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PARKS & WILDLIFE



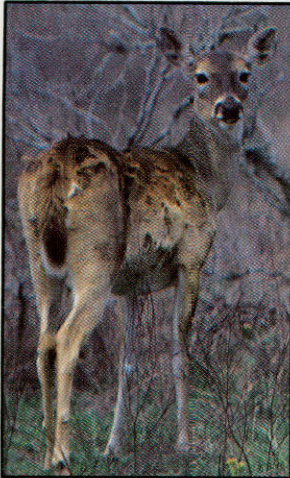
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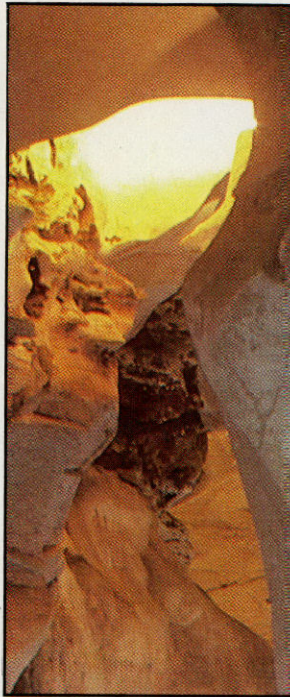
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Front Cover: Wetlands often are considered useless, but many plants and animals depend on such habitat for survival. Among the many plants supported by wetlands in the Big Thicket are lily pads, which function like the leaves of land plants. (See story on page 26.) Photo by Glen Mills.

Inside Front: Softshell turtles are the exception to the rule about turtles being slow. They are speedy in the water as well as on land. Their shells are soft and leathery, but their claws and mandibles are sharp. Photo by Leroy Williamson.



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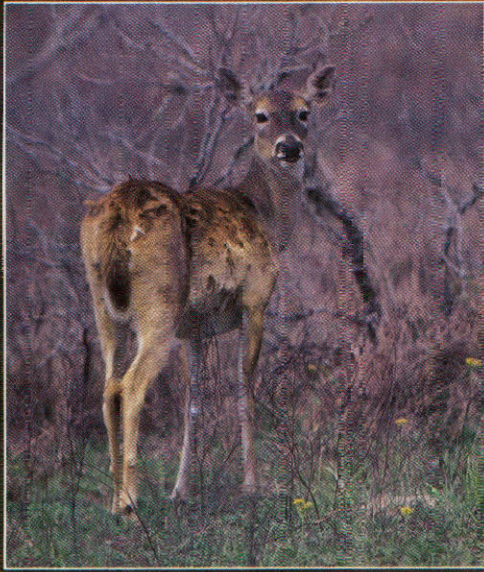
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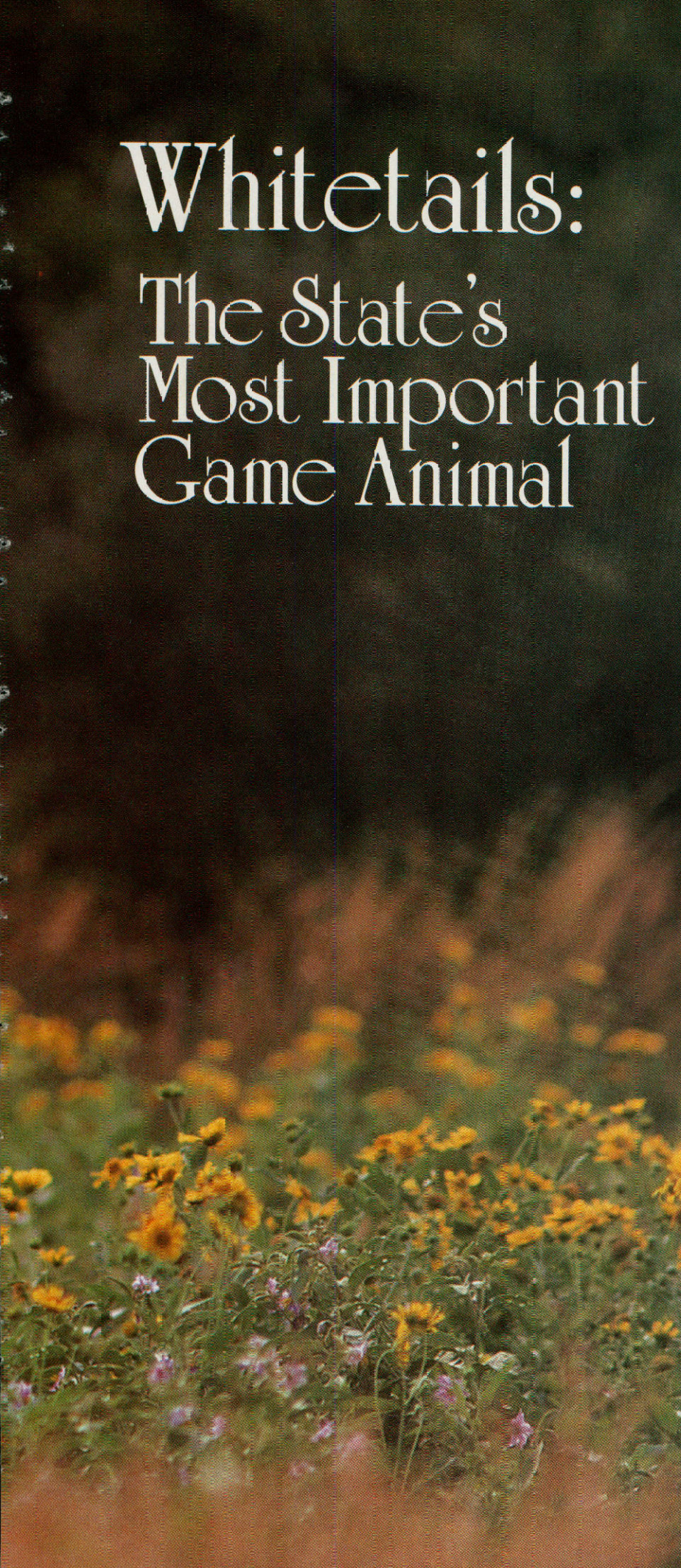
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Dedicated to the conservation and enjoyment of Texas wildlife, parks, waters and all outdoors.

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Whitetails: The State's Most Important Game Animal

by Joe G. Herrera,
Wildlife Biologist, Beeville

White-tailed deer have been able to adapt and thrive in a variety of Texas habitats, from the pine and oak woodlands of East Texas to the meadows and sand hills of the Panhandle. In fact, with some three million animals, Texas has more whitetails than any other state.

Although no other state has as large a white-tailed deer population as Texas, they are the most numerous and widely distributed big game animal in the United States. Except for a small area within the intermountain region of North America, the whitetail's range extends from the southern provinces of Canada, down through Mexico and into Central America as far as 15 degrees south latitude. There are 30 subspecies recognized in North and Central America and eight in South America.

In the past, several subspecies of whitetails were found in Texas, but expanding-overlapping ranges and restocking efforts have diluted their differences. An isolated population of the Carmen Mountain whitetail, *Odocoileus virginianus carminus*, still can be found in the Big Bend National Park area; however it is unlikely that pure strains now exist of the Avery Island whitetail, *Odocoileus virginianus mcilhennyi*, in the coastal area from Beaumont to Rockport, or the Kansas whitetail, *Odocoileus virginianus macrouras*, once found in the northeast corner of the state from Paris to Carthage. Whitetails in the remainder of the state are the Texas white-tailed deer, *Odocoileus virginianus texana*.

Within each of their diverse Texas habitats, deer are resident animals with restricted home ranges. Movements within their home range are associated with seasonal effects on

Bucks' velvet-covered antlers start growing in the spring and early summer from two permanent stumps of bone. They shed their antlers following the mating season each year (inset, right). Fawns are born in early summer (inset, center) and shed their spotted coats three to four months later. Adult whitetails shed their coats twice a year (inset, left).

food supplies, need for adequate cover or protection and breeding requirements. Movement studies and radio-tracking research in Texas indicate that most whitetails spend their lives within 1½ miles of their birthplace. During the breeding season, some bucks trail female deer out of their normal home range, but usually return once the breeding season or rut is over.

Food and Cover

The ranges that whitetails occupy include a wide variety of food and cover plants. Woody vegetation, in the form of trees, shrubs and vines is a basic requirement. It provides cover to protect deer from man, weather and predators.

In addition to furnishing protection, cover also can be an important food source. Whitetails eat mostly browse (leaves, twigs, young shoots of woody plants and vines) and forbs (weeds and other broad-leaved flowering plants). They eat very little grass and then only when it is green and succulent. In fall, browse makes up most of a deer's diet as the succulent summer plants dry up. Large quantities of acorns and other mast are eaten when available.

Deer diets usually are influenced by a combination of factors such as the animal's preference, forage availability, season, weather, range site, range condition or plant succession, deer population density, age of deer, livestock grazing management and range improvement practices.

Breeding and Birth

White-tailed deer have a very high reproductive potential. The rut for whitetails in Texas ranges from about the first of September through mid-January depending on climate, nutrition and latitude. Peak breeding activity occurs in mid-November in Central Texas and mid-to-late December in South Texas.

The doe normally is capable of having three estrus (heat) cycles per year. The first is brought on by a combination of body condition, temperature, hormone levels and decreasing light (day length). She remains receptive for approximately 24 hours. If not serviced or if she fails to conceive, she will come into heat

once or twice again at 28-day intervals. If not bred by the end of the third cycle, she is through cycling for the year, but it is uncommon to find a doe that has not been bred.

Fawns are born after a gestation period of seven months. The doe giving birth for the first time at about 1½ years of age usually has a single fawn. Thereafter, if food is adequate, the doe should have twin fawns almost every year. Multiple births are more frequent when range conditions have been good during the preceding winter months. A doe's reproductive rate will begin to decline by her sixth or seventh year. Does rarely are barren throughout their lives.

When a doe is ready to give birth, she will attempt to lose her fawns from the previous year or drive them away, if they still accompany her. The fawn's birth may be in some spot the doe has chosen or, more likely, wherever she is when her time arrives. Except for the nursing period, the fawn is inactive for the first few days of its life. Its rust-colored coat with white spots blends easily into almost any background. The fawn sheds this coat three to four months later. Yearling (1½ years old) and adult whitetails change pelage twice annually.

The first few days following birth, fawns remain isolated and bedded. The fawn selects its own bed, apparently without assistance. Twins usually bed separately during the first three weeks of life, but they may be brought together for nursing. Young fawns have little scent because of their sedentary habits and frequent grooming by the doe. Scent does not concentrate around the fawn because the doe visits her young only for short periods to nurse and groom them and because a fawn usually beds in a new location after each feeding.

During their first few months, fawns do not wander far and usually remain hidden. As they grow older, they accompany their mothers for gradually longer distances and periods of time. By fall, mother and fawn are nearly always together.

Antlers

In the spring and early summer

Antlers continue to grow until late summer. Velvet nourishes the growing antlers (inset, left) then dries up and is shed when they are fully developed. A Carmen Mountain white-tail (inset, right) is an isolated subspecies found in the Chisos Mountains of Big Bend National Park.

months the buck's antlers start their yearly growth. Antlers develop from two permanent stumps of bone generally referred to as pedicels. Antler growth is initiated by the pituitary gland, which is stimulated by increasing hours of daylight. The growing antler is covered with velvet, a membrane containing small blood vessels which supply nutrients to the bony structure. By late summer the antlers of the mature bucks are fully developed and the male hormone testosterone is released into the bloodstream to inhibit further antler development. When the antlers' blood supply stops the velvet dries up and is shed. Whitetail bucks help accelerate velvet shedding by rubbing their antlers against trees, shrubs or saplings.

Bucks shed their antlers following the mating season each year. Antler shedding is triggered by the cessation of testosterone production. Most bucks in Texas shed their antlers during late January and February.

Longevity

White-tailed deer have a usual life span of about 10 years, but deer kept in captivity or under controlled situations have been known to live 15 to 20 years. After a deer reaches eight or nine years of age, its teeth may be worn to the gumline, and some may even be missing. Deer without adequate teeth are at a disadvantage in getting food, chewing or ruminating what they find.

Besides old age and legal hunting, the main causes of death are predation, starvation, diseases, parasites, crippling losses, accidents and poaching.

White-tailed deer are economically and aesthetically the most important game animal in Texas. Continued research concerning the white-tailed deer, its requirements and management is necessary. Knowledge and accurate information about all aspects of deer and deer herds then can be integrated into sound wildlife management programs. **



Martin T. Fuller



Bill Reeves

The Attractions of Man-Made Structures: Part 2 - Artificial Reefs

Article by Jim Cox
Illustration by Andrew Saldaña

Gerald Partin peered over the wheel of his bass boat, fine-tuning his chart recorder with one hand and steering with the other. "We ought to be over it just about now," he intoned, with all the drama and gravity of a bombardier approaching a munitions plant behind enemy lines. "Yep, there it is."

Partin grinned and jammed a stubby finger on the plexiglass window of the depth-finding device. Sure enough, an impressive blob appeared on the chart paper, rising some four feet from the muddy bottom of Lake Nacogdoches.

As the idling boat passed over the object the chart recorder printed a reasonable facsimile of an artificial tire reef — one of four "reef patches" adorning the floor of the 2,000-acre city water supply lake.

The reefs, constructed of more than 4,000 discarded automobile, truck and tractor tires, were a deliberate effort by the Nacogdoches Bass Club to improve fishing. Assisted by Parks and Wildlife Department workers, the bass clubbers spent most of a spring weekend three years ago binding, weighting and placing the massive collection of tires.

The rest, as the saying goes, is history.

In a scenario that has been duplicated on scores of reservoirs across the state, reefs of wide-ranging construction styles and materials have been dumped in waters considered lacking in proper natural "structure" conducive to holding bass, crappie and other sought-after freshwater fish species. And more such reefs will appear in the future, especially if the past few decades of lake-building abates. As reservoirs age, their productivity tends to decline, making such attractors even more important.

Reef construction has spawned its own technology.

As with fishing in general, there still is much to be debated as to which materials and shapes of reefs are best, and which locations or placements are most productive. But one thing remains clear in the minds of fishermen who have used them: Fish attractor reefs work.

Partin, at 62 a grizzled veteran of countless bass tournaments, has very few reservations about the reefs. "They (reefs) won't help a poor fisherman catch a lot of fish, especially some times of the year," said Partin, "but when the bass concentrate around those tires it can really get exciting."

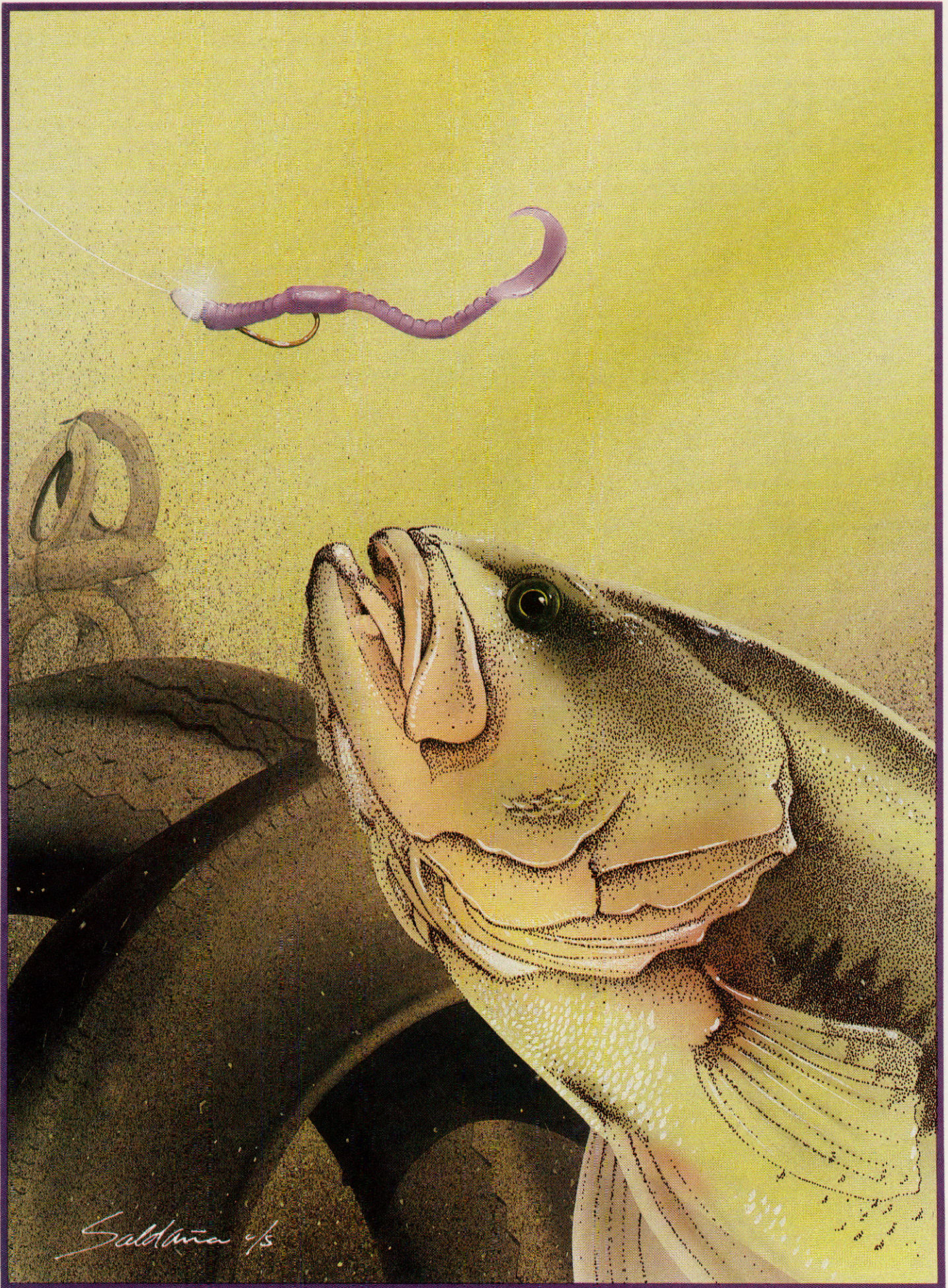
Partin's theory on fishing the reef areas hinges upon the movements of bait fish such as shad and minnows. "I have noticed that the best bass fishing around the tires coincides with the times when the bait fish are spawning, or at least when they are most abundant. On this lake, fishing the reefs is best from late spring through the fall," he said.

Partin theorizes, and biologists agree, that bait fish congregate on reefs to feed on the algae and microorganisms that attach themselves to the tires. This, in turn, draws in predators from higher on the food chain.

On the March day we ventured onto windy Lake Nacogdoches, Partin confidently predicted we would catch bass, but he hedged on promising the fish would be on the reefs this early in the year. He was right on both counts.

Although his chart recorder indicated some large fish were hovering around the edges of the reefs, most of the bass obviously were on shallower ridges and shoreline structure. "When the spring spawning time rolls around, the bass abandon the deeper structures and look for shallow spawning areas, so unless a reef happens to be located right in a good spawning ground they don't usually produce," Partin advised.

Lake Nacogdoches is an excellent demonstration lake



for tire reefs, having been largely cleared of trees, brush and other structures before impoundment five years ago. Although some timber remains in the lake's upper end, most of the reef sites are clean-bottom areas in depths of 10 to 18 feet.

Although tire reefs are productive for the bass fisherman in general and the plastic worm enthusiast in particular, Partin hastens to add that crappie fishermen have cashed in on the action as well. "Right after these reefs were placed, the bass took over three of them and the crappie got the other one," Partin said. "When I say the crappie took over, I mean they moved in so thick you couldn't catch anything else."

Partin guesses that 90 percent of the largemouth bass caught from tire reefs are caught either on plastic worms or weedless jig-and-eel combinations. "It's just plain tough to fish a crankbait or any other lure that's not weedless around reefs because of hanging up," he noted. He added, however, that one need not fish directly over or next to a reef for success. "Bass seem to cluster on one side of the reef or the other, often on the side toward deeper water. They probably move right up on the tires at times, but we've caught more fish on worms out around the edges of the reefs, fishing on the bottom."

Crappie fishermen ordinarily anchor over a reef, sometimes using two anchors to keep the boat from swinging in the wind. They "tight-line" straight down with minnows or jigs, sometimes employing weedless hooks when fishing right on top of the structure.

Another cheerleader for artificial reefs is Guy McIlhane, a U.S. Soil Conservation Service agent at Madisonville and member of the Madisonville Bass Club. His favorite local stomping ground is tiny (76 acres) Lake Madison, which was the recipient of eight tire reefs made with about 3,000 tires.

McIlhane said his fishing success improved rather markedly soon after the reefs were placed about three years ago. "During three brief trips to the lake about a year after the reefs were in, I caught 12 bass averaging over five pounds apiece," he said.

But McIlhane said the reef's productiveness was even more noticeable last September, when his bass club had a kids' fishing tournament. "We had about 15 to 20 youngsters out there in boats, and they caught 330 fish, mostly crappie, in about two hours. This was fishing almost exclusively over those tire reefs," McIlhane said.

McIlhane, who also fishes tire reefs on nearby Lake Fairfield, said the shallower reefs produce well in the spring and early summer, but he finds better success at the deeper reef locations as summer fades into autumn. Crappie also seem to abandon reefs during the spring, then move into the deeper water and raft up around reefs by midsummer where they remain through the winter.

Artificial reefs are not just for small reservoirs. At Lake Tawakoni east of Dallas, workers from the Tawakoni Bass Club placed 6,000 tires at five reef stations in the 36,000-acre reservoir a couple of years ago. Leonard

Ranne of Dallas was among the 50 bass clubbers who spent the weekend on the reef installation. "It was amazing," he said. "Fish started gathering over the tips of those reefs three or four hours after they went in. There have been large numbers of bass over four pounds caught from around the reefs, and I think they've done as much if not more for the crappie fishing." He added that he believes all native species of fish tend to gather in and around reef patches at times.

"Tires are a great resource for building reefs," Ranne asserted. "They don't cost a thing, and they are as close to being permanent as anything you can put in the water." He also said safety is another factor, as boat dock owners feel tire reefs are less likely to create a hazard for swimmers than reefs made of trees or brush. "Furthermore, the tires don't deteriorate or cause any sort of pollution problem," said Ranne. "It's a great way to turn a nuisance into something beneficial."

Ranne believes tire reefs act as an "ambush point" for largemouth bass, and he said he has done well fishing plastic worms around the edges of the reefs. "When we drove the barges out to place the reefs, we paid a lot of attention to location. Most of them were put on or near a submerged creek or draw, because bass tend to use these as migration routes. A high spot or ridge near one of these areas usually is the best spot for a tire reef."

The ultimate fish-attraction situation on Tawakoni, in Ranne's opinion, is a tire reef located where there are favorable water depth changes and some aquatic vegetation in the immediate area. "When you get the combination of coontail moss or other water weeds with the cover provided by the tires, that's where you really can find some fish," Ranne said.

The man in charge of coordinating club-sponsored reef projects is department biologist Kirby Gholson of San Antonio. Gholson said no major reef projects currently are underway, as his crews recently have been concentrating on water hyacinth control. However, he anticipates that by this fall more projects will get underway. He can be contacted at 512-349-2174.

For anglers not affiliated with a bass club, but who would be interested in establishing reefs on their own, brush shelters are a relatively easy and economical alternative.

One Austin man probably has spent as much time putting brush reefs in lakes as most folks have spent fishing. Mike Moore believes that strategically placed brush can do more to enhance a fisherman's success than most would believe.

"I know they work, but you don't have to take my word for it," said Moore. "I've known of some nationally famous tournament fishermen who have practically made their careers by placing reefs and using them to win tournaments."

He offered one example to illustrate that serious fishermen are serious about reefs. "One television fishing personality who has won several national tournaments was going to compete in a tournament on a big southern reservoir, Moore said. "About a month before the tournament, he spent an entire week placing

70 brushpiles at different locations in the lake." It may have been more than a coincidence that he won the tournament, Moore observed.

Is this fair? "Well, it seems that with fishing or any other sport, the people who win consistently are the ones who put the most time and effort into it," Moore said. "In the case of brush reefs, if you do it right you can count on something good happening."

Moore believes that using the correct materials and selecting the right locations are probably more important than fishing techniques used once the reefs are in place. "Almost any kind of trees or brush will work, but some are superior. If willow trees are available, they are definitely the best," Moore said. Farther down on the scale of desirability are cedar and Christmas trees. In East Texas, sweet gum trees are held in high regard as fish attractors, especially for crappie.

"I don't think willow trees actually provide shelter for bass, but rather the bark and leaves become part of the food chain and attract bait fish," Moore said.

Moore recommends using willows up to five inches maximum trunk diameter. He binds and weights them at the bottom, then adds weights to the tops to make the structure rest near a horizontal position on the lake bottom.

"One of the most common errors is failing to pinpoint the location using landmarks," Moore added. "A pile of brush can look huge in your boat, but it actually is a small item to locate once it's on the lake bottom." He usually uses four distant landmarks to triangulate the location. "You line up two landmarks, such as trees or utility poles, making sure there is enough distance separating the two," he said. "Then pick two others in a different direction and try to find a spot where all are lined up."

The reef location should be in four to 20 feet of water, on a hard rather than muddy bottom. "For some reason, bass will not stay around a brushpile resting on a mud bottom. If I'm not sure what the bottom conditions are, I just lower my anchor and drag it along a bit. If it comes up caked with mud, I keep looking."

Just as with tire reefs, the best locations are where there is a depth change, and Moore believes the more change the better. "Just on the edge of a steep creek channel is a top choice for a brushpile," he said.

Another fine point of reef placing overlooked by some practitioners is placement of the brush with the tops facing the prevailing winds. "The point here is to be able to approach the brushpile and anchor downwind. That way, you can throw your worm past the brush and pull it through without hanging up in the forks of the branches," he pointed out.

Anchoring the boat for fishing a brushpile also involves some care, Moore believes. "A large enough anchor with plenty of rope is necessary when there's any wind at all, because precise casting to the reef is the only way to catch fish." He said tying the anchor rope to the gunwale slightly to the rear of the mid-line sometimes mitigates the "swinging" effect caused by the wind. Two anchors, one at each end, sometimes works best.

Moore, who has concentrated much of his brush-sinking technology in Lakes Braunig and Calaveras near San Antonio, said he fishes with plastic worms most of the time. "We rig the worms Texas-style (with the barb imbedded in the worm body to keep it weedless) and use a heavy slip-sinker." In breezy weather, the heavier 3/8- to 1/2-ounce sinkers help Moore feel the lure hitting the reef's branches. "If you can't throw that worm out there and actually hit the brush, then you're wasting your time," he said.

Moore uses another trick which he believes helps get strikes. "The standard method of rigging a worm is to have the slip-weight resting on the eye of the hook. I've found that rigging the weight about a foot ahead of the worm helps get more strikes and also helps the fisherman detect when a bass is taking the lure," Moore said. He first threads the weight on the line, then ties on a swivel. Then he ties a foot-long section of line to the other end of the swivel before attaching the hook.

"Most plastic worms are fairly buoyant, and tend to hover over the bottom when rigged this way," Moore explained. "This method keeps the worm off the bottom and gives it better action when the weight hits the branches of a brushpile." As most worm-fishing enthusiasts have found, a graphite or boron rod is superior to fiber glass rods for detecting the sometimes tentative bites of bass.

Of course, brush for fish attractors is usually easy to find, but it's advisable to check with local authorities before doing any cutting around the lake shoreline. Also, some controlling authorities may have rules against putting any kind of structures in their lake. All reefs should be placed deep enough so that normal fluctuations in the water level don't make them shallow enough to cause a boating hazard.

Fluctuating lake levels often afford an excellent opportunity for anglers to place brush reefs without using a boat. Lake Travis west of Austin often dips to low water levels during the summer, and fishermen frequently anchor brushpiles in spots calculated to be 10 to 15 feet underwater when the lake rises.

Fish attractor reefs are largely the province of the boat fisherman, and mainly those who have depth finders to locate the reefs. Many of the reefs have been marked with buoys, either by bass clubs or by lake authorities. Unfortunately, some buoys have been cut loose, presumably by fishermen who wish to keep the locations as secret as possible. Buoys are important for bank fishermen, since tire reefs have been placed within casting distance of the shoreline in many lakes.

The Boating Trades Association has made funds available to the department for purchase of marker buoys for reefs in 24 lakes, and officials hope most reef locations can be marked this year. **

Editor's note: The department is preparing leaflets with a map of each lake that has fish attractors, where they are found in the lake and other information for fishermen. They should be ready later in the year; we'll keep you posted in Outdoor Roundup.

When the 1983 hunting season kicks off on September 1, it will mark the 30th consecutive year that Texas sportsmen have had opportunities to harvest surplus game animals on wildlife management areas operated by the Texas Parks and Wildlife Department.

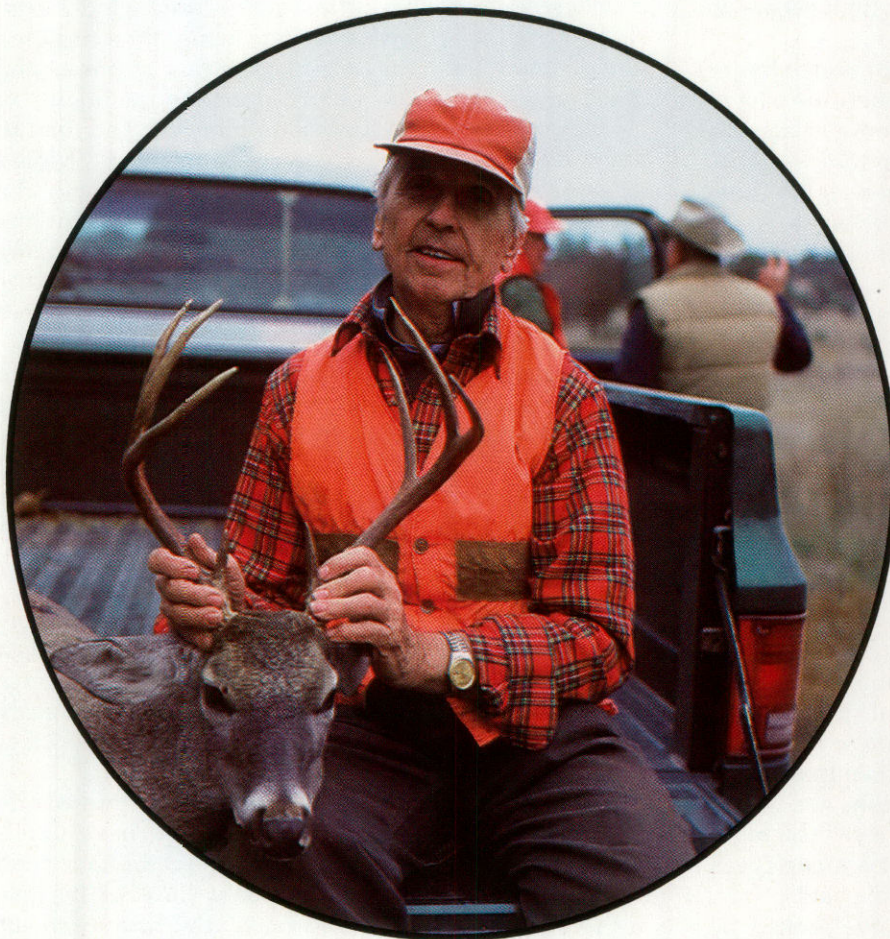
The first public hunt was held on the Kerr Wildlife Management Area in 1954 when 70 hunters harvested 36 deer. Since that time, approximately 750,000 hunters have participated in a variety of hunts and taken

more than 300,000 game birds and animals from wildlife management areas.

The department began its program of acquiring land for wildlife management in 1945 when the Texas Legislature authorized the purchase of up to 20 sections of land in Hudspeth and Culberson Counties to preserve the Texas bighorn mountain sheep. Since then, the department has bought 170,000 acres of land scattered throughout the state to provide areas that could be used by sportsmen, tourists,

sightseers, scientists and students.

These areas provide a site where wildlife management and research can be conducted under controlled conditions. They also provide areas to display the results of tested range, livestock and wildlife management practices. They serve as refuges for rare, endangered or unique species of animal and plant life and provide outdoor classrooms for use by university groups, naturalists and other serious biological investigators. In addition to being a source of brood-



Wildlife Management Areas **A PLACE TO HUNT**

Article by Bobby Alexander, Wildlife Division
Photos by Glen Mills



stock for transplanting to depleted wildlife ranges, the areas provide the public with outdoor recreation when such use is compatible with the primary goal of the management area.

Initially, the main goal in acquiring these areas was to facilitate scientific wildlife research. Biologists were looking for answers to the many questions and difficulties confronting wildlife resources in the face of rapidly increasing human populations and associated problems. But lately in-

creased emphasis has been placed on maximum use of management areas to provide opportunities for public hunting.

In an attempt to increase public hunting opportunities without jeopardizing the state management areas' research capability, the department

has assumed management responsibility for 131,000 acres of wildlife habitat owned by other government entities, such as the U.S. Army Corps of Engineers. These areas are used primarily for public hunting, wildlife observation and outdoor classrooms. A recent addition to this program

Special permits issued through a public drawing are required to hunt deer on the Kerr (left) and Engeling (right) Wildlife Management Areas. Applications for archery hunts on the Engeling and Walter Buck Areas usually are available by July 15. Gun hunt applications for Kerr, Engeling and eight other management areas are available around September 1 of most years.



was the 43,893-acre Matagorda Island Wildlife Management Area in Calhoun County. It will be managed primarily to provide habitat for endangered species such as the whooping crane, but the area also will provide limited public hunting for deer, quail, dove and waterfowl.

To be eligible to participate in public hunts on the department wildlife management areas, a person must be at least 12 years old with each person between 12 and 17 years of age accompanied by someone at least 21 years old. Everyone must have the required hunting license, and all hunters, except migratory bird and turkey hunters, are required to wear 400 square inches of visible daylight fluorescent orange material. Of this, 144 square inches must appear on both the chest and back.

Hunter numbers are controlled where necessary by a system of permits. A limited number of special permits are issued for certain hunts through a public drawing. Applications to participate in these hunts generally are available at the times specified in Table 1. No person may receive a special permit for two consecutive years unless all applications are filled from persons who applied but did not receive a permit for the preceding year.

Regular permits are issued in unlimited numbers at some management areas to hunters on a first-come, first-served basis. Fees for special or regular permits are listed in Table 2.

On some wildlife areas, hunting is available at no charge by registering at designated access points and following instructions in brochures available at these access points. Failure to register could result in prosecution.

Table 3 is a summary of permit requirements for specified hunts on each wildlife area currently operated by the department. Telephone numbers for each area are provided for those who may wish to obtain further information. **

J. D. Murphree Wildlife Management Area near Port Arthur (opposite page) provides waterfowl hunting during the regular season. Permits are issued on a first-come, first-served basis for a fee of \$4.00.

TABLE 1
Dates of Availability of Applications For Special Permits

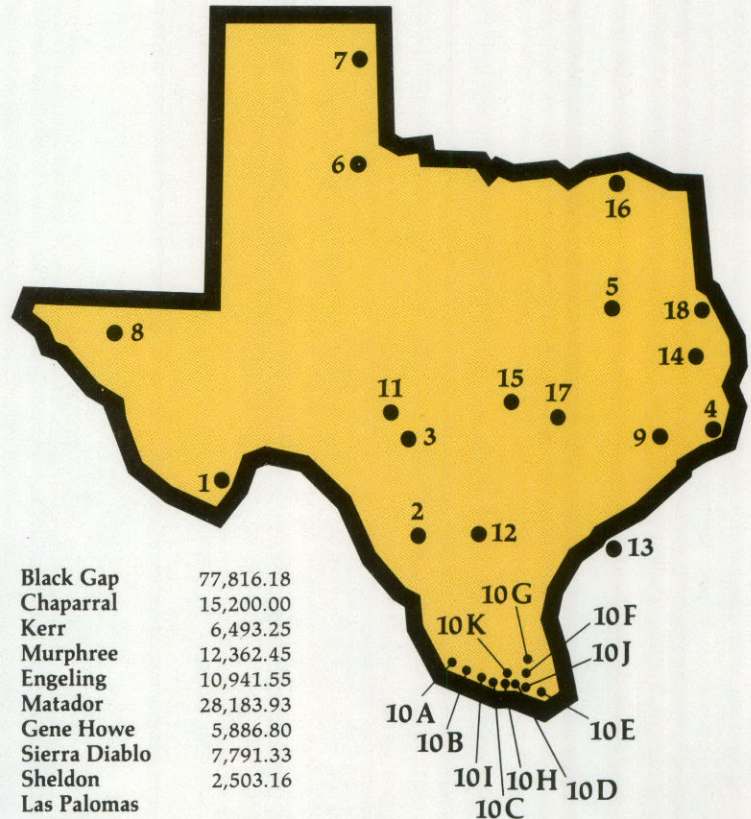
Type of Hunt	Date
Whitewing Dove Hunt	July 15
Archery Hunt (Deer)	July 15
Pheasant Hunt	July 15
Deer Gun Hunt	September 1
Javelina Hunt	October 1
Feral Hog Hunt	December 1
Spring Turkey Hunt	December 1

Applications are available at Regional and District Parks and Wildlife Department Law Enforcement offices, Wildlife Management Area offices and the Austin office at 4200 Smith School Road, Austin, Texas 78744.

TABLE 2
Current Fee Schedule for Special and Regular Permits
(Subject to change by Parks and Wildlife Commission action)

Species	Fee
Whitetail Deer	\$20.00
Mule Deer	\$40.00
Javelina	\$10.00
Turkey	\$10.00
Feral Hogs	\$10.00
Pheasant	\$10.00
Whitewing Dove	\$10.00
Mourning Dove	\$ 5.00
Quail	\$ 5.00
Waterfowl	\$ 4.00
Squirrel	\$ 4.00

MANAGEMENT AREAS ACREAGE



1	Black Gap	77,816.18		
2	Chaparral	15,200.00		
3	Kerr	6,493.25		
4	Murphree	12,362.45		
5	Engeling	10,941.55		
6	Matador	28,183.93		
7	Gene Howe	5,886.80		
8	Sierra Diablo	7,791.33		
9	Sheldon	2,503.16		
10	Las Palomas			
A	Prieta	164.37		
B	Grulla	136.06		
C	Kelly	45.00		
D	Adams	64.84		
E	Voshell	66.11		
F	Longoria	200.53		
G	Frederick	35.00		
H	McManus	56.27		
I	Penitas	119.50		
J	Anacua	200.99		
K	Baird	122.29		
11	Walter Buck	2,123.00		
12	Daughtrey	25,000.00		
13	Matagorda Island	43,893.00		
14	Dam B-Angelina Neches	13,445.00		
15	Granger	10,600.00		
16	Pat Mayse	8,317.00		
17	Somerville	3,500.00		
18	Toledo Bend	3,600.00		



TABLE 3

Permit Requirements for Specific Hunts on Wildlife Management Areas

Area	Deer (Archery)	Deer (Firearm)	Feral Hogs	Javelina	Turkey	Quail	Squirrel	Waterfowl	Mourning Doves	Whitewing Doves	Pheasants
Black Gap 915/376-2216	-	-	-	S	-	R	-	-	P	-	-
Chaparral 512/676-3413	-	S	-	S	-	R	-	-	R	-	-
Daughtrey 512/358-6038	-	S	-	S	-	R	-	R	R	-	-
Engeling 214/928-2251	S	S	-	-	S	-	R	R	-	-	-
EASTERN AREA: 713/564-3224											
Angelina Neches Unit	P	P	-	-	-	P	P	P	P	-	-
Granger Unit	-	-	-	-	-	P	P	P	P	-	S
Pat Mayse Unit	P	S	-	-	-	P	P	P	P	-	-
Somerville Unit	P	S	-	-	-	P	P	P	P	-	-
Toledo Bend Unit	-	-	-	-	-	P	P	P	P	-	-
Gene Howe 806/323-6079	-	S	-	-	S	R	-	-	P	-	-
Kerr 512/238-4483	-	S	-	-	S	-	-	-	-	-	-
Las Palomas 512/383-8982	-	-	-	-	-	-	-	-	R	S	-
Matador 806/492-3405	-	-	-	-	S	R	-	-	P	-	-
Matagorda Island	-	S	-	-	-	R	-	R	R	-	-
Murphree 713/736-2551	-	-	-	-	-	-	-	R	-	-	-
Sierra Diablo 915/376-2962	-	S	-	-	-	-	-	-	-	-	-
Walter Buck	S	S	-	-	S	-	-	-	-	-	-
S - Special Permit R - Regular Permit P - Permission by Registration - - No Open Season											

COMMISSION SELECTS WATERFOWL STAMP ART

The Texas Parks and Wildlife Commission has selected a painting by nationally known waterfowl artist Maynard Reece of Des Moines, Iowa, to adorn the department's 1983-84 waterfowl stamp and art prints.

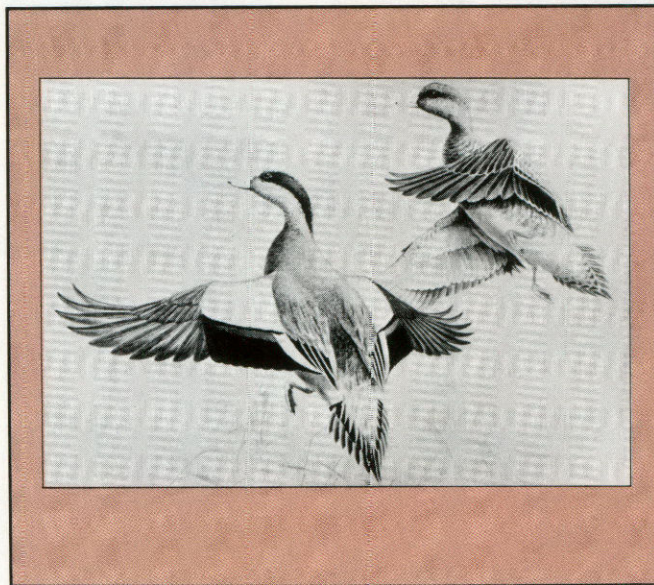
The painting depicts two American widgeons in flight, and it was rendered by an artist whose credentials include producing artwork for Iowa and Arkansas waterfowl stamps and the 1983 Ruffed Grouse Society Conservation Stamp and Print. He also was named artist of the year by Ducks Unlimited in 1973, and is the only artist to have won the federal duck stamp contest five times.

Reece's artwork was submitted by Collectors Covey of Dallas, which guaranteed a minimum royalty payment to the department of \$213,780 from projected sales of art prints. The firm will pay 28.5 percent of the retail price of \$125, or \$35.63 per print to the department.

All money accrued from sales of stamps and prints will be used for waterfowl research, management and habitat acquisition and restoration in Texas. All Texas waterfowl hunters are required to purchase the \$5 waterfowl stamp as well as a valid hunting license unless exempted by law. The stamps will be available from department offices and hunting license

Outdoor Roundup

COMPILED BY THE
PARKS AND WILDLIFE
DEPARTMENT'S NEWS SERVICE



outlets. Federal law requires hunters to have a federal waterfowl stamp, available at post offices.

The 1983-84 waterfowl stamp

is the third edition of the stamp program in Texas. The first two stamps and prints earned in excess of \$2 million for the state's waterfowl programs.

FISH SHOCKERS ARRESTED IN TEXAS "OUTBACK"

Six West Texas area poachers probably figured one of the most desolate spots on the Texas map would be a good place to break the law. They were right, for a while.

Texas Parks and Wildlife Department game warden Royce Wells, who is assigned to vast Brewster County, drove 90 miles to the 100,000-acre Black Gap Wildlife Management Area last week after receiving a tip that illegal fishing activities were suspected on the Rio Grande.

Once at the area, he was joined by area manager Jerry Cooke, and the two bounced along 40 miles of "four-wheel-drive-only" roads to a fishing camp on the river.

On arrival, the six suspects were proudly loading their catch into trucks: 25 catfish ranging as large as 70 pounds. In all, their catch totaled 400 pounds.

Wells caught the men with five electric shocking devices they had used to collect the fish. The transistorized instruments are modern counterparts to the old "telephoning" contraptions formerly used to shock fish to the surface illegally.

The men were taken before a justice of the peace in Marathon, where they paid \$3,700 in fines after pleading guilty to possession of illegal shocking devices and possession of illegally taken catfish.

NEW REDFISH HATCHERY ALREADY PAYING OFF

The state's new saltwater redfish hatchery has produced its first dividends in the form of 3.4 million redfish fry.

The event held special significance for Texas Parks and Wildlife Department biologists, since the fish represent the first tangible returns from a unique cooperative venture involving the state, a private organization and an electric power company.

Construction of the \$1.2 million hatchery was made possible by funds raised by the Gulf

Coast Conservation Association and land donated by Central Power and Light Co. of Corpus Christi. The power company also permitted access to warm discharge waters which will keep the hatchery ponds usable virtually year-round.

Hatchery biologist Gene McCarty said the fry were stocked into nine ponds, and were expected to reach stocking size of about two inches in length within a month.

"All the systems have functioned well, and we have had to make very few modifications along the way," said McCarty of the indoor tank rooms where critical light and water tempera-

ture adjustments are necessary to induce the fish to spawn.

The light/photoperiod manipulations trick the mature fish into believing it's time to spawn, which occurs in the fall for wild fish. Biologists collect the fertilized eggs in special containers and hold them for about a week, until the mouth parts develop and the fry are ready to be placed in rearing ponds.

All these efforts are aimed at restoring redfish populations which have been declining for the past decade. Studies of redfish spawned and reared at the department's research facility at Palacios have shown the fingerling-sized redfish have good sur-

vival rates when released into the bays.

The seven redfish that spawned in April ranged in weight from 18 to 30 pounds. They were collected by rod and reel, with three coming from Gulf waters and four from CP&L's cooling reservoir.

McCarty said work still is underway getting the remaining spawning tanks operational. "We expect to get additional spawns in June, September and October this year," he said. Officials predict as many as 15 million redfish fingerlings produced at the hatchery will be stocked in Texas bays by the end of 1983.

COMMISSION SETS HUNTING, FISHING REGULATIONS

The Texas Parks and Wildlife Commission set hunting and fishing regulations for 1983-84 in a public session April 30.

Regulation changes authorized by the commission generally were minor and limited to items presented in public hearings held in 241 counties across the state during March. The hunting changes will become effective September 1, 1983. Saltwater fishing regulations will become effective as soon as possible in order for an emergency amendment concerning throwlines to become permanent.

Commission Chairman Perry R. Bass of Fort Worth said legislation recently adopted by the Texas Legislature giving the Parks and Wildlife Department authority over fish and wildlife resources in all Texas counties will become effective August 29. "I would like to emphasize that no further changes in hunting and fishing regulations will be made after August 29 by this commission in any county without additional public hearings," Bass said.

Before passage of Senate Bill 94, called the "Wildlife Conservation Act of 1983," some counties' game and fish laws were set by legislative act rather than by the Parks and Wildlife Commission. Other counties had a county commissioners' court clause which enabled the courts in those counties to approve or disapprove changes adopted by the Parks and Wildlife Commission.

Since Senate Bill 94 has not

yet become effective, April's commission action will not have any effect in nonregulatory or general law counties, and the changes will be subject to approval by counties having a commissioners' court clause.

One significant change for the upcoming hunting seasons which will not be subject to change is an alteration in the buck hunting permit system in Webb, Duval, Maverick and Zapata Counties. This season, buck permits will be issued on an unlimited basis in all four counties, rather than on an acreage basis.

Ted Clark, Wildlife Division Director, told the commission the buck permit system has not achieved its announced goal of improving overall quality in the deer herd and enhancing the production of trophy bucks in that area.

"We (the department) started the buck permit system in Webb County nine years ago, with the other counties coming under the program later," Clark said. "I think we have enough data to say that the system has controlled the harvest of bucks, but it has not significantly improved overall quality of antlers and body weights in the herd. This is simply because hunters have not been able to bring overpopulation of deer under control."

Clark said in spite of liberal regulations enacted to encourage an adequate annual harvest of antlerless deer and spike bucks, high deer populations are continuing to place too much

pressure on the habitat. "If this trend continues I'm afraid we will see a continuous decline in South Texas deer quality, similar to what has happened in the Hill Country," he said. Chronic overpopulation problems in many areas of the Edwards Plateau have caused smaller deer, with little potential for trophy buck production.

Clark said that even with unlimited issuance of permits, the buck permit system will be maintained as a method for monitoring the harvest and collecting data on the condition of bucks in those counties.

Most hunting seasons in Texas vary by county or region, but the general white-tailed deer and turkey season set for most counties this year will be November 12-January 1, 1984. The archery deer season in most counties will be October 1-30. Mule deer season in Panhandle counties will be November 19-27, and November 26-December 4 in the Trans-Pecos.

Quail seasons vary widely, but most West Texas counties will have an October 29-January 29, 1984, season, and in East Texas the general season is November 12-February 12, 1984.

Complete information on all hunting seasons, bag limits and other regulations will be published in the department's 1983-84 Guide to Hunting and Fishing Regulations booklet which will be available at hunting license outlets across the state in August.

The hunting and fishing regulation changes authorized by the commission for the 1983-84

seasons are as follows, and most of them require approval or disapproval of county commissioners' courts.

—Removal of special protection of spike bucks in Comal and Kendall Counties.

—Provide a standard 51-day deer gun season for Dimmit County.

—Permit the harvest of antlerless deer in Robertson County where surplus deer occur.

—Provide a standard 30-day archery-only season for deer in Edwards, Kendall and Real Counties.

—Provide a two-javelina bag limit and no closed season in Edwards, Frio, Kendall, Kerr, Medina and Real Counties.

—Provide a standard 30-day archery-only turkey season in Edwards, Kendall and Real Counties.

—Provide a spring turkey gobble season in Bandera, Brooks, Edwards, Frio, Gillespie, Kendall, Kerr, Kimble, Reagan, Medina and Real Counties.

—Delete exceptions to bag, possession and size limits for red drum in the fresh waters of Comal and Robertson Counties.

—Provide a 37-inch minimum size limit for cobia (ling).

—Provide a 14-inch minimum size limit for Spanish mackerel.

—Define saltwater throwlines as a type of trotline.

—Restrict use of dip nets and gaffs to only a supporting role in taking of fish in salt water.

—Redefine what are considered saltwater trotlines as per commission emergency amendment, November 2, 1982 (coastwide).

'OPERATION GAME THIEF REWARDS SET RECORD

"Operation Game Thief," the Texas Parks and Wildlife Department's reward program for reporting game law violators, set new records for calls, arrests and convictions during the six-month period which ended in early April.

Officials said more calls were received, 718, than were recorded during the program's

entire first year of operation. The calls resulted in 347 convictions and \$39,106 in fines paid by poachers. The toll-free number is 1-800-792-GAME, and callers may remain anonymous.

The six-member Operation Game Thief Committee recently met and authorized payment of \$8,525 to 50 persons whose tips led to convictions. Another 37 callers whose tips turned out to be valid requested no reward.

Rewards are funded entirely by donations from individuals and organizations and the Game Thief Committee serves without pay.

JULY IN . . .

TEXAS PARKS & WILDLIFE

Steel shot—it's been criticized, maligned and challenged in court. But biologists have determined that the only way to stop lead poisoning of waterfowl is to terminate the use of lead-loaded shotgun shells by hunters. And the only alternative to toxic lead shot available today is nontoxic steel. This fall Texas will have the nation's largest nontoxic shot zone, covering all

or portions of 25 counties. Next month's lead story looks at all sides of steel shot issue and answers the most frequently asked questions about the use of nontoxic steel shot. Heading for the seashore this summer? Bet you can't resist picking up shells along the beach. Next month we'll take a look at some of the seashell species found along the Texas coast. Also in July are stories on the aplomado falcon, Dinosaur Valley State Park, the 4-H Trap and Skeet Shoot and Fredericksburg's annual shooting festival, the Schuetzenfest.

by Mary-Love Bigony

Lurking beneath the Hill Country south of Burnet, Longhorn Cavern State Park presents a spectacle different from the oak and juniper covered hills above, but no less impressive. This intricate hole reaching 130 feet into the earth has intrigued generations of people who have lived in or passed through the area, and legends are firmly interwoven with the cavern's tunnels and chambers.

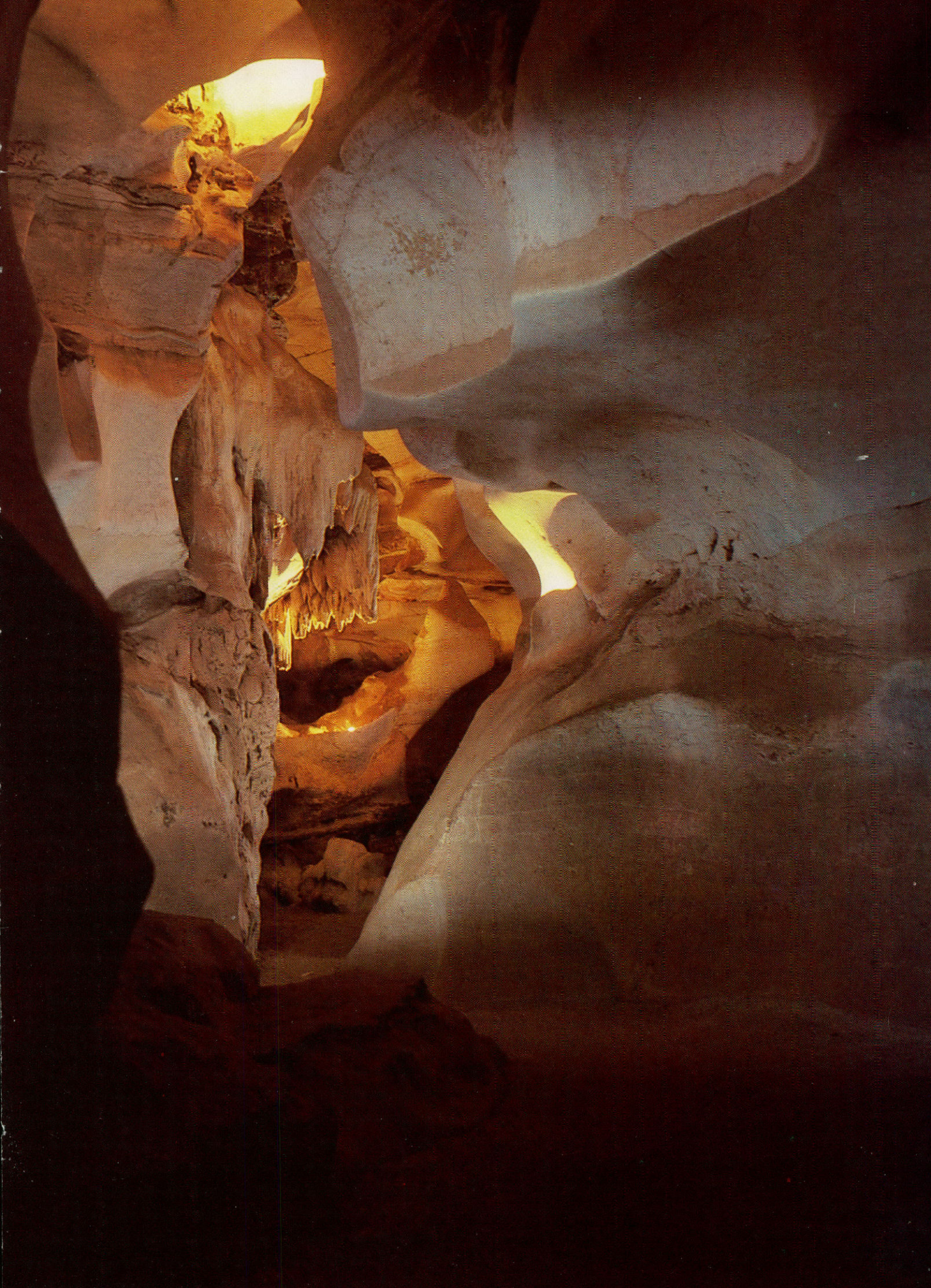
Longhorn Cavern was in the making for millions of years. A sequence of carbonate rocks known as the Ellenburger Group began to form some 500 million years ago during Ordovician time, the first link in a chain of events that led to Longhorn Cavern's formation millions of years later. The intervening millennia saw the area alternately beneath the sea, uplifted and eroded to create the landscape we know today.

Underground streams carved the cavern during the last few million years. Rocks slowly dissolved as water charged with carbon dioxide seeped downward along cracks, and the abrasive action of sediments carried in the running water enlarged the passageways as the water flowed from the surface to the cave's lower levels. Some one million years ago the cavern began to take shape, and slowly dripping underground water gradually decorated the cave with ornate deposits. Surface streams drained into the cave, and the mud and rock that filled many of the passages would be hauled out by Civilian Conservation Corps workers in the 1930s.

Humans discovered the cavern thousands of years later. No one knows when — unlike some of Texas' other

Step into Longhorn Cavern's cool 64 degrees for a visual feast. Generations of people have discerned a variety of shapes and forms in the cavern's deposits and formations. Running water carved these chambers and tunnels one million years ago.

Longhorn Cavern Underground State Park



caverns, Longhorn Cavern's discovery cannot be pinpointed. A skeleton discovered in the Indian Council Room was identified as a Confederate soldier by the buttons on his uniform, and legend has it that gunpowder was manufactured and stored in the cavern during the Civil War. Another skeleton believed to be that of an Indian was discovered, fueling speculation that Comanches took advantage of the cavern's seclusion.

A dramatic legend that has been handed down through the generations concerns a band of Comanches that raided San Antonio and captured a young woman named Mariel King. Three Texas Rangers trailed the Indians to the cavern's Indian Council Room, where they found Miss King with her hands tied behind her and the braves squatting around a fire. At a given signal, each ranger shot one Indian and the rest of the Comanches fled into the dark recesses of the cavern. The rangers rushed in and freed the girl, but when the Indians realized there were only three rangers, they attacked. A battle of flailing knives and gun butts ensued, and the rangers fought their way to freedom while keeping themselves between the Indians and Miss King.

Photo courtesy of H. H. Galloway



The story ends with Mariel King marrying one of the rangers, Logan Van Devere, and the two living out their lives in Burnet.

Guns, a bayonet, crude tools and arrowheads also have been found in the Indian Council Room, leaving little doubt that humans have occupied the cavern in times past. Indian writing on one of the walls is said to be a map of the surrounding area. Bones of bobcats and grizzly bears indicate that predatory animals dragged their catch to the cave to enjoy it in privacy. Outlaw Sam Bass is said to have used the cavern as a hideout in the 1870s.

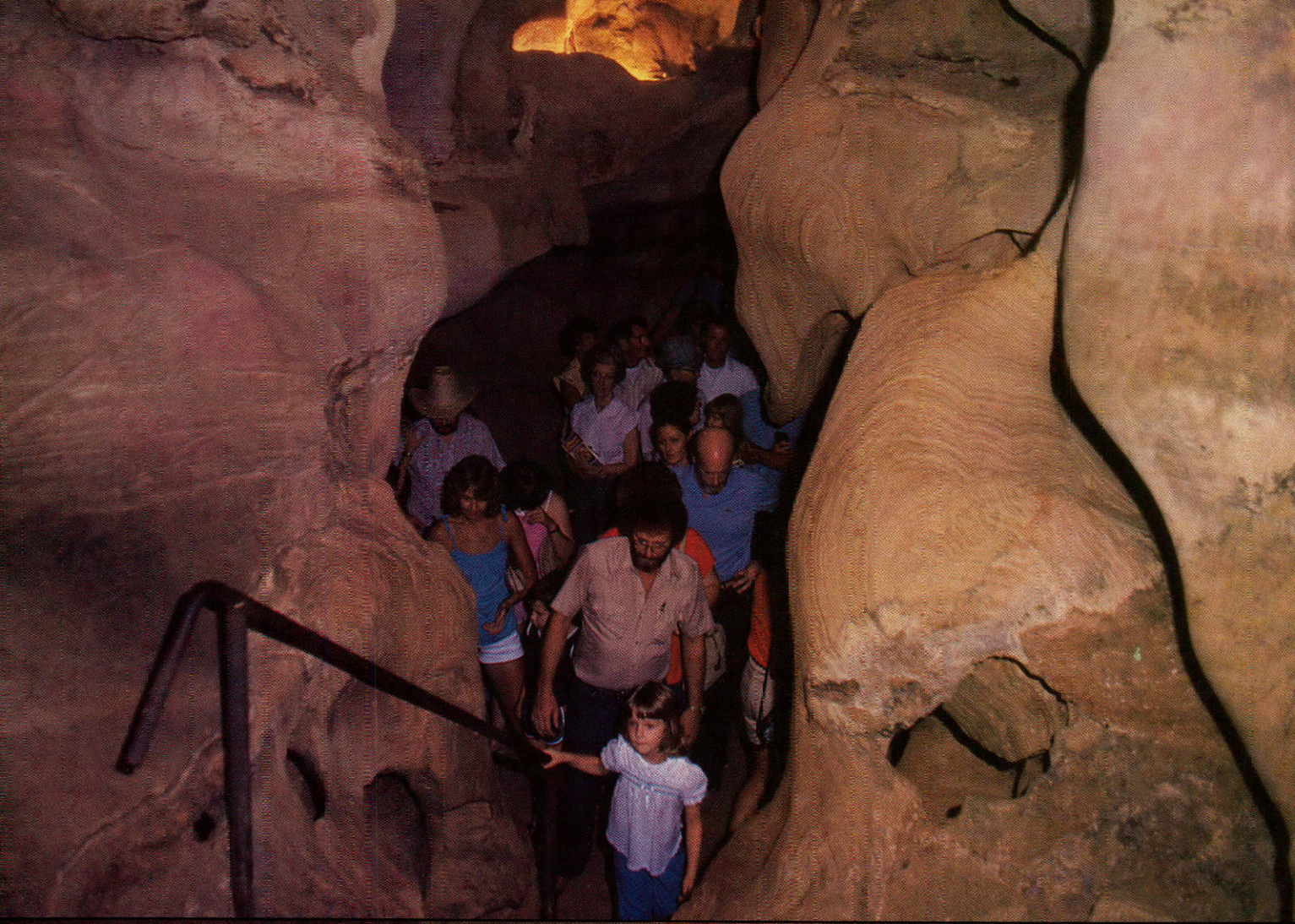
Longhorn Cavern—known as Hoover's Valley Cave and Sherrard's Cave prior to 1931—has been a part of the lives of less flamboyant people as well. Almost a century ago, Burnet County residents would gather up their children and friends and ride out to the cavern for a weekend of camping, picnicking and church services on Sunday. Since the temperature inside the cavern is a cool 64 degrees year around, it must have been a welcome respite on summer days in Central Texas before air conditioning.

In the 1930s, the "Subterranean Ballroom" came to Longhorn Cavern.

Couples in evening dress danced to live music on an elevated five-foot wooden dance floor in the chamber known as the Lunch Room. Supplies were lowered into the chamber via a large sinkhole. Bleachers were erected around the bend in the Cathedral Room, where a minister, who boasted he had the coolest church in Texas, held services on Sunday mornings. It is said that occasionally some of the Saturday night revelers climbed into the bleachers to take a break from the dancing, fell asleep and awoke to find themselves in church on Sunday morning.

The State Parks Board acquired the cavern and surrounding parkland in 1931 and gave it the name Longhorn Cavern. Dedication ceremonies in the Cathedral Room on Thanksgiving Day 1932 featured Governor Pat Neff as the principal speaker. But a great deal of work was required to transform the land into its present state. The first work was done by convict labor, which raised strong objections from area residents. Next came a group called the Cavern Company working with the State of Texas, but that too was short lived. Then in 1933, the Civilian Conservation Corps established a work camp at Longhorn Cavern. These young men were the ones responsible for shaping up the park; no major work or excavation has been done at Longhorn Cavern since the CCC left in 1937. During those four years they constructed an administration building, Park Road 4 and an elaborate new entrance to the cavern. The old entrance into the Indian Council Room was sealed in 1935 and the Sam Bass entrance constructed by the CCC men still welcomes visitors

The 1930s were a colorful period in the cavern's history, with couples in evening dress dancing to live music in the "Subterranean Ballroom" (left). One of the many interesting features on the cavern tour is the Attic (right). It developed when an inverted pothole cut through the main tunnel's ceiling and intersected a smaller channel in the rocks above the main passage.





Longhorn Cavern State Park

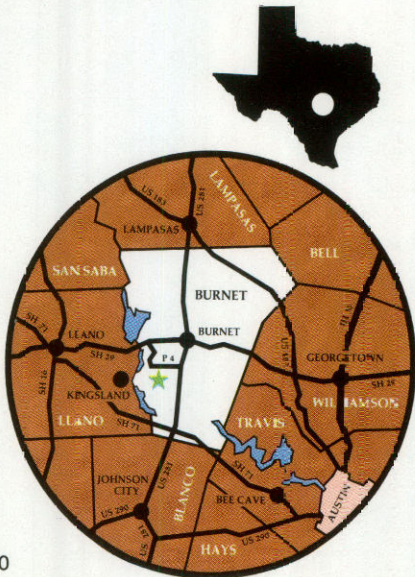
Location: Burnet County, five miles south of Burnet or US 281 to Park Road 4, then west on Park Road 4 for 5.5 miles.

Summer Hours: Open daily Memorial Day through Labor Day. Tours begin every hour on the hour between 10 a.m. and 6 p.m.

Winter Hours: Tours begin at 10 a.m., 1 p.m. and 3 p.m. Monday through Friday and hourly from 10 a.m. to 5 p.m. Saturday and Sunday from Labor Day to Memorial Day. Closed Monday and Tuesday from October through February.

Fees: Adults \$3.50, children five through 12 \$2.50, under five free. Group rates available at \$2.50 for adults and \$1.25 for high school and under.

For information: Call 512-756-6975 (tour information) or write Longhorn Cavern State Park, Rt. 2, Box 23, Burnet 78611. Business office telephone: 512-756-4680.



today. In what must have been back-breaking work, the CCC hauled 2½ million cubic yards of earth, guano and rocks from the cave. The basic lighting system they installed is still in use today. A new administration building was built in the 1960s, but the fine craftsmanship of the CCC can be seen in the old building, now used for displays.

Guided tours through Longhorn Cavern start at the Sam Bass entrance, a collapsed sinkhole through which water entered the rocks when the cave was forming. A natural bridge above the entrance was formed when a section of the cave roof collapsed, leaving only the middle section standing. Soon after entering, the tour comes to Crystal City, which provides a good look at some interesting flowstone deposits, formed when mineral-laden water flowed over the cavern walls. Large crystalline masses of calcite encrust the walls here, believed to have been formed from standing pools of calcium-saturated water. Soon after Crystal City comes the Queen's Watch Dog, a piece of limestone that probably was eroded into the shape of a dog. Although some stories claim the dog was an idol carved by a primitive race that once lived in the cavern, it is of a different type of rock than the block on which it stands and probably was placed on its pedestal by an early cave developer.

The impressive Queen's Throne is one of the largest flowstone masses in the cavern. Little Holland features rimstone deposits reminiscent of The Netherlands' dikes. Rimstone is formed when water collects into pools on the cavern floor. As the water evaporates, calcium carbonate is deposited around the rim of the depression. The longer the pool exists, the higher the limestone rim will be.

During the summer months a photographer takes visitors' pictures in

the 183-foot Indian Council Room. The 60- by 40-foot Lunch Room features delicate stalactites that form when drops of mineral-laden water hang suspended from the ceiling. When the water evaporates it leaves behind a thin layer of calcium carbonate that continues to grow as more water drips and evaporates. A row of stalactites produces blade-shaped draperies that appear to hang in folds. These also are present in the Lunch Room.

The huge Cathedral Room is 40 feet by 130 feet, and contains an impressive mass of flowstone called the Frozen Waterfall. The Chandelier Room boasts an unusually large array of deposits on its walls and ceilings; some are living deposits that are still growing while others are nonliving and have a more weathered appearance. The tour goes on down 33rd Street, a man-made tunnel carved by 33 men with 33 picks and 33 shovels. The walls here are rough, an interesting contrast to the smooth walls of tunnels created by running water. Above 33rd Street is a chamber called the Smokehouse, which is filled with stalactites and draperies that resemble slabs of bacon. Impurities in the seeping water gave these deposits a reddish color. Most of them are nonliving.

Lumbago Alley is appropriately named, since only children can walk upright along this 200-foot tunnel. Next comes the Hall of Marble, one of the most beautiful areas in the cavern. The smooth walls and ceiling were dissolved by the main underground stream in a uniform manner not found elsewhere in Longhorn Cavern. The Giant Icicle is found here, the cavern's largest stalactite at 14 feet long. On down the trail is an interesting example of the many variations of erosion. A layer of dark rock similar to flint called chert has been eroded into a shape resembling Abraham Lincoln's face. The Hall of

Diamonds provides a resplendent display of calcite crystals, draperies and stalactites.

This is only a thumbnail sketch of Longhorn Cavern's natural opulence. Knowledgeable tour guides describe the history and geologic development of the cavern, and there is no limit to what the imaginative visitor might discern in some of the deposits and formations. The guided tour takes about an hour and a half. The path is level with no ladders or steep grades, but it may be slippery in spots so low heeled shoes with rubber soles are recommended.

The scenic approach to Longhorn Cavern along Park Road 4 is a treat in itself, and a picnic at one of the shaded tables in the park is a perfect prelude or conclusion to the cavern tour. The administration building houses a gift shop and a snack bar with picture windows and a patio overlooking a Hill Country panorama. A one-quarter mile nature trail and a three-quarter mile hiking trail provide an interesting contrast between the aboveground and subterranean scenery.

Longhorn Cavern is enjoyable year around. It provides a cool break from a hot summer day of sightseeing in the Hill Country, and its constant 64 degrees seem warm on winter days when the outside temperature drops below freezing. Give free reign to your imagination on the tour and you might envision an Indian crouched on one of the ledges or Sam Bass looming around the bend. You might even hear the strains of Big Band music and the faint sound of feet on a wooden dance floor. **

Stalactites (bottom left) form when dripping water evaporates and leaves behind a thin layer of calcium carbonate. They increase in thickness at an average rate of one inch per 100 years. Many of these dripstone deposits are thousands of years old.



Blacktips Save the Day

Article by Jim Cox
Photos by Buddy Gough

It wasn't one of your picture-postcard mornings on the Gulf of Mexico. A brisk north breeze caused enough waves to lap against the bow of the oil rig-tethered boat to bring on symptoms of that queasy feeling so dreaded by landlubbers.

The late spring winds also blew ill for the water, coloring it a dusky green and pushing powerful north-to-south currents. A scant 15 miles offshore from the mouth of the murky Colorado River at Matagorda, the water often is clear enough to suit the fancy of king mackerel, ling and even clarity-conscious dolphin fish. But those conditions usually occur when the wind direction is about 180 degrees opposite from what we were observing.

"Dirty water," muttered my companion as he threaded a piece of squid on a bottom-fishing rig. "May be some snappers here, but it sure doesn't look like king water today." Prospects for big-fish were dim.

Our initial efforts at snapper fishing were surprisingly productive, and after several of the roseate beauties were safely on ice, we decided to put out a couple of drift lines just in case a wayward kingfish might be in the area. The gear was fairly standard—20-pound test line on one reel, 30-pound on another. I clumsily cast each in a downcurrent direction, paying out enough line to allow the ribbonfish bait to drift some 40 yards.

With the rods placed in holders in the stern, we continued to amuse ourselves with snappers and frisky, two-pound sand trout. Shortly, a tentative clicking sound emanated from one of the drift-line reels, indicating something was sampling the ribbonfish.

As occupant of the stern seat in our 15-foot open boat, I was responsible for the drift lines. Not expecting much, I picked up the rod and watched the line. Suddenly the slack monofilament was jerked from the

surface with a sharp zipping noise and the reel spool threatened to backlash with the strike's velocity. I thumbed the spool for a second or two, then cranked it into gear. The noise changed from a high-pitched click to the throbbing buzz of the drag being tested by a strong fish.

As quickly as it started, the battle ceased, "He got off," I told my partner. "That felt like a good king." Crestfallen, I was cranking in what I expected to be a broken line or hook, when the rod again tried to jump from my hands into the Gulf. The fish had executed a very unking-fish maneuver, turning and swimming directly toward the boat. The second run was shorter, and I could see the taut line ominously rising toward the surface. I had not quite gotten the words "he's coming up" out of my mouth when a gray and white fish broke the surface and did a credible imitation of a tail-walk, shaking its head vigorously before falling awash again. "Blacktip," said the experienced skipper in the bow, unsurprised at the antics of this surprisingly game species of shark.

After a spirited mano-a-mano at boatside we brought the fish aboard. I immediately was impressed by its appearance. Its silver-gray back blended into a creamy white underside, with the characteristic black tips on the fins and tail. Having heard of the fish's table qualities, we filleted the 15-pounder. The flesh had a wholesome pink color reminiscent of salmon, with firm texture and no bones.

I later found the blacktip's table qualities to be remarkable. The flesh is a bit on the firm side, but not excessively so. Rated as one of the two or three best-eating sharks available in Texas waters, blacktip meat can be served alongside such revered dishes as red snapper and ling. In fact, tests conducted by seafood marketing specialists at Texas A&M University revealed that when the volunteer taster was not told what he or she was eating, blacktip shark was named by a large percentage of them as the

most tasty dish served. And this was in competition not with other shark species, but prized food fish such as redfish, speckled trout and flounder.

A Gulf of Mexico Fishery Management Council report states that blacktips may be the most frequently eaten shark by recreational fishermen in the Gulf Coast states, probably due to its availability and convenient size. The report also says palatability of blacktip meat rates as "good to excellent."

From the fisherman's viewpoint, blacktips indeed offer the advantage of availability, being a near-shore species. You don't need a \$20,000 offshore boat to catch them; in fact, Texas Parks and Wildlife Department biologists guess that a large percentage of blacktips are taken by bank fishermen around passes, jetties and Gulf fishing piers. Trout anglers plying the flats for redfish and trout occasionally have been surprised to see blacktips hit lures or bait intended for the more traditional species.

This preference for shallow water appears to be substantiated by department experiments conducted with longlines in Gulf waters 10 to 50 fathoms deep. Blacktips easily were outnumbered by Atlantic sharpnose sharks in the longline catch results.

Blacktips are found in Texas' bays and shallow offshore waters throughout warmer months, when most traditional sportfishing activity occurs. They tend to be more scarce during the winter months. Blacktips are known to be migratory, but so far there is insufficient life history data to indicate where most of them spend the winter. They appear to be readily available in most Texas coastal areas from April through October.

As with most other shark species, blacktips are not the least particular about their diet. Their small teeth and slender bodies tell biologists that they mainly pursue smaller bait fish. Menhaden, mullet, butterfish, squid and stingrays have been recovered from their stomachs, according to the Gulf Council report. They

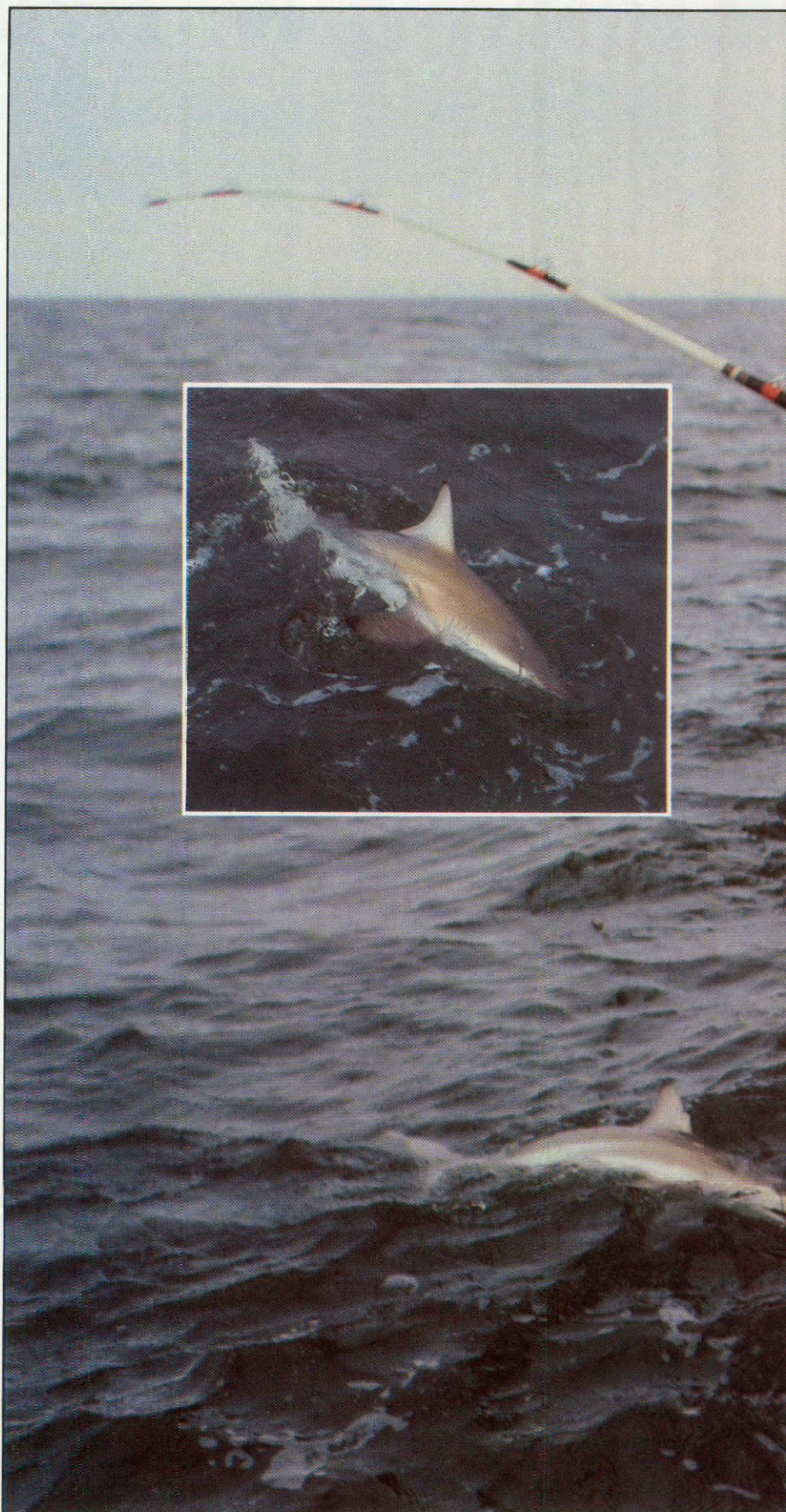
will take virtually any kind of bait, but cut bait is the most economical and convenient. They are swift enough to strike fast-trolled spoons and jigs used by Gulf trollers after king mackerel. Once a feeding school of blacktips is located, the trick is getting them in the boat or on the bank, more than which bait or lure to use.

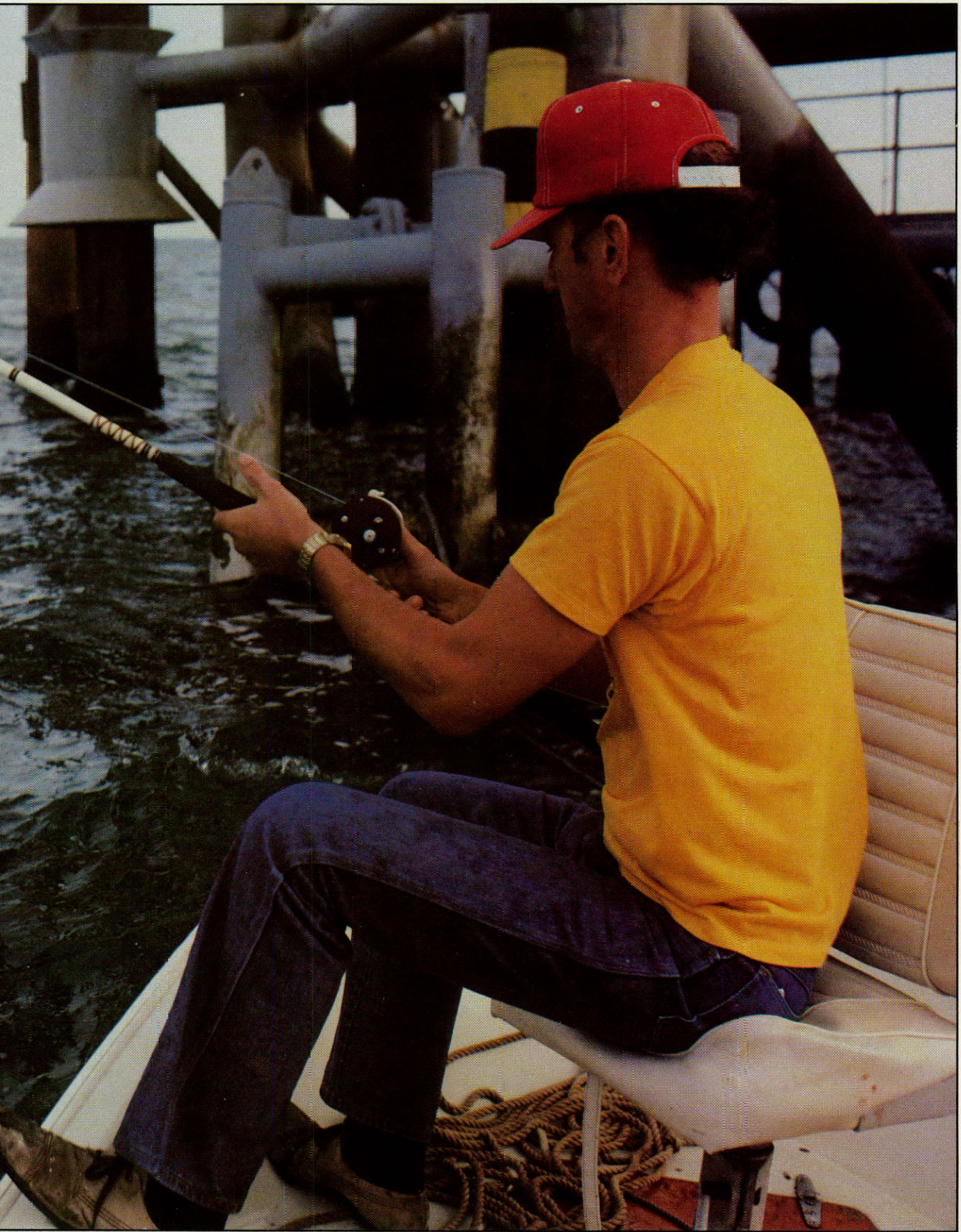
Called "the poor man's marlin," blacktips probably deserve to be rated as a sport fish. They do, however, have one negative characteristic which they share with other types of shark. Once a school of blacktips moves into an area, and especially after one has been hooked, most other fish either move out or stop feeding. In fact, anglers who want to avoid catching sharks should not bleed mackerel or other fish over the gunwale until ready to vacate that particular fishing spot, since small amounts of fish blood can cause large schools of blacktips magically to appear within minutes.

Sportfishermen in Texas and elsewhere have demonstrated a general lack of interest in sharks either as a sport or food fish. The main exception to this is a trophy shark fishery which is believed to be gaining momentum in some Gulf areas, with the larger species such as the tiger and hammerhead being the main targets. Meanwhile, blacktips are an abundant source of fun and food for a small minority of light-tackle anglers who remain undeterred by the general public's traditional aversion to sharks.

Blacktips and other small sharks doubtless will never replace the king mackerel, redfish or specked trout in the hearts of coastal anglers, but they can save the day when the finfish are finicky, and they deserve to be recognized for their considerable sporting and table merits. **

Blacktip sharks are shallow water fish. They can be caught around oil drilling platforms some 10 miles offshore as well as around passes, jetties and Gulf fishing piers. Blacktips are more abundant during the warmer months.





The Value of Wetlands

by Kay M. Fleming, Wildlife Biologist,
Texas Parks and Wildlife Department
and Bob Barsch, Wildlife Planner,
Arizona Game & Fish Department, Phoenix

Glen Mills



Wetlands are the most productive of all wildlife habitats. In East Texas, they include marshes, swamps, bogs, sloughs, baygalls and river bottoms — areas where the soils are waterlogged and poorly drained.

The habitat often is considered useless by many. All too often man will attempt to place an economic value on land with little regard to the plants and animals. Across the United States we have lost millions of acres of this valuable habitat to drainage, channelization and land-fill projects. Thousands of acres of wetland dis-

appear each time a new dam is constructed. The preservation of these areas is critical if Texans are to maintain biological communities that are dependent on the habitat for their survival. The destruction of our wetlands at the current pace will mean the loss of wildlife and botanical resources for the future. Hunters, birders, naturalists and all who enjoy the adventure of nature will suffer.

Ecologically, wetlands provide an "edge" effect. This edge, or ecotone, is produced by the mixing and blending of two or more different habitat types. Ecotones contain a mixture of soil types, plant life and geology, and consequently provide a greater variety of living situations for more diverse forms of wildlife.

Ecotones in the southern forest, when not produced by man, are provided primarily by wetlands. The changes in soil structure, moisture and topography produce the edge effect. A survey of mast-producing trees (those which grow nuts and acorns) in sloughs, creek and river bottoms shows the wetlands have more variety than upland sites. One survey of oaks within the floodplain of Little Pine Island Bayou in Hardin County revealed there were 28 different acorn-producing species in the bottom compared to 16 species in adjacent upland sites. When intermediate sites were surveyed on the waterlogged soils between the two, it was found that the variety had increased dramatically over the other two sites. Plants that are considered desirable food for deer and squirrels were three to four times as abundant on the intermediate sites than on the upland sites.

The Big Thicket area of Hardin, Jasper, Newton, Polk and Tyler Counties has the greatest variety of plant life in East Texas and possibly in the entire state. Due to a unique combination of wetlands and soil types, the Big Thicket provides an unusual mixture through the Pineywoods. One area, which many believe has the greatest variety of mast-producing trees in East Texas, is the Magnolia Springs Community. Magnolia Springs is located along the Neches River about 10 miles south of Jasper. Here, trees of the northeastern deciduous forest meet those of the Big Thicket. Botanists have distinguished more than 30 different species of mast-producing trees in the area. This plant association of two large habitat types provides a more stable environment for the great variety of wildlife found in the area.

The streams, sloughs and baygalls of East Texas produce the edge necessary for diversity in the vegetation and wildlife by blending varying quantities of water, sunlight and soil types. Trees that border the streams and wetlands of the Pineywoods produce more fruit and mast on a continuing basis due to the amount of water and sunlight available. The shrubs, vines and herbaceous plants adjacent to the wetlands flourish,

Wetlands' value goes beyond aesthetics; they offer habitat diversity and promote wildlife production. The Big Thicket, pictured here, boasts a huge variety of plant life due to a unique combination of wetlands and soil types. The water lily (right) found in ponds and quiet waters, is just one example of the Big Thicket's diverse flora.



providing cover and food for wildlife. Many of our endangered plants exist unmolested in these boggy areas where the delicate balance of nature remains untouched. Many ecologists and botanists feel that the creation of the Big Thicket National Preserve was the only way many of these rare plants and their habitat had a chance of survival.

Daniel W. Lay, a respected biologist and ecological historian, believes wildfire once played an important role in wetland ecology. Before civilized man settled East Texas, lightning periodically set fires that burned uncontrolled through stands of longleaf pine and into the sloughs and creek bottoms. Large, virgin pines usually survived the fires but dense, brushy areas adjacent to wetlands burned, leaving these areas open to sunlight and free of ground litter. Seeds that had laid dormant in the shade were suddenly free to sprout. Plants that were intolerant of shade and suppressed by the overstory quickly regained their vigor and flourished. This new growth created much more variety along the wetland ecotone than existed prior to the fires. Lay believes that some of our rare plants became endangered because of this lack of fire to free their environments.

The river otter is an excellent example of a mammal whose survival is influenced by the wetland's ecology. The otter depends on wild waters and the seclusion offered by our wetlands. The loss of the ecotone along rivers in the Ozark Mountains of Missouri and Arkansas is believed responsible for the marked decline in their otter populations. Wayne McMillian, a biologist with the U.S. Department of Interior in Missouri, said the otter's decline can be traced to "a century of forest clearing and stream channelization that has eliminated 2.4 million acres of Missouri's swamps and lowland forests, leaving only 70,000 tenuous acres of suitable otter habitat." The loss of wilderness and wetland habitat for the otter has extirpated this remarkable mammal in 11 states where it once was common, and has endangered it in nine others.

Soil fertility always has been an excellent indicator of wildlife productivity. In East Texas the most fertile soils are those of the wetlands. The decaying action of the wet, warm climate combined with the varying sedimen-



Glen Mills

River otters (below left) depend on the wetlands' ecology for their survival. They have declined markedly in states where suitable habitat has diminished. Other animals that depend on wetlands are the gray squirrel (below) and the beautiful wood duck (opposite).

tations produced by receding floodwaters and erosion have produced a labyrinth of different soil types with differing fertilities. Waters have eroded nutrients from East Texas for thousands of years. These nutrients are recycled as floodwaters deposit the sedimentations throughout the wetlands. This erosion and deposition of nutrients is critical in recycling nutrients eventually lost from the soil. Sedimentation varies from stream and river channels to the edge of the inundated tiers where the bottomland soil types fade into upland. Due to the varied composition of these wetland soils, plant variety and habitat diversity increase dramatically.

The effects of dredging and channelization of a waterway work against this natural consequence of flooding. Instead of sediments being deposited in the bottoms and lowlands adjacent to the waterway, the silt load builds up in the canal or is carried downstream and deposited in the Gulf of Mexico or nearby coastal beds.

Reservoirs also trap nutrients that under normal conditions would be redeposited throughout the creek and river bottoms. When wetlands are left alone, their maze of meandering streams, marshy sloughs and flooded lowlands act like filters, catching nutrients. Many of the pollutants that invariably end up in our water are filtered out by the wetlands. This complexity in nature provides a natural method of improving water quality and soil fertility.

The complexity of the wetland community increases

Bill Reaves





even more when the variable nature of water is considered. While many plant species are restricted to the wetlands because of the fertile soils, others are directly related to the abundance of water. Some plants and trees thrive because of the lack of competition for sunlight in the waterlogged soils and flourish in the standing water that is common throughout the wetlands. The varying adaptability of some plant species is readily apparent when shallow sloughs and baygalls are examined. These areas commonly dry up for short periods, but remain flooded most of the year. The various plant species normally form vegetation belts or zones that parallel the creek and river channels. The composition of plant species within these zones is determined primarily by the various plants' tolerance to water. Often there is little or no transition between these zones and numerous mast- and fruit-producing trees usually are encountered between the upland sites and these waterlogged areas.

A good example of this diversity can be found when the various species of oak are examined. As you walk from the dry upland sites into the wet sloughs and creek bottoms, you commonly will discover a sequence of oaks starting with the red oaks, then the white oaks. As you get into the wetter soils, the willow and water oaks are common.

The riverflat hawthorn, commonly called the mayhaw, is one of the best examples of a wetland plant that is totally dependent on periodically flooded habitats. It grows along sloughs and creeks where water stands part of the year. The fruit of the mayhaw ripens in late April or early May and forms a pome about half an inch in diameter. East Texans lucky enough to have a mayhaw thicket located when the fruit ripens, wade into the shallow sloughs and scoop the fallen fruit from the water. Mayhaw jelly is one of the best delicacies nature has to offer, but few realize this unique tree will disappear if our wetlands vanish.

The importance of wetlands and the varied habitats they provide for both wildlife and plants cannot be emphasized enough. The colorful wood duck and spunky gray squirrel are two wildlife species that depend on the wetlands for their survival. If the sloughs and creek bottoms disappear so will these and other animals. Their continuance depends on our attitudes and protection of the wetland environments which produce them. Do not be alienated by what seems to be a hostile, inaccessible and useless environment.

What appears to the unlearned eye as muddy, wild and worthless, is in fact a jewel of habitat diversity and wildlife production. **

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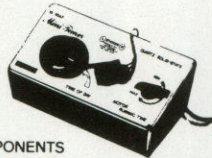
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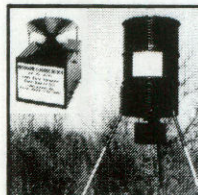
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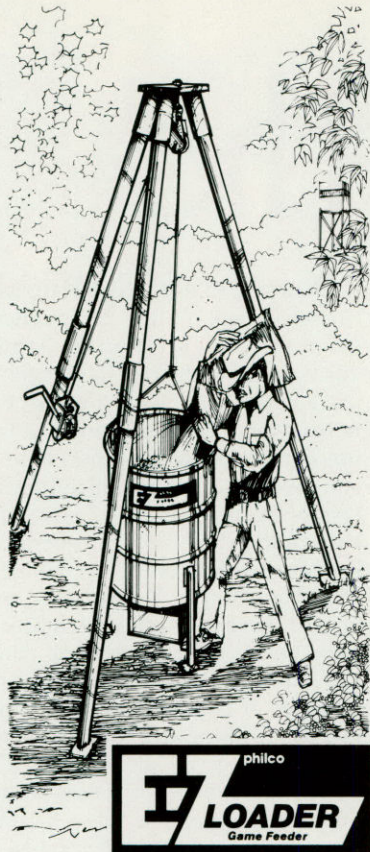
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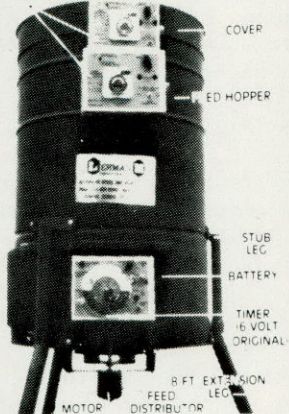
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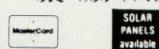
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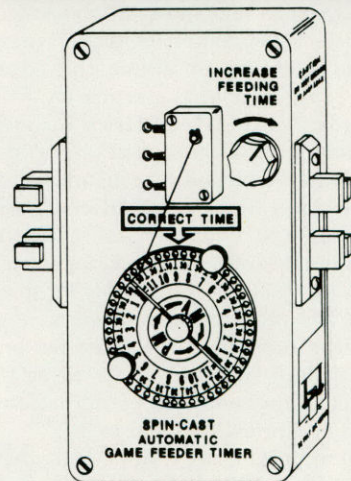
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Letters to the Editor

Watching the Wildlife

I really enjoy your magazine. I get to visit your Hill Country, the Kerrville area, and enjoy just sitting on the porch watching the wildlife—deer, coons, turkeys—that come in the field where I visit.

Keep up the good work with your conservation programs and there will be game enough for the generations to come.

Warren H. Alford
Gretna, Louisiana

Getting Better

I subscribed to the then *Texas Game and Fish* when it first was published. It wasn't much then, but now it is something else.

J. E. Zanella
Stephenville

Guadalupe Mountains National Park

We were pleased to see the wrap-around cover featuring McKittrick Canyon on the March issue and also the article on the Guadalupe Mountains on pages two through five. However, there was no mention in either the cover photo caption or in the article by Paul Montgomery that McKittrick Canyon and the entire Texas portion of the Guadalupe Mountains are in, and a part of, Guadalupe Mountains National Park.

Articles and photos relating to the Guadalupe Mountains published in past issues of *Texas Parks & Wildlife* have carried this recognition, and we call it to your attention this time since we feel your readers surely want to associate the Guadalupe Mountains with one of our nation's newest and finest national parks.

William W. Dunmire, Superintendent
Guadalupe Mountains National Park

Top of the List

Out of approximately 15 magazines we receive monthly, I think yours is at the top of the list. Your articles and color photographs are superior to most magazines. Keep up the good work. I am sending copies of the April issue to several relatives and friends out of state.

Mrs. Elwin G. Kirby
Cedar Park

Queen Angelfish

The photo on page 11 of the April 1983 issue was incorrectly identified as a black-bar soldierfish. It is a queen angelfish, a beautifully colored fish frequently associated with coral reefs such as the Flower Garden Reefs.

Enjoy Every Issue

I have been getting your magazine for two years. I really enjoy the issues I receive every month, and they keep me busy all month long. When I am older I hope to be a veterinarian and the issues help me a lot. I have learned many things about animals and animal behavior from the magazine. Thanks a lot from my family and me. We enjoy every issue that comes out.

Vince Ruffino
Houston

Early Man Discoveries

In "Leanderthal Lady" (April), three other Texas locations were mentioned where Early Man discoveries of world importance have been made. One of these is an early-day kill site at Yellow-house Draw within the present city limits of Lubbock. This was misprinted as Yellowstone Draw... too well-known a place to confuse.

Bob Parvin
Bastrop

Hothead?

The letter from Bob Mathews of Houston in the April issue is chilling! If ever a socialist frame of mind... And his last sentence, "In case he hasn't noticed, there are more of us than there are of him," sounds as if it came from a hothead of the '60s. Nowhere in my logic book does it say numbers make right. No wonder landowners get turned off if guys like Bob come around.

Lowry Riggins
Monroe, Louisiana

Daughters of the Republic

As president of the Fort Concho Chapter of the Daughters of the Republic of Texas, I read with pride the article "Birthplace of Texas Liberty" by Joan Pearsall in the March issue. I would like to make one correction. Mary Jones, wife of Anson Jones, did not organize the Daughters of the Republic of Texas. She was the organization's first president, but the founders were Miss Bettie Ballinger and Mrs. Hally Bryan Perry. In the summer of 1891 these two ladies met in the Ballinger's home in Galveston and conceived the idea of forever perpetuating the memory of the Texas pioneers and soldiers by forming an organization of their descendants to be known as the Daughters of the Republic of Texas. Today this old home is known as "The Cradle."

Marjorie M. Slagle
San Angelo

BACK COVERS

Inside: Many people who come upon a fawn in the wild are unable to resist taking it home with them, a practice that is cruel to the animal, dangerous to the humans and above all, illegal. Unfortunately for the animals and the well-intentioned humans, fawns are born in the summer when thousands of people take to the outdoors. Anyone who goes camping or hiking this summer is likely to see one of these irresistible little animals. Rest assured it has not been abandoned; its mother is probably nearby. (See white-tailed deer story on page 2.) Photo by Glen Mills.

Outside: Fireflies perched on a pane of glass give a different look at insects usually noticed only when they're blinking in the night. A complex chemical process allows fireflies to flash, the method by which the sexes find each other. The yellow parts of the lower body contain the light-producing chemical, and different firefly species flash at different rates. Photo by Martin T. Fulfer.



