including junked nuclear submarines, says a Texas A&M geophysicist.

Dr. Thomas Hilde, a professor of geophysics and director of the Geodynamic Research Program, has found that giant depressions, known as grabens, are formed in the "downgoing" plates of the Earth's crust as the plates bend downward into the trenches. Hilde suggests the grabens might be used to carry waste deep into the Earth's interior as they descend beneath the overriding land mass plates.

By placing waste in the grabens it may be carried deep enough so that it would return to the Earth's surface only through volcanic action and only after one to five million years, Hilde says.

No nuclear waste would be dangerous after that time, he says.

## Nautical archaeologists land bound most of year

If some people enter nautical archaeology for the lure of undersea diving, they quickly find out that such researchers spend two years on land studying artifacts for every month they are in the water, says one of the world's foremost authorities.

"Diving and swimming skills, to the dismay of a surprising number of applicants, are almost irrelevant to our graduate studies," says Dr. George Bass, a Texas A&M University professor and past president of the Institute of Nautical Archaeology (INA) headquartered at the University.

Although most people associate nautical archaeology with diving, we average two years on conservation, recording and research for every month we dive — and not all of our staff and students dive," Bass says.

Texas A&M, where Bass is a professor of both anthropology and geography, has become the leading center worldwide for training nautical archaeologists.

In addition to being well-versed in history and schooled in the modern techniques of excavation, these researchers must learn the intricate details of conservation, preservation and scholarly research.

Research teams composed of faculty and students from Texas A&M and of staff members from the non-profit INA have excavated shipwrecks and marine-related sites on four continents and in the Caribbean since 1976, when INA moved its operations to Texas.

## Proposed leaded gas ban worries marine industry

America's boating industry is capping off its best sales year in a decade, and looking forward to an even brighter 1985. But in addition to satisfying increasing consumer demand, marine manufacturers must also devote their energies in the coming year to meeting an Environmental Protection Agency proposed leaded gas ban.

Of the estimated nine-plus million outboard motors in service and 1.5-plus million inboard engines in use,



the National Marine Manufacturers Association indicates the vast majority will require some form of alteration to remain safe and operational when fueled by low-lead or no-lead gasolines.

The EPA has proposed to reduce lead used in gasoline 91 percent by January 1, 1986, in order to curtail its harmful effects on human health and the environment. While the measure is supported by the industry, NMMA president and spokesman Jeff Napier says the adoption date is too soon for technology and manufacturing lead times to handle. "We have already redesigned many of our engines to use the major lead substitute, alcohol additives to gas, but need more time to convert the rest," Napier said.

Manufacturers are chiefly concerned that presently available lead substitutes — namely alcohol — are unsafe for use, not only in marine engines but tens of millions of car and truck engines as well. Alcohol causes rapid deterioration in the rubber commonly used in automotive and boat fuel systems, which permits the alcohol and eventually the rest of the gas to leak into the bilges. Performance problems, such as reduced fuel

economy and harder starts, are also common, the NMMA says.

"The real loser is the consumer, who won't be able to buy anything but lead-substitute alcohol fuels and will have to watch the problems grow," Napier said. Because the lead ban is still in the proposal stage, Napier said an NMMA task force composed of engine manufacturers, component part suppliers, boat builders and oil companies will participate in the EPA regulatory process asking for a slower phase-out.

## Returned fish tags could bring rewards to anglers

Biologists with the Texas Parks and Wildlife Department are beginning another season of gill net monitoring of the bays' finfish populations, and fishermen are asked to assist the research by reporting tagged fish information.

Returned tags may earn a reward of up to \$25 from the Gulf Coast Conservation Association. Each internal anchor tag is attached to a long yellow streamer which protrudes from the side or belly of the fish. Anglers who catch a tagged fish should carefully cut the tag from the fish, weigh and measure the fish, and send the information along with the tag to the nearest coastal fishery laboratory.

Parks and Wildlife officials suggest that fishermen mark their favorite fishing rod or carry along some other measuring gadget when going after redfish, speckled trout or other species which have size limits. Redfish measuring between 18 and 30 inches are keepers, their bag limit is five and possession limit is 10. Specks must be at least 14 inches long. Their bag limit is 10, and possession limit 20.

Parks and Wildlife officials also remind fishermen that circle-type hooks are now required for use on all saltwater trotlines. The hooks, which have a radical bend and extremely short shank, are required over the standard-shank hook because of their more effective design. Fishermen report hooking virtually all their fish in the lip with the hooks, rather than the gills, throat or stomach. The hooks also tend to pierce more cleanly, and



remain in place, even with trotlined fish, according to the TPWD. Circle hooks are available in some coastal tackle shops or through a number of tackle catalogs.

And just to be sure you're within the limits of the law while fishing outside of Texas, a new listing of sport and commercial fishing license requirements of the states along the Gulf Coast is available from the Gulf States Marine Fisheries Commission. Single copies of the license requirements and fees can be obtained by writing the commission at P.O. Box 726, Ocean Springs, Mississippi, 39564, or calling (601) 875-5912.

## Abandoned shipwreck act gives new rights

Recognizing the need to clarify conflicting federal court rulings on the ownership and management of historic shipwrecks in state waters, the U.S. House of Representatives has passed the Abandoned Shipwreck Act of 1984.

Since the passage of the Submerged Lands Act of 1953, states have held title to the lands and resources beneath the navigable waters within their boundaries, extending seaward three miles, and have managed a wide range of resources and activities in these areas.

"The intent of this bill is to make clear the right of states to manage certain abandoned shipwrecks located within their waters and to enable them to preserve their historical significance," says Walter Jones, Chairman of the Merchant Marine and Fisheries Committee.

Specifically the bill asserts U.S. title — and then transfers it to the states — to abandoned shipwrecks located in the state's submerged lands which are substantially buried, located in coral formations or eligible for or listed on, the National Register of Historic Places.

Traditional admiralty salvage law will continue to apply to abandoned shipwrecks not falling within this narrow class.



## Upcoming marine-related meeting schedule listed

**January 5-9, 1985.** *Fourth International Aquaculture Conference*, MGM Grand Hotel, Reno, Nevada. Contact: Glasscock & Associates, Little Rock, AK, (501/376-7883).

**January 7-11, 1985.** *Fourteenth Dredging Engineering Short Course*, Texas Engineering Experiment Station and National Sea Grant Program. Contact: Dr. John B. Herbich, Director, Center for Dredging Studies, Department of Engineering, Texas A&M University, College Station, Texas 77843-3136.

**February 24-28, 1985.** *Ninth Annual Larval Fish Conference and Annual Meeting of the Early Life History of the American Fisheries Society*. Contact: Dr. Joan Holt, University of Texas at Austin, Marine Science Institute, Port Aransas, Texas. (512/749-6711).

**March 15-20, 1985.** *50th North American Wildlife and Natural Resources Conference*, the Shoreham Hotel, Washington, D.C. Contact: L.R. Jahn, Wildlife Management Institute, Suite 725, 1101 14th Street, N.W., Washington, D.C. 20005 (202/371-1808).

**March 31-April 3, 1985.** *Symposium on the Role of Fish Culture in Fisheries Management*, Lodge of the Four Seasons, Lake Ozark, MO. Contact: Delano Graff, 450 Robinson Lane, Bellefonte, PA 16823 (814/359-5169).

**April 26-27, 1985.** *10th Annual Marine Recreational Fisheries Symposium*, "Recreational Uses, Production, and Management of Pacific Salmon," Seattle, Washington. Contact: Frank Carlton, Chairman, Marine Recreational Fisheries Symposium, P.O. Box 23298, Savannah, GA 31403.

**June 3-9, 1985.** *National Fishing Week*. Contact: R.F. Hutton, National Marine Fisheries Service, (202/634-7220).

**June 23-28, 1985.** *Second International Symposium on Genetics in Aquaculture*, University of California, Davis, CA. Contact: Graham A.E. Gall, Second Symposium, Department of Animal Science, University of California, Davis, CA 95616 (916/752-1257).

**July 24-30, 1985.** *1985 National Scout Jamboree*, Fort A.P. Hill, near Fredericksburg, VA. Contact: Walter J. Wenzel, Director, High Adventure and Conservation Service, Boy Scouts of America, 1325 Walnut Hill Lane, Irving, Texas 73038-3096 (214/659-2000).

**July 28-August 2, 1985.** *Eighth Biennial International Estuarine Research Conference*. Durham, New Hampshire. Abstract deadline February 18, 1985.

**July 30-August 2, 1985.** *Coastal Zone 85 Conference*, Baltimore, Maryland. Contact: Orville T. Magoon, General Chairman, Coastal Zone 85, Code A, P.O. Box 26062, San Francisco, CA 94126.

**September 7-11, 1985.** *115th Annual Meeting of the American Fisheries Society*, Sun Valley, ID. Contact: Dr. William Platts, U. S. Forest Service, 316 E. Myrtle Street, Boise, ID. 83706, (208/334-1457).

**March 16-21, 1986.** *51st North American Wildlife and Natural Resources Conference*, the MGM Grand Hotel, Reno, Nevada. Contact: L.R. Jahn, Wildlife Management Institute, Suite 725, 1101 14th Street, NW, Washington, D.C. 20005. ■



Texas Parks and Wildlife Dept.

BROWN PELICAN

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The chickens are not your common barnyard variety. They are distinctive, particularly during the spring mating rituals. At that time, the males inflate bright orange air sacs on their necks and make a booming sound. The noise lets females know they're around and warn off other males.

The prairie chickens are not exactly long-lived. The birds live an average two and a half years and only about one third of the newborn live to be adults — the rest are lost to predators. Many young birds often drown during hurricane season.

The population has decreased from 8,700 in 1937 to less than 2,000 today, Silvy says. "They've lost much of their habitat to the state's growing human population and rapid development."

The few birds which lived in Brazoria and Harris counties were lost over the past year and they will probably be lost in Galveston County next because of urbanization and ex-



Tennessee Valley Authority

BALD EAGLE

pansion. They could also disappear in other regions such as Fort Bend County where prairie grasslands are being converted into cropland.

The greatest number of the birds are found in Austin, Colorado, Galveston and Refugio counties, he says. At present, Victoria and Goliad counties offer the best opportunities for the birds.

While the bird's populations have dwindled primarily because of the influx of people and development along the coast, Silvy believes the bird can be brought back up to 5,000 birds through efforts described in the Attwater's prairie chicken recovery plan.

Among the recovery plan's top priorities for saving the birds is securing additional land and perhaps even another refuge for them. Meanwhile, landowners can be given tax incentives for setting aside a portion of their land for the birds and can be taught wildlife management practices that would help the chickens survive.

The plan calls on U.S. Soil Conservation Service biologists to work with ranchers and farmers in implementing the landowner assistance program. They could also help teach people about the chicken's habitat requirements, which includes thick, dense vegetation for nesting mating and shorter grasses for mating and the young to move about.

Strategies also include transplanting some of the birds, learning how to propagate them in captivity, controlling animals that kill the birds for food, learning more about the effects of inbreeding and determining different mortality factors.

According to the plan, the birds will be "downlisted" to a threatened status when the population reaches 3,000 and will be taken off the U.S. Fish and Wildlife Service's list of threatened species when there is a minimum population of 5,000 and an additional 22,000 acres of land are provided for habitat. ■

# PUBLICATIONS

The following publications are available from the Marine Information Service, Sea Grant College Program, Texas A&M University, College Station, Texas 77843. Prices quoted are for single copies, write for prices for multiple copies. Request publication by both title and TAMU-SG number, and send a check payable to Texas A&M University.

**UNDERSTANDING INVOLVED FISHERMEN: A SURVEY OF MEMBERS OF THE GULF COAST CONSERVATION ASSOCIATION.** Robert Ditton and Stephen Holland. June 1984. \$2 for single copy; multiple copies, price on request. **TAMU-SG-84-623.**

The Gulf Coast Conservation Association is a group of about 10,000 individuals concentrated in Texas, but with members in other gulf states. They have concerned themselves with fishery conservation issues in general and in protecting the interests of recreational fishermen in particular. This report is based on a mail survey of 559 randomly selected members in the Houston-Galveston area. The majority of the respondents were male, middle-aged fishermen who held professional-technical occupations with family incomes over \$40,000 per year. Virtually all were active fishermen who fished an average of 37 days a year. They participated in a variety of fishing: 86 percent fished from a boat in coastal bays, 75 percent engaged in shore fishing, 55 percent fished freshwater and 48 percent went boat fishing in the Gulf. The most sought after fish were speckled trout, redfish, flounder, largemouth bass and king mackerel, respectively.

**BAY BOUNTIES.** Annette Reddell Hegen. September 1985. Single copies free; multiple copies, price on request. 6 panels. **TAMU-SG-84-510.**

For a hearty breakfast, scrumptious appetizer or elegant main meal, this recipe collection provides eight new ways to fix the bountiful harvest of shrimp, crab, sheepshead and other seafood from Texas bays. Members of Families Involved in Seafood Harvest (FISH), whose goal is to maintain marine resources for present and future generations, have netted time-honored recipes from pioneering Gulf coast families and fishermen.

The brochure includes a quick and easy recipe for crab dip and shrimp dip, as well as more elaborate dinner spreads like stuffed crab, baked sheepshead, fish fillets simmered in a seasoned tomato sauce or fish fillets smothered in a spicy mushroom sauce and served over steaming rice.



There's also an easy, one-skillet shrimp, bacon and eggs breakfast, or a gumbo of crab, shrimp and vegetables that tastes best after simmering several hours.

**1984 YEAR OF THE OCEAN (poster).** January 1984. Single copies free; multiple copies, price on request. 18" X 24". **TAMU-SG-84-111.**

This full-color poster commemorates the Year of the Ocean observance in 1984. It includes a watercolor of the ocean by artist Jim Raatz framed in a solid black border, and the theme, "The Ocean... America's heritage... America's future."

**WHALES & DOLPHINS OFF THE TEXAS COAST (poster).** February 1984. \$3. 36" X 24". **TAMU-SG-84-505.**

This full-color reproduction of specially commissioned work by artist Lori Grassman depicts the five species of marine mammals most frequently stranded off the Texas coast. The Atlantic bottlenosed dolphin, spotted dolphin, pygmy sperm whale, beaked whale and great sperm whale are included. All are painted to scale, and a brief description of each species is printed on the back of the poster.

**TEXAS RIPS! February 1984.** Single copy free; multiple copies, price on request. 11" X 17". **TAMU-SG-84-506.**

Another in Sea Grant's series of water safety materials, Texas Rips! delivers a warning message about the dangerous rip currents along the Texas coast. A high percentage of drownings occur each year in Texas when swimmers or waders are caught in rip currents adjacent to rock groins, jetties or piers.

In addition to an illustration of a typical rip current hazard, the poster also includes information on how to escape should a person be caught.

**A TAIL OF SUCCESS: TEXAS FARM-RAISED, PURGED CRAWFISH.** Michael Haby. April 1984. 8 panels. Single copies free; multiple copies, price on request. **TAMU-SG-84-508.**

Buying high quality crawfish not only gives customers a better tasting product, but also guarantees a product with a longer shelflife. How can you tell if the crawfish you buy for resale are among the best on the market? This brochure unfolds into a poster that lists things to look for when receiving shipments of live or whole, cooked crawfish. It can help you or your employees decide whether to accept or reject deliveries. It also lists ways to extend the shelflife of crawfish once they are yours.

Written by Mike Haby, a seafood marketing specialist with the Texas Marine Advisory Service, the publication explains what purged crawfish are and what purging does to enhance the quality of crawfish. It briefly outlines crawfish seasons.

**MARINE OFFSHORE OUTLOOK — 1984.** Dewayne Hollin, compiler. June 1984. 24 pages. \$5 for single copy; multiple copies, price on request. (please include payment with this order form). **TAMU-SG-84-509.**

What does the future look like for the marine/offshore industry? This executive summary highlights what industry experts are saying about industry problems and trends in market supply and demand, regulatory problems and trends, technological developments, labor availability and financial trends. The discussions were part of the 1984 Marine/Offshore Industry Outlook Conference in Houston, Texas. This conference, sponsored by the Texas A&M University Sea Grant College Program and the Marine Services Association of Texas, looks at trends through 1986.

Included in the summary are remarks from Robert G. Burke, Offshore Magazine; K.W. Waldorf, Zapata Offshore Company; Ogden Thomas, Jr., Seahorse, Inc.; Herb F. Hamilton, Raymond Offshore Constructors, Inc.; John V. Harter, Taylor Diving and Salvage Co., Inc.; B.S. Flowers, Shell Offshore, Inc.; Robert E. Bradbury, Marathon Marine Engineering Co.; Berdon Lawrence, Hollywood Marine, Inc.; Neal S. Platzer, Platzer Shipyard, Inc.; and James G. Tompkins III, Lykes Bros. Steamship Co., Inc.



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