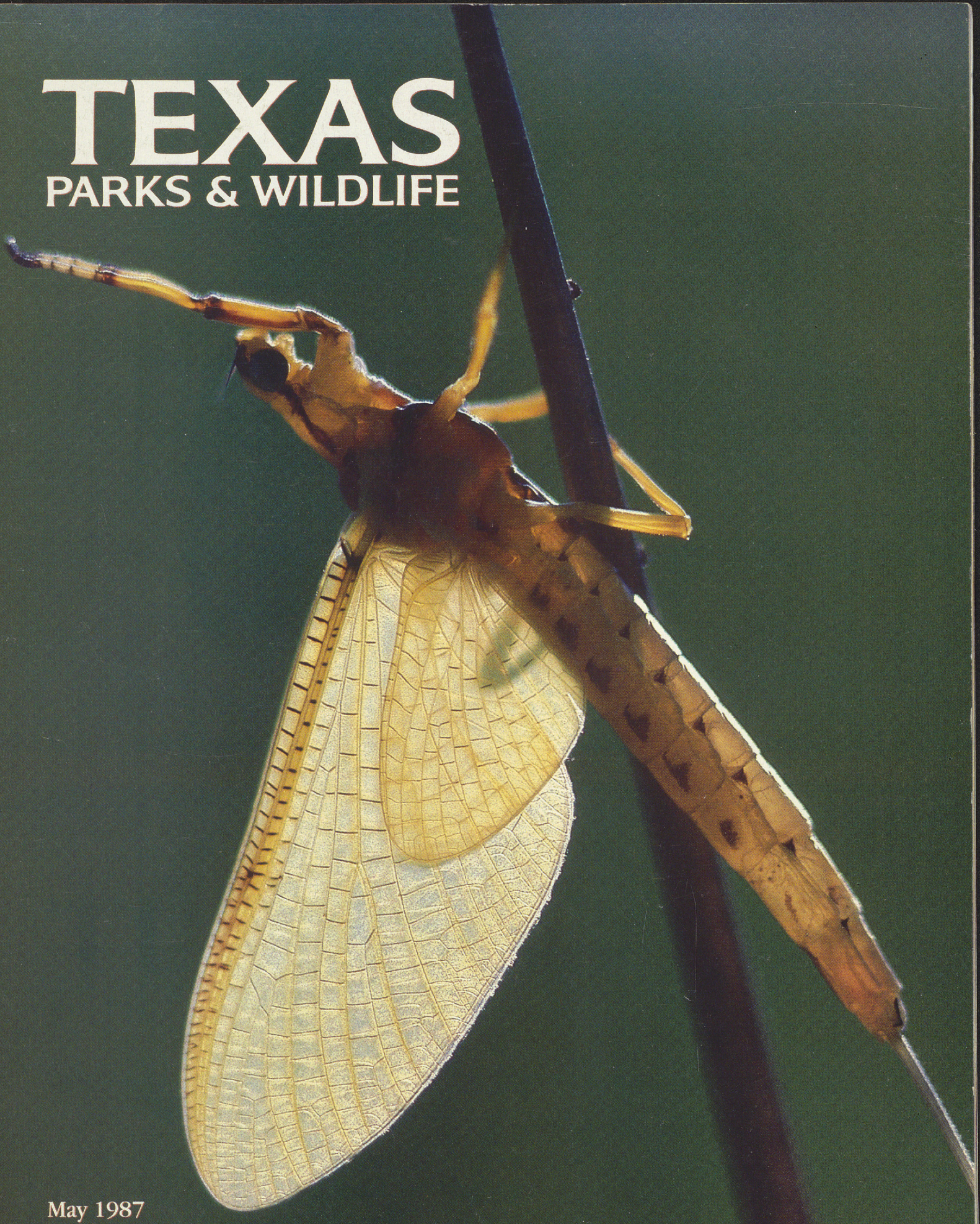
TEXAS
PARKS & WILDLIFE



May 1987

TEXAS
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Dedicated to the conservation and enjoyment of Texas wildlife, parks, waters and all outdoors.

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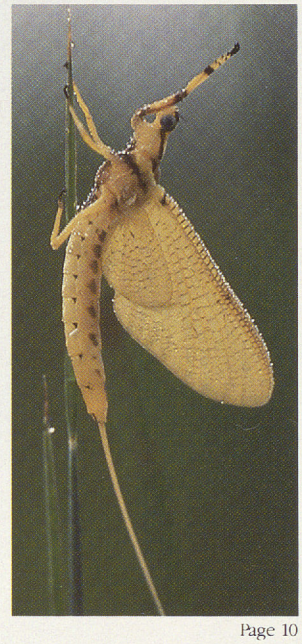

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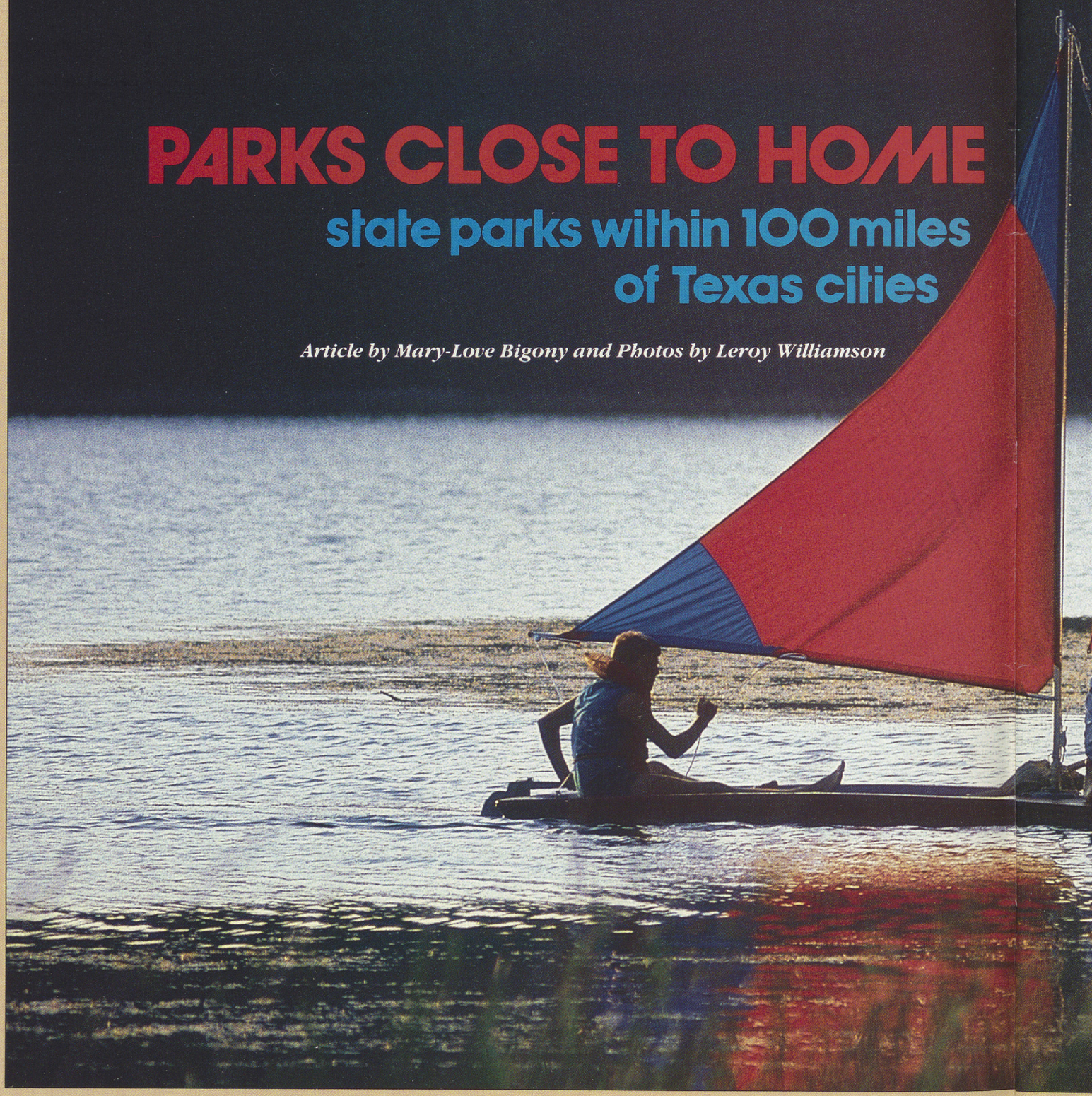
Covers

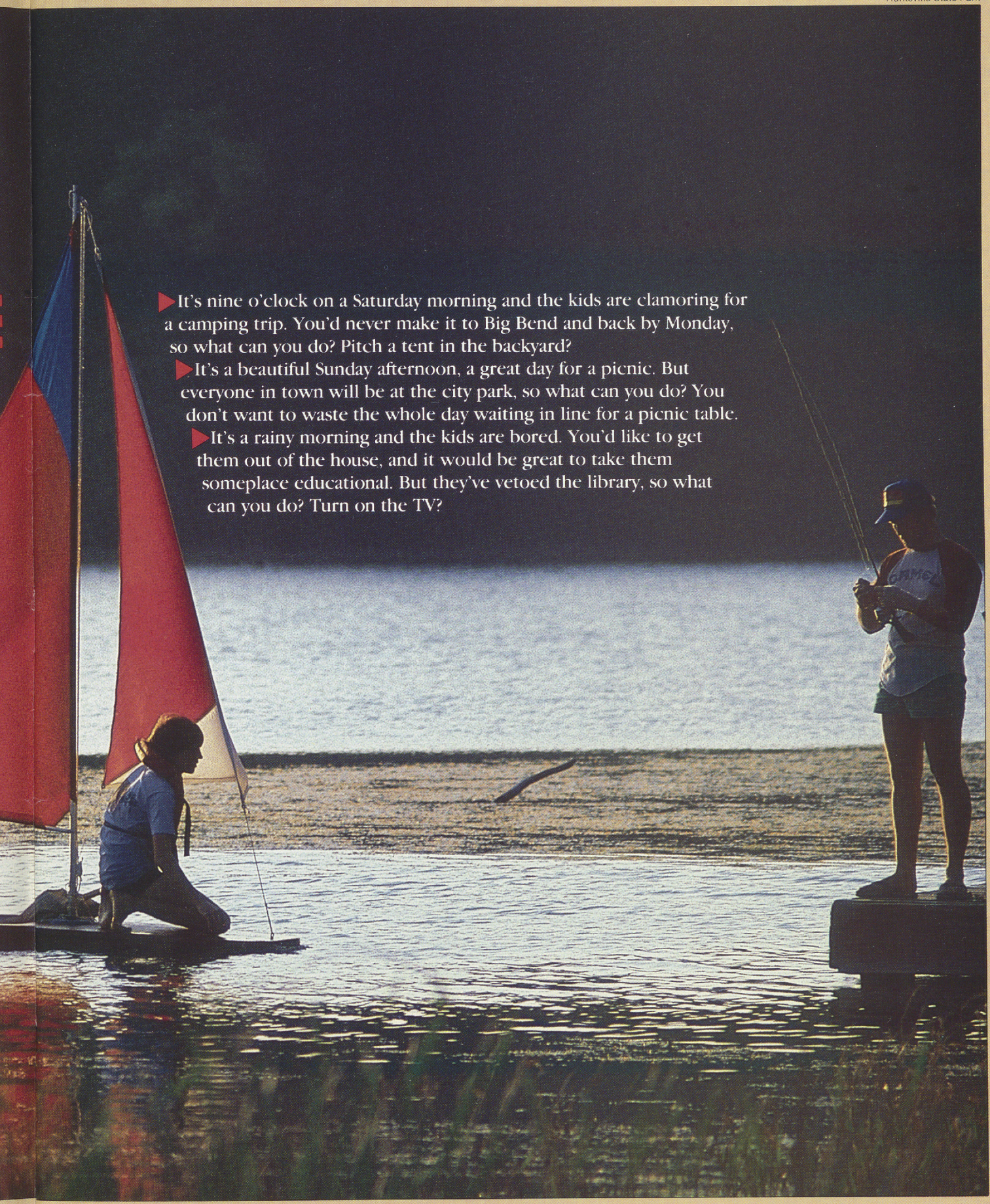
Front: Emerging on a late spring evening, this adult golden mayfly is just one of many beautifully colored insects flying near any freshwater pond in Texas. Photo by Paul M. Montgomery. (See story on page 10.) **Inside Front:** Some of the best entertainment of the summer could be provided by hummingbirds in your own backyard. Photo by Luke Wade. (See story on page 20.)

PARKS CLOSE TO HOME

state parks within 100 miles of Texas cities

Article by Mary-Love Bigony and Photos by Leroy Williamson





▶It's nine o'clock on a Saturday morning and the kids are clamoring for a camping trip. You'd never make it to Big Bend and back by Monday, so what can you do? Pitch a tent in the backyard?

▶It's a beautiful Sunday afternoon, a great day for a picnic. But everyone in town will be at the city park, so what can you do? You don't want to waste the whole day waiting in line for a picnic table.

▶It's a rainy morning and the kids are bored. You'd like to get them out of the house, and it would be great to take them someplace educational. But they've vetoed the library, so what can you do? Turn on the TV?

The solution to all these dilemmas is as close as a Texas state park, and you might be surprised to learn just how many parks are close to your home. In fact, there are several state parks within an easy two-hour drive of every major city in Texas. You may already be familiar with the state park that is virtually in your own backyard, but you can expand your horizons a little and check out the other parks in the area, without venturing too far from home.

Most Houstonians know about San Jacinto Battleground, but they might not know there are 14 more state parks within a 100-mile radius of the city. The Birch Creek and Nails Creek units of Lake Somerville State Recreation Area can be reached in just a couple of hours, as can the historic Monument Hill and Kreische Brewery, which combine scenic picnic sites and stories of early Texas history.

Similarly, many Austinites enjoy McKinney Falls State Park just southeast of the city, but their state park options don't end there. Hill Country parks such as Inks Lake and Kerrville lie to the west, while the lost pines of Bastrop State Park and the attractions of Lockhart State Park are less than an hour away in the opposite direction.

The same situation exists all across Texas, with more than 100 far-flung state parks. Many people have known for years that state parks are good vacation spots; East Texans can enjoy the drama of the west at Davis Mountains State Park and West Texans can camp under the pine trees at Huntsville or Lake Livingston. But you don't have to have a week's vacation for a state park outing.

And don't make the mistake of thinking you have to be a camper to enjoy what the parks have to offer. Almost one-third of them provide insight into a period of Texas history, from the time of prehistoric man 8,000 years ago at Seminole Canyon to the early 20th century Hill Country farm at Lyndon B. Johnson. The turbulent period of Texas' fight for independence from Mexico is commemorated at such parks as Washington-on-the-Brazos, Stephen F. Austin, Fannin Battleground and Goliad.

Examples of 19th-century family life can be seen at restored homes such as the Sam Bell Maxey House, Fulton Mansion, Magoffin Home and Starr Mansion. Jose Antonio Navarro House in central San Antonio, home of the Texas patriot and signer of the Texas Declaration of Independence, depicts life in a Texas-Mexican home in the mid-1800s. Six 19th-century forts—four military, one fortified trading post and one built by a group of settlers—give a glimpse into frontier life.

A few of these historical parks have campsites, but most of them are for day-use only. Many have picnic grounds, so you might want to include an outdoor lunch on your agenda for the day.

If you want to camp in a state park, be sure to call first. All the parks accept reservations for campsites, and a telephone call will prevent disappointment when you reach your destination. Many parks are extremely busy during the summer, so if your first choice isn't available, try another.

Check the lists on the following pages to see which parks are within a couple of hours' drive of your home. You also can use these lists if you plan to visit another city in the state and want to enjoy some state parks while you're on your trip.

Addresses and telephone numbers for the parks follow. For a complete list of facilities and fees, request a Texas state parks information sheet from the Parks and Wildlife Department. Within Texas, call toll-free 1-800-792-1112 during regular business hours, or write 4200 Smith School Road, Austin, Texas 78744. * *

*No Camping

ABILENE

Abilene
Fort Griffin
Lake Brownwood
Lake Colorado City
Possum Kingdom

AMARILLO

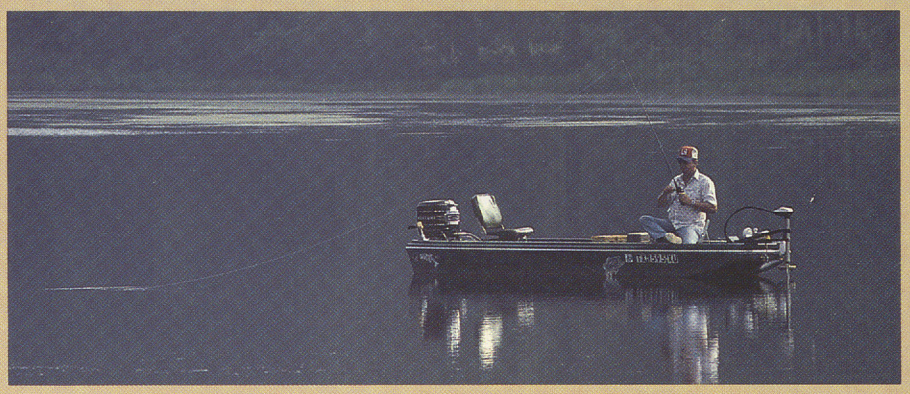
Caprock Canyons
Palo Duro Canyon

AUSTIN

*Admiral Nimitz
Bastrop
Blanco
Buescher
Enchanted Rock
(walk-in tent camping only)
Guadalupe River
Inks Lake
*Jose Antonio Navarro
Kerrville
Lake Somerville
Lockhart
*Longhorn Cavern
*Lyndon B. Johnson
McKinney Falls
*Monument Hill/Kreische Brewery
Mother Neff
Palmetto
Pedernales Falls
*San Jose Mission
(not operated by TPWD)

BEAUMONT-PORT ARTHUR

Brazos Bend
Cassells/Boykin
Galveston Island
Lake Livingston
Martin Dies, Jr.
*Sabine Pass Battleground
*San Jacinto Battleground
Sea Rim
*Sheldon



BRYAN-COLLEGE STATION

Bastrop
Buescher
*Confederate Reunion Grounds
Fairfield Lake
Fort Parker
Huntsville
Lake Livingston
Lake Somerville
McKinney Falls
Mission Tejas
*Monument Hill/Kreische Brewery
Mother Neff
*Old Fort Parker
Stephen F. Austin
*Washington-on-the-Brazos

CORPUS CHRISTI

Choke Canyon
*Copano Bay Fishing Pier
*Fannin Battleground
*Fulton Mansion
Goliad
Goose Island
Lake Corpus Christi
Lipantilan
(not operated by TPWD)
Matagorda Island
(access by boat only)
Mustang Island
*Port Lavaca Fishing Pier
Tips (not operated by TPWD)

Campers enjoy Huntsville (above) and Brazos Bend (left). Governor Hogg Shrine honors the first Texas-born governor.

Lake Texana
*Monument Hill/Kreische Brewery
*Sabine Pass Battleground
*San Jacinto Battleground
Sea Rim
*Sheldon
Stephen F. Austin
*Varner-Hogg Plantation
*Washington-on-the-Brazos

LAREDO

Choke Canyon
Falcon
Lake Corpus Christi
Lipantilan (not operated by TPWD)
Tips (not operated by TPWD)

LUBBOCK

*Big Spring
Caprock Canyons
Lake Colorado City
Mackenzie
(not operated by TPWD)

DALLAS-FORT WORTH

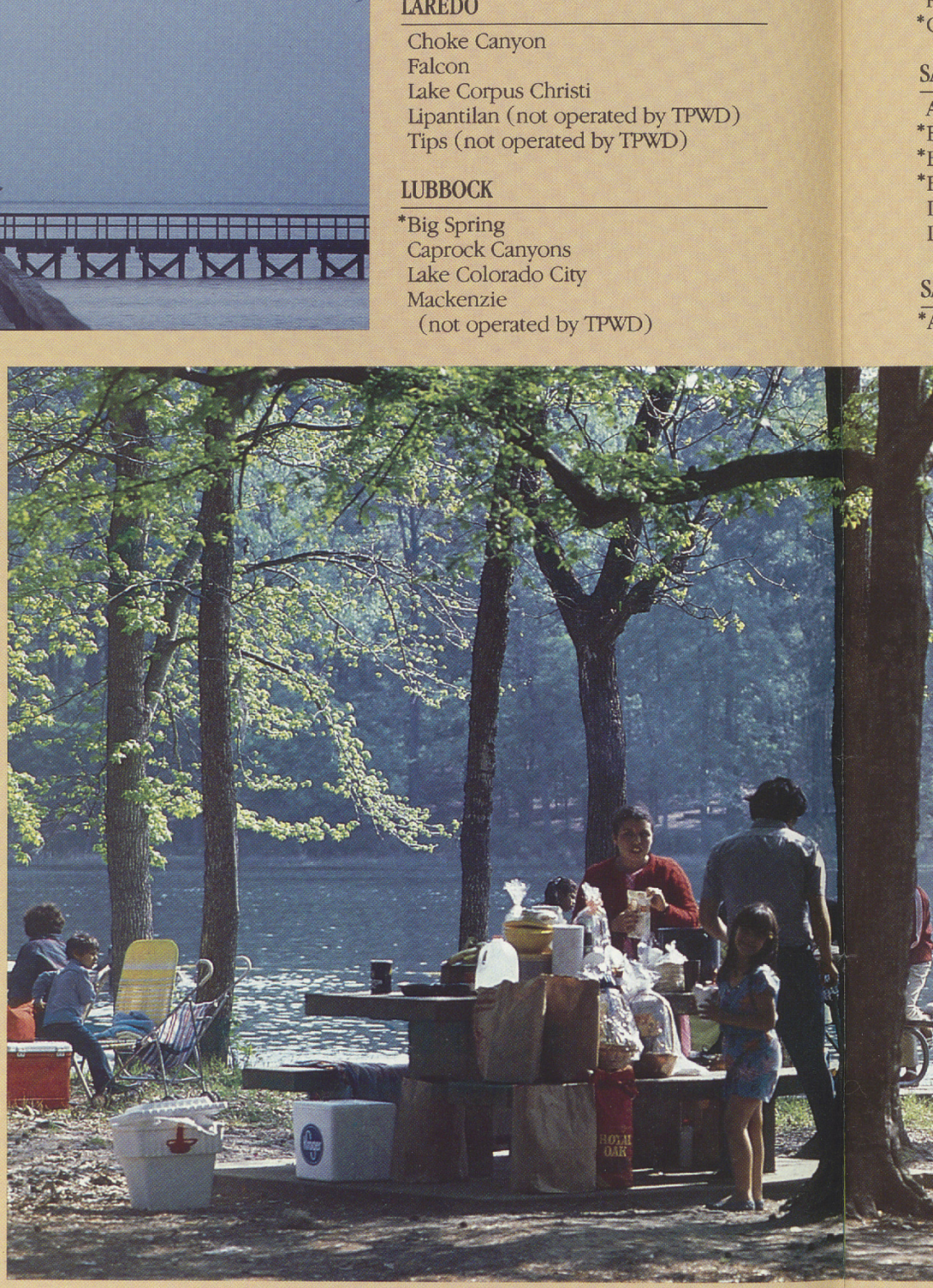
*Acton
Bonham
Cleburne
*Confederate Reunion Grounds
Dinosaur Valley
Eisenhower
*Eisenhower Birthplace
Fairfield Lake
Fort Parker
Fort Richardson
*Governor Hogg Shrine
Lake Lewisville
Lake Mineral Wells
Lake Whitney
Meridian
Possum Kingdom

EL PASO

*Franklin Mountains
(pedestrian access only; no facilities)
*Magoffin Home

HOUSTON-GALVESTON

Brazos Bend
Bryan Beach
(undeveloped Gulf beach)
Galveston Island
Huntsville
Lake Livingston
Lake Somerville



Huntsville (right) is one of many parks with a lake. Coastal activities are popular at Goose Island (above) and Mustang Island.

MIDLAND-ODESSA

*Big Spring
*Fort Lancaster
Lake Colorado City
Monahans Sandhills

RIO GRANDE VALLEY

Bentsen-Rio Grande
Falcon
*Port Isabel Lighthouse
*Queen Isabella Fishing Pier

SAN ANGELO

Abilene
*Big Spring
*Fort Lancaster
*Fort McKavett
Lake Brownwood
Lake Colorado City

SAN ANTONIO

*Admiral Nimitz
Bastrop
Buescher
Blanco
Choke Canyon
Enchanted Rock
(walk-in tent camping only)
Garner
Goliad
Guadalupe River
Hill Country
*Jose Antonio Navarro
Kerrville
*Landmark Inn
(hotel-type accommodations)
Lockhart
*Longhorn Cavern
Lost Maples
*Lyndon B. Johnson

McKinney Falls
Palmetto
Pedernales Falls
*San Jose Mission
(not operated by TPWD)
Tips
(not operated by TPWD)

SHERMAN-DENISON

Bonham
Eisenhower
*Eisenhower Birthplace
Fort Richardson
*Governor Hogg Shrine
Lake Arrowhead
Lake Lewisville
Lake Mineral Wells
*Sam Bell Maxey House

TEMPLE

Bastrop
Buescher
Cleburne
*Confederate Reunion Grounds
Dinosaur Valley
Fairfield Lake
Fort Parker
Inks Lake
Lake Somerville
Lake Whitney
Lockhart
*Longhorn Cavern
McKinney Falls
Meridian
Mother Neff
*Old Fort Parker
Pedernales Falls

TEXARKANA

Atlanta
Caddo Lake
Daingerfield
*Governor Hogg Shrine
*Martin Creek
*Sam Bell Maxey House
*Starr Mansion
Tyler

TYLER-LONGVIEW-MARSHALL

Atlanta
Bonham
Caddo Lake
*Caddoan Mounds
Cassells/Boykin
*Confederate Reunion Grounds
Fort Parker
Daingerfield
*Governor Hogg Shrine
*Jim Hogg
*Martin Creek
Mission Tejas
*Old Fort Parker
Rusk/Palestine
(no overnight facilities at Palestine)
*Sam Bell Maxey House
*Starr Mansion
*Texas State Railroad
Tyler

VICTORIA

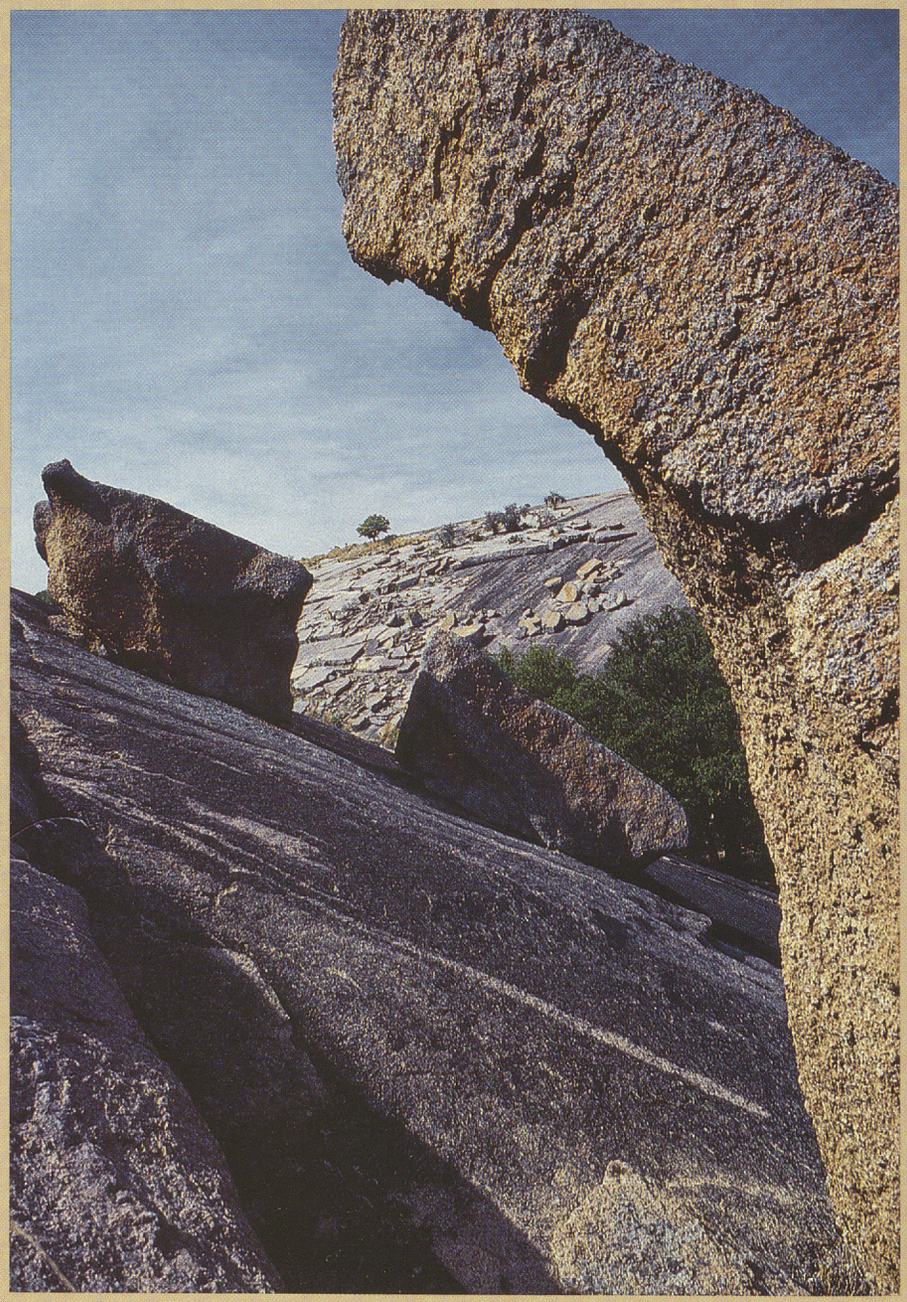
Bastrop
Brazos Bend
Buescher
*Copano Bay Fishing Pier
*Fannin Battleground
Goliad
Goose Island
Lake Corpus Christi
Lake Texana
Lipantilan
(not operated by TPWD)
Lockhart
Matagorda Island
(access by boat only)
*Monument Hill/Kreische Brewery
Palmetto
*Port Lavaca Fishing Pier
Stephen F. Austin
*Varner Hogg Plantation

WACO

*Acton
Cleburne
*Confederate Reunion Grounds
*Dinosaur Valley
*Fairfield Lake
Fort Parker
Lake Whitney
Meridian
Mother Neff
*Old Fort Parker

WICHITA FALLS

Copper Breaks
Fort Griffin
Fort Richardson
Lake Arrowhead
Lake Mineral Wells
Possum Kingdom



Mission Tejas and Enchanted Rock illustrate the scenic contrasts of state parks.

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915 572-3204 **ABILENE** Route 1, Tuscola 79562
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214 465-8908 **EISENHOWER BIRTHPLACE** 208 East Day, Denison 75020
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512 645-2020 **FANNIN BATTLEGROUND** Fannin 77960
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915 396-2358 **FORT MCKAVETT** P.O. Box 867, Fort McKavett 76841
817 562-5751 **FORT PARKER** Route 3, Box 95, Mexia 76667
817 567-3506 **FORT RICHARDSON** P.O. Box 4, Jacksboro 76056
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512 232-6132 **GARNER** Concan 78838
512 645-3405 **GOLIAD** P.O. Box 727, Goliad 77963
512 729-2858 **GOOSE ISLAND** Star Route 1, Box 105, Rockport 78382
214 763-2701 **GOVERNOR HOGG SHRINE** Route 3, Park Road 45, Quitman 75783
512 438-2656 **GUADALUPE RIVER** Route 4, Box 2087, Bulverde 78163
512 796-4413 **HILL COUNTRY** Route 1, Box 601, Bandera 78003
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512 793-2223 **INKS LAKE** Rt. 2, Box 31, Burnet 78611
214 683-4850 **JIM HOGG** Route 2, Box 29, Rusk 75785
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409 365-2201 **LAKE LIVINGSTON** Route 9, Box 1300, Livingston 77351
817 328-1171 **LAKE MINERAL WELLS** Route 4, Box 39C, Mineral Wells 76067
409 535-7763 **LAKE SOMERVILLE** (Birch Creek) Route One, Box 499, Somerville 77879

Lost Maples by Mike Herring

409 289-2392 **LAKE SOMERVILLE** (Nails Creek) Route 1, Box 61C, Ledbetter 78946
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817 694-3793 **LAKE WHITNEY** Box 1175, Whitney 76692
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409 345-4656 **VARNER-HOGG** Box 696, West Columbia 77486
409 878-2214 **WASHINGTON-ON-THE-BRAZOS** Box 305, Washington 77880

Paul Montgomery

Paul Montgomery

Paul Montgomery

Paul Montgomery

fliers on the pond

by Paul M. Montgomery

Of the infinite number of insects that make the pond their home, none are more spectacular or interesting than the dragonflies, damselflies and mayflies. These beautifully colored fliers, many of which are remarkably agile, are the most primitive aquatic insects alive today.

These fliers on the pond also have been found as fossils as far back as Paleozoic times. Near Coventry, France, in limestone sediments more than 300 million years old, dragonflies with wingspans of up to two feet have been preserved. And in Kansas, a fossil dragonfly was discovered with a wingspan of 30 inches. These large insects, which flew at estimated speeds of up to 60 miles per hour, would dwarf today's four- to seven-inch species. In their time, these fossil dragonflies probably were the rulers of the air.

Even the ephemeral soft-bodied mayfly has an ancient history. A specimen with a wingspan of six inches was recovered in rocks 250 million years old. This is gigantic when one considers that present-day Texas mayflies measure scarcely one inch or less.

Although these remote ancestors of today's insects probably were aquatic in origin, it is now believed that they and all other insect groups eventually left the primordial waters and developed air-breathing respiratory systems for survival on land. Dragonflies and mayflies can be described as land dwellers because they breathe oxygen, but they also represent a very small group of insects that have returned successfully to the aquatic environment for at least a part of their lives.

After hatching from eggs laid on the water, the larvae of these insects require from one to four years to develop, and during this time, they breathe with an elaborate set of tracheal gills. But even at this stage of their lives it is safe to say that they are not completely aquatic. Under the surface, the larvae live on borrowed time and must return to land as adults to mate and begin the life cycle over again.

While the life cycles of immature dragonflies and mayflies are similar in many ways, it is only after they crawl from the surface of the pond to become adults that we can recognize and enjoy their beautiful structural differences. To the casual observer, a mature dragonfly may seem formidable, but closer inspection reveals a harmless and fascinating insect.

Among the fliers found near ponds such as this are (left to right) the brown-spotted yellow-wing, blue damselfly and brown drake mayfly.

An enormous compound eye filled with clouded reflections covers most of the head surface and gives the dragonfly both monocular and binocular vision, as well as vision up, down and to the side. The dragonfly's vision is acutely sensitive to movement and is thought to be mosaic, as the sum of images are seen by thousands of tiny subunits or cameras that make up the insect's eye.

The two pairs of narrow, transparent wings reflect sunlight and beat alternately when the dragonfly is in motion. In some species, the wings are held outstretched while the insect is in flight and at rest. A resting damselfly holds its wings vertically above its body. Dragonflies' wings are powerful and are attached to a muscular upper body (thorax) while the abdomen or "tail" is slender, often brightly colored and segmented. Six spiny legs used for catching and holding prey are attached beneath the thorax.

The mouthparts of a dragonfly consist of two freely movable paired jaws filled with crushing, needlelike teeth. They are capable of chewing up prey (hide and all) into a fine hash, making the dragonfly an efficient winged predator. This body plan, above that of any other insect, has adapted the dragonfly for life on the wing. As a result, many species today possess great speed, acrobatic skills and the remarkable ability to hover almost effortlessly for hours.

Mayflies, with their thin and feeble wings, are no match for the powerfully built fliers with whom they share the pond. Many mayflies supplement the diet of dragonflies and damselflies. Emerging on summer evenings, the adult mayfly is a delicate, soft-bodied flier easily recognized by its two or three long tails which sweep out from the posterior of the insect in a long curving arc. Two pairs of glistening wings are held vertically over the body at rest. But these wings are unequal in size and, unlike those of the dragonfly, the mayfly's wings couple together when the insect is in flight.

Mayflies also have compound eyes and short, bristlelike antennae. The eyes are located on the side or the top of the head. They are thought to aid in the location of a female. Adult mayflies take no food after emerging from the pond since the mouthparts are useless or absent. Instead, their digestive system has been modified to act as a balloon. As it fills with air, it gives the insect additional lift to supplement the feeble wings.

During their lifetime, both dragonflies and mayflies mate on the wing and the females deposit their eggs on the surface of the pond or in the tissues of submerged plants. But even at this critical phase of their lives there are some obvious differences. Mature dragonflies can live from one to five months. The male often accompanies the female during this period as she searches for a suitable place to lay her eggs. Holding the back of her head with claspers located near the tip of his

Paul Montgomery

Powerful wings make the bluebell dragonfly (right) a skillful acrobat. The green darner (top and bottom, emerging from its chrysalis) is one of the largest dragonflies. The short-stalked damselfly (middle) also is known as the dancer.

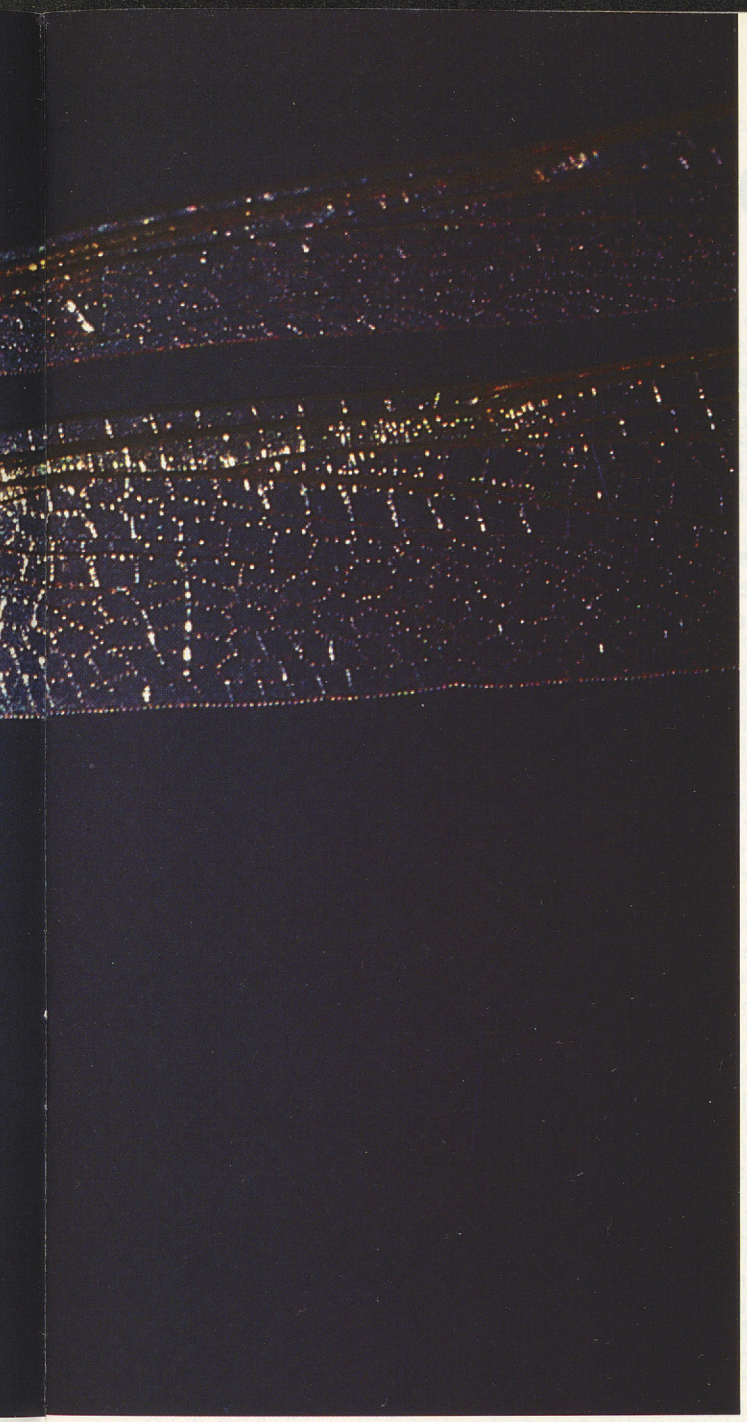
Gwen Fidler

Paul Montgomery

Gwen Fidler

Paul Montgomery

Paul Montgomery



mery

Paul Montgomery

Dragonflies are powerful fliers, despite narrow, transparent wings such as those of the common skimmer (left). Bottom left to right: golden mayfly, which many artificial lures resemble; climber dragonfly; red skimmer.

abdomen, the male either descends to the water with the female or hovers over her until she finds a spot to her liking.

However, mature mayflies live only for a few hours, a day at most. At maturity, male mayflies can be seen drifting through the air in great swarms searching for females. But once the mating ritual is complete, the isolated female scatters her eggs on the water and then, along with the male, falls to the surface of the pond and dies.

In every phase of their lives, dragonflies and mayflies contribute to the health of the pond environment and are important to a host of creatures that depend upon them for survival. In the larval stage, these insects devour bits of algae and other plant materials, smaller aquatic insects, tadpoles, small fish and even their own kind. As they grow, they become a primary food source for fish as well as turtles, frogs, ducks and other aquatic insects.

Adult dragonflies are effective predators on the wing, and by consuming large quantities of mosquitoes, midges and gnats, they and mayflies become another food source for fish and birds. Even the fisherman benefits from these important insects; many artificial lures closely resemble both larval and adult forms of dragonflies and mayflies.

Although all freshwater ponds in Texas provide the opportunity of observing these beautiful insects, they also are common around marshes, streams and lakes throughout the state. Short-lived mayflies usually cling to shoreline vegetation, while dragonflies tend to glide or flutter from one perch to another. A few are even inactive and seem content to sit on protruding rocks or twigs for long periods.

Though common in aquatic habitats, these fliers are by no means restricted to them. Dragonflies frequently search for prey in meadows, vacant lots and gardens of suburban neighborhoods, even in locations that are many miles from a pond or stream. They also may be found in pastures around cattle and horses and are particularly fond of the horseflies and mosquitoes that often swarm around these grazing animals. Mayflies, while they consume no insects, also can be found in these locales, as wind currents often transport their delicate bodies miles from where they were born.

The wings of dragonflies, damselflies and mayflies flash in the sunlight over the pond as they continue with life cycles generated millions of years ago. Fascinating both in color and design, these insects are an important link in the aquatic food chain of the pond, while they continue to intrigue us with the mastery of their flight and the sheer magnitude of their numbers.

From their extinct ancestors who at one time were rulers of the air, to the smaller forms we observe today, these fliers on the pond remain the most distinctive and successful of all aquatic insects. * *

Outdoor Roundup

Glen Mills

Record Participation, Harvest Seen On State Hunts

Public hunts on Texas Parks and Wildlife Department wildlife management areas (WMAs) continued to grow in both participation and harvest during the 1986-87 hunting season.

Herb Kothmann, public hunt coordinator, said the gun deer hunts conducted on 20 WMAs were especially successful. "We had 4,643 hunters reporting to hunt, which was a 22 percent increase over the previous year's total of 3,805 hunters," Kothmann said. "Also, we were able to conduct gun deer hunts on 270,000 acres of land during 1986, compared to 213,000 in 1985."

Gun hunters harvested 1,647 deer during the hunts, a 58 percent increase over the 1,045 taken in 1985.

The total deer harvest includes 161 antlerless deer taken during a special antlerless-only hunt on the Tomas Ranch in Duval County, which was the second year that public hunting was administered by the department on a private ranch.

Archery deer hunts were held on a more limited scale than gun hunts, but the number of archery hunters increased from 407 in 1985 to 719 in 1986, while the harvest jumped from eight deer to 40.

A new standby system installed for the 1986-87 hunts allowed participation by an extra 815 hunters, taking the place of individuals who were drawn to hunt but failed to accept the hunt being offered. An additional 455 standby applicants found no hunt vacancy available, Kothmann said.

Kothmann noted that he was especially pleased with the deer hunts on the three management areas leased from the U.S. Forest Service on national forest areas in East Texas. Hunters took a total of 127 deer on the Alabama Creek, Bannister and Moore Plantation areas, which is a significant increase over the 46 taken during 1985.

In addition to deer, public hunts on WMAs were conducted for chachalaca, javelina, quail, turkey (spring gobbler only), alligators, pheasant, pronghorn antelope, feral hog, waterfowl and mourning and white-winged doves.

The big-game hunts on state WMAs generally are held on a special permit basis, and prospective hunters are required to submit applications for computer drawing to select participants. Many other opportunities, including most of the small game species, are available on a registration basis.

Permit fees collected during the 1986-87 public hunts totaled in excess of $310,000, which served to defray the cost of administering the hunts.

Prospective hunters should inquire about 1987-88 public hunt opportunities beginning July 1, Kothmann said.

Texas Endangered Species List Undergoes Revisions

The Texas Parks and Wildlife Department has announced that six animals will be classified for the first time as endangered in Texas, and 21 species will be added to the threatened list.

Dr. Bruce Thompson, nongame and endangered species program leader, said the classifications, effective March 1, resulted from extensive conservation review.

Thompson said almost 300 species and subspecies of amphibians, birds, fish, mammals and reptiles have been reviewed since 1983. The review assessed abundance, distribution, habitat conditions and human uses that have impact on conservation of the species.

The new rules contain strict prohibition against taking, possession, sale and transport of listed species, including those newly classified. However, Thompson pointed out there are provisions in the regulations for anyone who legally possesses these newly classified animals to declare them by July 15, 1987, to department officials and receive a special authorization for future possession. Information may be obtained from the Permits Branch, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744.

Although 27 species were added to those either threatened or endangered, the review also found 26 species which no longer need to be classified. A total of 99 species previously listed as threatened or endangered remained on the list. In all, the new regulations identify 126 species and subspecies of endangered and threatened Texas animals.

Copies of the new regulations may be obtained by writing the Nongame and Endangered Species Program.

Thompson also reminds anyone interested in helping sensitive species that a Special Nongame and Endangered Species Conservation Fund has been established for that purpose. Contributions to the fund as well as purchase of nongame stamps and limited-edition artwork all accrue to that fund and ultimately will aid a variety of species.

The following are species added to the endangered list, effective March 1, 1987:

MAMMALS: Black bear, coati.

REPTILES: Western smooth green snake.

AMPHIBIANS: Blanco blind salamander.

FISH: Phantom shiner, blackfin goby.

The following species will be added to the threatened list:

MAMMALS: Coues' rice rat.

BIRDS: Rose-throated becard, tropical parula, piping plover, Bachman's sparrow, Botteri's sparrow, sooty tern, northern beardless-tyrannulet and black-capped vireo.

REPTILES: Alligator snapping turtle, timber rattlesnake, Big Bend blackhead snake, northern scarlet snake and Texas scarlet snake.

AMPHIBIANS: Sheep frog.

FISH: Creek chubsucker, blackside darter, river goby, opossum pipefish, Pecos pupfish and bluehead shiner.

The following species were deleted from the endangered species list:

MAMMALS: Bighorn sheep.

BIRDS: Bachman's warbler.

The following species were deleted from the threatened species list:

MAMMALS: Southeastern bat, bridled dolphin.

BIRDS: Osprey, coastal least tern

REPTILES: Big Bend canyon lizard, Presidio canyon lizard, Trans-Pecos copperhead, gray-banded kingsnake, rock rattlesnake, Big Bend milk snake, central plains milk snake, Louisiana milk snake, Mexican milk snake, Baird's rat snake and Trans-Pecos rat snake.

AMPHIBIANS: Mexican cliff frog, Rio Grande frog, giant toad, fern bank salamander, mole salamander and Valdina Farms salamander.

FISH: River darter, western sand darter and Kiamichi shiner.

June In . . .

TEXAS PARKS & WILDLIFE

Forty-three years ago next month, the *USS Texas* steamed toward the coast of France as part of the historic Omaha Beach landing. Today the *Texas*, now undergoing restoration, is part of the Texas State Park System. In the June issue, we'll relive D-Day aboard the *Texas*. If you come across a newborn fawn, alone and seemingly abandoned, the best thing you can do is not disturb it. We'll explain why next month. Also in the June issue are stories on protecting yourself from sun damage this summer; Martin Dies State Park; the Concho River snake; young birds of prey and a Young Naturalist feature on butterfly wings.

TPWD Announces List Of Endangered And Threatened Plants

The Texas Parks and Wildlife Department has listed 14 species of plants found in Texas as "endangered" and three species as "threatened."

Susan Rieff, director of the department's Resource Protection Division, said the plants on the state list are also designated on the U.S. Fish & Wildlife Service's federal list.

State and federal regulations prohibit the collection, transport or sale of endangered, threatened or protected plants without a permit issued by the TPWD.

Texas' endangered plants are Texas wild rice, Navasota ladies'-tresses, Texas poppy-mallow, Tobusch fishhook cactus, Nellie cory cactus, Sneed pincushion cactus, Lloyd's hedgehog cactus, black lace cactus, Davis' green pitaya, ashy dogweed, Johnston's frankenia, Texas snowbells, slender rush-pea and Texas bitterweed.

Plants classified as threatened are bunched cory cactus, Lloyd's Mariposa cactus and McKittrick pennyroyal.

Gibbons Creek Largemouth Populations Strong

An electroshocking survey by Texas Parks and Wildlife Department biologists indicates that Gibbons Creek Reservoir near Bryan is supporting high populations of largemouth bass.

Biologist Ken Kurzawski said the special slot bag limit of 15 to 21 inches that has been in effect on the 2,400-acre lake since it opened to fishing two years ago has helped maintain unusually large numbers of large bass. "A total of 86 bass collected were in the slot, and they represented 44 percent of all bass collected," said Kurzawski. Nine fish were longer than 21 inches and the largest weighed 9.47 pounds, he said. Also, 101 bass shorter than 14 inches were collected, indicating good reproduction, he said.

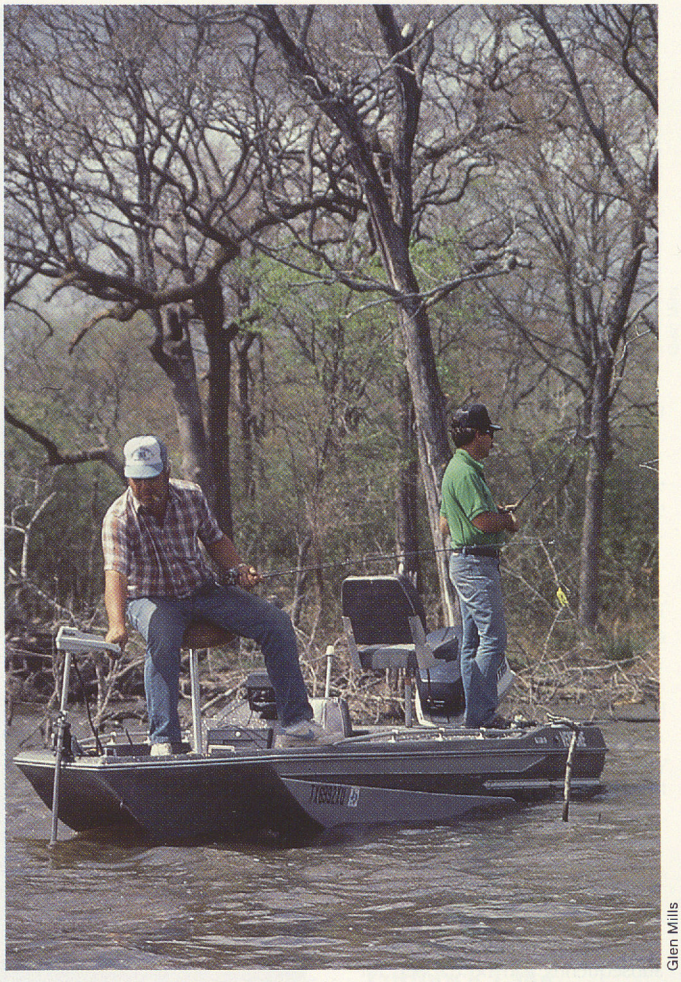
On Gibbons Creek, only bass shorter than 15 inches or longer than 21 inches may be retained, and there is a daily limit of three largemouths.

Kurzawski said most of the bass collected during the early-March survey were in shallow water of five feet or less near the shoreline. "The structure of the bass population indicates a promising future as more bass exceed 21 inches," the biologist said. "Most of the largest bass are from the stocking of Florida largemouths during 1981 when the lake was being impounded. Other year-classes have been produced by natural reproduction, and these fish are growing well."

Phil Durocher, inland fisheries management coordinator, called the survey results "almost unbelievable" in terms of the number of quality-sized fish. "This was the most bass over 21 inches ever collected on Gibbons Creek, and it indicates the lake is one of the best producers of bass of any lake in the state."

He added that the 196 bass collected in three hours is almost unheard of for a survey of that kind.

As a bonus, the survey also turned up good numbers of white crappie ranging from 10 to 13 inches in length.



Glen Mills

Gibbons Creek is located west of Bryan off State Highway 30. It is owned by the Texas Municipal Power Agency, which charges an access fee.

Nontoxic Shotshells Now Available In 16-Gauge

Waterfowl hunters who packed away their 16-gauge shotguns when steel shot requirements went into effect in some regions can unpack them now.

Texas Parks and Wildlife Department officials said Federal Cartridge Co. has indicated it will introduce two 16-gauge magnum loads in shot sizes 2 and 4 beginning in July, which should give waterfowlers time to shoot test patterns before hunting seasons begin.

Ammunition company officials stress that shooting test rounds is important with nontoxic steel shells. Since steel shot is lighter than lead, it is recommended to use larger shot sizes in steel.

Experts also recommend using a more open choke with steel than with lead shot.

Federal officials said the 16-gauge cartridges were developed to meet the increased demand for steel shot resulting from increasing areas where nontoxic shot will be required for waterfowl hunting. Use of nontoxic shot is an effort to reduce lead poisoning among waterfowl which pick up and ingest toxic lead pellets, mistaking them for food or grit.

Steel shot shells currently are available in 10, 12 and 20 gauges. Barrel scoring problems associated with early steel shot has been corrected, the manufacturers say.

Outdoor Roundup

Eastern Turkey Stocking Program Sets Record

Restoration of wild turkeys in East Texas has advanced significantly this year, according to the Texas Parks and Wildlife Department.

Don Wilson, turkey program leader, said support from the National and Texas chapters of the Wild Turkey Federation made possible the importation of 45 eastern-strain turkeys from the Southeastern United States. The birds were released at two sites in Trinity County and one in Wood County.

"Obtaining these birds represents a tremendous breakthrough for the restoration program, and one which would not have been possible without help from the Wild Turkey Federation and interested individuals," Wilson said.

Eastern turkeys once ranged over most of East Texas, but were virtually eliminated by the early part of this century. Prior restoration efforts have established populations sufficient for a spring hunting season in portions of seven East Texas counties.

Wilson said the immediate goal of the program is to establish populations where broodstock subsequently can be trapped for further restoration efforts. The long range goal is to establish viable turkey populations throughout their former range in East Texas.

Leroy Williamson

All-time Record Deer Harvest Achieved In 1986

For the third consecutive year, hunters in Texas harvested a record number of white-tailed deer.

Texas Parks and Wildlife Department officials estimated that 445,000 whitetails were taken during the 58-day hunting season that ended January 4, an all-time high and an increase of 16 percent over the 1985-86 season total of 383,500.

A number of all-time highs were achieved, including largest overall harvest, highest buck harvest, highest antlerless harvest, largest number of hunters in the field, highest hunter success rate and the highest percentage of antlerless deer in the total harvest.

Horace Gore, white-tailed deer program leader, said the estimated deer population last fall of some 4.2 million deer was a prime cause for the high harvest. "Even with the record harvest, hunters still only took slightly more than 10 percent of the herd," Gore said.

Gore said there were several factors contributing to the excellent 1986 deer season. They are:.

—High deer populations in most of the traditional deer range, especially the Edwards Plateau, South Texas and East Texas.

—More awareness among hunters and landowners of the importance of keeping deer numbers under control, especially the antlerless segment of the herd.

—A long season which opened early (November 8), giving some hunters a chance to hunt when the rut was still underway in East Texas, the Edwards Plateau and other regions.

—The addition of an extra antlerless deer tag on the hunting license two years ago, which allows hunters to take up to four antlerless deer if they hunt in counties where sufficient permits or tags are available.

—More counties added to the list of "either sex" counties, wherein unlimited numbers of landowner-issued tags are distributed rather than using antlerless deer hunting permits based on estimated deer populations.

—Issuance of antlerless deer hunting permits in more counties during the 1986 season.

—The department's Deer Hunting Lease Registry program may have contributed, as an estimated 3,800 hunters found leases through the service.

The antlered harvest of almost 281,000 was the highest ever, up 11 percent over 1985. Officials were pleased with the antlerless harvest of 164,200, which was a 27 percent increase over 1985 and 34,000 higher than ever recorded before.

Also, the percentage of antlerless deer in the overall harvest increased significantly, estimated at 37 percent of the total.

The estimated 563,300 hunters in the field set an all-time record with a harvest rate of 57.5 percent, which is the percentage of hunters taking at least one deer. Hunters also spent more time in the field during 1986, averaging eight days which also is a record. The total hunter-days was over 4.5 million, up five percent from the year before.

Hunting, Fishing Regulations To Be Adopted May 7

The Texas Parks and Wildlife Commission will meet in Austin May 7 to consider proposed hunting and fishing regulation changes. Testimony from public hearings held across the state during March will be heard before any changes are adopted, with new regulations taking effect September 1, 1987.

Among the proposals to be considered is the establishment of an either-sex system of antlerless deer harvest for the Edwards Plateau, South Texas and most of the Trans-Pecos.

The either-sex system in effect eliminates the requirement that hunters obtain an antlerless deer hunting permit or tag from the landowner. Officials stress that landowners still have the right to dictate what hunters may take from their property.

The either-sex system requires a hunter to place the appropriate tag from his hunting license on any deer taken. It would apply only to white-tailed deer. The antlerless permit system will continue for

taking antlerless mule deer and for whitetails in counties not having an either-sex system.

Charles Allen, director of the department's Wildlife Division, told the commission in March that establishment of either-sex hunting in 80 counties will save the agency approximately $230,000 during the upcoming hunting season. "This change would save the department money and manpower which could be used more effectively elsewhere," Allen said. "It also would make it easier for hunters and landowners to harvest more antlerless deer in those areas where the herds are chronically overpopulated."

Allen said the antlerless permit system would be continued in areas of limited deer habitat, especially where hunting pressure is high. Antlerless permits are issued after census surveys determine approximate deer populations, and permit issuance is based on those surveys.

In another deer hunting proposal, hunters would be required to retain the head of any deer taken until the carcass arrives at its final destination. The head need not be attached to the rest of the carcass, however. Officials said the proposed change would help game wardens assure that hunters use the proper tags on deer.

Where the hunting of deer with dogs is legal, the season is proposed to be December 10, 1987, through January 3, 1988. The general season for white-tailed deer is November 14-January 3.

Other proposed hunting regulation changes include establishing a pronghorn antelope season in Tom Green County and setting up rules to allow live-trapping of nuisance squirrels.

Another proposal would extend the state's spring turkey gobbler hunting season from its present 16 days to a 23-day season beginning in 1988. Officials said the extended season would have no biological impact on turkey populations, and would offer additional hunting opportunity. It also might help hunters get into the field during the period of peak gobbling activity, which varies from year to year. Under the proposal, the season would open the Saturday nearest April 1, which in 1988 would be April 2, and continue for 23 consecutive days. This would allow hunting on four weekends.

The department staff also proposed to open the spring turkey season in Colorado and Lavaca Counties because of expanding turkey populations in those areas.

Other upland game proposals are to allow pheasant hunting for the first time in Crosby and Lubbock Counties; close the prairie chicken season in Collingsworth, Donley, Gray and Roberts Counties; and eliminate check stations but require a free permit to hunt prairie chickens.

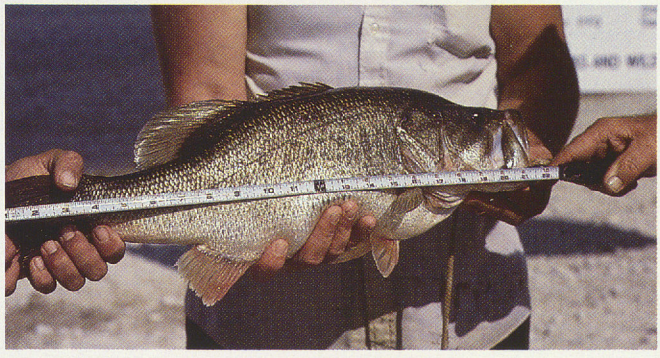
In freshwater fishing regulations, the statewide bass and crappie daily bag, possession and size limits are proposed for Lake Conroe in Montgomery and Walker Counties. This would be a limit of five largemouth, smallmouth and spotted bass in the aggregate, and possession limit of 10 in the aggregate. Only largemouth bass longer than 14 inches would be legal for retention, and the minimum length limit for smallmouths and spotted bass would be 10 inches. The crappie limit would be 25 per day, 50 in possession, with no minimum length limit.

Other proposed freshwater fishing changes include a 16-inch minimum length limit for walleyes and prohibition of trotlines in Pinkston Reservoir in Shelby County.

Saltwater regulation changes proposed include establishment of bag and length limits for striped bass and snook caught in salt water. If adopted, the striped bass bag and possession limit would be the same as the statewide limit in fresh water, five per day, 10 in possession. The saltwater regulation would establish a minimum length limit of 18 inches.

The proposal would set a bag limit of five snook per day and possession limit of 10, with an 18-inch minimum length limit and 30-inch maximum length limit.

Another proposed change would remove an exception that currently allows fishermen on headboats (party boats) to be exempted from red snapper minimum size limits. The department also proposed to limit crab traps to no more than 18 cubic feet in size.



Glen Mills

'Paper' Bass Tournaments Help Conserve Fish

An increasing number of bass clubs across the state are adopting rules allowing the immediate release of bass instead of bringing the catch to a central weigh-in site.

Texas Parks and Wildlife Department officials said this is made possible by measuring each bass caught and using length/weight conversion tables to determine the weight of the total catch for the day.

Gene Whitworth, fishery research analyst for the department, said the department will provide conversion tables to bass clubs or tournament organizations considering use of this "paper" tournament concept. "Tables can be provided based on statewide length/weight relationships of bass, or in some cases for individual lakes," said Whitworth.

Whitworth noted that paper tournaments are especially appropriate on lakes with "slot" limits. For instance, on some reservoirs anglers can retain only those bass shorter than 15 inches or longer than 21 inches. "That means tournament fishermen often have to release considerable numbers of bass which don't count in the tournament scoring," Whitworth said. "With the measuring system, these fish count the same as fish brought to the weigh-in."

Paper tournaments require honesty in recording the fish's size, and Whitworth said the usual procedure of random drawing for fishing partners helps minimize the possibility of cheating.

The department also encourages tourney organizations to effect live-release programs when fish are brought to a weigh-in site. Paper tournaments and live releases not only help conserve the resource, but also can contribute to the conservation image of tournaments, Whitworth said.

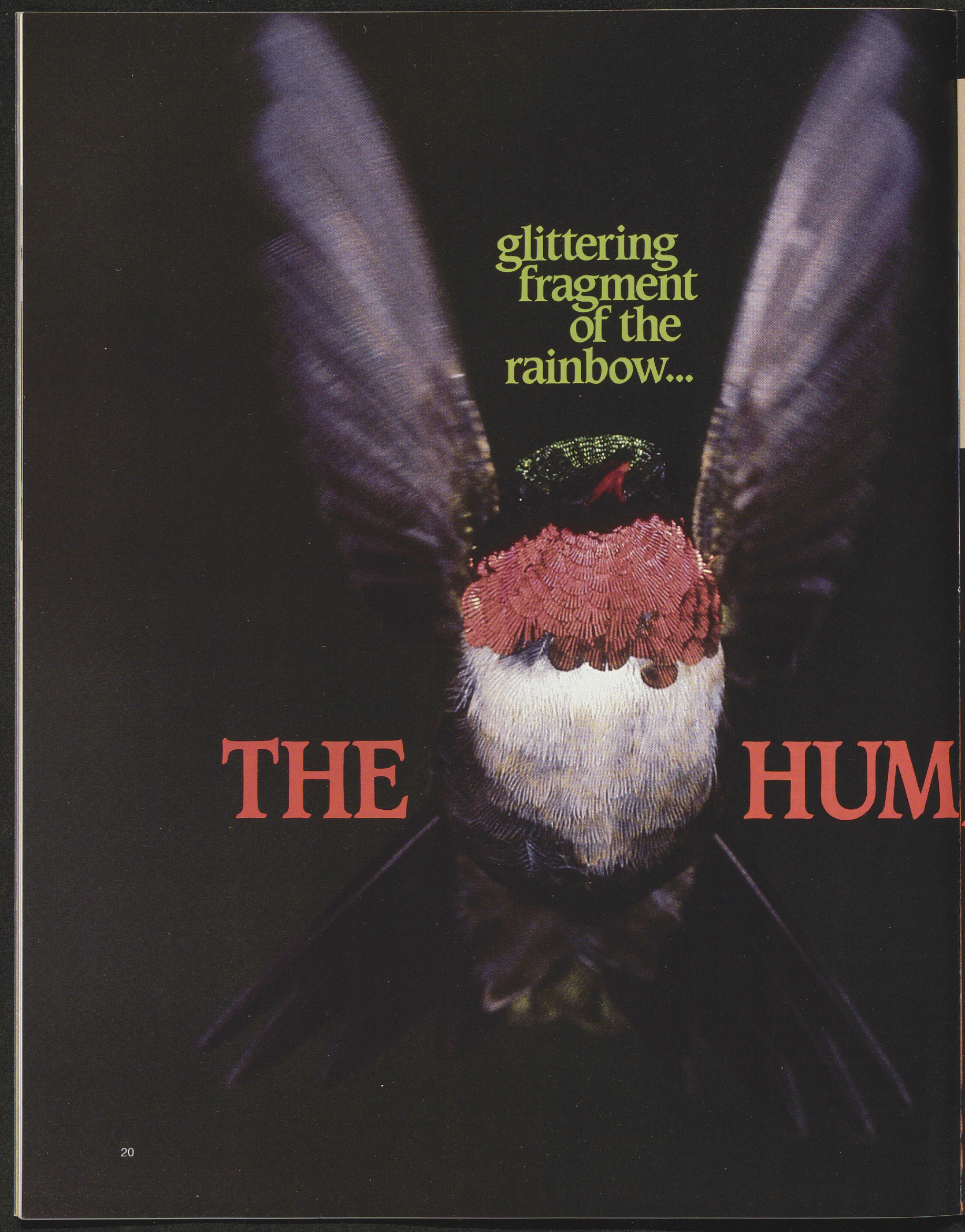
To assist organizations and individuals in better handling of bass, the department is offering a brochure entitled "Catch and Release Fishing." The free publication contains tips on handling and release of bass in tournament situations. It may be obtained by writing the TPWD, 4200 Smith School Road, Austin, Texas 78744, or by calling toll-free 1-800-792-1112.

Stripers Doing Well In Small Lubbock Lake

Striped bass are normally associated with coastal waters or mighty inland reservoirs, but they are proving also to be adaptable to some small lakes.

Buffalo Springs Lake is one of these, according to the Texas Parks and Wildlife Department. The 250-acre lake on the eastern edge of Lubbock has produced surprisingly good populations of stripers, perhaps owing to its good populations of gizzard shad for forage, said biologist Joe Kraai.

Kraai said during January crews set five survey nets in the lake and collected 52 stripers ranging from 3.5 to 12.5 pounds. "Fish that were stocked in 1983 averaged almost 10 pounds, and those stocked in 1984 averaged almost five pounds," said Kraai. "Catching that many striped bass in nets is a good indicator that there are high populations in the lake."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THE
HUMM

The aptly named ruby-throated hummingbird (opposite and left) has a red neck that glitters in the sunlight. The female black-chinned hummingbird (center) lacks the male's distinctive markings. The rufous (below and bottom) is a champion distance flier.

Article and Photos by Luke Wade

MMINGBIRD

For just a few cents a day and very little of your time, you can have one of nature's most remarkable and entertaining shows right in your backyard all summer.

Install a hummingbird feeder outside a window where it can be easily seen and you will be treated to the most unusual aerial displays of all time as the birds congregate to feed. They hover, fly backwards and—using the tail as a help in braking—they come to a dead stop, change direction, accelerate and are gone before you can blink an eye. They can even fly upside down.

Hummingbirds, like the swifts, actually fly with their "hands." The arm is very short with very little flexibility in the elbow and wrist, but the shoulder joint can rotate almost 180 degrees and is extremely flexible. The hand forms almost the entire length of the wing.

Birds that flap their wings generate power for flight only on the down stroke, while the upstroke places the wing into position for the next down stroke. This is like paddling a boat where half the motion is lost returning the paddle for the next power stroke.

The hummingbirds, with their stiff and narrow wings rotating at the shoulder, generate power on both the up and down stroke. This gives them more efficient and smoother flight. When hovering, the wing moves in a figure-eight pattern, analogous to a swimmer treading water.

Hummingbirds' flight requires a vast amount of energy because the one thing they cannot do is soar. This means their wings must be in constant motion to keep the birds airborne.

The activity and chatter hummingbirds create around a feeder is captivating and colorful. Adult male birds

have an area on their throat called a gorget that reflects light at certain angles, causing an iridescence that glitters like gems. Their sparkling colors prompted John James Audubon to call them "a glittering fragment of the rainbow."

The male of each species has its own coloration, which often is used to name the species. The ruby-throated hummingbird is aptly named, as people in the eastern part of the state know. The rare blue-throated hummingbird adds its dash of color to the southwestern part of the state.

Our most abundant hummer, the black-chinned, lives in the central and western parts of the state. It appears to have an all-black head and throat until the throat feathers catch the light and suddenly burst into a beautiful royal purple. The buff-bellied hummingbird in the southern coastal regions displays an emerald green, while the broad-tailed hummingbird of the southwest sports a rose red gorget.

So, if you have a feeder and are enjoying the show, you have been well rewarded for your effort. But there is more.

Hummingbirds derive their energy from the sugar in the feeder and the nectar they gather from flowers, but they get their necessary proteins, fats and minerals from insects. It is estimated that approximately 25 percent of their diet is composed of insects. They can be seen catching insects in the air, on the ground, hunting them around flowers and leaves, on tree trunks and on walls of houses. They also are not above occasionally robbing a spider-web of a small insect.

Since hummingbirds are nectar feeders, many plants depend on them as major pollinators. They prefer a red flower which is tubular and odorless, but will feed on other types of flowers. They have little or no sense of smell.

Hummingbirds are found only in the western hemisphere. They range from the tip of Argentina to Alaska, but are most numerous near the equator. Eight species breed in Texas, 16 in the United States, 51 in Mexico, four in Canada and a total of about 338 in the world.

Hummingbird migrations are something to stir the imagination. It seems impossible that such a small creature, requiring so much energy for flight, can make such long journeys. The rufous hummingbird is one of the cham-

pion long distance fliers, breeding as far north as Alaska and wintering deep in Mexico, some 2,500 miles away. It is often seen in Texas during its fall migration. The ruby-throated crosses the Gulf of Mexico in a nonstop, 500-mile trip.

When it comes to making nests, hummingbirds are masters of camouflage. They build them in such a way that they are almost impossible to see even when you know where to look. The inside is about the diameter of a half-dollar and lined with soft plant fibers, bits of grass and spiderwebs. Lint from a clothes dryer has been suggested as a good nest liner and will be used if placed out near a feeder.

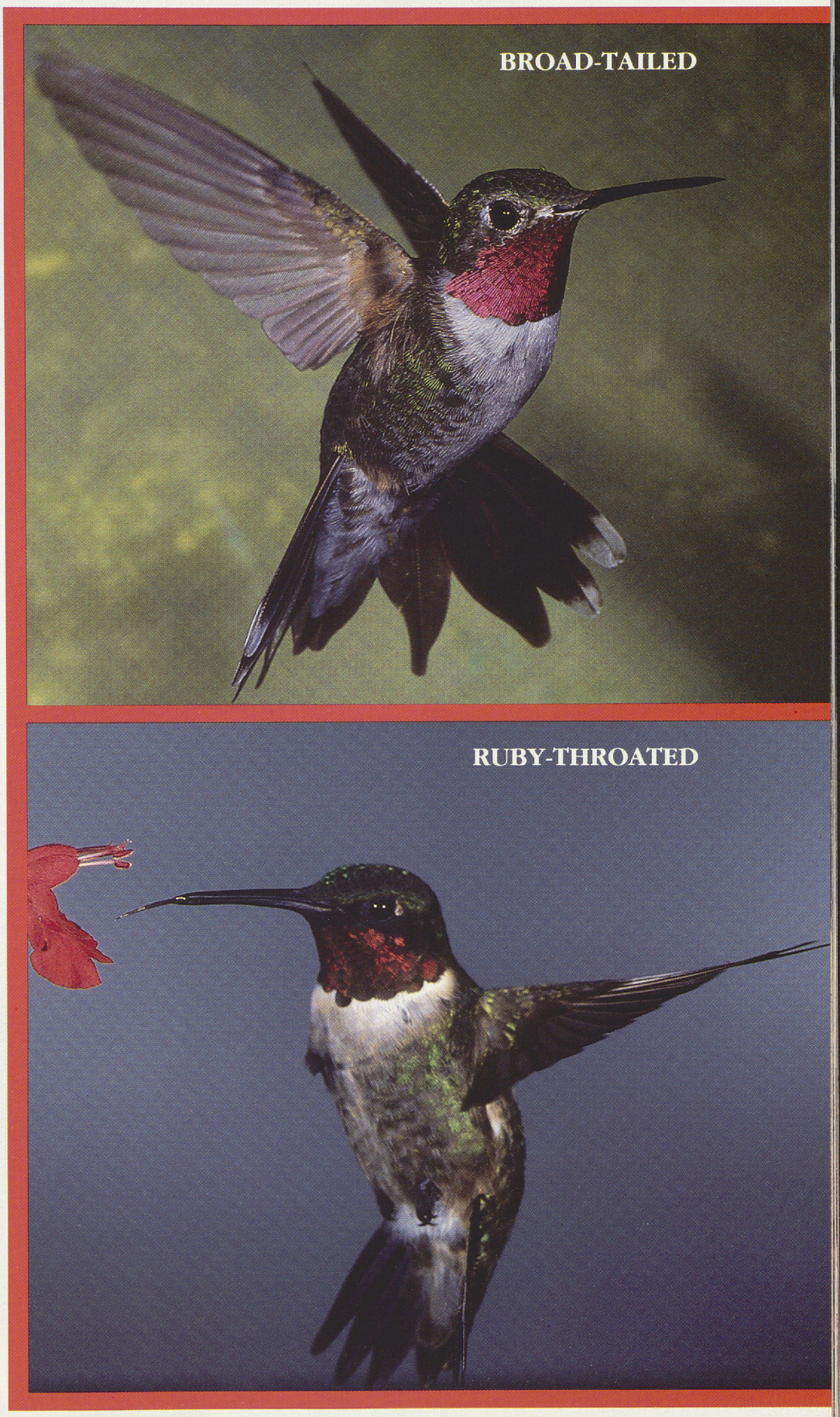
The outside of the nest is made of bits of lichen or material picked from the branches on which it is built. The nest is held together and bound to the branches with spiderwebs in such a way that the texture and colors match the branches exactly.

Once a feeder is in use and the birds have come to depend on it for a large part of their diet, the females will begin nesting in the area. Four nests were observed within 30 yards of a feeder where there was a large population of black-chinned hummers. Many of the young birds could not be raised if the food source were suddenly taken away from the mother, so it is important to keep the feeder filled.

Nectar from most preferred flowers contains 20 to 25 percent sugar, almost all sucrose. For best results with a feeder, this concentration should be approximated. One part sugar in three to five parts of water seems to be most attractive. It is important to change the sugar water every few days if it is not consumed to prevent it from fermenting. The feeder should be scrubbed often to prevent molds from growing.

It is not necessary to add red coloring to the water as long as the feeder itself is red. The best attraction is a constant supply of fresh, clean sugar water.

If you want some company around the house, just hang a feeder to keep things humming all summer. Some folks are sure they have the same birds return from year to year, and they may be right. Last fall a female broad-tailed hummingbird returned to a feeder in Colorado where it had been tagged 10 years earlier. It was at least one year old when tagged, making it 11 years old last fall—a ripe old age for a hummingbird. * *



THE SHIFTING SANDS of WEST TEXAS

Article and Photography
by Laurence Parent

Red dunes, Hueco Mountains

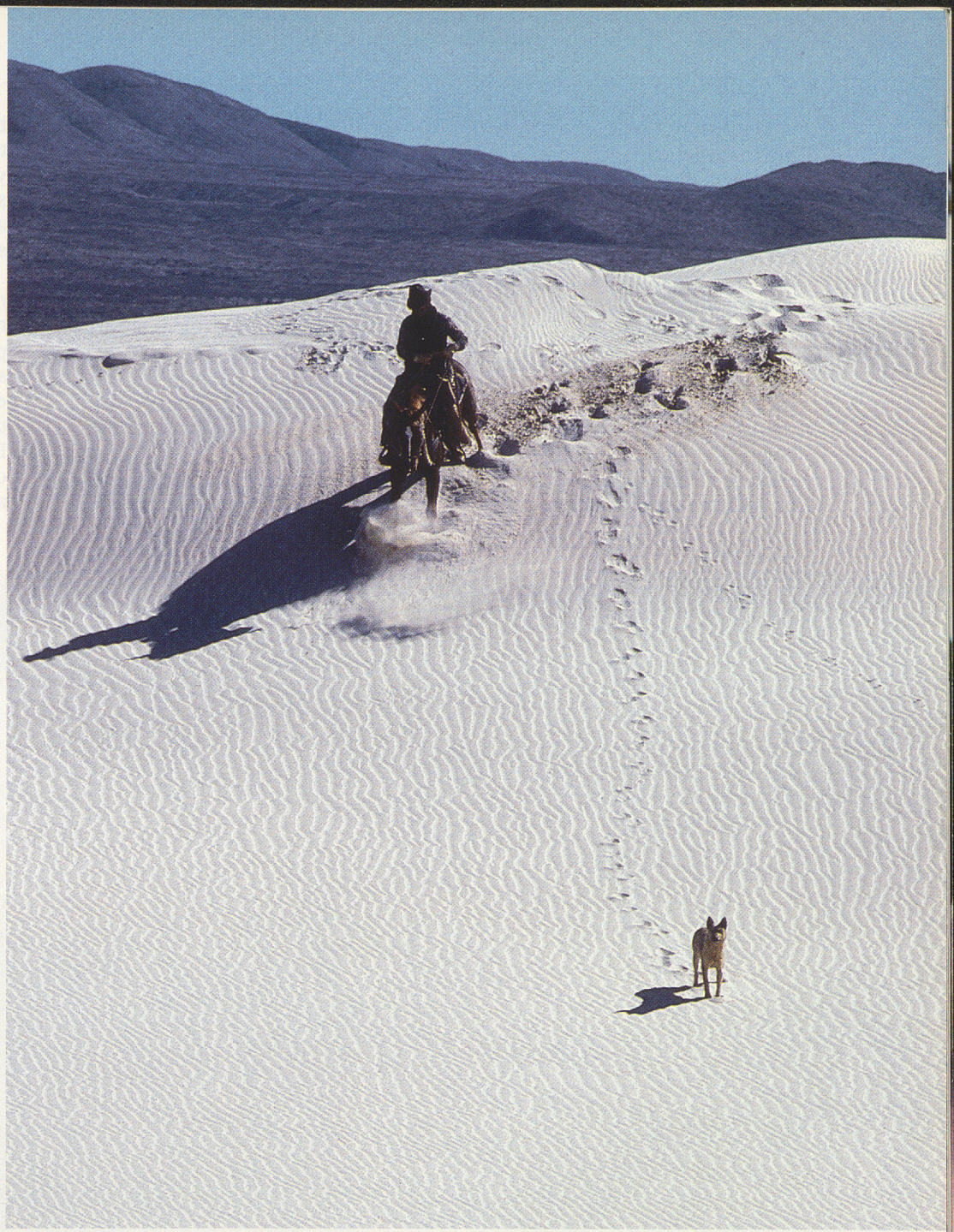
Like bits of the vast Sahara, fields of sand dunes lie tucked away in parts of windswept West Texas. Most well-known is the huge field of dunes in the Permian Basin, a fraction of which is in Monahans Sandhills State Park. Far to the west are red dunes at the foot of the Hueco Mountains, several miles east of El Paso. And perhaps most beautiful are the snow-white gypsum dunes found at the base of the western flanks of the Guadalupe Mountains.

Come morning at the gypsum dunes, the rising sun peeks around the massive limestone face of El Capitan, the prominent bluff at the southern end of the Guadalupe Mountains, and the first rays sparkle off the dunes rising from the desert flats below. A multitude of animal tracks crisscrosses the sand, remnants of a busy night life. The widely spaced tracks of a kit fox overlie a trail of small rodent tracks.

Located in a remote stretch of Chihuahuan Desert between the Guadalupe Mountains and Dell City, the gypsum dunes actually are the southern extremities of White Sands National Monument in southeastern New Mexico.

Most of the 5,000 acres of sand are partially stabilized by vegetation, but some of the tallest dunes are bare, and constantly shift and move with the wind. Plants may slow the dunes temporarily, but eventually the sand moves on, smothering anything in its path.

Two hundred fifty million years ago, the dune material began as dissolved minerals in a shallow sea in the basin west of the Guadalupe



Located in a remote stretch of the Chihuahuan Desert, the gypsum dunes are the southernmost extremity of White Sands National Monument in New Mexico. The Nature Conservancy is working with area ranchers to protect the flora and fauna of these dunes by restricting access. No such protection is afforded the red dunes near El Paso (following page), parts of which bear the scars of vehicle tracks. When winds erase the tracks, the dunes regain some of their beauty, and ripples stand out as stripes of light and shadow at sunset.

Mountains. The minerals, primarily gypsum (hydrous calcium sulfate) and salt (sodium chloride) were left behind when the sea evaporated. Bare salt flats and beds of gypsum clay to the west of the dunes are almost all that remains of the prehistoric sea.

Prevailing westerly winds carry the gypsum crystals up from the salt flats and deposit them where the slope begins rising toward the Guadalupes. Rising many feet above the desert floor, the stark white dunes are visible for miles. Adjoining the white dunes is a field of smaller, stabilized red quartz dunes left behind from the beaches of the ancient sea.

It was more than the area's beauty that caused the Nature Conservancy to become interested in acquiring part of this dune field. The climate is hot and arid and the soil sandy and saline, with its own unique plant community. A number of plants are endemic to the dunes and their environs; that is, they have no known occurrence anywhere else in the world. Two plant species recently discovered here by researchers had never before been described. One, *Lepidospartum burgesii*, is a small shrub, and the other, a member of the genus *Ericameria*, is part of the sunflower family.

Dr. Cliff Crawford of the University of New Mexico found other interesting features. Plant species in the gypsum dunes vary significantly from those in the adjoining areas of desert grassland and stabilized red quartz dunes. Mesquite and creosote bush, common in the red dunes, are scarce in the gypsum dunes, which are only a few yards away. Crawford also determined that insects that subsist on plant litter, rather than carnivores or herbivores, are by far the most common surface-active insects at both dune areas.

One well-adapted animal found at the dunes is the lesser earless lizard, *Holbrookia maculata*. Almost impossible to see when not moving, this grayish-white creature blends perfectly with the gypsum sand. When captured specimens are removed to an environment with more normally colored soil, the lizards darken within a few months until they are indistinguishable from their darker cousins.

Other than the occasional lizard skittering across the sand, or golden eagle or vulture drifting far above, little wildlife is evident during the day. But the stillness misleads. Unseen and unheard, except for the occasional call of a coyote, most animals come out only at night. The endless trails of tracks and a few droppings are the only signs of busy nocturnal wildlife.

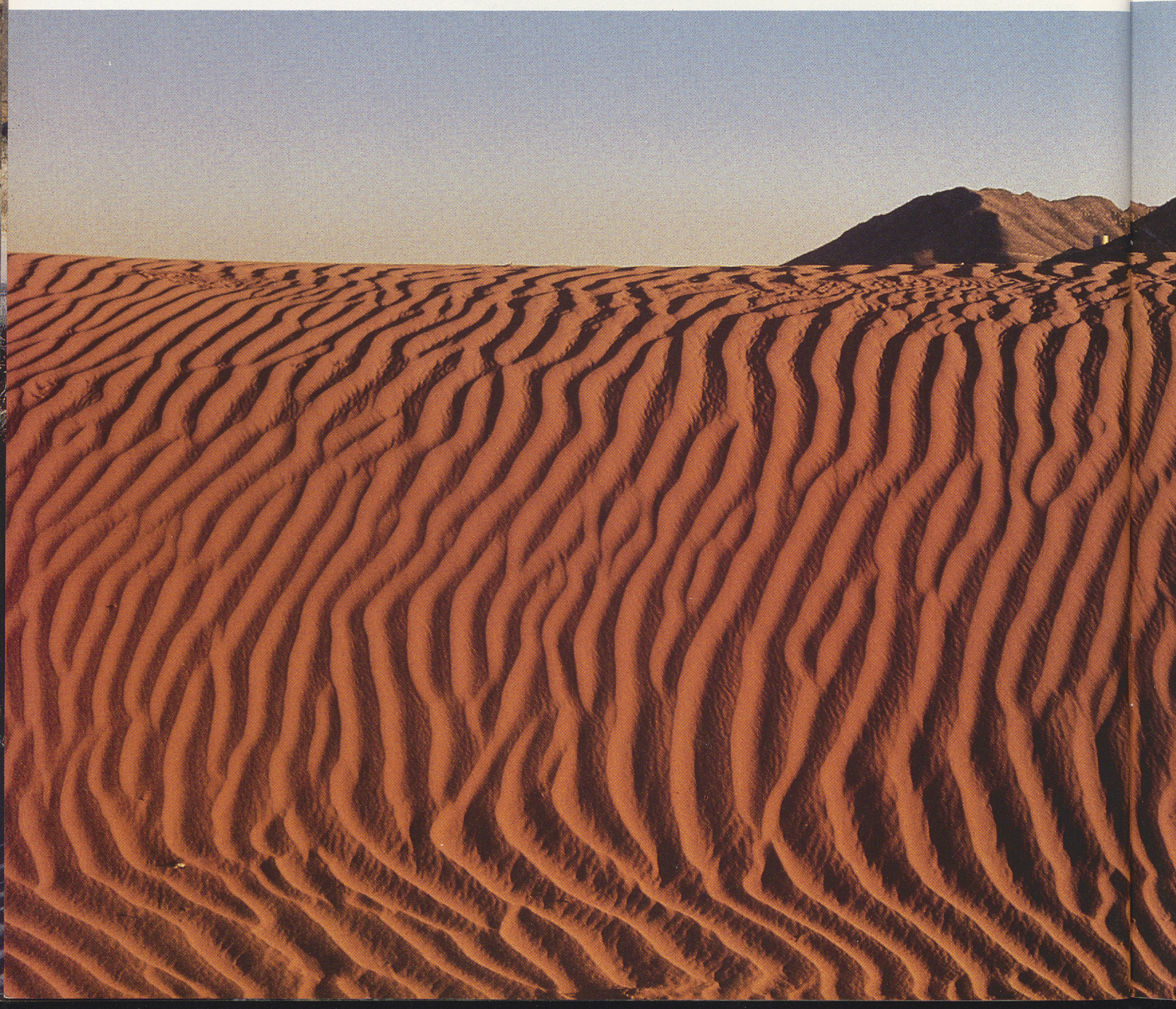
The Nature Conservancy is working in conjunction with area ranchers to protect the delicate flora and fauna of the dunes, by restricting access to the dunes to several tours per year. Inquiries should be directed to the Conservancy office in San Antonio, 512-224-8774.

In contrast to the quiet, pristine beauty of the gypsum dunes, the red dunes near El Paso resound with the roar of off-road vehicles. Located between the Hueco Mountains and the eastern edge of El Paso along U.S. Highway 62/180, the reddish quartz dunes show the effects of their proximity to civilization.

Vehicle tracks crisscross the dunes in an unconscious parody of the animal tracks at the gypsum dunes. Beer cans and candy wrappers catch in the branches of sparse surviving vegetation. Wildlife is scarce.

But not all of the dunes are damaged beyond repair. Areas of dunes farther from the highway are less abused. After a day of heavy wind has erased the vehicle tracks, the dunes regain some of their beauty. In late afternoon, the setting sun paints the dunes a deep reddish-brown and the limestone bluffs of the Hueco Mountains a rich golden yellow. The ripples on the dunes stand out as bold stripes of light and shadow, just before the sun sinks below the horizon.

The El Paso dunes formed relatively recently during the Pleistocene. As the climate became drier, prevailing westerly winds carried the sand from river deposits to the eastern side of the Hueco Bolson, the valley between the Franklin and Hueco Mountains. These river deposits were left by the Rio Grande about a million years ago when it



flowed on the east side of the Franklin Mountains, instead of in its present course on the west side. As the winds were deflected upward by the Hueco Mountains, the sand dropped out, forming dunes.

A few gnarled one-seed junipers survive where the dunes lap over the limestone ledges of the Hueco Mountains' foothills. According to Kevin von Finger, an ecologist with the Fort Bliss Environmental Management Office, the junipers do not occur elsewhere in the area at that elevation except at Hueco Tanks State Park. Because the climate slowly became drier, most junipers died out approximately 8,000 years ago. Apparently, the sand on top of the limestone acts as a good moisture trap. At Hueco Tanks, the large expanses of bare rock concentrate runoff into small areas, allowing plants such as junipers to survive.

Since the El Paso dunes are composed of a normal quartz sand, unlike that of the gypsum dunes, the red dunes do not support as unique a set of flora and fauna. So, although the red dunes are not as interesting biologically as the gypsum dunes, their beauty makes one hope that at least part of them will be preserved. Otherwise, with the rapid growth of El Paso, the dunes may be completely destroyed through abuse.

Unlike the red dunes, a 3,840-acre portion of the Monahans dune field is well-protected. Although many of the dunes are stabilized by vegetation, Monahans Sandhills State Park contains an area with many active dunes. These dunes, some as tall as 70 feet, constantly move and change in shape in response to the wind. This large dune field stretches from southern Crane County far into southeastern New Mexico.

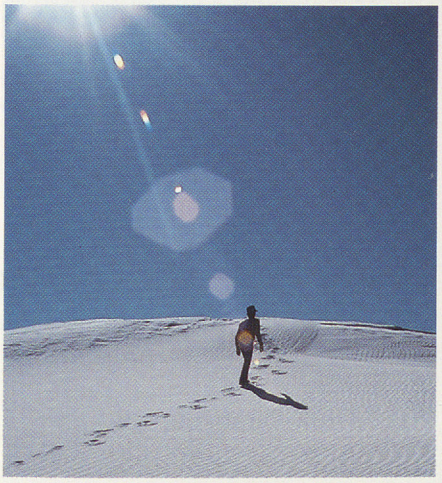
Originally derived from erosion of Triassic sandstone to the west, winds have deposited sand in a narrow belt on the western side of the caprock. The first major dune building period began 25,000 years ago as the climate became drier. On top of this early layer, known as the Judkins Formation, are several later layers, ending with the present dunes, the Monahans Formation.

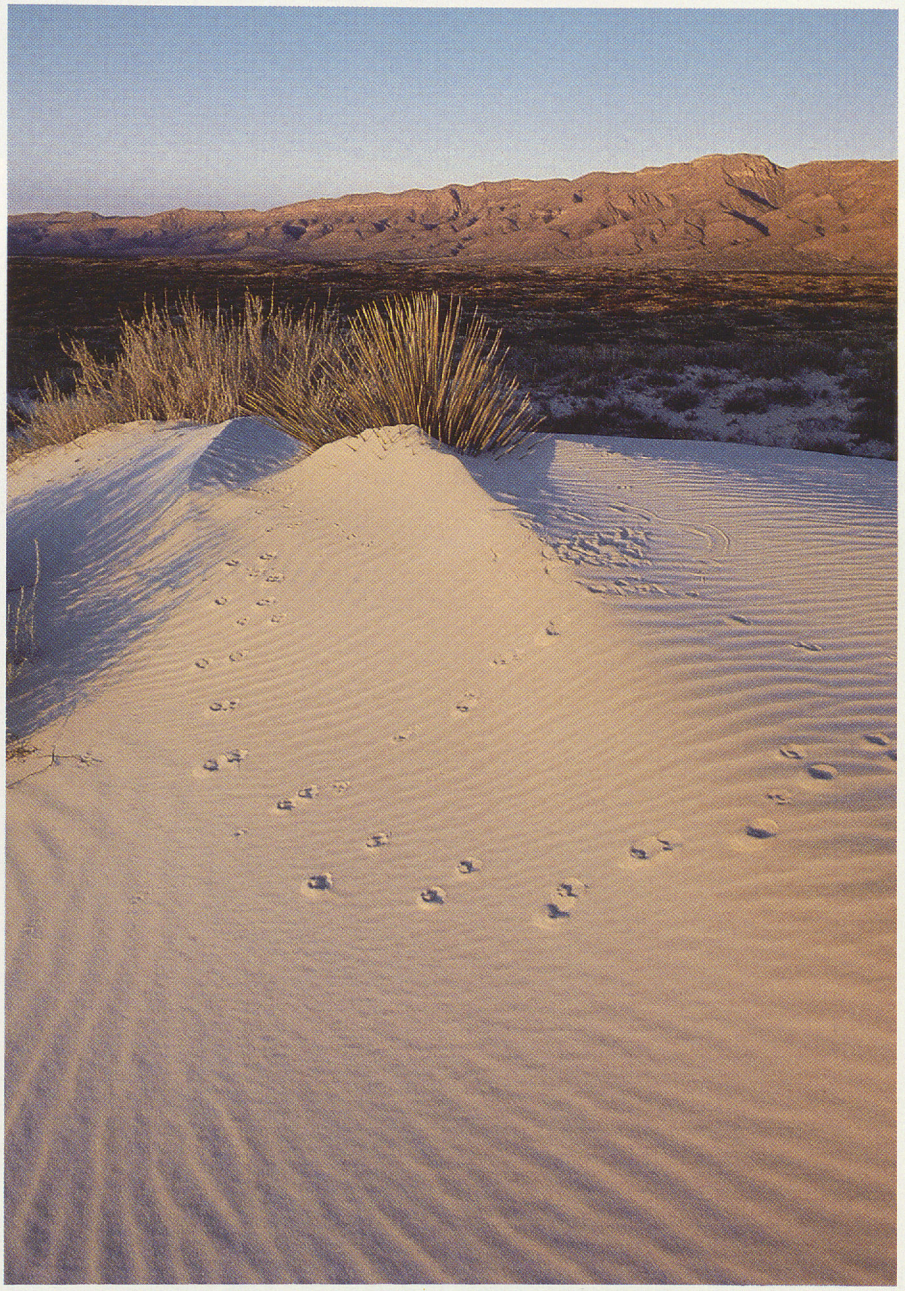
Miniature oak trees, usually less than three feet tall, cover much of the stabilized dunes. These shin oaks or shinnery oaks, *Quercus havardii*, are well adapted to the arid, windy climate, with roots as long as 70 feet reaching down to the shallow ground water. In contrast to the oaks' small stature, the acorns on the trees are quite large. The late Dr. Roy Bedichek, whose writings encouraged the formation of the park, wrote, "I venture the statement, without research, that in no other forested section, the Amazon Valley not excepted, is there to be found a higher proportion of fruit to wood than in this Lilliputian jungle in the northern part of Ward County."

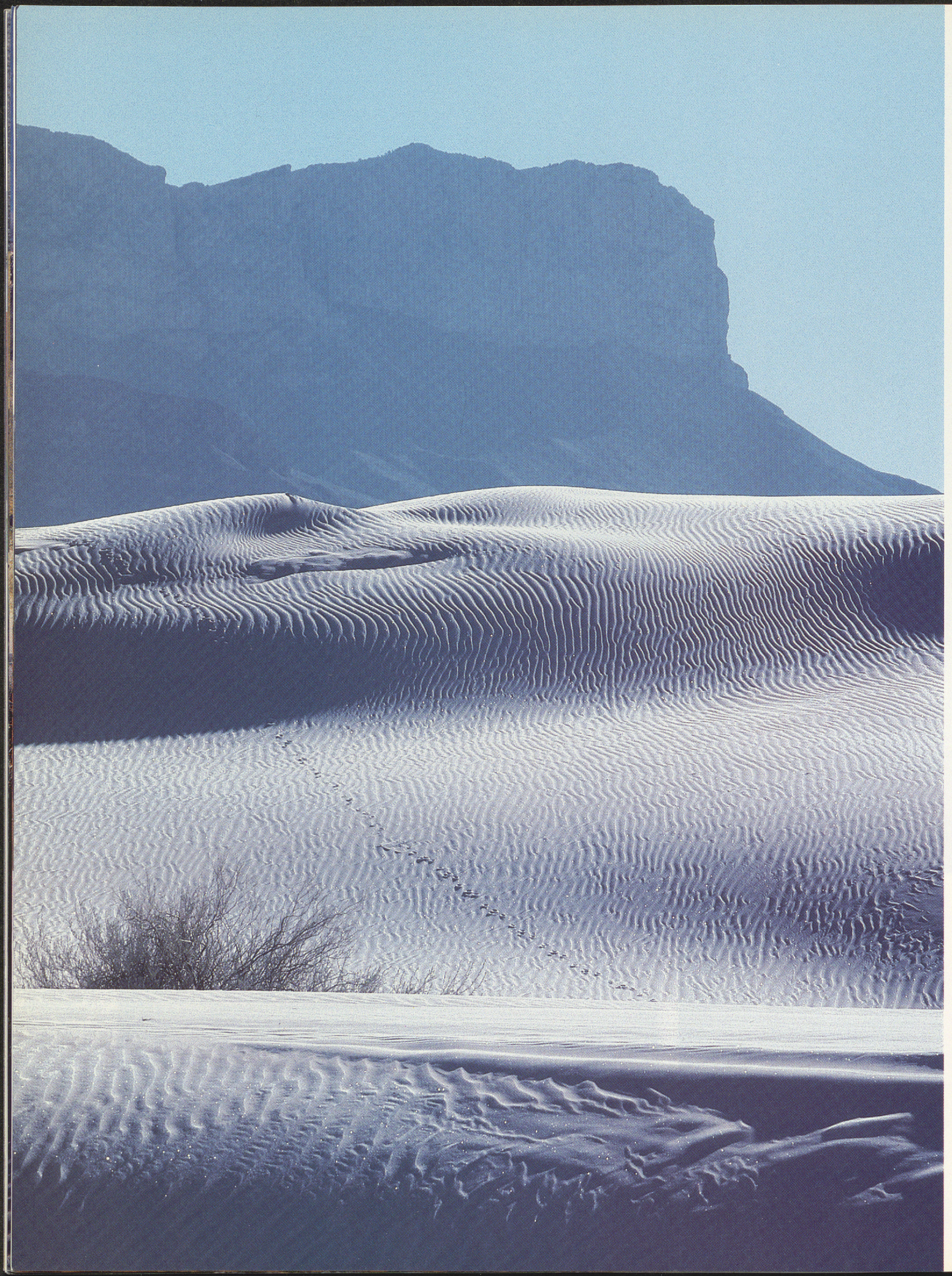
The shallow ground water tapped by the oaks attracted humans to the area as long as 12,000 years ago. Indians found abundant fresh water beneath the sands, plentiful game, acorns and mesquite beans. More than 400 years ago, Spaniards became the first Europeans to visit the dunes. But even with the shallow ground water, most travellers avoided the area because of difficulty crossing the dunes.

The dunes' relative isolation ended in the 1880s when the Texas and Pacific Railroad chose Monahans

Some 3,800 acres of the Monahans dune field (left) comprise Monahans Sandhills State Park. The park road winds through the dunes, some as tall as 70 feet. Many of the dunes are stabilized by vegetation; others are active, constantly moving and changing in shape in response to the wind. The huge Monahans dune field stretches from southern Crane County into southeastern New Mexico. Animal tracks crisscross the gypsum dunes (below), signs of a busy night for the creatures that live there. Human footprints (bottom left) are more obtrusive than those made by wildlife.







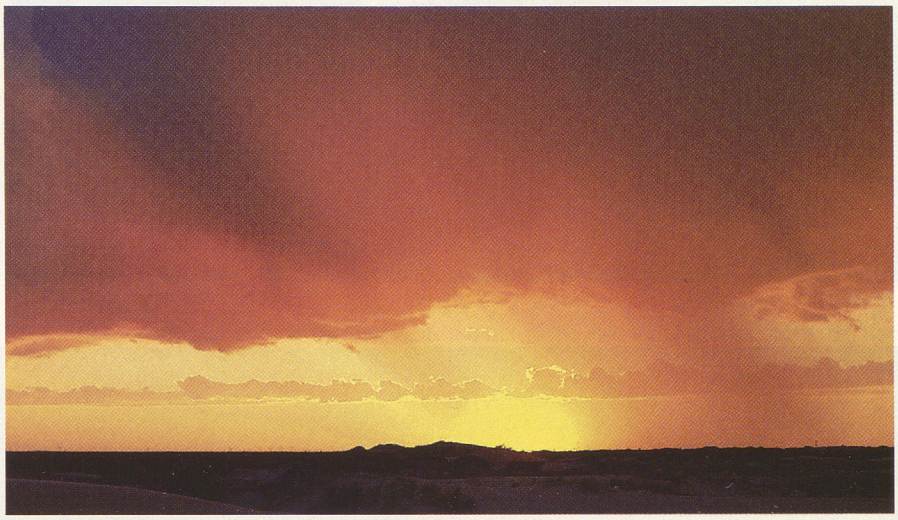
as a water stop between Big Spring and the Pecos River. In the 1920s, the discovery of oil beneath the sand accelerated the area's development.

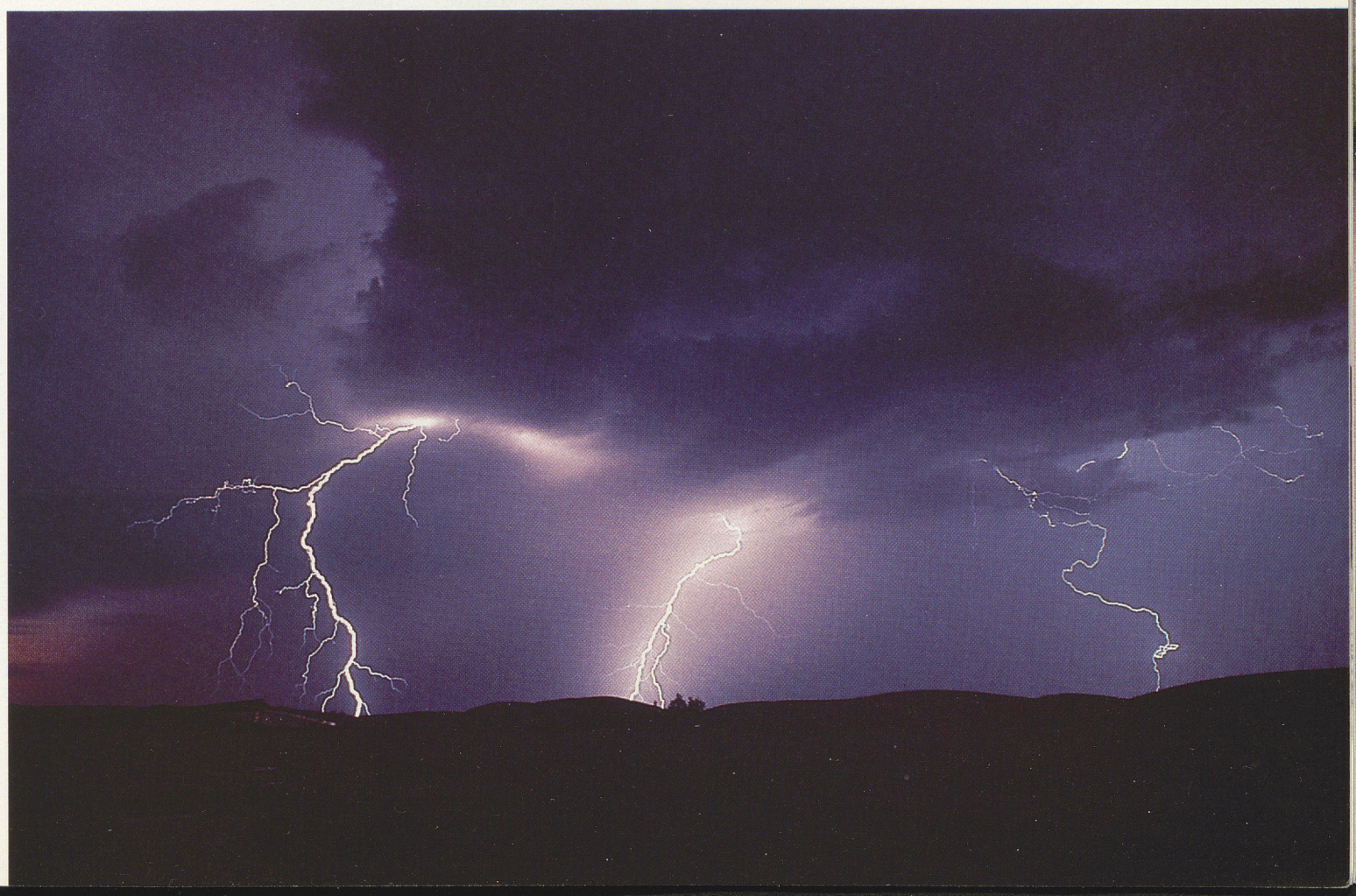
Present-day visitors find easy access to the dunes from Interstate 20, six miles northeast of Monahans. Camping, picnicking and interpretive facilities have been added since the park's acquisition in 1956. The park road winds through the dunes, many stabilized by the Havard oaks. Mesquite and desert willows grow between the dunes which also support healthy wildlife populations: lizards, mice and predators such as coyotes and bobcats.

As on the gypsum dunes, animal trails cover the sands after a busy night of hunting and foraging. But winds quickly erase the tracks of wildlife and those of the occasional human visitor.

Pushed along, the dunes slowly engulf anything in their path. Roads must be cleared regularly; tenacious plants are ultimately buried. The sculpted, rippling dunes owe much of their beauty to their unpredictability and ceaseless change. * *

El Capitan looms in the background as the snow-white gypsum dunes sparkle in the morning light (left). Rising many feet above the desert floor, these dramatic dunes are visible for miles. The material that forms these dunes began as dissolved minerals in a shallow sea 250 million years ago. Below, a West Texas sunset and a sudden thunderstorm provide impressive backdrops for the Monahans dunes.





A javelina is not a pig ... but a fe

Wyman P. Meinzer

by Mary-Love Bigony

The adage about looks being deceiving is nowhere more evident in the wildlife community than in the case of the javelina. With its short legs, stout body and piglike snout, the javelina has got to be some type of hog, right?

Wrong, say biologists. Javelinas are not swine. The confusion between javelinas, or peccaries, and true pigs started as soon as European explorers first set foot on this continent and continues today. To complicate matters further, there's the feral hog, which has invaded much of the javelina's range. Unlike javelinas, feral hogs are indeed true pigs—specifically, barnyard hogs gone wild.

Then there's the European wild boar or Russian boar, an Old World species which landowners occasionally have stocked on ranches for hunting purposes over the past century. True European boars are dark brown, black or reddish in color, have a tail of 12 inches or more and four continually growing tusks, two in each jaw. Most of these imported animals eventually escaped from the ranches on which they were stocked and interbred with free-ranging feral hogs, so most European boars found in Texas nowadays probably have watered-down bloodlines as a result of this interbreeding. Physical

Mike Biggs

a feral hog is

Grady Allen

characteristics of the imported boars, such as straight tails and very long snouts, sometimes can be seen in feral hogs. Hunters often call feral hogs "wild boars" or "European boars," misnomers that have some validity.

Confusion between peccaries and true pigs is understandable, since they share similar physical characteristics and habits. But anyone who has had a chance to see the two animals side by side can distinguish between them easily. For starters, there's the size difference. Javelinas are relatively small and compact, weighing 30 to 50 pounds. Feral hogs commonly reach 100 pounds or more and an old boar can approach 500 pounds. True European boars usually don't grow as large as feral hogs or the feral hog/European boar mix. Coloration is different, too. Collared peccaries, the javelinas found in Texas, are a grizzled brown and black, with a white band of coarse hair, or "collar," around the neck. Feral hogs, on the other hand, come in a variety of colors—red, black, white or a combination. Solid black hogs are the most common statewide, but white hogs with black spots can be found in the Hill Country.

Biologists also note some less obvious differences between the two animals: the javelina, unlike a true swine, has only one dew claw on the hind foot and a scent gland near the base of the tail. This scent gland puzzled early explorers who were familiar with the Old World pigs. Edward Tyson, in 1683, called the peccary the "Mexico musk hog." Juan Nentvig mistook the scent gland for the animal's navel, writing in 1764: "In all respect these (peccaries) are similar to the domestic hog except that the navel is up in the loin."

Scientists generally agree that the peccary and the true swine have similar evolutionary histories, although they originated in different parts of the world. The javelina, or peccary, is native to the Western Hemisphere while true pigs, including ancestors of the feral hog, developed in the Eastern Hemisphere.

In a way, feral hogs are a case of a species coming full circle. Early explorers were the first people to bring wild boars to this continent some 500 years ago. Settlers later brought more hogs, which they domesticated for their farms. Pork was important during the frontier days, as it could be cured and kept without refrigeration. Domestic hogs in this country today are descendants of those imported animals, and feral hogs are domestic swine that have reverted to the wild.

Wyman P. Meinzer

Which ones are javelinas and which ones are feral hogs? Confusion between the two species is common. Javelinas or collared peccaries (opposite page) can be recognized by the white "collar" around the neck. Feral hogs (left and above) come in a variety of colors and can be spotted, as the one at left illustrates.

Grady Allen

The collared peccary of West Texas and the South Texas Brush Country is one of three peccary species in North and South America. Its original range has been reduced since settlement of the New World, but it also has expanded northward into Texas and Arizona. Today the collared peccary can be found throughout Mexico and Central America and well into South America. The white-lipped peccary, considerably larger than the collared, is found in tropical forests of Mexico, Central America and south to Paraguay. The Chacoan peccary lives in a relatively small area covering parts of Argentina, Bolivia and Paraguay.

Feral hogs can be found over much of Texas. "They're probably expanding their range and increasing in number constantly," said David Synatzske, manager of the Chaparral Wildlife Management Area near Cotulla. Synatzske is well acquainted with both species of piglike creatures, having spent several years at the Engeling Wildlife Management Area near Palestine, which has a large feral hog population, and now as manager of the Chaparral, home to a large number of javelina. A study by the Texas Parks and Wildlife Department found feral hogs to be most widespread in eastern and southern parts of the state, with distribution lighter in the central portions.

Both javelinas and feral hogs are omnivorous, eating almost anything available. Javelinas feed primarily on various cacti, as well as mesquite beans, sotol, lechugilla and other succulent vegetation. The prickly pear cactus has been found to be the most abundant food item in the diets of javelinas in Texas and Arizona, and in areas where prickly pear is abundant the animals seem not to drink much water, getting what they need from the cactus. Observers have said javelinas tend not to

Young javelinas (above) are yellowish brown with a black stripe down the back. The feral hog's piglets (opposite, top) are miniatures of the adult. At 30 to 50 pounds, a mature javelina (opposite, bottom) is relatively small compared to feral hogs (right), which commonly exceed 100 pounds. Feral hogs that interbreed with imported European boars can show characteristics of the imported animals, such as the short tusks on the hog at right.

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Wyman P. Meinzer

root in the ground as pigs do, but rather push around on the surface turning up insects. Javelinas generally aren't considered detrimental to the land.

Feral hogs, however, have earned the name "Pineywood rooters" because of their extensive digging for insects and tubers. Like javelinas, they eat prickly pear fruit, grasses and forbs; they also feed in grain fields, oat fields and troughs filled with cattle feed. Hogs are believed to compete with other game animals for forage, especially white-tailed deer.

Synatzske said javelinas are herd animals, whereas feral hogs are more solitary. He also pointed out that the aggressive nature attributed to both animals has been exaggerated. "Feral hogs or javelinas won't attack unless they are cornered or threatened," he said. "If a hunter wanders into a herd of 20 or 25 javelinas, he might be trampled by the animals trying to get away from him." Synatzske also said that in a confrontation between a hog and a javelina, the hog is usually the one to run away.

Javelina populations in Texas were seriously reduced in the 19th century. Commercial hunting of the animals was heavy, with their hides used for leather and their bristles for brushes. They were designated as game animals in 1939 and given the protection of hunting seasons. Although they are classified as big game animals, hunting javelinas usually takes a back seat to

Grady Allen

deer and turkey hunting. The animals are good quarry for archers, but most are taken incidental to deer hunting in South Texas. Five wildlife management areas offer public hunts for javelinas.

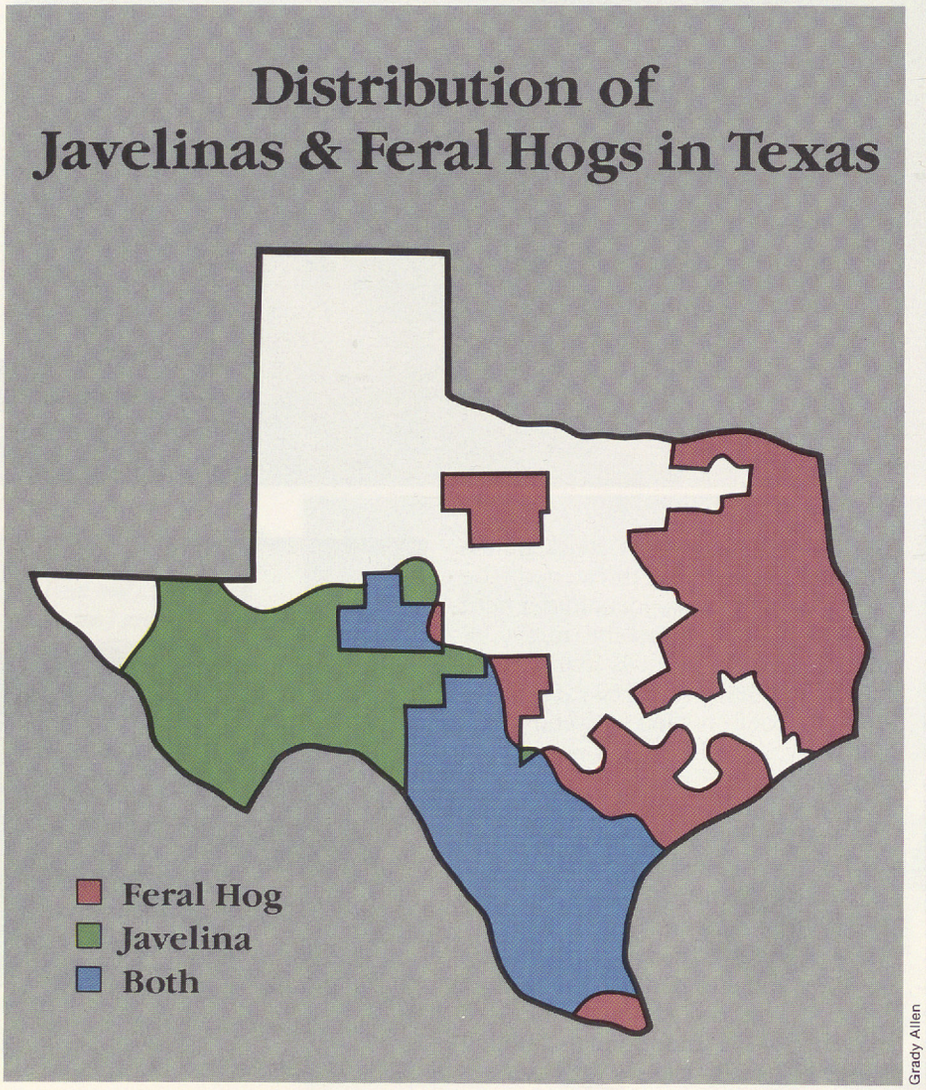
Feral hogs, on the other hand, never have had game animal status and are not likely to any time in the near future. In a survey conducted by the Parks and Wildlife Department, 78 percent of the respondents indicated that landowners should be allowed to control feral hog populations. Synatzske added that game animal status is unlikely because it can be difficult to distinguish between feral hogs and domestic pigs, and the wild hogs frequently are considered nuisances because of habitat destruction from rooting and wallowing, and depredation on wildlife and livestock.

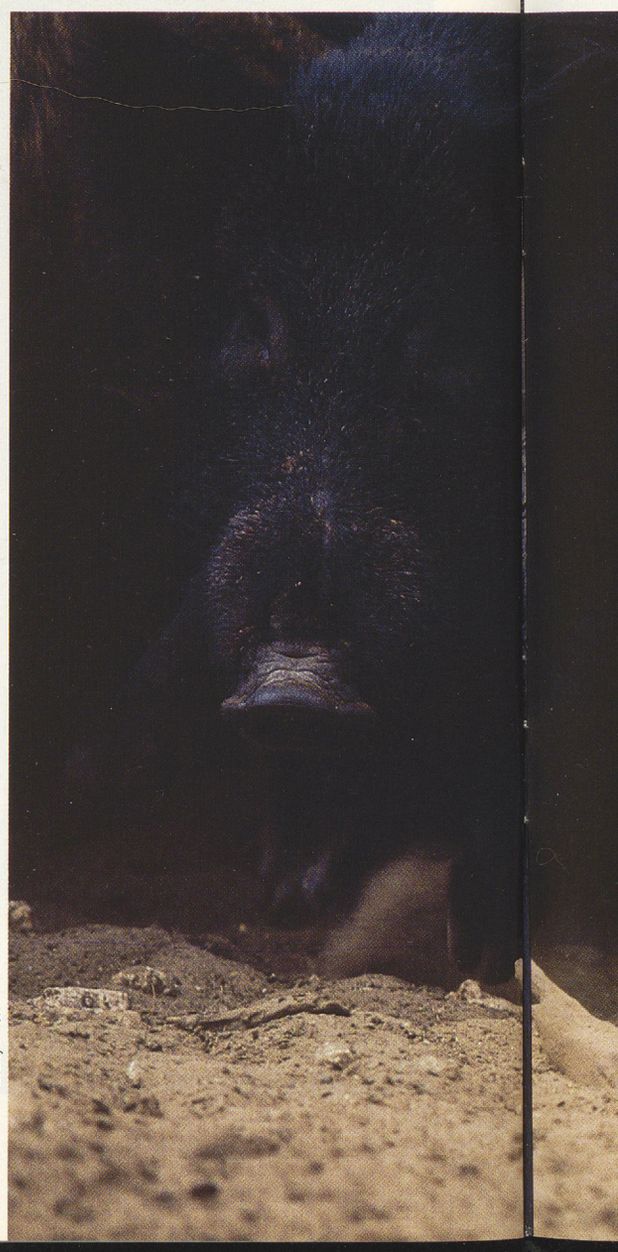
Game animal status notwithstanding, there are plenty of Texas hunters who would rather hunt feral hogs than deer. Ten of the department's wildlife management areas offer public hunting for the hogs, and the response each year is overwhelming. "Maybe it's because there aren't many places to hunt them," said Synatzske. "There's also a lore about wild hogs, and they're good meat animals."

Hunters and biologists alike testify to the hog's intelligence and craftiness. "They're difficult to hunt," said Synatzske. "They have bad eyesight, but excellent hearing and smell." The hogs' intelligence is further verified by the low hunter success rate on public hunts; once the shooting starts, the animals know how to get out of the way.

Department officials discovered the overwhelming public interest in feral hog hunting when the first organized hunt was held on the Engeling Area in February 1978. "The hunt was set up on a first-come, first-served basis," said Synatzske, "and was to start on Friday morning. It was cold and icy, but hunters started lining up on Tuesday, and had to stay in line or lose their place. We had our quota on Wednesday."

A sign in George Orwell's allegorical "Animal Farm" states, "All animals are equal, but some animals are more equal than others." The "more equal" animals in the book were the pigs, which gained superiority over the other barnyard animals. Among wildlife, however, most people don't consider the feral hog—a descendent of those barnyard pigs—to be "more equal" than the eminent big game animals. But hunters who have spent a day in an East Texas river bottom in pursuit of the crafty hogs, only to be outsmarted and go home empty handed, can understand how Orwell's clever fictitious pigs managed to gain control of the farm. * *





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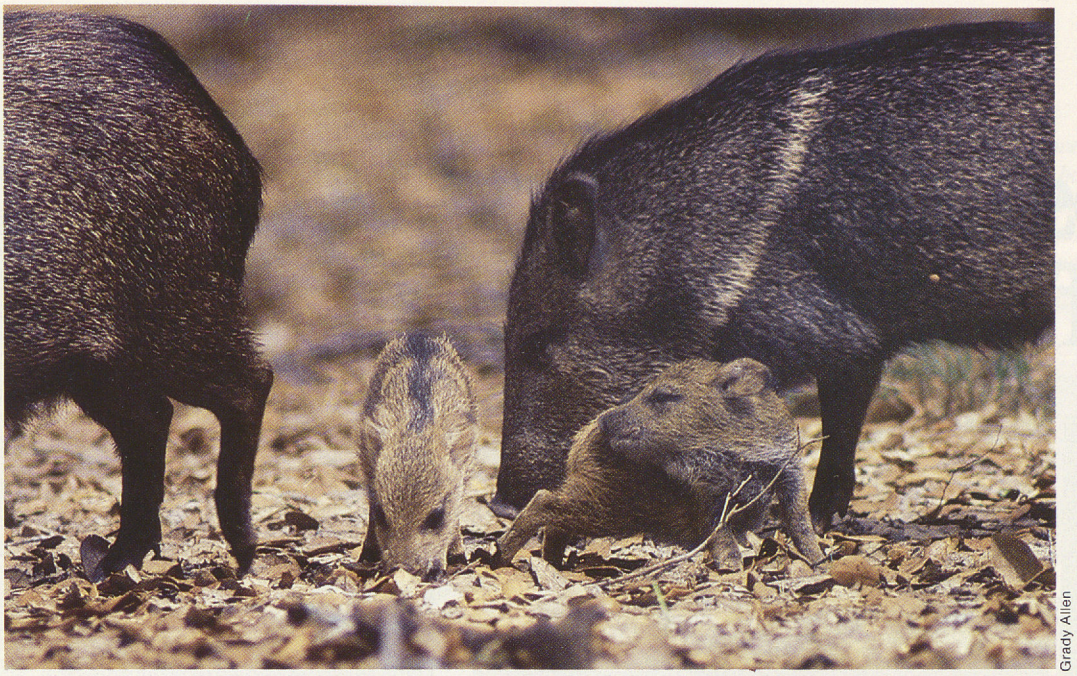


Grady Allen

Javelinas (left) range throughout the South Texas Brush Country and parts of West Texas where prickly pear cactus, an important food item, is plentiful. Feral hogs (below) have invaded much of the javelina's South Texas range and are believed to be increasing in number constantly. In a confrontation between a hog and a javelina, the larger hog usually is the one that runs away.

Palacios facility charts Texas' fishing future

Leroy Williamson

by Jim Cox

During the 1940s and 1950s, an annual "Tarpon Rodeo" at Port Aransas attracted fishermen from far and wide, and it was not unusual for participants to catch hundreds of the silvery gamefish.

Also during that time, those who chose to take time out from the customarily spectacular red drum and spotted seatrout fishing in the bays and passes could sample excellent snook fishing along the Texas Gulf Coast.

Those days are gone, along with most of the tarpon and snook. The "silver king" occasionally is caught in Texas waters, and snook are found in token numbers in the Lower Laguna Madre area of South Texas. But as coastal oldtimers can attest, these remnant populations are little more than shadowy reflections of past glory days.

Red drum (redfish) and spotted seatrout (speckled trout) have not declined as dramatically as tarpon and snook, but their populations are well below levels of a few decades ago.

The reasons for declining fisheries are never easy to pinpoint. Fishing pressure and environmental changes are two factors, with the latter probably being more significant in the case of tarpon and snook. Management efforts, including stocking and more restrictive regulations, appear to be slowly bringing trout and redfish populations back to eventual abundance, in spite of recent setbacks in the form of a 1983-84 freeze and 1986-87 invasion of red tide.

Restoring populations of all four of these important game fish species may depend heavily on fisheries science techniques that are just now coming to the forefront.

Research now underway in an unassuming cluster of one-story buildings and ponds nestled beside Tres Palacios Bay at Palacios may eventually have far-reaching effects on coastal fishing's future in Texas. Called the Perry R. Bass Marine Fisheries Research Station, the facility has been home base for department researchers who have compiled an impressive track record, primarily in the spawning and pond culture of redfish. The technique for replicating the redfish spawning cycle by manipulating lighting over indoor tanks was fine-tuned at the Palacios facility, and breakthroughs accomplished there made possible the large-scale production of redfish fingerlings at the GCCA-John Wilson Saltwater Hatchery near Corpus Christi.

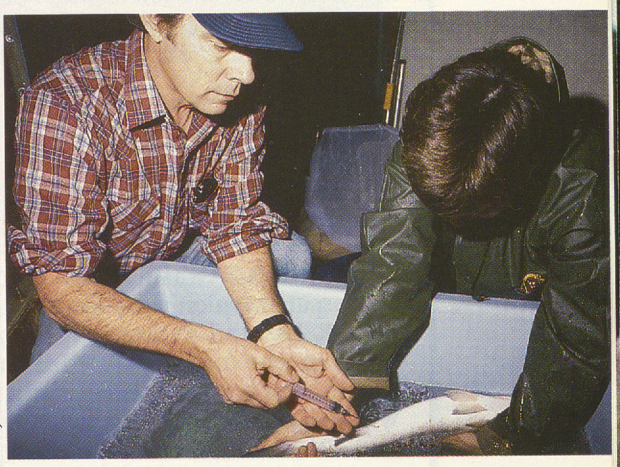
The Wilson hatchery, along with satellite pond facilities at Freeport, has produced about 30 million red drum fingerlings since 1981, and follow-up field studies on reds released into the bays indicate the fish have good survival rates and are providing a boost to the fishery.

Successes in redfish culture led re-

Leroy Williamson

Fish are removed from tanks (far left) and injected with hormones to induce spawning (bottom). Later, ponds are seined to check the growth of the stocked fish. Below are red drum brooders.

Leroy Williamson



Leroy Williamson

searchers to believe that similar results could be attained with other species, including spotted seatrout, tarpon and snook.

Recent advancements in the field of electrophoresis will be an integral part of future research, according to Dr. Tony Maciorowski, head of the Bass facility. "This technique is being used to identify the genetic makeup of species already present in the bays, and it also will enable us to assess the effectiveness of stocking programs," he said. Electrophoresis allows positive identification of a fish's genetic makeup by examination of tissue samples.

To get an overview of the status of ongoing research, here is a review of past and present work with the four main species being studied at the facility:

RED DRUM

Restoration of red drum populations has come a long way during the past decade, due in part to cooperative efforts of the department and private industry and organizations. The red drum production and stocking program, along with more restrictive sport fishing bag and size limits and prohibition of commercial sales, appear to be paying off. However, the 1983-84 freeze and other potential environmental threats illustrate the need for continued research.

New studies involving red drum imported from South Carolina may eventually give Texas redfish stocks genetic diversity and perhaps even better growth rates. Also, a separate strain of redfish could provide a genetic "marker" which would aid biologists in subsequent identification of stocked fish. Cold-tolerance tests showed the South Carolina fish are not measurably more resistant to cold water temperatures, said Bob Colura, culture research leader at Palacios, but the imports nevertheless could have other advantages in future research.

Ongoing pond studies at Palacios have steadily increased the survival rates of fry placed in rearing ponds, always a limiting factor in production of game fish.

SPOTTED SEATROUT

Red drum received the lion's share of research and production work during the 1970s and early 1980s because of declines in their numbers. Now an increasing share of attention is being directed at spotted seatrout. Trout were first spawned at Palacios in 1974, using hormones to induce spawning. The first efforts were limited by poor survival in the ponds, but improved pond fertilization techniques have boosted survival to a point where a 35 percent average return of fingerlings has been achieved. Some ponds have produced as much as 70 percent survival.

Colura pointed out that the department's experiments with orangemouth

corvina, a close relative to the spotted seatrout, yielded important breakthroughs in the handling and maturing of brood fish for spawning. The department has a good supply of mature spotted seatrout brood fish, most of which were caught on rod and reel. Spotted seatrout are more difficult to produce in large numbers than red drum because trout are more susceptible to handling mortality and each female produces fewer eggs than do red drum, Colura said.

TARPON

Tarpon fishermen may be surprised to know that despite its international popularity as a sport fish, very little is known about the tarpon's life history. It is not known, for instance, when or where the fish spawns. Colura said it is known that tarpon produce an eel-like larva, and juvenile tarpon usually inhabit brackish water in the upper parts of estuaries. "As they mature, they return to the higher salinities of the bays and Gulf where their habits become more mysterious," said Colura.

The first, and possibly most difficult, step toward learning how to produce tarpon is obtaining enough brood fish for experiments. The department currently has only one tarpon, although several years ago about 20 captured in a drainage canal were used in temperature tolerance studies. A few of these fish were released in Lake Braunig near San Antonio, and some of them still are thought to be living in the lake.

Colura said there is a good possibility some small tarpon can be located, but the program could be accelerated if mature fish were available. "Obtaining large tarpon caught by anglers would be difficult at best, since the fish fight so hard and would be unlikely to survive handling and transportation," he said. "We feel that it eventually would be possible to produce tarpon in a hatchery setting if we could accumulate enough large fish for study."

SNOOK

Like tarpon, snook are a tropical species that apparently depend upon the availability of brackish backwaters for at least a part of their life cycle. They still frequent the waters of the Lower Laguna Madre and the Rio Grande, although in lesser numbers than a half-century ago. The department collected 25 young-of-the-year snook from the Laguna during 1986, and also has brood fish and fingerlings obtained from Florida.

Biologist Dr. Anne Arzapalo has investigated spawning requirements of snook, and she has found the fish do not respond to light/photoperiod manipulations that are successful with trout and redfish. "Because of this we are experimenting with hormone implants to induce maturation and spawning," Arzapalo said. Another problem is that snook grow more slowly than the other fish under study, which makes pond mortality an even more important production factor, she added.

As pond culture techniques improve and more pond space becomes available, researchers are confident that snook can be produced in large enough quantities to restore fisheries along the Texas coast. * *

Saltwater Stamp, Private Donors Support Bass Facility

The Perry R. Bass Marine Fisheries Research Station is named for Perry R. Bass, a Fort Worth businessman who formerly served as chairman of the Texas Parks and Wildlife Commission. Bass, an avid fisherman, donated a substantial portion of the funds being used to construct a new laboratory building. Additional financial support has been received from Zebco Corporation's Fish America Foundation, the Gulf Coast Conservation Association and George Bolin of Houston, who is currently a member of the Parks and Wildlife Commission.

Coastal fishermen of Texas also are supporting saltwater fishing programs each time they buy a $5 State Saltwater Fishing Stamp. The saltwater stamp is required in addition to a valid fishing license for all persons fishing the salt waters of Texas, unless otherwise exempted.

The Parks and Wildlife Commission and Department staff are indebted to the individuals and organizations for their continuing support in revitalizing the state's coastal fishery resources. * *

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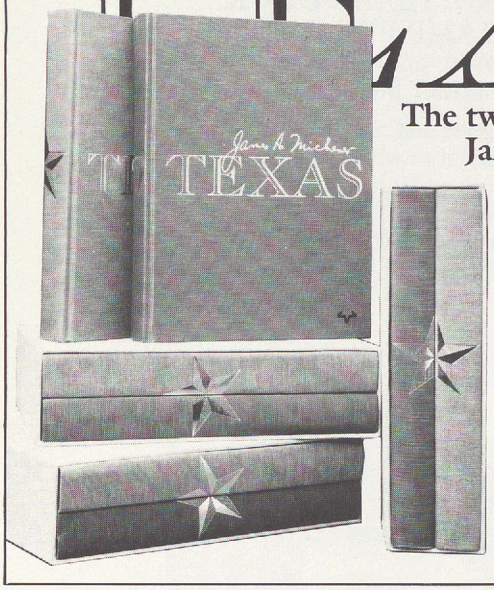

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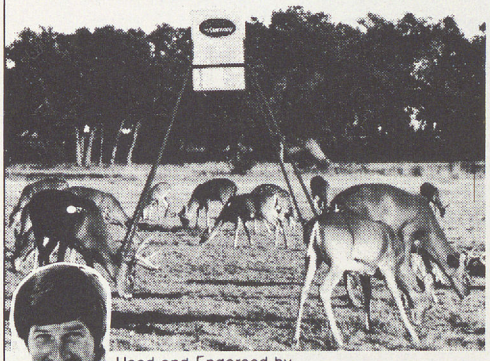

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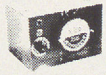
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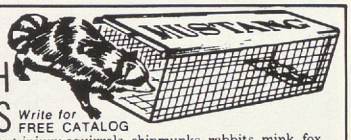

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Orvis Houston
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Houston, TX 77057
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Don Rouse Wildlife Gallery
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Galveston, TX 77550
409/763-1391

Spencer's Gallery
5243 Buffalo Speedway
Houston, TX 77005
713/667-1987

Estelle Stair Gallery
406 Austin Street
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Letters

Bermuda Chub Record Omitted

The state fish record listings in the March issue omitted the Bermuda chub in the saltwater category. The record stands at 1 pound, 5.92 ounces; length 13½; girth 11; caught by David R. Lindsay Jr. of Austin; 18 miles east of Port Aransas; September 4, 1982.

North Rosillos Mountains

I am writing to express my appreciation for the spectacular article, "Rosillos Mountains Preserve: 100 Square Miles of West Texas," which appeared in the February 1987 issue of *Texas Parks & Wildlife* magazine.

We have received numerous comments, compliments and accolades concerning the article and photography of our North Rosillos Mountains Preserve in Brewster County.

This type of positive publicity for our work in the state is very helpful to our conservation cause.

Andrew Ransom, Director,
Texas Nature Conservancy
San Antonio

Montgomery Photo

On page 5 of the Big Thicket story in the April 1987 issue, we incorrectly credited the pitcher plant photo.

Paul Montgomery was the photographer and we apologize for not giving him proper credit.

Texas Field & Stream

When I received my renewal for *Texas Parks & Wildlife* magazine, I couldn't help noticing the ad that came with it. You know the one, "Fish or cut bait, more stories, more pictures, and 48 pages." I will be the first longtime Texan to admit that you do have a fine magazine, but I also will admit that it's clear that you are outright unfair in coverage of the camping parks of our state.

You want to talk about 48 pages? Let's go back just six months. Out of 288 pages, you had eight pages on camping in state parks. In addition, you seldom take pictures of the actual campsites, and you never publish articles on park rangers or park employees except for game wardens.

I love to hunt and fish as well as anyone. But please give the parks their 33 percent fair share of coverage. If you don't, perhaps the name of the magazine should be changed to *Texas Field & Stream* rather than *Texas Parks & Wildlife.*

Ron Brewer
Richardson

■ We don't think your figures are exactly correct, but we are not going to argue the point. We will, however, take your suggestions to heart, and hopefully do a better job on our parks stories. Over the course of a year we strive to publish stories and photos on the state's outdoors that will be of interest to all our readers.

Outstanding Photography

Just a note to let you know that I enjoy *Texas Parks & Wildlife* magazine, especially the photography, which is outstanding.

I notice that some subscribers don't like this and they don't like that. Well, I'm neither a fisherman nor a hunter and I like it all. I have every copy except one since August 1967.

Roy E. Barnett
Alba

Tennessee Traveler

I was in the waiting room of a Knoxville, Tennessee, hospital when I picked up the July 1985 issue of *Texas Parks & Wildlife.* I enjoyed it so much that I am sending a check for a one year's subscription.

The photographs are beautiful and the articles are so plainly written. I felt like I was travelling through Texas as I read the articles and turned the pages.

I can't visit your state right now, but in the months to come I will travel to Texas by way of your magazine, *Texas Parks & Wildlife.*

Alleen Stansberry
Sevierville, Tennessee

Fish Hawk

Your article "Fish Hawk" in the March 1987 issue by Mary-Love Bigony was of particular interest to my wife and me.

In early 1984, we noticed what appeared to be an eagle nest of dried twigs in a dead tree on our ranch in Dripping Springs. On closer inspection, we saw an immature osprey that was later incorrectly identified as a red-tailed hawk by two Parks and Wildlife Department employees.

Several weeks later, as we sat on our front porch overlooking Onion Creek, my wife noticed this large bird in a cottonwood tree. There was no mistake in identity when he dove behind our dam, and after being one of the lucky ones "to be present when an osprey makes its impressive fishing dive," I truly feel that we "witnessed one of nature's finest dramas."

Even more impressive, this drama took place just 25 miles from Austin.

Richard N. Jordan
Dripping Springs

Correct County

I would like to correct information in the February 1987 issue. On the inside back cover you have a photo of cypress trees along a creek. In describing the photo, you stated that it was Cypress Creek near Camp Ben McCullough in Travis County.

Well, the correct spelling is Camp Ben McCulloch, and both Cypress Creek and Camp Ben McCulloch are in Hays County, not Travis County.

Many years ago, the land that is now Camp Ben McCulloch belonged to my husband's family. So, guess I should know a bit about this since, I too, live in Hays County.

Mrs. Joe R. Rogers
Buda

Thicket Phone Correction

We incorrectly listed the phone number for the Big Thicket National Preserve in our April story. The correct number is 409-839-2689. We apologize for the error.

BACK COVERS

Inside: Trying to make a quick getaway after stealing an egg from a bird's nest, this fox squirrel plans on enjoying the benefits of a crepe myrtle tree's residents. Fox squirrels are prominent throughout Central, East and many counties in South Texas. Spring and summer foods consist of leftover mast, insects, green shoots, fruits and seeds of such trees as elm and maple. Photo by Richard Haverlah. **Outside:** Located in a stretch of Chihuahuan Desert between the Guadalupe Mountains and Dell City, the gypsum dunes are reminiscent of White Sands National Monument, swelling and breaking in frozen white waves across the empty desert plains. Photo by Laurence Parent. (See story on page 24.)