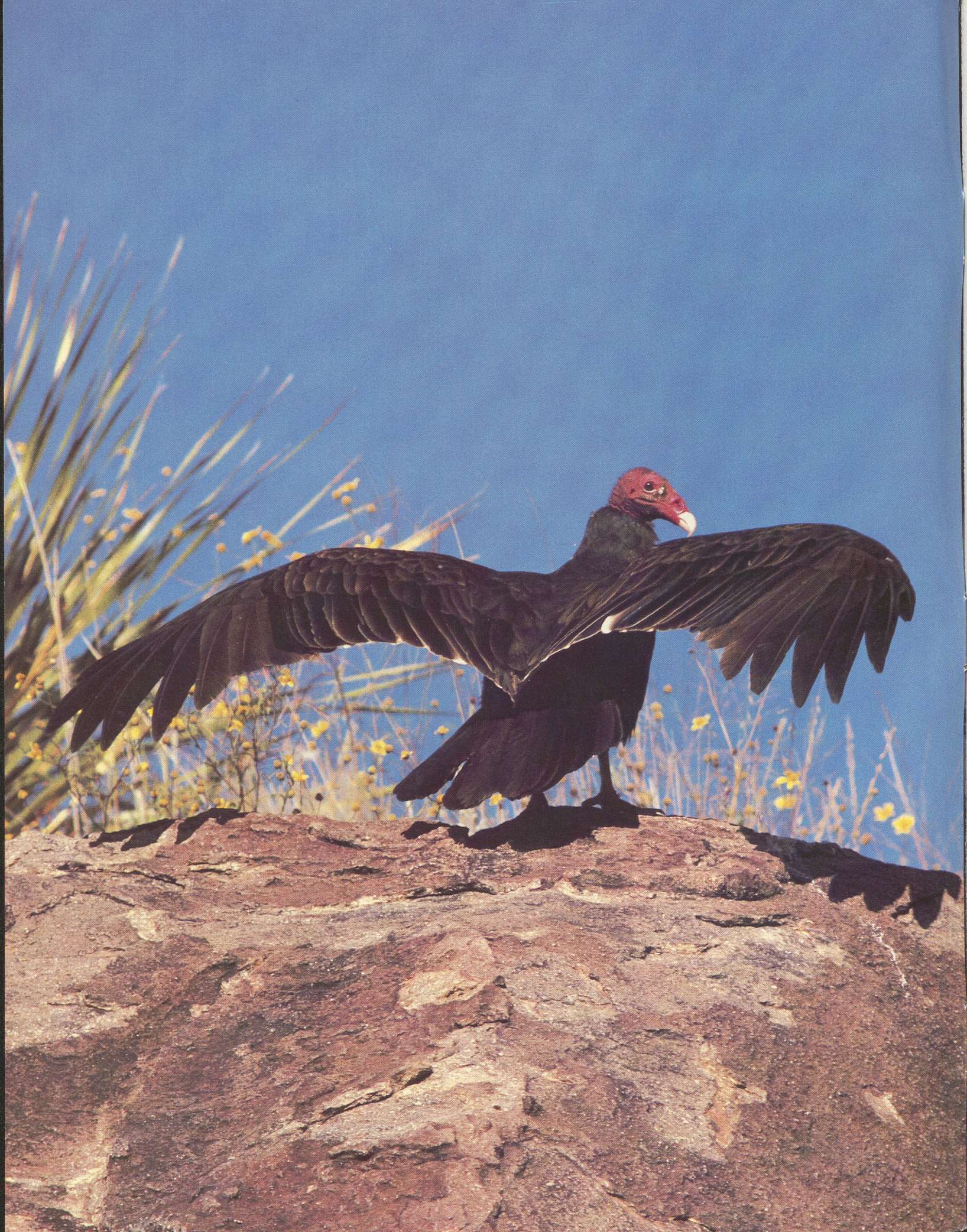


# TEXAS

PARKS & WILDLIFE

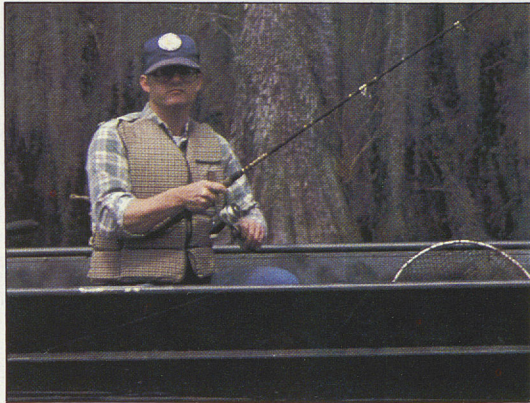


March 1982 • \$1



# TEXAS PARKS & WILDLIFE

March 1982, Vol. 40, No. 3



Page 2

**Lying in Wait for the Angler** by Jim Cox 2  
Chain pickerel are a sportfisherman's delight, striking with abandon.

**Paths in the Parks** by Mike Herring and John Ruben 8  
State park trails are designed for people of all ages with a variety of outdoor interests.

**Working for More Trails** by Mary-Love Bigony 14  
The Texas Trails Association promotes state-wide trail development.

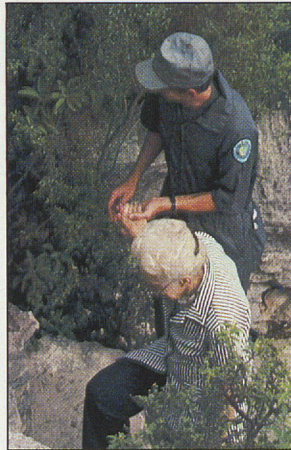
**Colorful Grouse of the Prairie** by Winifred B. Kessler 16  
There's no sound quite like the courtship booming of the endangered Attwater's prairie chicken.

**Outdoor Roundup** 20  
News briefs compiled by the department's news service.

**Its Shallow Waters Teem with Fish** by Karen Thompson and Page Campbell-Hostettler 22  
The Corpus Christi Bay system has a variety of marine species for the coastal angler.

**Young Naturalist: Crawfish** by Ilo Hiller 28  
This freshwater cousin of the lobster is a fascinating creature.

**Letters to the Editor** 32



Page 8

**Front cover:** Moss-draped Caddo Lake is on the extreme western edge of the chain pickerel's natural range. These members of the pike family are hard-fighting fish that are surprisingly easy to catch in the winter and early spring. (See story on page 2.) Photo by Bill Reaves.

**Inside Front:** Outstretched wings tell the turkey vulture when thermal drafts are right for flying. Under good conditions they can soar through the air for hours without a single wingbeat. Photo by Glen Mills.

Published monthly by the Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. Circulation: 512-479-4830; Editorial Office: 512-479-4992. Republication of material is not permitted except by special written permission. The inclusion of advertising is considered a service to subscribers and is not an endorsement of products nor concurrence with advertising claims. Rate schedule available upon request. Subscription rates: \$5 for one year and \$9 for two years. Single copies and all back issues \$1. Foreign subscription rates: \$6 for one year and \$11 for two years.

Postmaster: If undeliverable, please send notices by form 3579 to 4200 Smith School Road, Austin, Texas 78744. Second class postage paid at Austin, Texas, with additional entry at Dallas, Texas.



Page 22

**GOVERNOR OF TEXAS**  
**William P. Clements Jr.**

## COMMISSION

Perry R. Bass, Chairman . . . . . Fort Worth  
James R. Paxton, Vice-chairman . . . . . Palestine  
Edwin L. Cox Jr. . . . . Athens  
W.B. Osborn Jr. . . . . Santa Elena  
William O. Braecklein . . . . . Dallas  
William M. Wheless III . . . . . Houston

## DEPARTMENT

Charles D. Travis . . . . . Executive Director  
Roy L. Hogan . . . . . Deputy Director  
Bill Anderson . . . . . Data Processing  
James D. Bell . . . . . Parks  
Johnny L. Buck . . . . . Design & Construction  
Chester L. Burdett . . . . . Law Enforcement  
John W. Church . . . . . Administration  
Ted Clark . . . . . Wildlife  
James E. Dickinson . . . . . Finance  
Robert J. Kemp Jr. . . . . Fisheries  
Leroy Williamson . . . . . Information & Education

## MAGAZINE

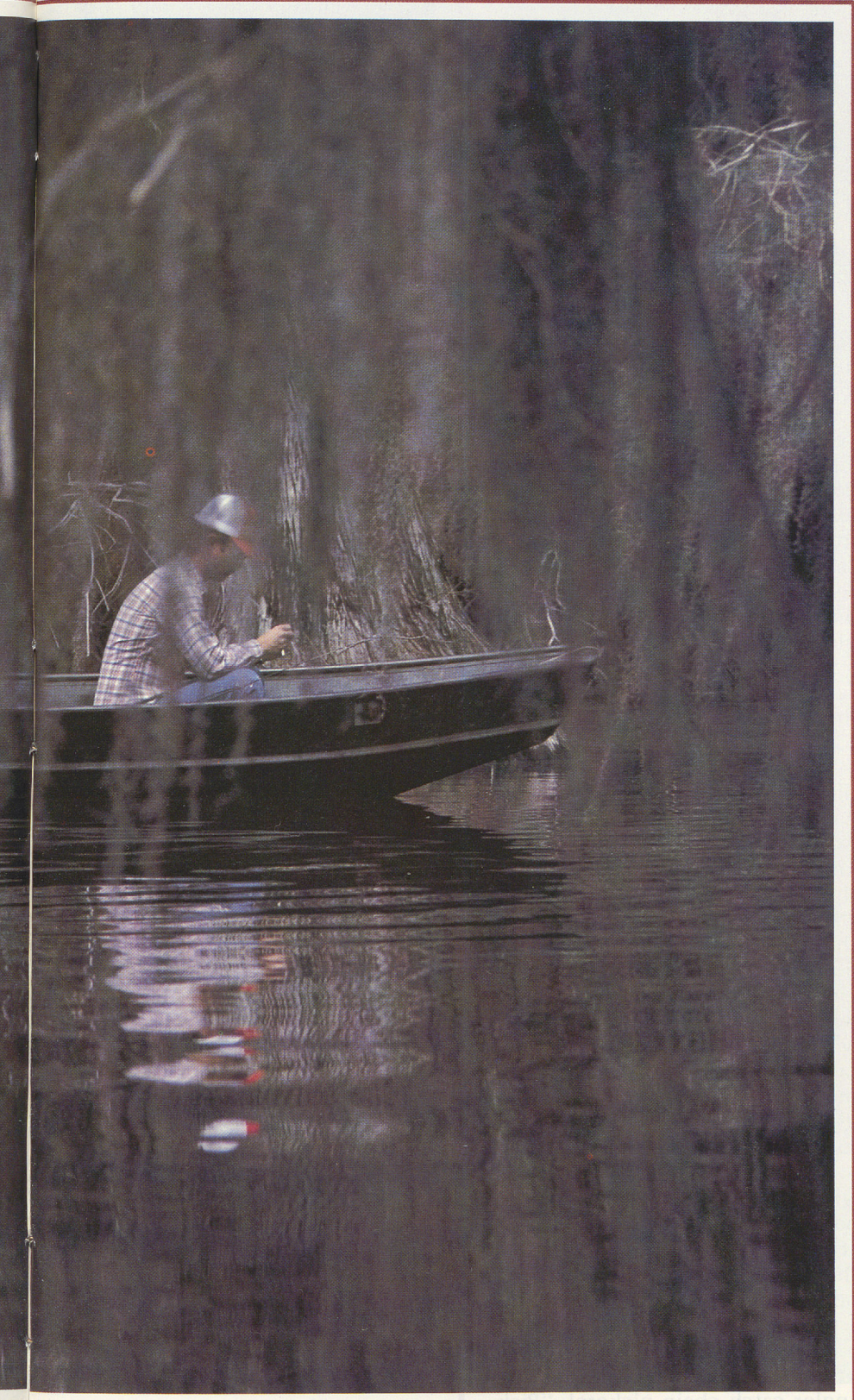
(ISSN 0040-4586)

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

David Baxter . . . . . Editor  
Ilo Hiller . . . . . Associate Editor  
Mary-Love Bigony . . . . . Assistant Editor  
Dianne Richards . . . . . Art Editor  
Bill Reaves . . . . . Chief Photographer  
Glen Mills . . . . . Photographer  
Susan E. Geary . . . . . Typesetting  
Ruth Perry . . . . . Circulation  
La Verne Moccia . . . . . Office Manager

Attach recent magazine address label  
here for renewal or change of address.





# Chain Pickerel LYING IN WAIT FOR THE ANGLER

Article by Jim Cox  
Photos by Bill Reaves

Few outdoor sports possess built-in frustrations as severe as those which bedevil fishermen. Bass fishermen in particular, even the most skillful ones, must resign themselves to returning home on occasion crestfallen and fishless. It's reassuring, then, to note that not all freshwater fish are of such perverse nature. One hard-fighting fish found in certain Texas waters seems not only willing to be caught, but exhibits an almost suicidal tenacity when attempting to get itself hooked.

It is the chain pickerel. The only thing the pickerel asks of a fisherman is to wait until winter or early spring before throwing a lure in its Caddo Lake or Lake O' the Pines haunts. "It's really difficult to go out in the winter and not be able to catch several pickerel," said biologist Mike Ryan of Marshall. "On a good day it's no trick to land 10 or 15, and you can catch them on a variety of lures."

By way of introduction, the chain pickerel is a member of the pike family. It's related to the more famous northern pike and muskellunge of northern climes. Although chain pickerel closely resemble other pike, they don't grow as large. The typical Caddo Lake pickerel weighs one to two pounds, although larger individuals are not uncommon. The state record pickerel, caught from Caddo in 1976, weighed four pounds, seven ounces.

Even with their diminutive size and questionable table qualities (tasty but bony), chain pickerel are a sportfisherman's delight. On light

*A winter or early spring fishing trip to Caddo Lake invariably results in a catch of several chain pickerel. Caddo is a shallow lake with most of the fish habitat in less than six to eight feet of water, so anglers can find the good fishing spots easily.*

tackle they strike and fight as viciously as any freshwater fish, and will hit a top-water lure with abandon. "Pickerel will scare you to death sometimes," Ryan said, "because often they wait until you're ready to lift the lure from the water, then they try to take it away from you.

"Even after you hook a pickerel, anything can happen," he continued. "It's not uncommon for the fish that strikes to be followed by one or two other pickerel trying to get the lure for themselves. Catching two pickerel on the same cast is not unusual, especially when using a long-bodied lure with multiple treble hooks."

Fishing for pickerel on Caddo Lake is an aesthetically pleasing experience for several reasons. Forests of moss-laden cypress trees create a maze which can confuse the newcomer on Caddo, but the scenery is unique among Texas lakes. "Caddo Lake is very shallow, with most of the fish habitat in less than six to eight feet of water," Ryan said. "This helps the fisherman, because most of the good fishing areas can be found easily." The shallow water and abundance of aquatic vegetation is a top-water lure fisherman's dream, although shallow-running lures, such as spinners, spoons and crankbaits, also take their share of pickerel and bass.

Some fishermen might suspect that chain pickerel were stocked in

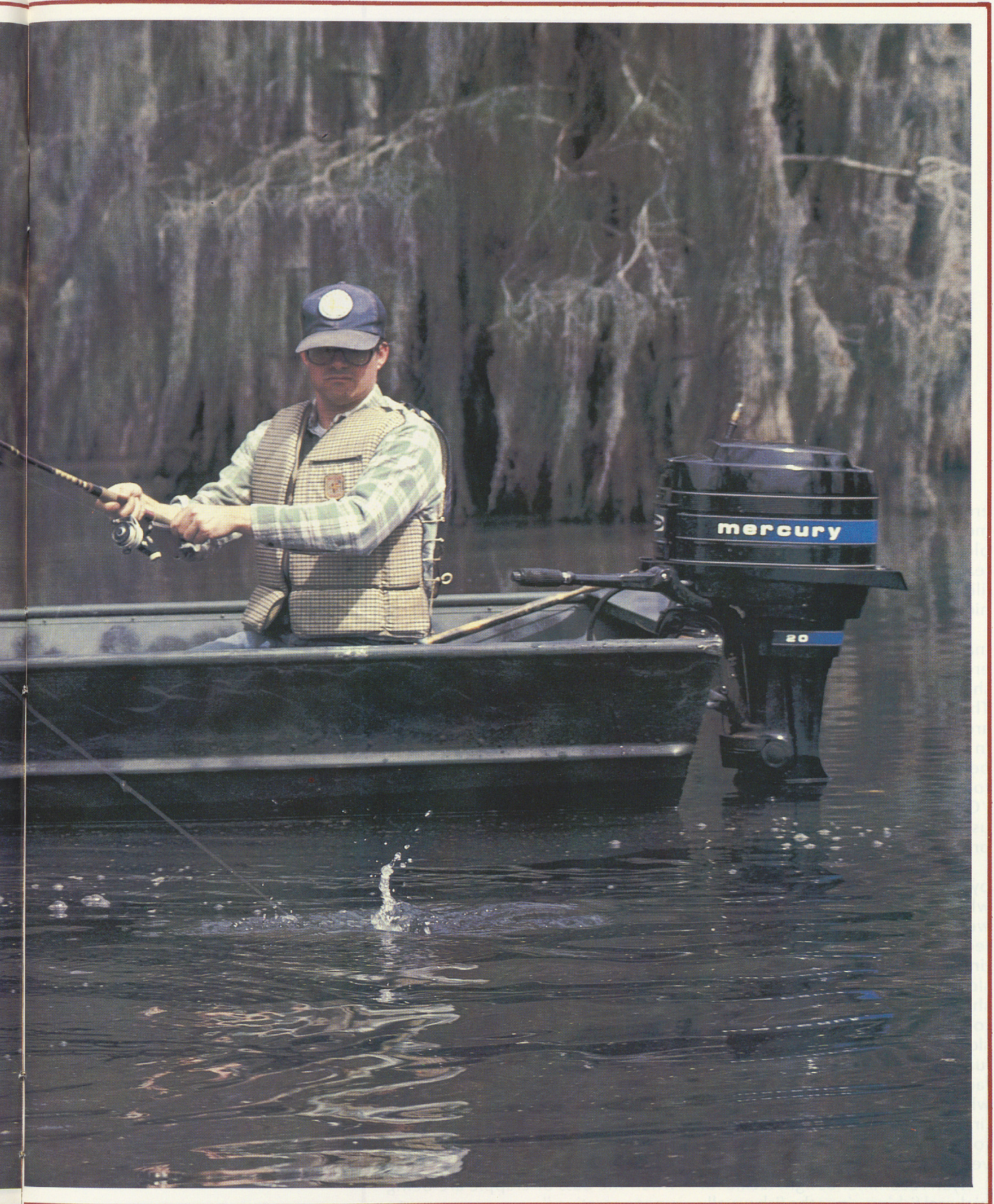
Texas waters, but according to Ryan, Texas is on the extreme western edge of their natural range, which extends from Maine to Florida and from Alabama to Texas. Caddo and Lake O' the Pines both are on the Cypress River drainage, which is the only river system in Texas with chain pickerel. The smaller grass pickerel actually has a wider distribution in East Texas, but its lack of size keeps the species from being a major sport fish.

There's no mistaking the chain pickerel's appearance, although when seen swimming Caddo's clear waters it might be mistaken for a gar. The main feature to be aware of is the pickerel's wide, flat mouth, which is armed with an arsenal of sharp teeth. "Don't use the traditional lower jaw-grabbing procedure employed in holding a largemouth when boating these fish," Ryan warns. The best way to land a pickerel is with a landing net, then the fish can be grasped by squeezing its gill plates between thumb and forefinger.

The morphological feature for which the fish is named is a chainlike pattern on its sides. The slender fish are a deep olive color on the back, shading to a creamy yellow on the belly.

Aside from fishing during the colder months, there also are a few other pointers which may help the angler catch chain pickerel. "Pick-





erel like to occupy areas where submergent or emergent vegetation is plentiful. Plants such as parrot-feather, elodea, coontail and water lilies usually make good pickerel hideouts," Ryan said.

Unlike largemouth bass, which may roam when seeking food, pickerel usually lie in wait for minnows, shad or other small aquatic creatures. This ambush site is always in or around the edges of vegetated areas in shallow water. "Fishing success is best when you can cast to within a foot or two of the fish," Ryan said. "Casting parallel to a weed bed usually is much better than approaching it straight on."

Lure selection is largely dictated by the vegetation, since using a lure which tends to become fouled in weeds wastes valuable time. Ryan feels the speed of the retrieve sometimes affects the catch. "Generally, slow or moderately fast retrieves on shallow-runnings baits are best, but top-water lures should be fished slowly. When you cast a top-water lure, leave it motionless on the surface after the cast. Often the strike will happen before you give it the first twitch." Ryan said the best colors for pickerel lures seem to be white, yellow, gold and silver.

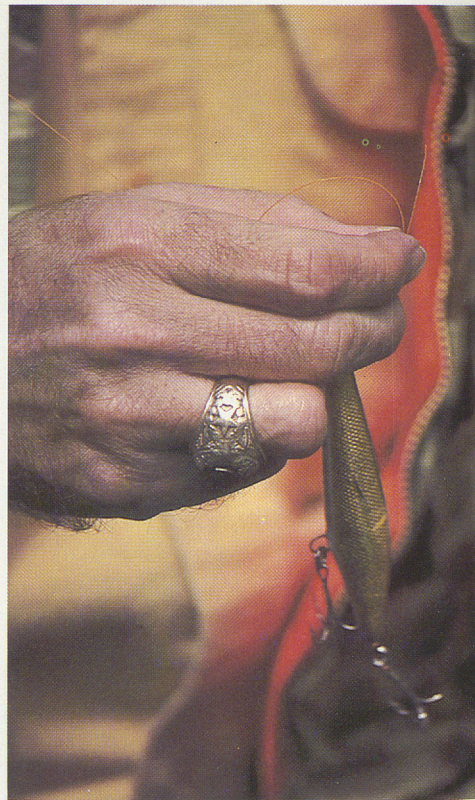
Ryan recommends light tackle for pickerel fishing, since the fish usually

*Top-water lures not only catch pickerel on Caddo Lake but a variety of other fish as well. Chain pickerel are named for the chainlike pattern on their sides which makes them distinctive-looking fish, although when seen swimming in the water they might be mistaken for gar. Pickerel have wide, flat mouths armed with an arsenal of sharp teeth, so don't use the traditional lower jaw-grabbing procedure for boating them. The best way to land a pickerel is with a net, then squeeze the gill plates.*

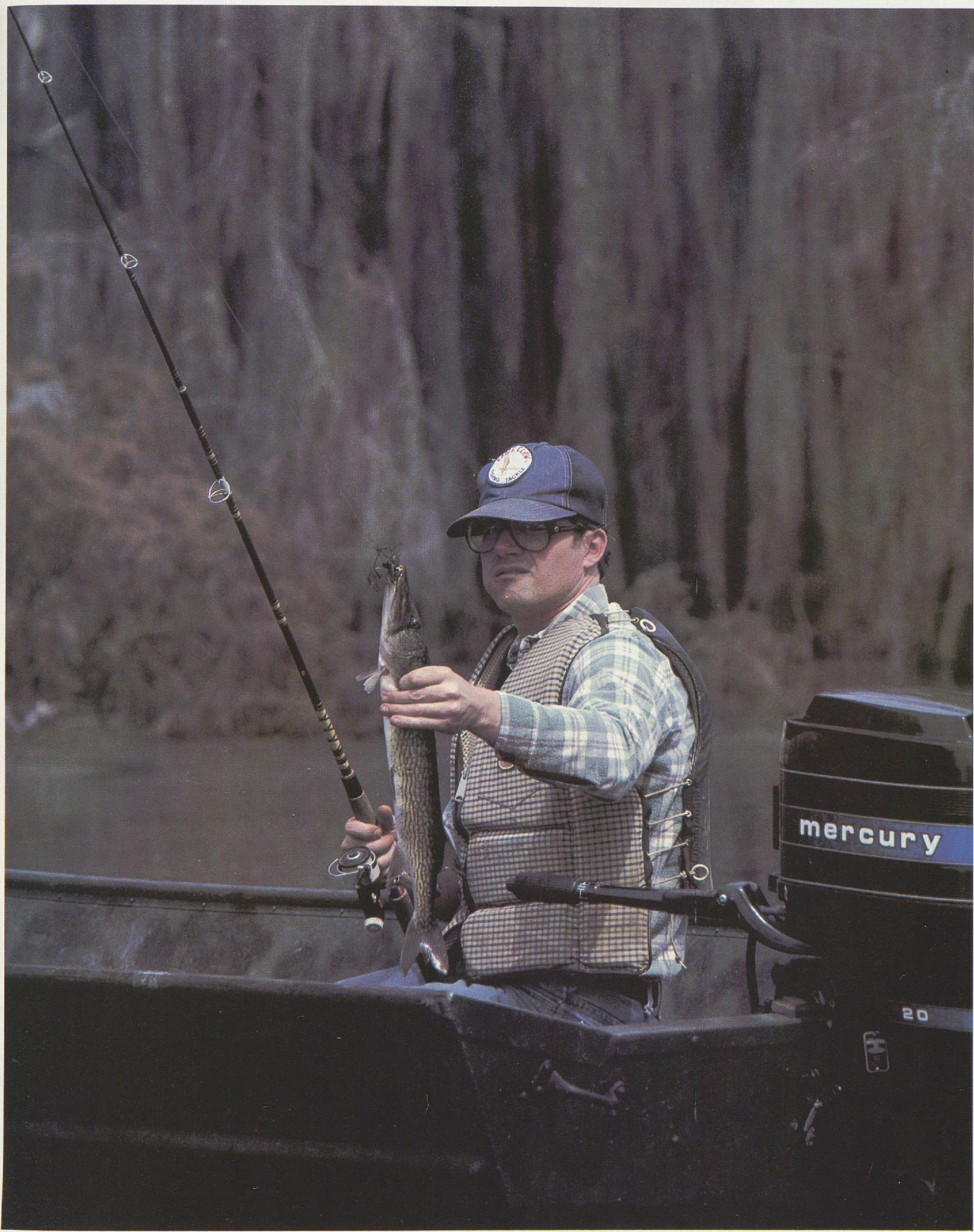
are not large and casting is easier with light equipment. A bait or spinning rig capable of handling three-eighths or one-fourth ounce lures is fine. Fly rod fishermen also can have a field day with pickerel, and the fish will readily take a top-water bass bug or any of a variety of streamers.

Although certainly sporting to catch, chain pickerel are not classified as game fish under state law. There is no bag limit on pickerel. Ryan said most fishermen release them, although some anglers have found them good for the table.

"I think pickerel are enough fun to deserve a special pickerel fishing trip," said Ryan, "but I'm certain that pickerel also can save the day when the bass or crappie are being uncooperative." \*\*









Leroy Williamson

# Paths in the Parks

by Mike Herring and John Ruben, Parks Division

Trails are excellent ways to take in state parks. Many parks have trails that traverse some of their most beautiful and inaccessible areas, and even a short walk can bring the park visitor closer to some of the area's plants, trees and wild flowers.

Since Texas state parks are so geographically diverse, the sights surrounding the trails change dramatically from one part of the state to the other. Trails can go through forests, past creeks, around lakes or over marshes. And there is a good chance of getting a glimpse of some of the wildlife that inhabits the park.

Trails in state parks are designated as nature/interpretive trails or hiking trails, and many parks have both. Nature trails usually are less than a mile long with informational stops to explain points of interest. Hiking trails are longer, with some hikes requiring more stamina than others. Only hiking trails of at least one mile are included in the following list. All designated nature trails are included.

Inks Lake, Lake Somerville, Fairfield Lake, Lost Maples and Pedernales Falls allow primitive camping for backpackers. Lakes Arrowhead, Mineral Wells and Somerville and Palo Duro Canyon have equestrian areas or trails. Rental horses are available at Palo Duro but visitors must bring their own at the others.

There are trails in state parks for people of all ages and inclinations. Taking time for a leisurely walk or a hike that makes every muscle tingle can be restorative, and it gives city folk an opportunity to explore worlds far removed from their everyday lives.

## NATURE/INTERPRETIVE TRAILS

**Abilene State Recreation Area's** Elm Creek Nature Trail winds through thick woods where Mississippi kites have nested. Oak and juniper dominate the hilly terrain, and pecan, willow and elm trees are abundant along Elm Creek. Guide posts and trail brochures available at the park identify particular points of interest along this short trail. Parts of the trail are accessible to the handicapped recreationist.

**Atlanta State Recreation Area's** 2.4-mile nature trail winds through an undeveloped area of the park. Several extensions of the trail form loops to allow short walks. The trail meanders through the tranquil forest and passes by a small creek. It terminates with a short extension along the shoreline of Wright Patman Lake where the deep blue water contrasts sharply with the red earthen bluffs and green vegetation.

**Bentsen-Rio Grande Valley State Park's** Singing Chaparral Nature Trail passes by many plants which provide food for a variety of bird life, and the park has become a haven for birders. The trail is named for the concentrations of birds within this brushland environment. Informational stops which correspond to a park brochure are located along this 1½-mile trail.

**Caddo Lake State Park's** Forest Nature Trail interprets the dense vegetation which forms a thick canopy of shade over the trail. Numbered stops corresponding to a brochure explain features of the diversified vegetation. Loblolly pine, dogwood, white oak, water oak, red oak, bald cypress and redbud are common along the trail, which is a little less than one mile long.

**Copper Breaks State Park's** Juniper Ridge Nature Trail is a one-half mile, self-guided interpretive trail which takes visitors through a portion of the rugged breaks or eroded canyons of the Pease River. Many areas off the trail are loose, unstable rock and users are asked to remain on the trail to avoid possible personal injury or creating further erosion.

**Galveston Island State Park's** Clapper Rail Nature Trail is one of the most unusual in the state, providing interpretation of the various ecological zones which comprise the park. The three-mile trail begins in the salt meadows and enters the marsh, where the uplands and the sea merge to form brackish saltwater ponds. Freshwater ponds are located in the meadows. The trail terminates with an observation point overlooking the surf and sea. Special features include bird blinds for photography and

a 1,000-foot boardwalk over the marsh. The boardwalk is accessible to the handicapped.

**Goliad State Historical Park** has two short trails. The River Trail offers a peaceful walk along the San Antonio River and the Aranama Trail goes through a subtropical woodland with emphasis placed on native plants used by the Aranama Indians and Spaniards. Parts of the trails are accessible to the handicapped. Goliad is located on the meeting ground of the Gulf Coast Prairie and the South Texas Brush Country and much of the park is riparian woodland associated with the San Antonio River.

**Huntsville State Park's** Big Chinquapin Nature Trail begins in a mature, mixed pine-hardwood forest dominated by shortleaf pine, sweetgum and post oak with an understory of dogwood and red maple. It passes a standing slough, fed by a seep-fed marsh. Across the marsh, the trail follows Big Chinquapin Creek. Bridges and boardwalks have not yet been constructed, so be prepared to encounter some wet or muddy spots and cross a creek or two. The trail is 1.3 miles long, so allow about one hour to walk it at a leisurely pace.

**Lake Brownwood State Recreation Area's** Texas Oaks Nature Trail is on an upland area overlooking the lake. It winds its way through an area of plants characteristic of the Edwards Plateau. The trail is just under a mile in length, and portions are accessible to the handicapped.

**Lyndon B. Johnson State Historical Park** has a 1.4-mile nature trail along which there are informational stops where a recording of the late President Johnson's voice conveys the message of the trail. The trail is accessible to the handicapped and passes through a living history exhibit of early 1900 farm life.

Trails at Caddo Lake State Park go through scenic East Texas forests adorned by lush foliage. Hiking trails cover more than three miles, and a nature trail just under a mile long interprets the dense vegetation which forms a thick canopy of shade.



Palmetto State Park's botanical garden has a tropical feel and appearance, and two nature trails point out interesting plants and features (above). Although the dunes at Monahans Sandhills State Park seem barren (right), attentive visitors can use various senses to appreciate the natural world of this unusual park.

McKinney Falls State Park's Smith Rock Shelter Nature Trail traverses the woodlands of Onion and Rinard Creeks and the edge of the savannah characteristic of the park's uplands. Smith Rock Shelter, an Indian campsite, and the remains of the McKinney homestead and mill may be observed from the trail, which is just under a mile long.

Mission Tejas State Historical Park has a one-mile nature trail, the Tejas Timber Trail. It is composed of two units, one of which completely encircles a small, picturesque pond. The park's abundant forest resources are the central theme of the trail and its interpretation.

Monahans Sandhills State Park has a short nature trail, and visitors must use various senses to appreciate the natural world of this unusual park. Listen for sounds produced by birds and insects. Look at the sand, especially early in the day, for signs of the previous night's activities. Tracks in the sand tell of the remarkable degree of activity in the foreboding, seemingly barren sand dunes.

Palmetto State Park's Palmetto and River Nature Trails total about one mile in length. Canopied by trees covered

with Spanish moss and vines, the ground is covered with thick stands of palmetto and other low-growing shrubs. The trails are well marked and interpreted, pointing out interesting plants and features. At one time, this area was called Ottine Swamp, and it is extremely rare to find such a profusion of plant life in this limited area.

Pedernales Falls State Park has a one-half-mile Hill Country Nature Trail that begins on the uplands adjacent to the river and descends to a lower ledge where typical river bottom habitat and a beautiful canyon can be observed. Numbered trail markers correspond to an interpretive booklet which points out some of the unique aspects of the park and typical Hill Country vegetation.

Sea Rim State Park's Gambusia Nature Trail offers visitors a unique opportunity to see a portion of the 15,000 acres of coastal marsh within the park. The trail, just under a mile in length, consists of an elevated boardwalk two feet above the marsh. Numbered trail markers correspond to an interpretive booklet which points out interesting aspects of the marsh.

Seminole Canyon State Historical Park has a 1½-mile interpretive trail, and guided tours depart daily from the visitor center. The trail goes to the Fate Bell Shelter Cave where visitors can see ancient Indian pictographs. The climb back up from the canyon floor is strenuous.

Tyler State Park's Whispering Pines Nature Trail passes through an East Texas mixed hardwood-pine woodland. Numbered stops and an interpretive booklet identify and explain various aspects of forest ecology along the short trail. This walk is especially beautiful in the spring when redbuds and dogwoods bloom.

#### HIKING TRAILS

Bastrop State Park has several miles of undeveloped trails that provide ample opportunity for hiking in the famous Lost Pines, an isolated timbered region of loblolly pines and hardwoods. An impressive array of plants and animals live within the boundaries of Bastrop State Park, many of them geographically isolated members of their species.

Bentsen-Rio Grande Valley State Park has a 1.8-mile hiking trail with loops of two different lengths. Hikers can experience the South Texas brushland, the Rio Grande and an old oxbow lake or resaca. Many of the plant and animal species at Bentsen-Rio Grande Valley are unique to the Southwest.

Caddo Lake State Park has 3.2 miles of hiking trails through scenic East Texas





Bill Reaves

forests. Lush vegetation adorns the trail, and the attentive hiker might see some rare and endangered plants as well. The trail provides access to an old Civilian Conservation Corps overlook from the 1930s.

**Copper Breaks State Park's Bull Canyon Hiking Trail** leads visitors from the breaks area to the uplands or mesas, a mixed grassland savannah with scattered mesquite trees. This is a pleasant, fairly easy hike about two miles long.

**Daingerfield State Park** has a scenic 2½-mile hiking trail that encircles a small lake. More than 42 different species of trees and other vegetation have been identified along the trail. Dogwood and redbud trees are in bloom in the spring, and in the fall the leaves of the many hardwood trees change colors, providing a vibrant setting for a hike. Portions of the trail are accessible to the handicapped.

**Davis Mountains State Park** has a trail that begins at the park's interpretive center, passes two overlooks on the park's highest ridge and connects with a trail which leads to the Fort Davis National Historic Site. The trail is more than four miles long one-way, so the round-trip could be a several-hour venture.

**Dinosaur Valley State Park** has a 1½-mile trail that crosses the Paluxy River into an undeveloped section of the park. Hikers can climb from the river up the steep, cedar and live oak-covered hills for scenic vistas of the park and a close look at Wildcat Hollow. The trail goes near the best-preserved dinosaur fossil footprints in Texas. Three types of prints are found in the park—sauropods, theropods and ornithopods.

**Eisenhower State Recreation Area** has a 4.2-mile trail that traverses the entire length of the park and passes through most of the major use areas, so hikers can begin their trek at several different points. One portion of the trail follows the scenic shoreline of Lake Texoma while other sections go through rugged ravines and grasslands.

**Enchanted Rock State Natural Area** has no formally developed trails, but there is ample opportunity for both hiking and rock climbing. A printed guide to the various climbs is available at the park headquarters.

**Fairfield Lake State Recreation Area** has a seven-mile hiking trail that passes through blackjack and post oak woodlands with scattered grassy clearings, goes around one arm of the lake and ends at Big Brown Creek Primitive Camping Area. This is an out-and-back trail, not a loop.

**Garner State Park** has numerous undeveloped hiking trails. Hikers can ex-

plore this beautiful park's rugged hills and spring-fed streams. Large bald cypress, oak, elm and pecan trees border the Frio River and the hilly slopes are covered with cedar, wild cherry, persimmons, madrones and Hill Country shrubs. Ferns and mosses are profuse in the ravines, and the valleys are blanketed with wild flowers in the spring. A short, paved hike and bike trail runs along the entrance road from the park headquarters to the main concession area.

**Hueco Tanks State Historical Park** has a few limited-access trails, but the opportunities for climbing and hiking among the mountains of boulders is almost unlimited. Chihuahuan Desert scrub vegetation surrounds the park and the upland vegetation is succulent desert grassland. There also is a relic oak-juniper woodland. Caves and rock formations displaying Indian Rock Art are the park's main attractions.

**Huntsville State Park** has an 8½-mile trail that loops around Raven Lake. It takes about four hours to hike the entire trail. Five miles of trail are designated for bicyclists and one mile is designated for handicapped users.

**Inks Lake State Park** has a system of loop trails totaling about seven miles, so hikers can choose a distance that suits them. Some portions of the trails provide access to the lakeshore, while others traverse the backcountry portions of the park amid granite outcroppings and cedar and oak woodlands. A primitive camping area is available for backpackers.

**Jim Hogg State Historical Park** has a one-mile trail and a three-mile trail. The shorter one departs from the main park road and goes through typical East Texas Pineywoods. The longer trail follows the park boundary through steep, wooded hills of mixed pine and hardwoods.

**Kerrville State Recreation Area** also has two trails. A one-half-mile trail winds its way along the shore of Flat Rock Lake on the Guadalupe River. A two-mile developed trail in the park's Hill Country Unit traverses typical Hill Country landscape, with acres of juniper, live oak, sumac, redbud and buckeye. There also are several miles of primitive trails where sightings of white-tailed deer and turkey are common.

**Lake Brownwood State Recreation Area** has a system of trails totaling 3½ miles in length. Most of them are along the shores of rustic Lake Brownwood, and connect some of the major use areas; portions are accessible to the handicapped recreationist.

**Lake Livingston State Recreation Area** has a system of interconnecting trails. They total about 4½ miles and join most of the major use areas. The trails

lead to the shoreline of scenic Lake Livingston in the East Texas Pineywoods.

**Lake Mineral Wells State Park** has a five-mile hiking trail. Some parts of the trail require more stamina and endurance than others, which are designed primarily for short nature walks. Vegetation in the park is typical of the Cross Timbers and Prairies. Upland savannahs are covered by grasses with scattered post oak, blackjack oak and mesquite. Canyons and bottomlands support pecan, red oak, cottonwood and cedar elm trees.

**Lake Somerville State Recreation Area's** Somerville Trailway is a 21-mile system that forms the longest single trail in any state park. It connects the Birch Creek Unit on the north side of the lake and the Nails Creek Unit on the south, and there are opportunities for backpacking and equestrian camping. The trail winds through post oak woodlands and yaupon thickets, along the shoreline and banks of Yegua Creek and Flag Pond. Wildlife is abundant, especially white-tailed deer and fox squirrels. The area is open to the public, but visitors should be aware of oil and gas exploration in the area. Additionally, the Birch Creek Unit and Nails Creek Unit each have trails contained within the unit that loop through the post oak woodlands and along the lakeshore. Each park unit has segments of trail designated for the handicapped.

**Lost Maples State Natural Area's** 10-mile hiking trail is well marked and color coded for easy orientation. Several trail loops offer options for distance and degree of difficulty. There are eight primitive camping areas with four portable toilets located along the trails. The trail offers easy access to view the spectacular fall colors of the bigtooth maples, and portions follow the Sabinal River and Can Creek. Other sections offer impressive vistas from high canyon rims.

**McKinney Falls State Park** has a three-mile, surfaced hike and bike trail which begins at the visitor center below the upper falls on Onion Creek. The trail passes through the day-use area along the creek, then loops through the upland woods and back to the visitor center.

**Meridian State Recreation Area** contains several small trails which interconnect and form a loop around Meridian Lake. The trails meander through undeveloped areas of the park where the terrain is rugged. The six-mile trail passes some interesting features, including a scenic overlook of the lake and a bee cave. Juniper is the dominant vegetation, the only vegetation within which the rare golden-cheeked warbler will nest.

**Mustang Island State Park** has a one-mile loop that winds through the marsh grass and dunes on the interior of Mustang Island. This route allows hikers to observe barrier island communities in real life. The trail head is located on Park Road 53, just south of the park entrance.

**Palo Duro Canyon State Park** has a 4½-mile trail that takes the hiker up Sunday Canyon. The trail passes some of Palo Duro's scenic formations formed by erosion, such as Sleeping Indian, Satanta's Face and the turnaround at the Lighthouse landmark.

**Pedernales Falls State Park's** Wolf Mountain Hiking Trail is seven miles long with primitive camping available. The trail is in rugged, hilly terrain along the Pedernales River, yet it is easy enough for people in reasonably good physical shape to hike. It traverses fern-lined creeks and small canyons which contain clear pools and waterfalls and perennially flowing Jones Spring.

**Seminole Canyon State Historical Park** has a six-mile trail which gives hikers a look at the hot and dry Chihuahuan Desert. The trail also provides a spectacular view of the upper end of Lake Amistad.

**Stephen F. Austin State Historical Park** has two separate trails totaling 2½ miles. One of them takes hikers to an overlook on the Brazos River and the other goes through a stand of large cottonwoods to the river bank.

**Tyler State Park** has a 2½-mile hiking trail that connects the park's major use areas. It encircles the 65-acre, spring-fed lake in this scenic park of pine forests and woodlands. Portions of the trail are accessible to the handicapped.

#### EQUESTRIAN TRAILS

**Lake Arrowhead State Recreation Area** has an 80-acre area designated for horseback riding. Semiarid, gently rolling prairies make this park a good one for horseback riding. Visitors must bring their own horses.

**Lake Mineral Wells State Park** has an 8½-mile equestrian trail. Camping is available, and there is adequate parking for 20 horse trailers.

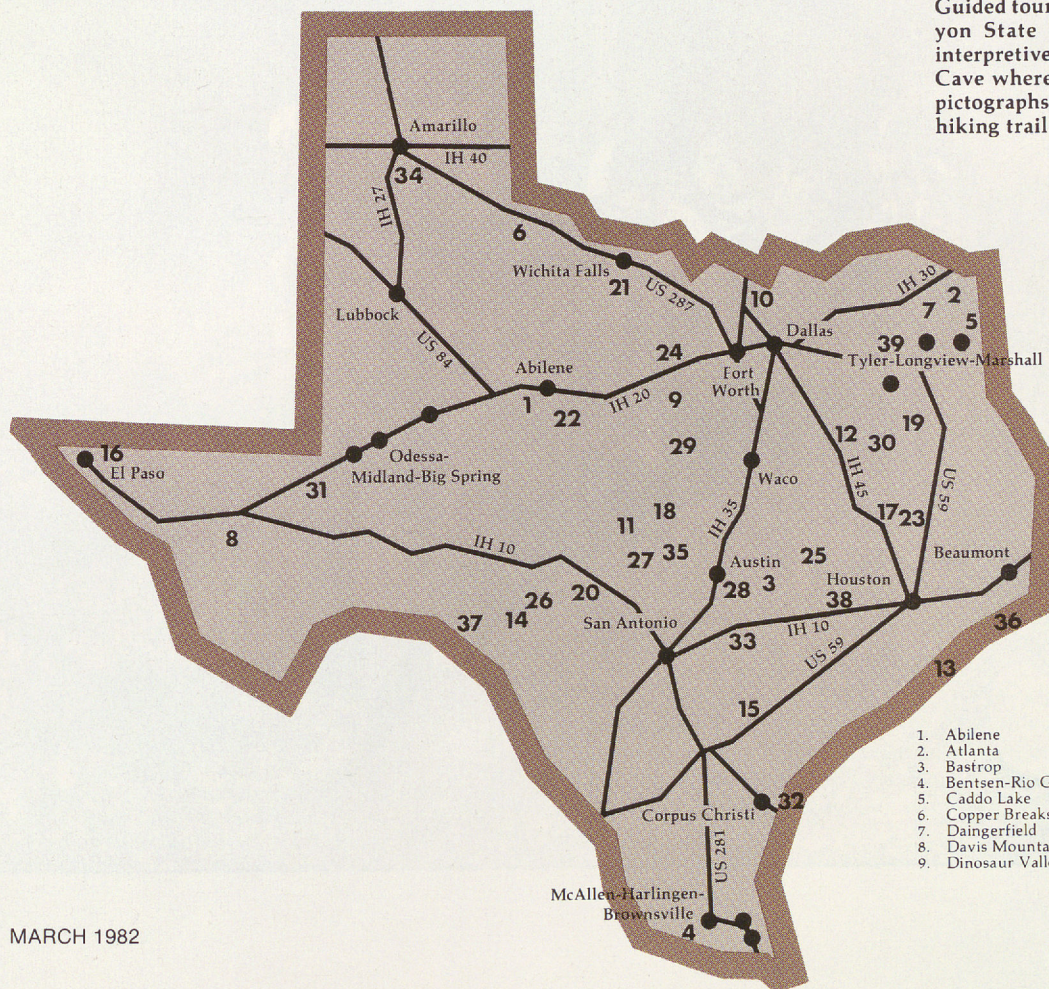
**Lake Somerville State Recreation Area's** Somerville Trailway, as previously mentioned, permits horseback riding and equestrian camping.

**Palo Duro Canyon State Park** has a 4½-mile equestrian trail. Like the hiking trail, it goes up Sunday Canyon, but the two trails do not share the same route. The trail begins at the riding stable, and passes some of the canyon's scenic erosional formations. Rental horses are available, or visitors may bring their own. \*\*



Bill Reaves

Guided tours are available at Seminole Canyon State Historical Park. The 1½-mile interpretive trail goes to the Fate Bell Shelter Cave where visitors can see ancient Indian pictographs. The park also has a six-mile hiking trail.



10. Eisenhower
11. Enchanted Rock
12. Fairfield Lake
13. Galveston Island
14. Garner
15. Goliad
16. Hueco Tanks
17. Huntsville
18. Inks Lake
19. Jim Hogg
20. Kerrville
21. Lake Arrowhead
22. Lake Brownwood
23. Lake Livingston
24. Lake Mineral Wells
25. Lake Somerville
26. Lost Maples
27. Lyndon B. Johnson
28. McKinney Falls
29. Meridian
30. Mission Tejas
31. Monahans Sandhills
32. Mustang Island
33. Palmetto
34. Palo Duro Canyon
35. Pedernales Falls
36. Sea Rim
37. Seminole Canyon
38. Stephen F. Austin
39. Tyler

1. Abilene
2. Atlanta
3. Bastrop
4. Bentsen-Rio Grande Valley
5. Caddo Lake
6. Copper Breaks
7. Daingerfield
8. Davis Mountains
9. Dinosaur Valley

Bill Reaves



T  
A  
V  
L  
by  
T  
S  
m  
ro  
th  
h  
m  
to  
tr  
u  
ci  
ci  
fo  
h  
is  
a  
h  
jo  
b  
in  
p  
s  
n  
r  
U  
h  
c  
f  
N  
P  
i  
N  
E  
o  
n  
T  
U  
a  
c  
L  
M



# Texas Trails Association

# Working for More Trails

by Mary-Love Bigony

**Trails** were the first roads in the United States. Pioneers followed Indian trails, making notches on the trees that surrounded them in the wilderness. At first these trails were traveled only on foot or horseback, but as more settlers began to move west, new trails were established to accommodate wagons.

As transportation improved, most trails fell into disuse. Roadways were upgraded as vehicles became more efficient. But today's highways and busy city streets are neither safe nor pleasant for pedestrians and nonmotorized vehicles, and efficiency in roadways often is accomplished at the expense of an area's aesthetic beauty. Trails once again have a place in American life-styles, for joggers in the heart of a city as well as backpackers in an East Texas forest.

Texas trails include a number of walking, hiking and nature trails in 39 state parks located in some of the state's most scenic areas. The National Park Service maintains developed trails and primitive routes in land it administers, as does the U.S. Forest Service. Several Texas cities have hike and bike trails or nature trails convenient for urban residents. Trails in five Texas cities have been designated National Recreation Trails because they provide a variety of outdoor recreation in or near urban areas: the Greer Island Nature Trail in Fort Worth; the Cargill

**Big Bend National Park's South Rim Trail is one of several trails and primitive routes maintained by the National Park Service. The Texas Parks and Wildlife Department, U.S. Forest Service and several Texas cities also administer trails for a variety of uses. The Texas Trails Association is working to develop and maintain trails for people with a broad range of interests.**

Long Park Trail in Longview; the Town Lake Walk and Bikeway in Austin; the San Antonio River Trail; and the Baker Park Nature Trail in Sherman.

But until recently, there was no coordinated effort between trail users in all parts of the state to develop and maintain trails to serve people of a variety of interests. The Texas Trails Association was formed in 1979 with the assistance of the Texas Parks and Wildlife Department and the Heritage Conservation and Recreation Service to promote statewide trail development for all trail users. Essentially an association of associations, the TTA is an umbrella group for individuals and organizations in every part of the state involved in recreational trail use. Its members are interested in hiking, nature walks, horseback riding, canoeing, bicycling, motorcycling and providing trail accessibility for the handicapped.

The organization grew from the Heritage Conservation and Recreation Service's national trails planning effort to establish trails offering a variety of recreational opportunities for people with a broad range of interests. In any state where a trails system has been established, a state trails association has come first. Thus, the Texas Trails Association was formed.

The TTA's primary goal is to promote trail development. Since only some two percent of the land in Texas is public property, the organization hopes to work out a method for using private land to establish long-distance trails. The TTA encourages cooperation among its members to make the needs of all trail users compatible, in order to establish multiuse trails and get the optimum use from a tract of land.

Another goal is legislation which would

benefit all Texas trail users. Association members have encouraged the Texas Legislature to create a Texas Trails System and a Trails Advisory Council to allow users to make comments on trail planning and development. The TTA also hopes to work with the Texas Parks and Wildlife Department to establish a system which would let trail users offer advice and assistance in trail planning in state parks.

The TTA believes in the strength in numbers theory. By combining the energy and enthusiasm of trail users across the state, the organization hopes to make its voice heard by the agencies which plan and administer trails. The group plans an annual trails symposium to foster the goal of cooperation among members. At the first symposium, held in the Davy Crockett National Forest in 1981, many members experimented with different trail uses by participating in activities other than their usual ones.

People interested in trail use should join a club that will represent their interest, or form a club if none exists in their area. TTA members can help you locate or organize a club for your particular interest, and then will urge your club to join TTA. By assuming part of the responsibility for trail development and maintenance, bikers, hikers, equestrians and canoeists can do a great deal to insure there will be safe and scenic trails where they can pursue these activities. \*\*

**Editor's Note:** The Texas Trails Association's second annual trails symposium is scheduled for March 27 and 28 at Bastrop State Park. For information about the Texas Trails Association contact Diane Spencer, Route 5, Box 734, Wichita Falls, 76301.

# COLORFUL C

Attwater's greater prairie chickens once were abundant game birds in southeast Texas, but habitat loss has reduced their numbers to about 1,500 birds. Courtship activities on the prairie chickens' booming grounds reach a peak in March.



T  
A  
th  
w  
th  
a  
p  
  
cu  
so

by Winifred B. Kessler

# GROUSE of the prairie

There was a time when the distinctive call of mating Attwater's prairie chickens was a familiar sound throughout the Texas coastal prairies during late winter and spring. Habitat loss gradually has reduced their numbers, but there are still a few locations where an observer can listen to this unique sound in the predawn darkness.

The Attwater's greater prairie chicken, *Tympanuchus cupido attwateri*, once was an abundant game bird in southeast Texas; now only about 1,500 exist on private

lands. Scattered populations are found in Colorado, Austin, Victoria, Harris, Galveston, Refugio, Brazoria, Aransas and Goliad Counties. The U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department have listed the bird as an endangered species.

The Attwater Prairie Chicken National Wildlife Refuge in Colorado County was established expressly for the preservation of the bird and its coastal prairie habitat. The public is welcome to visit the headquarters,

Entheos





During courtship, the male erects the winglike tufts on the sides of his neck, reveals the orangish bare skin over his eyes and inflates the bright golden air sacs on the sides of his neck. The less showy females (right) appear to ignore the spirited males but actually are discriminating in their choice of a mate. The cocks they select are the ones that successfully defend the choice, centrally located territories on the booming grounds.

and limited access is provided to areas of the refuge. The observant visitor may happen to view a flock of these rare Texas grouse on the wing or feeding along the roadside.

Courtship activities begin as early as late January, when the males assemble on flat, open areas called booming grounds. The spirited dancing, vocalizing and booming of the cocks make these areas come alive as they attempt to establish and defend individual territories within the booming ground. Any fighting which occurs is highly ritualized; feathers may fly, but serious injuries occur rarely if at all.

These daily assemblies continue until early May, but March is the month for peak breeding activity when the majority of the hens appear on the booming grounds. Smaller and somewhat less colorful than the male, the typical hen seems cool and coy despite the intensified activity of the males when a female is near. The hens slowly wander among the territories, pausing now and then to preen or to feed on young plant shoots.

Although these fickle females appear to ignore the spirited males, further observation reveals that the hens are hardly as nonchalant as they appear. They are, in fact, very selective in their final choice of a mate. The discriminating hens select cocks that are successful in defending the choice, centrally located territories on booming grounds.

Similar systems of mate selection, called polygyny, have been described for sage grouse, sharp-tailed grouse and both lesser and greater prairie chickens. In all, 12 grouse species are polygynous, with as much as

90 percent of the mating being done by 10 percent or less of the available males.

Mated females do not linger on the booming ground. They quickly leave for the protective cover of the prairie, and become secretive for the remainder of the season. The female assumes the tasks of nest building, incubation and brood rearing. Nests usually are located in grassy pastures where moderate cattle grazing has opened the plant cover. Grass litter and breast feathers provide a soft substrate for the 12 to 14 olive-colored eggs. Rapid plant growth in the spring provides concealment for the nests.

Hatching occurs after 23 to 26 days of incubation, and the well-formed young are able to walk almost immediately. The hen leads the brood from the nest site to pastures or fallow fields containing abundant insects and succulent plants. For the first few weeks of life, the young Attwater prairie chickens exist on a high-protein diet consisting primarily of insects. The brood groups gradually break up when the young are six to eight weeks old.

There is no sound quite like the booming calls of prairie chickens during their annual courtship ritual. Hopefully, Texas will continue to be a home for this colorful grouse of the prairies. \*\*

**Editor's Note:** For information on the Attwater Prairie Chicken National Wildlife Refuge contact: Manager, Attwater Prairie Chicken National Wildlife Refuge, P.O. Box 518, Eagle Lake, Texas 77434.



## BIG BUCKS TAKEN AT CHAPARRAL W.M.A.

The average weight of mature bucks taken during the public hunts on the Chaparral Wildlife Management Area near Artesia Wells in South Texas showed a marked increase of 25 pounds per deer over those taken last year.

Ernie Davis, manager of the area for the Parks and Wildlife Department, said antlers also were better this year.

Four of the 37 bucks taken during the public hunts were typical of the famous South Texas trophy bucks. The two heaviest each weighed 165 pounds, one a seven-pointer and the other a nine. Both were 7½ years old.

The seven-pointer had a main beam length of 25½ inches, a spread of almost 20 inches and a circumference of five inches at the base. The nine-pointer had a main beam length of 25 1/3 inches, a spread of 22 inches and a circumference of 4¾ inches at the base.

Hunter success was low this year—23 percent—with a total of 539 hunters harvesting 126 deer. Davis said lush range conditions and foggy mornings kept hunters from seeing large numbers of deer.

## STRIPER IDENTIFICATION SHEET OFFERED BY TP&WD

With the spring striped bass and white bass spawning season here, anglers may be interested in a free leaflet explaining how to identify the fish.

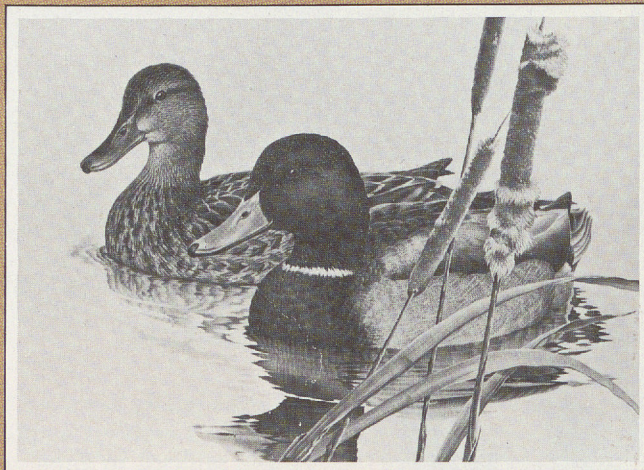
This leaflet, produced by the Texas Parks and Wildlife Department, includes illustrations of a striper, white bass and a striped/white bass hybrid.

Identification of the three species can be accomplished by observing general body shape, markings such as stripes and by tooth patches on the tongue.

To obtain the flyer, write the Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, or call toll-free 1-800-792-1112.

# Outdoor Roundup

COMPILED BY THE  
PARKS AND WILDLIFE  
DEPARTMENT'S NEWS SERVICE



## STAMP, PRINT SALES EARN DOLLARS FOR WATERFOWL

Sales of state waterfowl stamps and print reproductions of artwork used on the 1981 stamps will earn more than \$1.4 million to benefit Texas' migratory waterfowl.

Texas Parks and Wildlife Department officials said final totals have not yet been counted for the first year of the two new programs, but they expect sales of the \$5 waterfowl stamps to exceed \$750,000, and royalties from sales of 16,000-plus prints will bring in an additional \$670,000.

The 67th Texas Legislature authorized the Parks and Wildlife Department to establish the state waterfowl stamp for the 1981-82 hunting season. The bill also enabled the department to sell the prints on a bid basis.

Ted Clark, the department's Wildlife Division director, said he believes Texas' waterfowl

stamp and print program was the most successful first effort by any state. "Money from these two sources will go directly into programs for waterfowl, including management, research and habitat acquisition," Clark said.

The state waterfowl stamp is required of waterfowl hunters in addition to a valid hunting license. Federal law also requires waterfowl hunters to have a federal waterfowl stamp.

Collectors Covey of Dallas was the successful bidder for production and sales of the art prints, guaranteeing the state a minimum royalty of \$300,000. The artwork of Larry Hayden of Michigan was sponsored by Collectors Covey for use on the stamp.

Artists or sponsoring organizations have until April 1 to submit bids for artwork to be considered for the 1982-83 stamp program to the Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. For further information about the stamp, call the department's toll-free number, 1-800-792-1112.

## BOBCAT PELT EXPORT BAN UPHELD IN COURT

An injunction prohibiting the international export of bobcat pelts taken after July 1, 1981, from Texas and other states will continue indefinitely.

A federal court in Washington, D.C. recently upheld the injunction which is part of a long-standing court battle between a preservation group and the federal government.

Plaintiffs in the case, The Defenders of Wildlife, Inc., filed the suit against the Office of Scientific Authority, claiming that taking and exporting of pelts is detrimental to bobcat populations.

The recent ruling in effect prohibits the U.S. Fish and Wildlife Service from authorizing export of bobcat pelts taken after July 1, 1981, until the agency develops guidelines for bobcat harvest based on population and harvest estimates acceptable to the court in each state.

Parks and Wildlife Department officials said the Texas bobcat taking and tagging season closed February 15, 1982. Regardless of the court ruling, the state still requires bobcat pelts to be tagged when taken for the purpose of selling or shipping them out of state. Inquiries on the current tagging program should be directed to John T. Roberson, Wildlife Division, Texas Parks and Wildlife Department, Austin, Texas 78744, (512) 479-4800.

## RECORD-SIZED GAFFTOP CERTIFIED

A 13.3-pound gafftopsail catfish caught at the mouth of the Brazos River during December has been certified by the Texas Parks and Wildlife Department as a new state record.

The fish, caught by Herman Frank Koehne, Jr. of Houston, breaks a record which has been in the books for 16 years. The former record was a nine-pounder taken by Fabian Koroncok of Houston at Matagorda Bay in 1965.

The gafftop was 34 inches long and 18 inches in girth. It was caught on 20-pound-test line, using dead bait.

## BOAT ASSOCIATION GIVES MONEY FOR REEF MARKERS

The Boating Trades Association of Texas has contributed \$6,800 to the Texas Parks and Wildlife Department to purchase 95 buoys for marking locations of fish attractor reefs in 20 Texas reservoirs.

Department officials said they also were assisted by the Sportsmen's Clubs of Texas (SCOT) in obtaining specifications and other details for the reef-marking project.

Sportsmen's and fishing clubs around the state have cooperated with the department in collecting old tires and other materials and placing them in lakes as fish attractors. Some of the reef locations already are marked with buoys.

Plans call for buoys to mark reefs in lakes Calaveras, Braunig, Medina, Oak Creek, Kemp, Carter, Ray Hubbard, Texana, Halbert, Fork, Tawakoni, Bonham, Long, LBJ, Arlington, Mineral Wells, Nacogdoches, San Augustine, Palestine and Cleburne.

## TP&WD BIOLOGIST HONORED BY WRITERS

Texas Parks and Wildlife Department waterfowl biologist Charles D. Stutzenbaker of Port Arthur was named "Professional Conservationist of the Year" by the Texas Outdoor Writers Association at its annual meeting in Austin on January 23.

Alan Allen, executive director of the Sportsmen's Clubs of Texas, who nominated Stutzenbaker for the honor, said the biologist was singled out for the honor primarily for his recent work in the department's establishment of nontoxic (steel) shot zones for waterfowl hunting in the state.

## BOAT SAFETY COURSE OFFERED FOR COMMUNITY EDUCATION

Water Safety officials of the Texas Parks and Wildlife Department are making their Texas Better Boating course available to the public through community education programs in the public schools.

Persons interested in taking the boating safety course should contact their local school district to determine if it is available.

Officials said the course's main emphasis is on power boating, but can be modified to cover whitewater canoeing and sailing.

If a boating safety course cannot be located in your area, contact the Water Safety Section, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, or call toll-free 1-800-792-1112.

## DUCK HUNTERS DISAPPOINTED BY POOR SEASON

Weather conditions put a damper on duck hunting success during the season which closed January 17, but goose hunters reported having generally good hunting.

Texas Parks and Wildlife Department waterfowl program leader Charles Stutzenbaker of Port Arthur said the duck season was poor because of two weather-related factors. "Ducks had a poor reproductive season for the second year in a row on the northern prairies because of dry

conditions," Stutzenbaker said. "Then an unusually mild fall and early winter apparently caused a leisurely migration."

He said harvest surveys will not be completed until later, but indications are the statewide harvest in 1981-82 was below last year's figures.

However, goose hunting was generally good in the upper coastal prairie region, where traditionally 90 percent of the statewide harvest occurs. "Geese which nest primarily in the

## SIERRA DIABLO HUNTS CALLED EXCELLENT

Mule deer hunters on the Sierra Diablo Wildlife Management Area operated by the Texas Parks and Wildlife Department had excellent success during the 1981 hunt.

Biologist Jack Kilpatric of Marfa said 43 hunters brought in 25 bucks and eight does for a 77 percent hunter success rate on the 7,800-acre area located 32 miles northwest of Van Horn in Culberson County.

All the deer taken were in excellent body condition, but they were young, said Ray Watley, area manager. "We have a good population of mule deer on the area, about one to 35 acres, an upswing from the drought two years ago," he said.

The heaviest buck taken was a 5½-year-old nine-pointer weighing 169 pounds and having a 17-inch inside spread. A 4½-year-old eight-pointer weighing 165 pounds with a 22½-inch inside spread also was taken. The average weight of the 25 bucks removed from the area was 126 pounds. Several of the bucks had 10 points.

The largest doe field dressed 100 pounds and was 4½ years old.

Watley attributed the good deer population and body condition to a better than average rainfall during 1981. Almost 20 inches of rain fell on the area which usually receives only 12 to 15 inches per year.

Sierra Diablo is the only state wildlife management area where mule deer public hunts were held.

Arctic were affected much less by dry nesting conditions in Canada than were the ducks," Stutzenbaker said. "There were good numbers of geese, and about 40 percent were yearling birds, which makes for good hunting success."

Although duck populations are down, Stutzenbaker said a rapid comeback is possible if the Canadian nesting areas receive heavy snows in the next few months. "So far it looks as though there's a pretty good chance for more snow up there this winter. One good nesting season can make a significant difference in duck populations."

## STRIPER LIMITS INCREASED FOR LAKE TEXOMA ANGLERS

Fishermen now will be able to enjoy increased bag limits on the popular striped bass in Lake Texoma.

The Texas Parks and Wildlife Commission has increased the daily bag limit from five to 15, and raised the possession limit from 10 to 30. However, no more than five stripers longer than 20 inches may be retained daily.

The more liberal limits were authorized in response to biological surveys showing the lake has high numbers of stripers in the smaller age classes, resulting from outstanding reproduction in the lake.

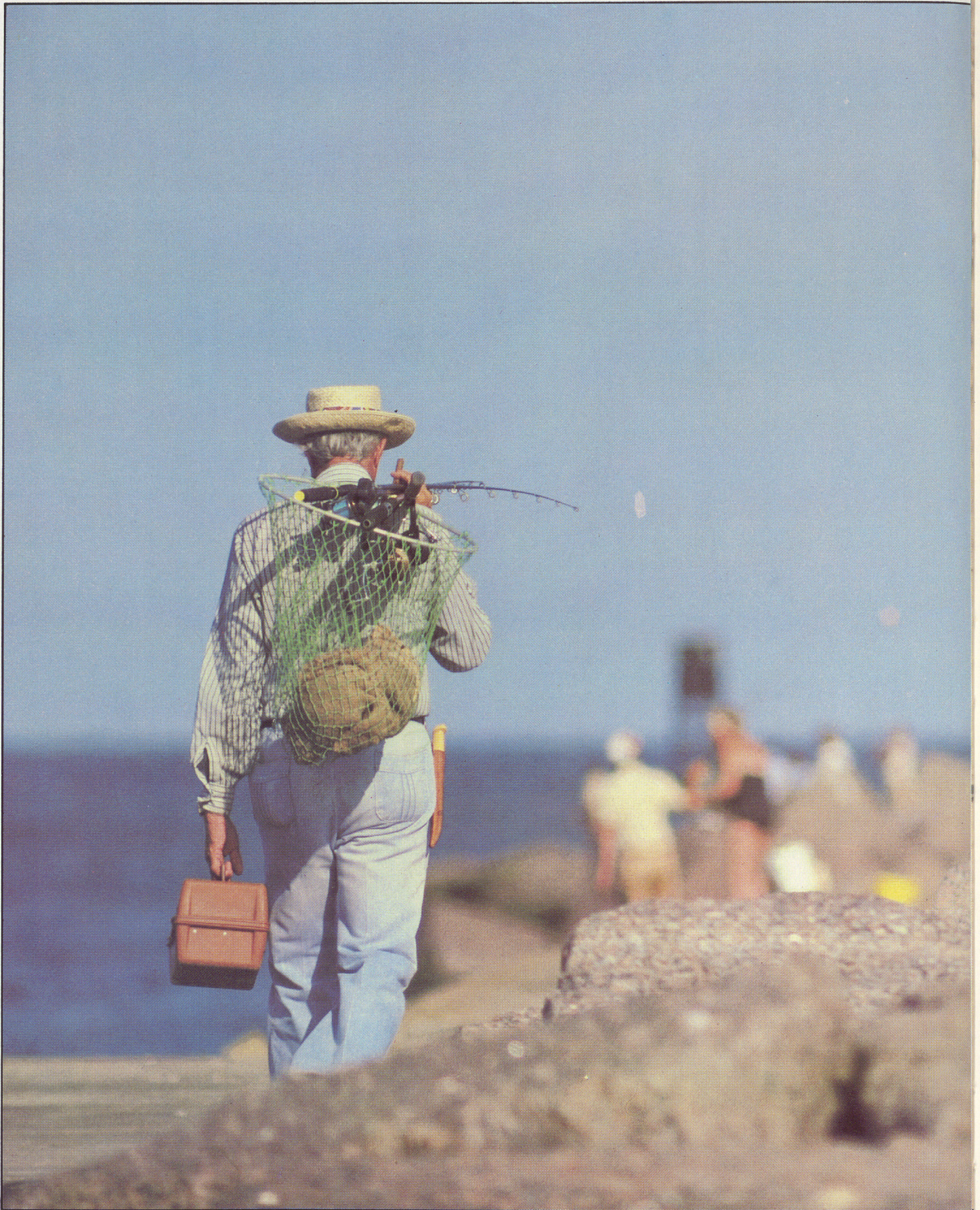
The limits are identical to those imposed by Oklahoma fisheries authorities for their portion of the Texas-Oklahoma border reservoir.

Anglers also should be aware that a special Lake Texoma fishing license is available. The \$5 license, available at license outlets in the Texoma area, allows the holder to fish both Texas and Oklahoma waters of the reservoir. It is not valid, however, on any other reservoir.

## APRIL IN . . .

# TEXAS PARKS & WILDLIFE

Spring will be welcome after this year's tough winter, and spring in Texas means wildflowers. Our photo story next month is on the diversity of the state's wildflowers, with photos by Paul Montgomery. Schools have discovered that state parks are excellent laboratories for their outdoor education curricula. The fifth graders at Austin's Zavala Elementary make a twice-yearly trip to Pedernales Falls State Park in the Hill Country to learn the basics of camping and other outdoor skills; we'll follow along with them. April is a great month for redear sunfish fishing, and we'll give you some tips for an enjoyable outing. We'll also look at the damage being done by indiscriminate cactus collecting. Also in April are stories on the Kleberg Wildlife Research Institute and sportfishing in the Upper Laguna Madre.



Tr  
Co  
ter  
fis  
wh  
ce  
pa  
ha  
fo  
(co  
an  
of  
av  
  
the  
is  
of  
lim  
Pa  
an  
vic  
  
are  
Pa  
an  
off  
co  
are  
  
A  
sys  
pri  
  
Fis  
Ch  
the  
bo  
wa  
sh  
pu  
ho  
oth



# SPORTFISHING TEXAS BAYS: CORPUS CHRISTI ITS SHALLOW WATERS TEEM WITH FISH

Article by Karen Thompson and Page  
Campbell-Hostettler, Coastal Fisheries  
Photos by Bill Reaves

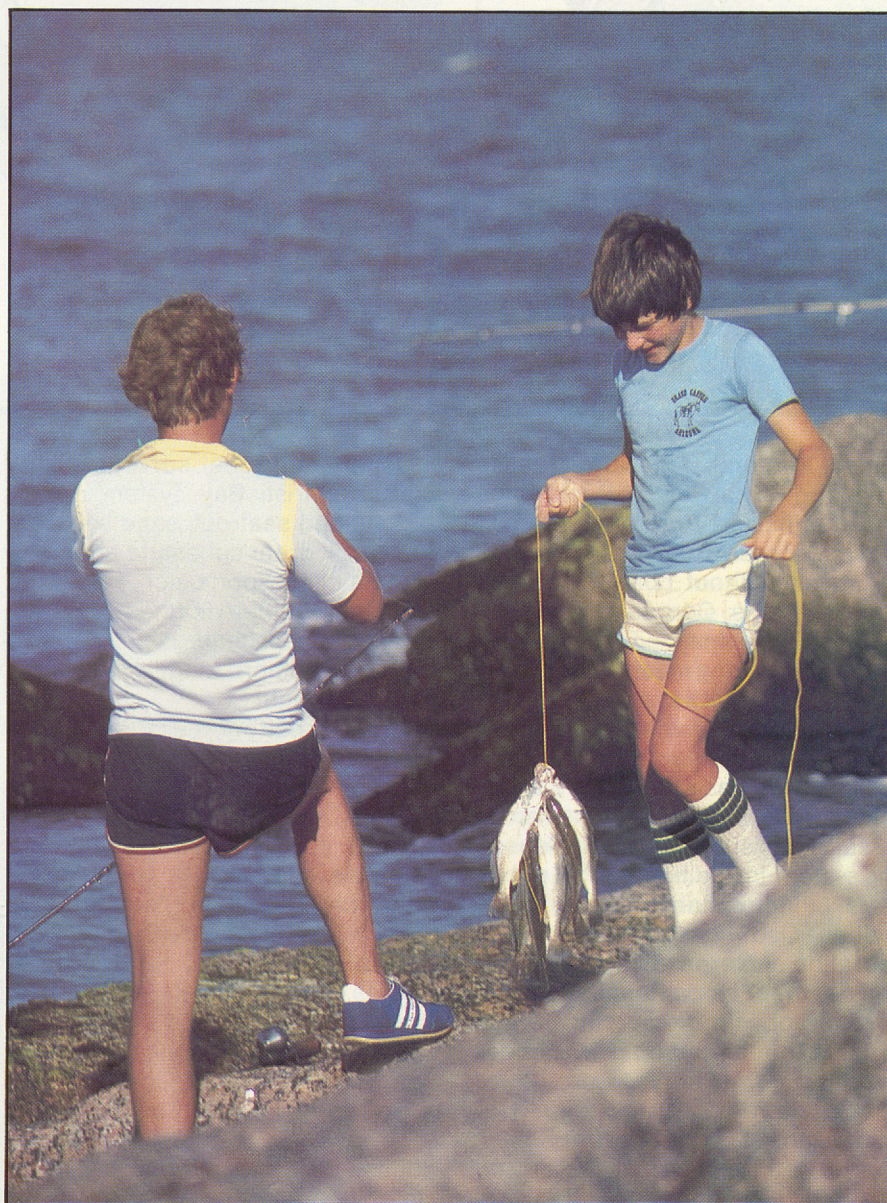
**Traveling** along the Texas Gulf Coast, the sport fisherman encounters a number of areas in which to fish. The Corpus Christi Bay system, which includes Corpus Christi, Nueces, Oso and Redfish Bays, encompasses 124,796 surface acres and has 127 miles of shoreline. Of the four, Corpus Christi Bay is the largest (covering three-fourths of the system) and deepest with an average depth of 11 feet. The other three bays average only two feet.

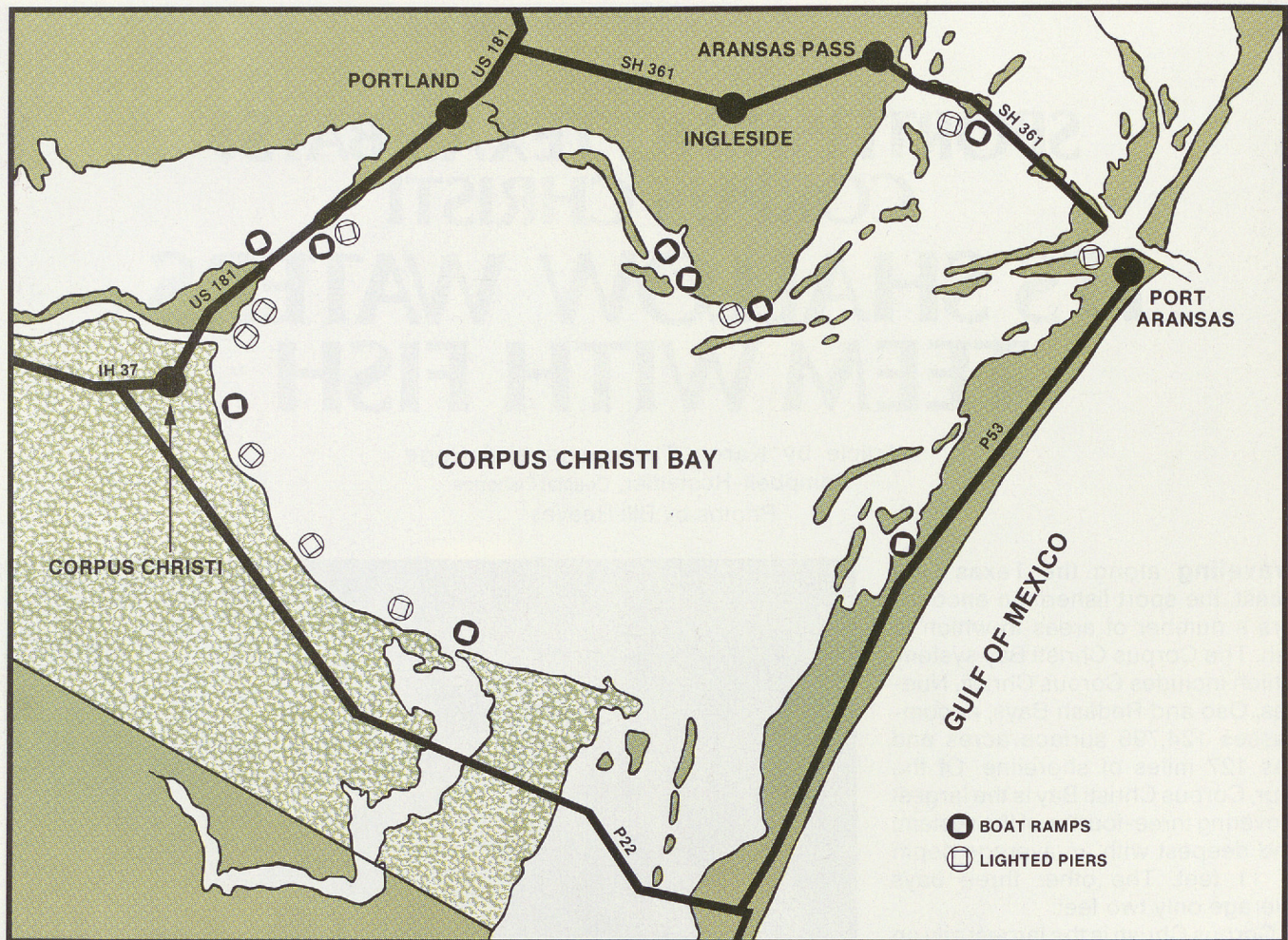
Corpus Christi is the largest city on the bay system. The downtown area is located on the western boundary of Corpus Christi Bay but its city limits extend as far as Mustang and Padre Islands. More than 3,000 hotel and motel units provide many services for visiting sport fishermen.

Camping facilities are available all around the bay. Mustang Island State Park, located between Flour Bluff and Port Aransas on Park Road 53, offers some of the best and most comfortable camping facilities in the area.

Access to the Corpus Christi Bay system is provided by 13 public and private boat ramps located in Corpus

*Fishing is good all year in the Corpus Christi Bay system. Anglers can launch their boats from 13 public and private boat ramps, and those without boats can wade or bank fish along much of the shoreline or use the jetties and lighted public piers. Successful anglers can take home good catches of seatrout and other prized fish.*





Christi, Portland, Ingleside, Aransas Pass and Port Aransas. Boat ramps and marinas in Port Aransas also provide access to the Gulf of Mexico.

Anglers without boats also have access to the Corpus Christi Bay system. They may enjoy wade or bank fishing along much of the shoreline. Public parks along Corpus Christi's Ocean Drive are particularly suitable for this activity. In these parks, as well as along shore areas of Nueces Bay, visitors might want to try sail-line fishing, a sport unique to this system. In addition, lighted public piers (which charge a small fee) include Oso Pier on the western shoreline of Corpus Christi Bay, Fin and Feather Pier on Redfish Bay and several public park piers in Corpus Christi. Another public pier is under construction next to the South Nueces Causeway boat ramp. Finally, in Port Aransas and Corpus Christi, charter boats and headboats may be boarded for either bay or Gulf fishing.

Department creel surveys in the Corpus Christi Bay system reveal that spotted seatrout, sand seatrout and black drum constitute about 70 percent of the sport catch. However, red drum, southern flounder, Atlantic croaker, sheepshead, gafftopsail catfish and southern kingfish (whiting) also are caught.

Spotted seatrout, the most sought-after sport fish, are caught year-round by fishermen familiar with their seasonal habits. During winter, spotted seatrout are found in holes and channels such as the Intracoastal Waterway, La Quinta Channel, Corpus Christi Ship Channel and Conn Brown Harbor. During warmer months, spotted seatrout frequent shallow grass flats and sand bars in early morning and late evening. Spawning sow trout are common during late spring and summer along back bay shorelines such as western Nueces Bay, lower Redfish Bay and the cove areas of Ingleside, Sham-

rock and Mustang Island. The average spotted seatrout caught by sport fishermen in Corpus Christi Bay weighs over one pound, with the large sows reaching eight pounds or more.

Sand seatrout, cousins to spotted seatrout, are abundant and caught all year in the Corpus Christi Bay system. Although smaller on the average than spotted seatrout, sand seatrout weighing up to one pound may be caught during fall and winter. Sand seatrout are a favorite of both boat and pier fishermen because they will strike a variety of baits.

Black drum are caught all year in the Corpus Christi area, but catches are low during winter. Small butterfly drum are caught most often from late fall through early spring. Black drum as large as 50 pounds are commonly caught during the spring (February through March) drum run when the fish school prior to spawning. Preferred habitats of black drum include

ship channels, the intracoastal Waterway, deep-water holes and areas around fishing piers and submerged reefs.

Highly prized red drum are best caught by wade fishing shallow waters and grass flats during warmer months and by fishing deep-water holes and channels during cooler months. Popular red drum fishing areas include Shamrock Cove on the western shore of Mustang Island, the grass flats in Nueces and Redfish Bays and the shoreline in and around Ingleside. Creel surveys indicate that the average red drum in the Corpus Christi Bay system weighs more than two pounds, but eight- to 10-pound red drum are common. They also are caught in channels and passes such as the Mustang Island Fish Pass which lead into the Gulf of Mexico, where red drum spawn.

Southern flounder are caught primarily during the fall when rod and reel fishermen and gig fishermen line the shores of passes and channels as the fish make their annual spawning migration to the Gulf of Mexico. However, good flounder

catches also occur during spring and summer in the Corpus Christi Bay system.

The onset of fall also triggers the brief Atlantic croaker run in Corpus Christi Bay. Fish up to two pounds are common during the run, but smaller croaker are abundant year-round throughout the bay. Good catches of Atlantic croaker occur in the channels near the Gulf of Mexico, in and around the Port Aransas jetties and off the rocks just east of downtown Corpus Christi.

Baits used in the Corpus Christi Bay system vary according to fisherman preference and type of fish sought. Live shrimp is by far the most popular and successful bait for red drum and spotted seatrout. Freshly dead shrimp and live finger mullet are also good baits for red drum. Live fish, such as pigfish (piggy perch), attract large spotted seatrout. Popular artificial baits for red drum include gold spoons, silver spoons and lead-headed jigs. Fish-shaped lures and speck rigs of many colors successfully catch spotted seatrout. Southern flounder are attracted to live bait

such as sheepshead minnows and finger mullet. Red worm jigs with a strip of flounder belly attached to the back and artificial shrimp bounced along the bottom also catch southern flounder. Black drum fishermen bait bottom rigs with dead shrimp, live fiddler crabs and small live fish. When fished with live or dead bait, the bottom rig, the flounder rig and the popping cork are successful baits.

Saltwater angling is a rewarding experience, especially in the Corpus Christi area, so pack your rods and reels and go give it a try. \*\*

Next month: Upper Laguna Madre.



### WILDLIFE PICTURES

By some of the State's most accomplished game photographers. These beautiful full color pictures come either unframed or framed in handsome wood ready to hang in your home or office. Can you think of a friend who would *not* like to receive one as a gift?!

WRITE FOR A FREE BROCHURE OF ALL OUR PICTURES TODAY!



**southwest  
wilderness art inc.**  
8812 Lockway Dept. PW  
San Antonio, Tex. 78217

*Continuing to bring you excellence  
in Wildlife Photography*



## FREE ARMADILLO PRINT

When you order a two-year subscription to TEXAS PARKS & WILDLIFE magazine, you are eligible to receive a full-color poster of that Texas favorite, the armadillo.

This 16- by 20-inch print by wildlife artist Terry Burleson, whose work has appeared in our magazine, is yours free.

All you have to do is ask for it when you place your order.

Not offered for sale, the armadillo print is available only with a two-year subscription to TEXAS PARKS & WILDLIFE magazine.

Send in your request today to extend your own subscription for two years or give a two-year subscription to a friend.

And remember, to receive the armadillo print, you must ask for it.

# STOP POACHING

## OPERATION GAME THIEF

Reward for information leading to the conviction of game and fish law violators. Call day or night.

**1-(800) 792-GAME**

### AFRICA IN TEXAS®

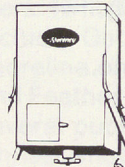
Photo Safari Sunrise to Sunset  
32 Species on 100 Square Miles  
Y.O. Ranch, Box TP, Mt. Home, TX 78058. 512-640-3222

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City, State, Zip \_\_\_\_\_

## THE DEPENDABLE RAIN OR SHINE

**Sweeney**  
AUTOMATIC  
FEEDERS

Deer, turkey, quail, songbirds, fish... attracts new wildlife. Sizes and styles to fit all needs... You preset for desired amount and time of feeding. Operates rain or shine... so dependable, 80% are repeat buyers.



Used and endorsed by Sportsman  
**Bob Lilly**

Former Dallas Cowboy,  
All-pro Tackle and Professional  
Football Hall of Fame.

**FREE  
BROCHURE**

SWEENEY ENTERPRISES, INC.

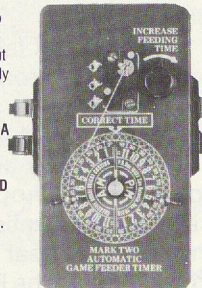
Route 2, Box 2452, Dept. TP Boerne, Tx 78006 (512) 537-4244

## RAIN OR SHINE

### GAME FEEDER COMPONENTS

Our components are designed to enable you to build your own Automatic Game Feeder for about half the price of one commercially made. We offer you:

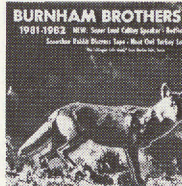
- (1) A 24 HOUR, 12 VOLT, QUARTZ TIMER. AVAILABLE AS A KIT OR FULLY ASSEMBLED AND TESTED.
  - (2) A 12 VOLT MOTORIZED FEED DISTRIBUTION SYSTEM.
  - (3) A BARREL CONE TEMPLATE.
- All you furnish is the barrel, a battery, and legs for the complete feeder.



For details call (512) 653-7514 after 5 p.m. or write to:  
SPIN-CAST INC. • P.O. BOX 18521 • SAN ANTONIO, TX 78218

## FREE!

### BURNHAM'S NEW CATALOG



CALL YOUR GAME UP CLOSE — varmints, crows, deer, elk, Hand & electronic calls, tapes, Red Beam Spot & Scope Lites. **Guaranteed to work or money back.** 52 pages of hunting, trapping, outdoor needs! For Calling Story Booklet, send \$1.

WRITE NOW for FREE Catalog.

### BURNHAM BROTHERS®

P.O. Box E-32-CT Marble Falls, Texas 78654



### AUTOMATIC ELECTRIC FEEDERS

GAME—FISH  
LIVESTOCK

For remote areas. Extremely effective in maintaining resident game in your hunting areas, with minimum feed consumption. Battery powered with inexpensive dry cell. Optional rechargeable battery and continuous Solar Charger now available. Direct factory sales—Best Prices—shipped fully assembled anywhere. Patented all-solid-state electronic timer—Reliable—3 year warranty. Dispenser unit available separately. Thousands in use nation wide. Sold since 1964. Send for free brochure on complete line of feeders, and tips on automatic game feeding.

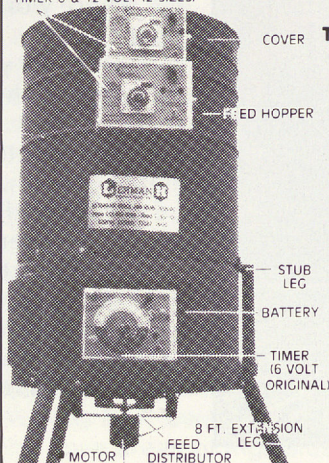
SPECIALTY SYSTEMS, INC.

5911 Bullard Drive, Austin, Texas 78731, (512) 454-3355

### SOLAR PANELS

available -  
professional quality  
with ample output.

TIMER 6 & 12 VOLT (2 SIZES)



### LEHMAN H AUTOMATIC FEEDERS

FISHERMEN • HUNTERS • BIRDWATCHERS

**TIME TESTED & HIGHLY REPUTABLE • 12,000 PLUS SOLD**

- 1 Feed one or more times day/night unattended
- 2 Distributes feed 25 to 75 feet. Install suspended, on pipe legs or floating
- 3 Capacities: 250 or 1000 pound sizes
- 4 This ORIGINAL Lehman feeder is specially made from galvanized metal

The timer is the most important item in an automatic feeder. Lehman H brings you their completely new 6 or 12 volt operated Quartz Solid State timer that adapts to all types of similar feeding systems. Smaller — Easy to set.

- 1 Designed for 6 or 12 volt battery and motor operation.
- 2 Dry cell or rechargeable battery
- 3 The most accurate and reliable timer on the market.
- 4 Allows you to feed from one to as many as 24 exact times in a 24 hour period.

Two Quality Timers Available

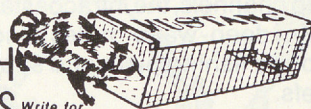
- 1 The original 6 volt — over 12,000 sold.
- 2 A newly patented solid state 6 or 12 volt timer.

Fully guaranteed. Write for FREE BROCHURE or see one of our many authorized dealers.

### LEHMAN H FEEDER & PLOW, INC.

(512) 855-0049 Route 3, Box 53, Corpus Christi, Texas 78415

### LIVE- CATCH TRAPS



Write for  
FREE CATALOG

Traps without injury squirrels, chipmunks, rabbits, mink, fox, raccoons, stray animals, pets, etc. Sizes for every need. Save on our low factory prices. Send no money. Write for free catalog and trapping secrets. MUSTANG MFG. CO., Dept. N-37 Box 10880, Houston, Tex. 77018, (713) 682-0811

NOW Enjoy your very own...



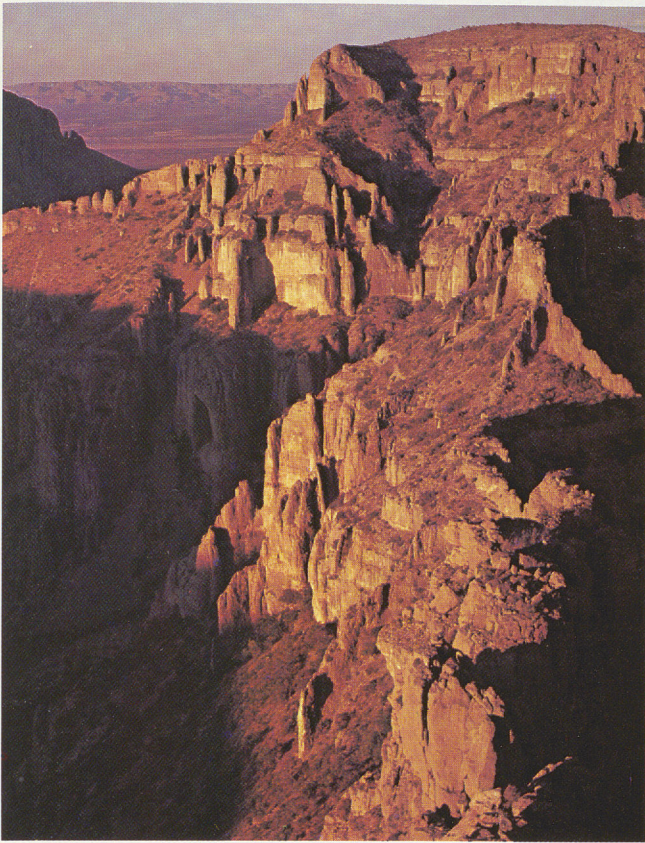
8 FEEDING STATIONS — 4 PERCHES  
LEAKPROOF 16-32-48-64 oz!

**MONEY BACK GUARANTEED LEAKPROOF**, this beautiful feeder with its crystal-clear shatterproof reservoir comes assembled — no fooling around! New brush-size hole for easy cleaning & filling. 4 removable/adjustable perches attract more hummers, adding 6 times usual play/feeding space for the "hummer-in-the-manger" to guard! Tired filling flimsy little feeders that leak & break? Here's solid quality lasting for years! FREE vitamin sample, instructions. Pint \$21, quart \$25, 1/2 gallon \$40. 16" iron T-bracket \$6.95. **ALL PREPAID.** Experienced observers & millions of belligerent comedians enjoy this acrobat-inviting design. Now you can enjoy your very own HUMMINGBIRD CIRCUS by calling **TOLL FREE 1-800-525-3451 on days, nights or weekends. In Colorado, call 245-1616 collect. VISA/MC accepted.**

DEALER INQUIRIES INVITED

### BIRD PRODUCTS

POB 2645R 171 Little Pk. Rd., Grand Jct., CO 81502



## THE TEXAS HILL COUNTRY

### Interpretations by Thirteen Artists

*Introduction by* A. C. GREENE

*Foreword by* JOHN PALMER LEEPER

Stunning color plates reveal the heartland of Texas as seen by thirteen noted Texas artists. Included are watercolors of land and wildlife by Ivan McDougal and Clay McGaughy; the clearly lighted barns and farmhouses of Ancel E. Nunn; impressions of rock and sky, woods and water by Michael Frary and William Hoey; the inimitable watercolors of E.M. "Buck" Schiwetz; the sunlight on water and field of Emily Guthrie Smith; brilliant impressionistic works by John Guerin, Ralph White, and William Lester; the unique personal statements of Kelly Fearing; paintings of the works of man by E. Gordon West; and sensitive studies of light and shadow by Woody Gwyn. Together they evoke the charm, the beauty, and the variety of the Texas Hill Country.

12 x 9. 128 pp. 49 color plates. \$29.95

## TEXAS WEST OF THE PECOS

*Photographs and text by* JIM BONES, JR.

Far West Texas is a solitary region encompassing more than thirty thousand square miles of wildly eroded flat and mountainous land bound together only by its intermittently life-giving streams. Yet it is a place of immense beauty, too. Jim Bones has traveled to the Big Bend, the Guadalupe, the Davis Mountains, the canyons of the Rio Grande, and all the salt flats, grasslands, ridges and deserts in between to gather these ninety-six magnificent photographs of an arid, rugged land.

*Number Four: The Louise Lindsey Merrick Texas Environment Series. 8 3/8 x 10 7/8. 136 pp. 96 color illus. \$29.95*



By Ancel E. Nunn

### ORDER FORM

TO:

**Texas A&M University Press**

*Drawer C*

*College Station, Texas 77843*

Please send me:

\_\_\_ copy(s) of **Texas West of the Pecos** at \$29.95 each M31

\_\_\_ copy(s) of **The Texas Hill Country** at \$29.95 each M32

Payment must accompany order. Texas residents add 5% sales tax.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

# Young Naturalist

# CRAWFISH

by Ilo Hiller

**Call it what you please**—crayfish, crawfish, crawdad, Dixie lobster, creekcrab or mudbug—this freshwater cousin of the lobster is a fascinating creature.

There are more than 300 species worldwide, including a giant Australian one that grows to a foot and a half in length. The 27 species recorded in Texas range in size from the pigmy crawfish, less than one inch, to the red swamp crawfish that may exceed five inches. Nearly every Texas county has at least one kind, but East Texas, with its abundant water, has the greatest variety and the largest population in the state.

All species live in water, but some burrow into the ground, digging down several feet to find water. These crawfish wells are marked with mud chimneys that may stand more than a foot tall. The chimney structure is made of balls of mud that the crawfish has scraped from the walls of its burrow and then rolled up the sides to the surface where they are deposited. When dried, these chimneys are a real nuisance for mowing equipment.

Almost any body of unpolluted fresh water is suitable for crawfish whether it is a temporary roadside ditch, mudhole, canal, creek, pond, slough or lake. They conceal themselves in the aquatic vegetation or hide under rocks and bottom debris such as logs, boards and tin cans.

Looking very much like a lobster, the crawfish strolls along the creek bottom on eight spindly legs, carrying its two big pincers upraised. Long waving antennae "taste" the water chemistry and feel objects that lie ahead. Its eyes, located on flexible stalks, pivot to allow it to see in any direction. At any sign of danger, a flip of its powerful tail sends the crawfish backwards. Body coloration may be jet black, brown, olive drab, red, orange, cream or bright blue. Spots or stripes of contrasting colors are common.

As with other crustaceans, the crawfish's skeleton grows on the outside of its body. Only by shedding this hard outer covering and replacing it with a new, larger one can the crawfish grow. Shedding, also called molting, is no easy task. It may take 10 minutes to several hours to complete, and one out of 10 crawfish die from exhaustion during the ordeal. Those that manage to get

out of their shells are still in danger. The new skeleton offers no protection since it remains soft for a while so the crawfish's body can expand. The soft pincers are useless, and quick getaways are almost impossible while the crawfish is in such a weakened condition. The helpless creature's only defense is to hide during this soft-shelled stage. Within a few days the new shell hardens and the crawfish can return to its normal activities.

An abundance of natural enemies, including man and pollution, insure that few, if any, crawfish die of old age. The average life span in the wild is one or two years for smaller species and two to five years for the larger ones. If crawfish were able to avoid their enemies, some might manage to live 15 to 20 years.

The time for mating varies considerably with the species and location. It may take place in summer, early fall or spring; however, the egg-laying period usually begins in September. The peak hatching period occurs in October.

When mating, the male uses a pair of specially grooved limbs to deposit his sperm into an external receptacle on the female's abdomen. These limbs, located on the male's abdomen behind his walking legs, are followed by four pairs of swimmerets which help steer the crawfish in water.

As the eggs are laid, they are fertilized by the sperm the female has been storing. She then attaches them to her swimmerets with a sticky substance called glair which is secreted from a gland in her abdomen. The constant movement of her swimmerets guarantees that the attached eggs get plenty of fresh oxygen from the water during their development. Since the egg cluster,

*Looking very much at home among the algae-covered rocks, this crawfish alertly watches the photographer and its surroundings with eyes that pivot on flexible stalks. At any sign of danger, a powerful flip of its tail will send the creature jetting backwards to safety. Its antennae "taste" the water and feel objects lying in its path. Like its saltwater cousin the lobster, the crawfish uses its large pincers to capture prey and tear food into bite-sized pieces.*



Paul M. Montgomery



Jim Whitcomb



Paul M. Montgomery

w  
sp  
to  
  
an  
no  
eg  
th  
th  
ac  
  
th  
la  
pe  
m  
de  
an  
th  
  
fis  
ha  
  
ba  
de  
th  
te  
de  
co  
w  
it.  
ba  
ca  
m  
be  
  
on  
m  
sh  
th  
tra  
  
on  
at  
an  
  
in  
m  
yo  
  
ci  
ra  
in  
th  
tie  
cr  
ca  
  
so  
up  
at  
  
MA



which contains 30 to 600 eggs depending on the species, resembles a bunch of berries, the female is said to be "in berry" during this stage.

The eggs begin to hatch two to four weeks after they are laid. Tiny crawfish, about one-fourth inch long and no bigger around than a pencil lead, crawl out of the eggs and cling to the female's swimmerets. They remain there for a few weeks until they are able to take care of themselves. By spring, those that survived will be near adult size.

Crawfish are not active predators, but will eat anything they can catch. Tadpoles, minnows, insect nymphs, larvae, worms and other crawfish make up about 20 percent of their diet. They are not attracted to animal matter in advanced stages of decay, but they do eat decaying water plants containing many microscopic animals. These plants and other vegetation account for the remaining 80 percent of their food.

Man has found two good uses for crawfish—food and fish bait—but before they can be used for either, they have to be caught.

If you want just a few for bait to tempt a big catfish or bass, the old coffee can method of catching them may do. Just punch a few holes in the bottom of the can and then wade out into crawfish territory. Be sure to wear tennis shoes to protect your feet from rocks and bottom debris. When you spot a crawfish, slowly lower your coffee can behind it. Take advantage of the creature's well-developed reverse gear by poking a stick in front of it. With a flip of its tail, the crawfish should scoot backward into your can, catching itself. Quickly lift the can out of the water and dump the crawfish into your minnow bucket. Take care when handling a crawfish because its pincers do pinch.

Catching enough crawfish for a meal (figure a dozen or two per person) requires more sophisticated equipment. Some crawfishermen use a rectangular or barrel-shaped, wire-mesh trap with a funnel-type opening through which the crawfish enters to get the bait. This trap is similar to those used for saltwater crabs.

A common minnow seine, spread as flat as possible on the pond bottom, may catch several dozen crawfish at one time. However, the baited seine is a bit awkward and requires at least two people to manage.

Several umbrella-type net or wire-mesh traps set out in crawfish waters also should catch enough for a good meal or two. These traps can be made by the do-it-yourselfer without too much difficulty.

To make the net trap, attach some netting to a wire circle about two feet in diameter. The handle used to raise and lower the net in the water is made with two inverted "V" sections of coat hanger-sized wire. Attach the open ends of the inverted V's to the circle of wire and tie a piece of colorful cloth at the spot where the V points cross to make the handle more visible in the water. A cane pole can be used to set out and retrieve the traps.

The wire-mesh trap is similar except it is made from a square of wire cloth that has had a two-inch edge turned up. The open ends of the inverted V sections of wire are attached at the corners of this trap.

Fasten bait such as chicken necks, liver, melts (spleen), lettuce or corn on the cob to the center of either type of trap to attract the crawfish. Set them on the bottom in likely looking water, wait a while for the crawfish to come to the bait and then lift up the traps to check for results.

If you catch enough for a meal, the easiest way to cook them is by boiling. Wash the crawfish thoroughly to remove any mud or vegetation and then purge them by placing them in a strong saltwater solution for about five minutes. Wash them again in plain water. The water should remain clear when the crawfish are clean.

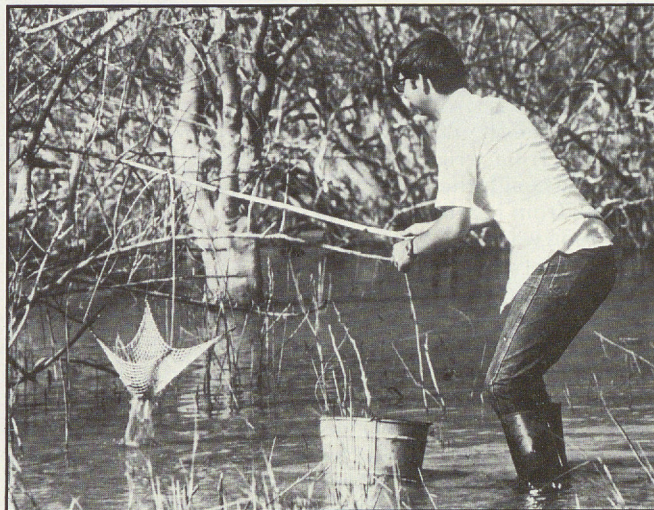
Fill a large pot with enough water to cover the crawfish, but don't put them in the pot yet. Add a box of salt to the water (for 10 to 15 pounds of crawfish). Cut up six lemons, four onions and a few buds of garlic and add them to the water along with a package of commercial seafood boil seasonings. Cover the pot and bring the water to a boil. Now put the crawfish in and let the water come to a boil again. Allow them to boil for five minutes and then turn off the fire. Let them soak in the hot seasoned water for 15 to 20 minutes. Your crawfish should be bright red and ready to eat.

Pile them on a platter and when they are cool enough to handle, fill your plate. Break off the tail and shell a piece of shrimp-sized meat. Remove the threadlike sand vein as you do in shrimp, dip the meat in your favorite sauce and pop it into your mouth. The claws also contain meat, so crack them open and pick it out.

Since early spring is considered the ideal crawfishing time, why don't you give it a try? Even if you don't care to use them for food or bait, you might enjoy taking a closer look at these miniature cousins to the lobster. \*\*

*All crawfish live in water, but some burrow down into the ground to find it. Chimneys (inset, opposite page), which mark the location of these wells, are constructed from balls of mud scraped from the burrow walls by the crawfish and rolled up to the surface where they are deposited. Easily made net traps (below) can be used to catch crawfish in the spring for fish bait or a gourmet treat.*

Jim Whitcomb



# Letters to the Editor

## Hurray for the Coyote

After reading W.P. Meinzer's learned story on the coyote in the December issue, I say "Hurray for the Kyote!" (sic). It seems everybody wants to kill a coyote for various reasons. Meanwhile, the coyote ducks poison, aerial gunnery, traps, etc. . . . and thrives! The main reason for his survival is he can't stand the smell of man. You think a coyote smells bad? You ought to ask him.

William H. Lamar  
San Antonio

## Photo by Paul Montgomery

We incorrectly credited the photo on page 20 of the February 1982 issue. This photo of a spider web and egg sac was taken by Paul M. Montgomery. We apologize for the error.

## Praise for Good Work

Like you said in the December Letters to the Editor, you can't please everybody. Both these readers had one complaint or another, but I didn't see any praise. I would like to say that I have been taking your magazine for about five years and have not discarded any of them. The pictures are just beautiful and I often have one matted and framed to hang at home or the office. Keep up the good work in your photographs and reading material.

Aline Crisp  
Edna

## Salton Sea Story

I noticed an inaccuracy in the January "Outdoor Roundup" item, "New Predator Fish Being Studied." Referring to the Salton Sea, the story stated, "The lake was created in an area which is below sea level, flooded originally by overflow from irrigation canals in the area." Although the lake is *maintained* by seepage from nearby irrigated areas, its formation was the result of a calamity of real enormity.

During Theodore Roosevelt's administration a canal was being run to the Colorado River for nearby irrigation needs. When flow into the canal started, the birth of the Salton Sea was a fact. The entire Colorado River diverted to the canal and there was much panic and alarm as the Imperial Valley eventually would have been inundated.

President Roosevelt even prevailed upon railroad tycoon Edward Harriman to use all the resources of his railroad in an attempt to plug the breach. Harriman responded but was not successful even though, among other things, hundreds of rail cars loaded with rock were run into the torrent on order of President Roosevelt. Harriman's railroad was never repaid for the expense. Eventually the river was diverted to the original channel leaving only the Salton Sea as evidence. *Scientific American* had an excellent article on the Salton Sea several years ago.

E.G. Hendrix Jr.  
San Antonio

## Tularemia Precautions

I have heard about wild rabbits being poisonous to eat and even dangerous to clean. Please explain this.

Robert W. Helbing  
McAllen

■ Tularemia, also called rabbit fever, is a disease of rodents which resembles plague. Rabbit hunters can avoid contracting the disease by taking a few precautions. Tularemia robs animals of their normal vigor, so don't shoot a rabbit that is listless or acting strangely. If you have a cut or abrasion on your hands, wear rubber gloves when cleaning rabbits as this is how humans contract the disease most of the time. Discard any animal that has white spotted areas on the internal organs, or does not appear completely healthy. Always cook rabbit meat until it is well done.

## Deer Processing

I was very interested in the item on fish filleting regulations in the December Outdoor Roundup. I am in total agreement with the new interpretation of the regulation, as I enjoy both freshwater and saltwater fishing and see no need to bring the heads and tails of fish all the way home.

Why can't the law be amended regarding the processing of deer? If a game warden can tell the size of a fish by the filleted meat, it seems like he could

determine the number of deer a hunter had shot by the amount of meat in the hunter's possession, provided he had the antlers or feet.

Fritz J. Oberhoff  
Rosenberg

## Brilliant Photographs

A short note to compliment your layouts, and especially the exceptional brilliance of color in the photographs. Enchanted Rock is one of my favorite places in Texas, and the photograph by Paul Montgomery on page 21 of the October 1981 issue captures precisely the magical essence one feels from the top of the Rock. Keep up the great work!

John J. Smith  
Austin

## New Brazos River

Regarding the letter from Mrs. Charles F. Laws of Houston in the January issue, why didn't you do some research with local people or a biologist before printing a statement of such magnitude that there is no marine life in the river? The New Brazos River at Freeport is one of our favorite places to catch redfish, flounder and speckled trout. Don't try to tell me there is no marine life in that channel because I know better. Give yourself three lashes on the hand for letting your fingers do the talking. Thank you for listening because I am really steamed.

Katy Brown  
Clute

## BACK COVERS

**Inside:** Spiderworts grow in thickets and along roadsides and often are cultivated. The one- to two-inch flowers open only in the morning. Photo by Leroy Williamson.

**Outside:** Warm spring rains sometimes spur spotted salamanders to make mass migrations to woodland ponds. These six- to eight-inch amphibians occasionally are found beneath stones or boards in moist environments or during wet weather. Yellow or orange spots are arranged in an irregular row along each side of its back from the eye to the tip of the tail. Photo by Bill Reaves.



