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# TEXAS PARKS & WILDLIFE

SEPTEMBER 1990



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# TEXAS PARKS & WILDLIFE

September 1990, Vol. 48, No. 9

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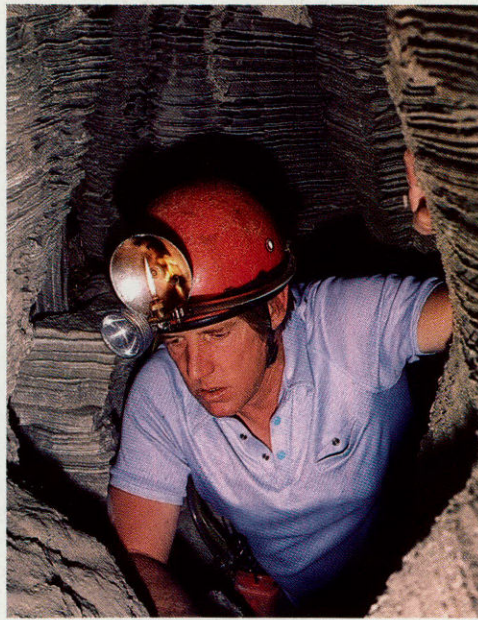
## MAGAZINE

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

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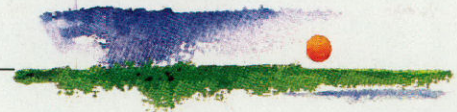


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**COVERS—Front and Back:** Alligators responded to a decade of protection by making a healthy comeback, increasing their numbers several-fold during the 1970s. Today they are recognized as a valuable cog in marsh ecology and can be seen in marshy areas such as Sea Rim State Park and J.D. Murphree Wildlife Management Area. (See related story on page 40.) Photo by Tom J. Ulrich. **Inside Front:** A young great horned owl fluffs up its feathers and spreads its wings as part of its threat display. (See story on page 16.) Photo by John Peslak.

# At Issue

**B**ack in July the organization Quail Unlimited had their national convention in Houston. One of QU's aims is to improve habitat for quail, and thus increase the numbers of quail available for sportsmen. The convention had its share of seminars, discussions and exhibits.

The most important discussion I attended addressed the growing anti-hunting sentiment in this country, or at least the perceived growth of such sentiment. I suspect a vocal minority has found a way to present an emotional case to the public, the majority of whom does not have an opinion one way or another on hunting.

At the meeting there was the usual grinding of teeth and beating of breasts on the part of those who have a vested interest in sport hunting—gun and ammunition manufacturers among others. But the most significant speaker was a quiet biologist from the California Department of Game and Fish by the name of Sonke Mastrup. Perhaps you've read about California's Proposition 117 that outlawed mountain lion hunting. Mastrup recounted to the group how this happened.

"Proposition 117 called for the acquisition of lion habitat," said Mastrup, "but at the same time it forbade hunting lions. Voters in rural counties opposed the measure but the voters from San Francisco and Los Angeles carried the day.

"The anti-hunters started small," said Mastrup. "They knew there was little interest on the part of sportsmen in hunting mountain lions and there was no significant opposition to Proposition 117 from California sportsmen."

According to Mastrup, Proposition 117 was sold as a habitat acquisition measure, but with a provision attached prohibiting lion hunting.

"The irony of this," he said, "is we will have to take money away from the acquisition of habitat for California's endangered species and use it to acquire habitat for a species—the mountain

lion—that is doing quite well in the state."

Mastrup said the California game agency now is being sued over the use of archery equipment for bear hunting in particular and its bear season in general.

"Hunters in California now comprise less than 1 1/2 percent of the population," said Mastrup. "We have experienced a \$12.5-million decline in license sales revenue."

Mastrup is concerned that this year's hunting seasons may be the last for California. Revenues are falling and professional staff probably will have to be cut. Now, I'm sure the antis among our readers will applaud this and the non-hunting majority will shrug their shoulders and say "so what, just a few more state bureaucrats out of work."

Well, that may be true, but when the biologists are fired who's around to continue the work on game and nongame species of wildlife? No one. All that expertise heads for the unemployment line. The wildlife might as well join them because there will be fewer professionals in the field and behind the computer terminal compiling information vital to our understanding of all wildlife—from the mountain lion down to a ground squirrel.

"In California," said Mastrup, "we have

something called the California Environmental Quality Act, CEQA. The intentions of CEQA are noble, and that is to require an environmental impact statement (EIS) on anything that will affect a threatened or endangered species. The California Supreme Court now requires that the California Department of Game and Fish file an EIS for each of our proposed hunting seasons. CEQA was intended for parking lot or shopping mall type developments; imagine the magnitude of an EIS on the effects of a quail season on threatened and endangered species when we have some 111 million acres of quail habitat in this state?

"If we continue to lose funding and staff," Mastrup continued, "there will be no one around to do the EIS work, and the seasons will effectively be closed on all species."

Sound like something that could only happen in California? My advice to Texas sportsmen this season is to watch your step. According to Mastrup, the Fund for Animals has targeted Texas and Georgia for more attention this year. Officials from Idaho, where 74 percent of the households have hunters, have called him about the effects of Proposition 117.

Watch your step and mind your



Wyman Meitzer



# LETTERS

## Red Wolf Update

Thank you for the outstanding story on the red wolves in the May issue. The magnificent photo on the lead page was of Rufus, the first male red wolf at The Texas Zoo. He is now deceased, but he continues to serve his species well whenever his photo is used.

The wolf on the inside back cover is Roxanne, the female who gave birth to a litter of seven at our zoo on April 29, 1989. Roxanne now resides at the Graham Breeding Facility outside Tacoma, Washington and she is paired with another male. Our adult female, Ruby, arrived here on January 3, 1990 to be paired with our male, Rusty, the father of last year's large litter. She gave birth to a litter of seven; three died shortly after birth but the others, two males and two females, are doing just fine. Ruby had been paired with other males but did not produce a litter. Rusty, age four, was a proven breeder so Ruby was sent to us. The pups were born April 10, 1990, the earliest date on record for a litter of red wolf pups.

The red wolf is an interesting and important animal. Thank you for helping the species with your fine story.

Jacquelin Mead  
Executive Director  
The Texas Zoo, Victoria

## Ill Wind of Spring

The reference to an "Arctic" or "polar" cap that compresses atmospheric energy prior to severe storm development is inaccurate (April). Actually the cap (or lid) is the result of a layer of warmer air aloft (an inversion), which has the effect of limiting the ascent of warm, moist air and confining the potential energy of that air to the lower atmosphere. The release of that cap or lid (called a "break or hole" in your article) allows the warm, moist air to resume its ascent into the relatively cold upper atmosphere. This produces thunderstorms.

The cap or lid can be "broken" in several ways. The heating of the atmosphere during a sunny afternoon is often enough to erode the cap, although this type of release may be more gradual and the storms that result may be less intense. Cold fronts, dry lines and

other atmospheric boundaries can "break" the cap. Also, air flowing from lower terrain to higher terrain can produce vertical motion that mechanically overcomes the cap and releases the lower-level air to rapid ascent.

Lon Curtis  
Belton

## The Plastic Problem

Two comments on "Plastics: The Problem that Won't Go Away" (July).

First, if people would realize that plastic items are foreign to the land or water body they are thrown on and require special disposal back home, the problem would be reduced in scope. Private industry and all levels of government need to say: This throw-away article is to be thrown away at the proper place, not on our land and water.

Second, the writer should have added that plastic litter also builds up on Texas' fragile and beautiful rivers and the private riverside property. All this plastic litter comes from persons using Texas rivers for recreation. Rivers and riversides are losing their beauty as the litter builds up.

An irritant to ranchers, farmers and all rural property owners is the task of picking up the litter at the river and riverside adjoining their property. Cattle consume icing-covered plastic wrap; unfortunately they later die. Rural property owners don't have commercial disposal facilities for sacks of plastic plates, glasses and dinnerware. The same goes for aluminum cans, cigarette packs and disposable diapers.

People, please, take your plastics and cans and other garbage home with you after you enjoy the beauty of Texas at the coast and in rural areas.

Arthur W. Nagel  
Riverside and Landowners  
Protective Coalition  
Boerne

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*Texas Parks & Wildlife* welcomes letters to the editor. Please include your name, address and daytime telephone number. Our address is 4200 Smith School Road, Austin, Texas 78744. We reserve the right to edit letters for length and clarity.

manners because many of my fellow sportsmen could stand a remedial course in hunter ethics. I hunt in Llano and Mason Counties, two areas that derive a great deal of their income from hunters. But when I go into one of Llano's convenience stores and see someone in a bloody camo outfit I want to crawl into a corner. Revulsion is written all over the face of the young lady at the cash register. She will take this dolt's money but she probably won't let her children hunt when they are of age. She also is part of that majority of Texans who neither hunt nor have an opinion in the matter, or at least she was.

This is an emotionally charged issue, perhaps not yet akin to abortion and flag burning, but getting close. Emotion is on the side of the anti-hunter. Bloody animals strapped on top of Suburbans and platoons of camo-clad good ol' boys emerging from convenience stores with six-packs of beer only reinforce the anti's position.

Don't think California's experience can't be repeated in Texas. Never underestimate the power of a single billboard along Loop 610 in Houston with a picture of a grinning hunter hunkered over a dead animal. That image will be etched in the minds of millions creeping along in Houston traffic.

It's September and time to get into the field. Be on your best behavior because people are watching.

Next month, our October issue will be a special one devoted to the Panhandle and High Plains, much on the order of our award-winning Trans-Pecos issue last October. The issue will have stories on Palo Duro/Caprock Canyons State Parks, the Lubbock Lake archaeological site, Lake Meredith fishing, the importance of playa lakes, fall foliage along the Canadian River and an interview with 89-year-old A. S. Jackson, a man who has seen much of the Panhandle and its wildlife.

--David Baxter



FRANKLIN MOUNTAINS STATE PARK

Laurence Parent

# AN URBAN

4 September 1996



**M**otorists whiz along Texas Loop 375, the Trans-Mountain Highway, often ignoring the rocky crags of the Franklin Mountains towering above. For 25 years, people have been able to take the route through the heart of the range, shortening their trips between the east and west sides of El Paso. Few have stopped, other than to admire the view from the overlook at Smuggler's Gap, almost a mile above sea level.

Now, however, most of the mountains are part of a huge state park. The fault-block mountains rise abruptly from the broad, cultivated valley of the Rio Grande on the west and the flat, desert basin of the Hueco Bolson to the east. The river cuts through the mountains on the south side, separating the Franklins from mountains lying across the river in Mexico. In that cut, or river pass, sprawls the heart of El Paso. Two horns of the city curve up to the north, flanking the mountains on both east and west, forming a large horseshoe-shaped urban area. Across the river, Juarez, Mexico stretches for miles.

by Laurence Parent

# WILDERNESS

To Anglo-Americans who visited here early in the 19th century, these mountains were full of menace and hidden dangers. The Franklins were a “chain of frowning mountains” to George Kendall, who was taken prisoner by Mexicans along with 300 others when the Republic of Texas sent them on an expedition to Santa Fe in 1841.

In 1951, noted artist and author Tom Lea wrote of the mountains: “Mount Franklin is a gaunt, hardrock mountain, standing against the sky like a piece of the world’s uncovered carcass. The plants that grow along Mount Franklin’s slopes are tough plants, with thirsty roots and meager leaves and sharp thorns that neither hide nor cover the mountain’s rough rock face. Mount Franklin is a lasting piece of our planet, unadorned.”

The Franklins still stand, virtually unchanged in human lifespans, but little remains to menace visitors. No Apaches haunt the slopes waiting to raid parties of passing travelers; no fearsome animals lie in wait for unsuspecting prey. The Franklins hide their secrets well, but the persevering will find the flowing water and lush vegetation of springs



Laurence Parent

*The Franklin Mountains rise on either side of the Trans-Mountain Highway (above). A trail from the picnic area leads to East Cottonwood Springs (below). The springs are small and delicate, so bikers should exercise care when visiting them.*

tucked out of sight in narrow canyons. Old mines mark the site of prospectors’ searches for mineral wealth buried deep within the rocky heart of the mountains. Other secrets, such as the tremendous views from the high peaks, are more obvious, but reward only those willing to hike.

Although a small range, the Franklins still rise an impressive 3,400 feet above El Paso, reaching the highest point on the summit of North Franklin Peak at 7,192 feet. The desert mountains follow a long ridge running north and south, from El Paso to the New Mexico state line. Chihuahuan Desert vegetation cloaks the mountain sides. Due to the low precipitation and steep slopes, plant growth is relatively sparse.

The spiny green rosettes of lechuguilla plants, whose stiff, daggerlike leaves seem designed to spear the ankles of unwary hikers, grow over much of the mountain park. Its tough fibers were once used by Indians to make ropes and sandals. Because the plant is common throughout the Chihuahuan Desert of Texas, Mexico and New Mexico, biologists consider it an indi-



Laurence Parent



cator plant for that specific desert.

All desert plants adapt to survive in harsh, dry environments. Many plants have small, waxy leaves to reduce water loss through transpiration. The tall, crooked stalks of the ocotillo appear lifeless until rains come, then small green leaves sprout all along the stalks. Not only does the plant lose its leaves during dry spells, prickly spines line its branches for protection from browsing animals. In Mexico, the branches are often cut

and planted in the ground in rows to form livestock corrals and fences.

Another common Chihuahuan Desert plant, the sotol, clings to the rocky inclines. Long, thin leaves radiate out from the center of the large, bushy plant. Small hooklike thorns line the leaf edges, like the teeth of a saw blade. The sotol hearts and budding flower stalks were used for food by ancient Indians. Today, Mexicans use the plant to make a potent alcoholic drink.

Creosote covers the slopes at the foot of the mountains. The plant multiplied after the desert grasslands suffered from overgrazing. Once established, creosote secretes a chemical that discourages other plants, such as the original grasses, from growing.

The barrel cactus, common to the Sonoran Desert of Arizona, finds its easternmost outpost in the United States in Franklin Mountains State Park. The distinctive cactus grows into ponderous

Laurence Parent



*It's more than a little unusual to look down on a large, thriving city from a wilderness area such as Franklin Mountains. El Paso stretches east, south and west, but from the mountains the city below seems silent and far away.*

individual stems up to four feet tall and two feet in diameter. The idea that the stem can be cut open to reveal a reservoir of water to thirsty travellers is only a myth. Many of the very old plants have been damaged or destroyed by people cutting into them, only to find a thick, unpalatable sap. According to El Paso-based Parks and Wildlife peace officer Jack Marshall, barrel cacti and other cactus species are frequently stolen from the park for use in gardens. Consequently, the large cacti are becoming rare in the Franklins.

**A**nother plant, rare in the rest of Texas, can cover the mountains with golden orange if enough rain falls in the winter and spring. The Mexican gold poppy, closely related to the California poppy, opens only on sunny days.

Desert vegetation doesn't completely dominate the Franklins. Here and there, tucked into hidden canyons, lie cool oases of trickling water and deep shade. On the upper slopes, rain and snow seep



Laurence Parent

into the ground, following fissures and aquifers, to reemerge as springs. The Franklins are too dry to have any large springs, but even the tiny trickles of water support lush stands of cottonwood, velvet ash and hackberry.

These permanent waterholes are invaluable to desert wildlife. Mule deer,

rabbits and ground squirrels frequent the springs for water, browse, nuts and berries. Hummingbirds come for flower nectar, while other birds search for wild grapes growing at the springs. Predators such as bobcats, foxes and coyotes come, drawn by water and the higher concentrations of prey animals. Even an occasional mountain lion appears in the park.

Early men and women visited the mountains, too. At Mundy's Spring, ancient mortar holes in the rock remain from the grinding of mesquite beans and acacia pods. Members of the Jornada branch of the Mimbres Indians inscribed petroglyphs on canyon walls in the Franklins between 900 and 1400 A.D. The Apache arrived in the area some time after 1400 A.D.

"Man has been roaming in the Franklins for at least 10,000 years," says Alex Apostolides, curator of El Paso's Wilderness Park Museum. "More Folsom points (10,000-11,000 years old) have turned up to the south and east of the mountains than anywhere else in the U.S."

Cabeza de Vaca may have been the first European to pass through the area in 1536. In 1581, the Espejo/Chamuscado expedition was known to have come through. Juan de Oñate, in 1598, was the first Spaniard to attempt to colonize the Rio Grande Valley in northern New Mexico. Since then, the El Paso area has been governed by Spain, Mexico, the Republic of Texas, the Confederacy and ultimately the United States.

Today, the state park encompasses most of the mountains, including many of the springs and high peaks. The park is fairly new, having been created by the Texas Legislature in 1979. In the 1970s,

*Mexican gold poppies, rare in most of Texas, cover the mountains with golden orange following spring rains. Shown above are Mexican gold poppies and fleabane. A snowfall dusts the mountains and the desert plants with powdery white (left). Ocotillos, growing here beneath a peak known as Anthony's nose, sport small leaves and blooms following a rainfall (right).*



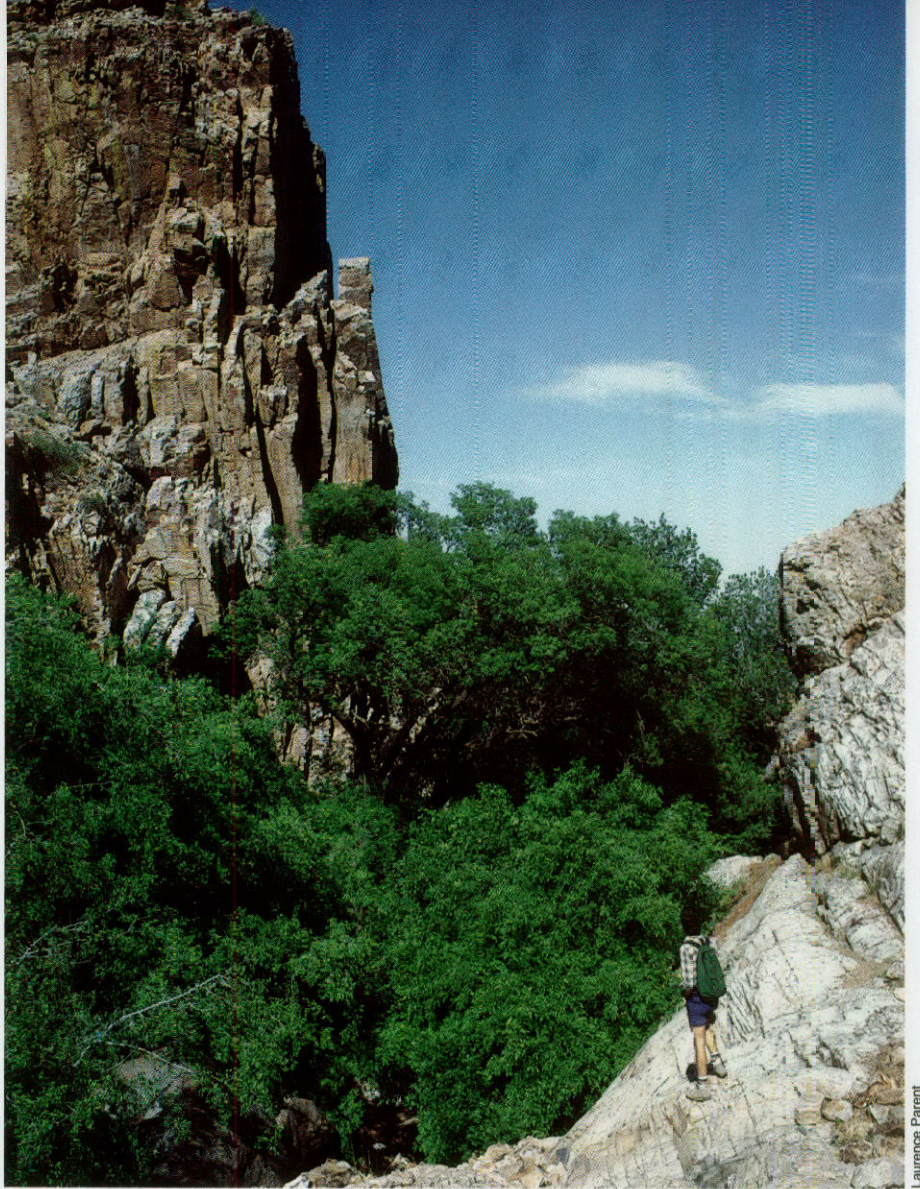
R. Michael Charske



as development encroached on the slopes of the Franklins, many citizens' groups in El Paso lobbied for creation of the park. In particular, the construction of a four-wheel drive road to the summit of North Franklin Peak by a developer spurred action by concerned citizens.

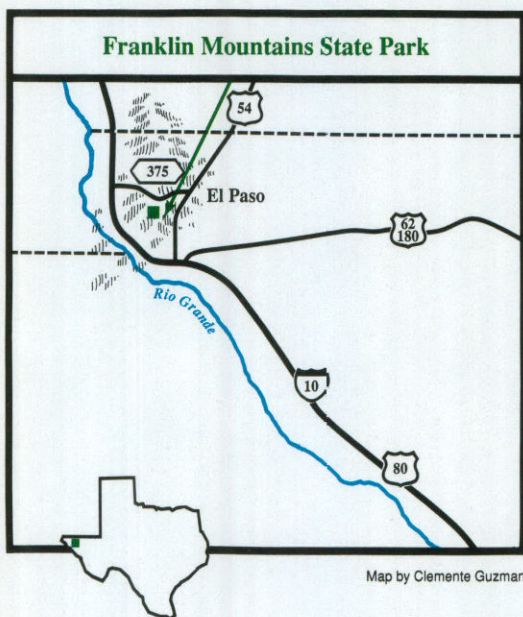
The state has acquired 23,117 acres of a projected 24,019 acres so far, which makes Franklin Mountains the third-largest state park in Texas. Parks and Wildlife continues to acquire acreage to fill in the legislatively mandated park boundaries. Part of Fort Bliss, the Castner Range, takes a large bite out of the east side of the mountain range. The old artillery range, no longer used by the Army, includes some of the most scenic parts of the mountains. Eventually the federal government may surplus the land for inclusion in the park. One major obstacle is the location and removal of any unexploded ammunition that might remain in the range.

Wilderness dominates the park. A picnic site, the Tom Mays Area, has tables and shelters but no water. It lies off of the Trans-Mountain Highway on



Laurence Parent

*A hiker visits Whispering Spring, which is accessible from the park but not on park property. Hikers should obtain permission to visit the spring from Fort Bliss.*



the west side of the park and is open for day use. El Paso operates a similar park in McKelligon Canyon on the south-east side surrounded by the park.

"Master planning for the park has been delayed pending substantial completion of land acquisition," says Dwight Williford, head of Parks and Wildlife Master Planning. "We expect that the high level of local interest in the park will produce extensive public involvement in developing the goals of the master plan."

Williford hopes that the lengthy planning and construction of amenities such as improved campgrounds will be ameliorated by some interim development such as primitive camping areas and trails.

Meanwhile, the park welcomes visitors for hiking, picnicking, backpacking, birdwatching and similar activities.

Many good trails already exist. From Tom Mays Park, trails lead to East and West Cottonwood Springs, Mundy's Spring, Indian Peak and the old tin mines on the east side. The springs are very small and delicate and easily trampled. Hikers should use care in visiting them.

The largest spring, Whispering Spring, is not yet part of the park and remains on the military range. Although many people hike up to it, the area is posted and permission should be obtained from Fort Bliss before entering.

At the turn of the century, tin ore was found and mined on the east side of the range. The mines are small and have been fenced off to prevent entry. Due to risk of collapse, entry is dangerous. Additionally, visitors disturb the bats that have set up house in the tunnels.

The trail (actually an old road) to the



R. Michael Charske

*Prickly pear blooms add touches of color to the springtime landscape.*

summit of North Franklin Peak follows the same route from Tom Mays Park, but climbs all the way to the top of the range. The spectacular view stretches from mountains far south in Mexico to 12,000-foot Sierra Blanca Peak 100 miles north in New Mexico. Hikers can backpack in and camp high on North Franklin Peak. After sunset, the city lights come on, creating a glittering blanket stretching east, south and west from the base of the mountains. El Paso and Juarez may be baking in the desert heat while cool mountain breezes brush the summit.

Wilderness Park Museum, operated by the City of El Paso along the Trans-Mountain Highway on the east side of the mountains, contains excellent exhibits on the early human history of the

Franklin Mountains area. Since the park itself does not have a visitor center at present, the museum makes a great first stop for an introduction to the area.

Much of Franklin Mountains State Park's attraction comes from its wilderness condition. With no more than a lunch, drinking water and some hiking boots, anyone can be deep into a wild area within a stone's throw of two million people. From the top of North Franklin Peak, El Paso and Juarez seem silent and far away. Amid the craggy peaks and cactus-covered canyons, solitude awaits the hiker. ★

*Austin freelancer Laurence Parent grew up in Carlsbad, New Mexico, just a short drive from the Franklin Mountains. He has made many a trip to El Paso.*

R. Michael Charske

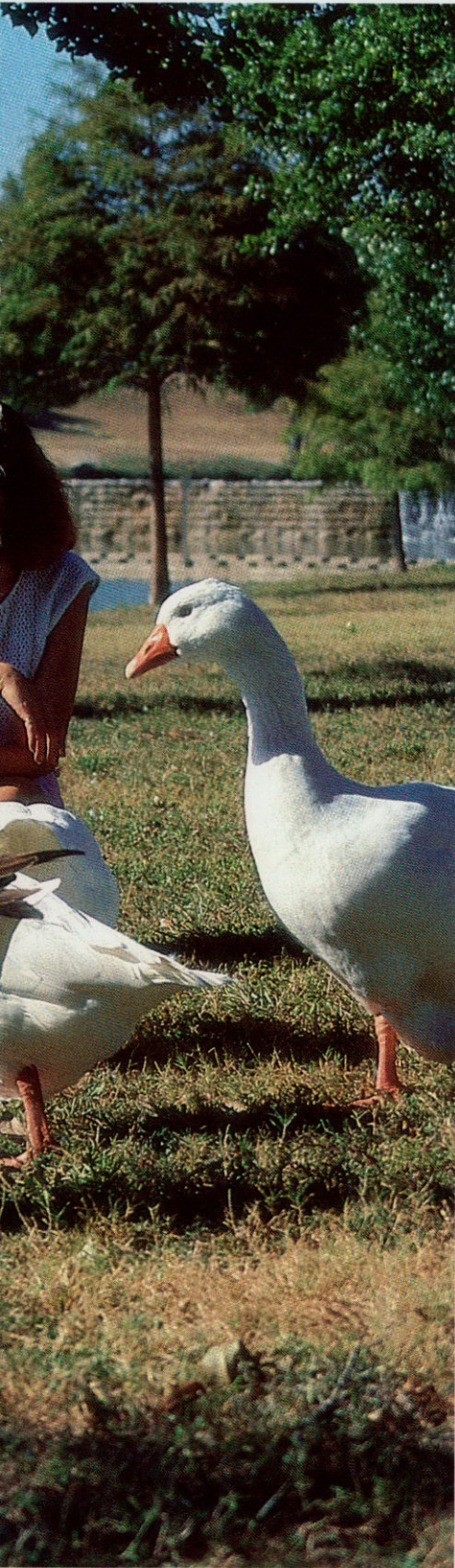


*Rushing water follows a springtime flash flood. On the upper slopes, rain and snow seep into the ground and reemerge as springs. Although the Franklins are too dry to have any large springs, even the small trickles support lush vegetation and provide water for desert wildlife.*

# From the Inside Looking Out



*With a state park as his back yard, young Patrick began learning about nature at an early age.*



## *Raising a family in a state park*

Article by Sheryl Smith-Rodgers    Photos by Leroy Williamson

**S**olitude reigns in our neighborhood. There's no loud music next door, no roaring traffic. Door-to-door salesmen can't even find us. But our neighborhood has hundreds of visitors each month. Where do we live? In a state park.

"You live in a park?" people ask, astonished at the thought.

No, we don't live in a tent. We live in a home provided by the state. As park superintendent, my husband Terry must live in the park as part of his job. Personally, I've never minded too much. In fact, since our wedding day I've never known anything else. We went straight from our honeymoon to a three-room residence in a Nueces County park, which Terry managed. Over the course of our nine years of marriage, we've lived in three other parks and plan to stay a long while in our most recent, Blanco State Park.

After our first year of marriage, Terry became assistant superintendent of McKinney Falls State Park, and we moved to Austin. There, we had the best of two worlds: big city conveniences and quiet country living. When we wanted entertainment, we chose from a variety of theaters, malls and restaurants. Once we had had enough of the crowds, all we had to do was head home. After all, the park was our front yard.

Since the house was surrounded by undeveloped terrain, wildlife often meandered onto our territory. I'll never forget the day I spotted a coyote loping across the field in front of our house. Now and then we'd hear a pack of them howl off in the distance. From our windows, we also watched deer, raccoons and armadillos.

From a safe perch up in the trees, a

chatty squirrel in the back yard enjoyed antagonizing our German shepherd, Zardo. A determined raccoon used to drop by nightly to do battle with the cat food canister in the carport. Now and then the cats would leave a bit of food in their dishes, much to the raccoon's delight. A few times he even let me open the door to bid him a good evening. More often than not, though, I'd see him wrestling that canister across the ground. He just couldn't open it. Out of sheer frustration, he eventually dropped us from his evening rounds.

One of our more unusual visitors landed on the roof. Terry bounded into the house one afternoon to tell me the news. "Have you ever seen a turkey vulture up close?" Terry asked. Feeling adventurous, I followed him outside. "Well, certainly not this close," I answered, eyeing the intimidating creature staring at me from the roof's edge. The vulture appeared to be in no hurry whatsoever to leave. In fact, the large bird bounced down closer to get a better view of us.

When Zardo caught a glimpse of him, the circus began. We sent the dog to the back yard to calm him. Not wanting the party to end, the vulture skipped over the rooftop in pursuit of Zardo. If Zardo returned to the front yard, so would the bird. Back and forth the two went until we finally tired of the show. The vulture returned to our roof two consecutive evenings, then vanished. Rangers later found a dead vulture not far from the park maintenance shop. They speculated that the bird accidentally landed on high power utility lines and was electrocuted.

After nearly six years in Austin, we moved to Martin Creek Lake State

Park, where the daily pace was much slower than the fast-moving Austin lifestyle. The East Texas park is located four miles south of Tatum, a little town of 1,300 residents and one stop light. Being a wife and mother, I appreciated living close to a community with all the necessities (grocery stores, bank, library and post office). Other park locations are not so ideal. For instance, Falcon, Caprock Canyons, Fort Lancaster, Fort McKavett and Copper Breaks State Parks are miles from a city of any kind. At the Big Bend Ranch State Natural Area, a paved road is two hours away. Teenagers of families at Big Bend Ranch live in Alpine so they may attend high school. Younger children are home schooled. These kinds of situations mean a lot of commuting for superintendents and their families.

Even though we have lived in parks located near a town so far, the isolation is still sometimes hard to bear. But that's one of the prices you pay for living in a park. At times, though, the loneliness can become overwhelming, especially in a new community. It's not like moving to a neighborhood where folks welcome new families next door. In a park, you can't sit and wait for someone to come knocking on your door. It takes an extra dose of determination and assertiveness to find and make friends.

Some parks have more than one residence, depending on the staff make-up. At McKinney Falls State Park, the state provided housing for the superintendent and his assistant. So we had one neighbor, Bruce Bunn and his family. And we couldn't have asked for better neighbors and friends. Barbara, Bruce's wife, became my walking partner. When our son, Patrick, came along, their kids, Toby and Amy, were thrilled. Instant babysitters, too!

At Martin Creek Lake, we lived in the only park residence. Our temporary neighbors were the park construction crews and their families. These workers, employed with the Texas Parks and Wildlife Department, lead a semi-nomadic life. They live in recreational trailers and move from park to park, where they construct and prepare facilities. Once work is finished, they head for another park.

After a year in East Texas, we re-



*Parents Sheryl and Terry realize that Patrick might miss having neighborhood kids to play with when he grows older. State park families feel an occasional sense of isolation, but the Rodgers believe the environment is the best anyone could offer a child. And Patrick gets to see his dad every day at lunch.*

turned to Central Texas where Terry became superintendent of Blanco State Park. From the very beginning, Blanco felt right. Folks warmly welcomed us into the community and immediately made us feel at home. I've met lots of other moms with young kids, and I continue to meet new people almost every day. The park's location within the city limits makes it even easier to be a part of the community. I've also discovered writing opportunities again and work as a reporter for the local newspaper. And an extra bonus: my parents live 40 miles away in Boerne.

As much as I enjoy park life, I can't always say the same for Terry. When you live where you work, you're never really off the job. Running a park is a 24-hour responsibility. Campers report problems, a stray dog runs rampant, water lines break, the electricity goes out. Those can happen at 3 p.m. or 3 a.m., and just as easily at dinner time, too.

I remember our first supper home after our honeymoon. I had the table set, the meal was hot. We sat down, said the blessing and ate our first bite. Someone knocked on the door. A woman had locked the keys in her car. Would Terry help? Away he went, and away went that momentous first meal. Other such similar events have followed over the years. Park problems happen whether it's the superintendent's day off, he has company or is celebrating a special occasion. So life as a park superintendent's wife is not without its frustrations, too.

Life-and-death emergencies also occur, and campers must be contacted, whatever hour that may be. Some-



times the emergencies happen right in the park. Terry will never forget the night a camper knocked on our back door with news that something was wrong at a campsite. Terry immediately drove to the site and found a man collapsed on the floor of his camper. The man had apparently suffered a heart attack. Terry quickly summoned an ambulance, but it was too late. The man died.

Tragedies such as that happen rarely. Even rarer are events such as Halley's Comet. Viewing it from Austin required a dark night away from bright city lights. Unlike most people, Terry

heaved a sigh of relief when the comet made its last pass. No more viewing parties with what seemed like half the cars in Austin trying to park at the state park. Remember that year, it was the thing to do—peer through a telescope at a fuzzy cotton ball so you could tell your grandchildren you had seen Halley's Comet. Never mind that it was 4 a.m. To commemorate the event, one group even handed out certificates, verifying that viewers had indeed seen the comet. Those were eerie nights. Dark, shrouded figures armed with flashlights paced the park road where telescopes aimed at the

sky. Nope, Terry and I won't forget Halley's Comet either.

Now that we've added a child to our family circle, living in a park has become even more special. At an early age, Patrick began learning about birds, trees, spiders, caterpillars and deer. At Martin Creek Lake, he claimed the park playground as his. We also periodically visited the fishing pier and watched for fish. In the summer we bicycled, and I pulled him in his wagon. Sometimes I even snuck a trip in it with him down a nearby hill. Terry still blames my extra weight for wearing out the wagon's wheels, not the fact that it once belonged to his grandmother, who wheeled it around for years collecting yard eggs.

Here in Blanco, we don't see as much wildlife meander by the house. However, a small band of horses or a noisy flock of goats often wanders past on the adjacent private property, sometimes stopping for a snack of corn we toss over the barbed wire fence. In the afternoon, Patrick loves to pedal around the huge driveway on his tricycle or play in his sandbox beneath the towering live oaks in the back yard. Down in the park, he and his dad sometimes try their luck at fishing in the Blanco River.

As Patrick grows older, though, the isolation and lack of neighborhood kids may become harder on him. Barbara Bunn used to tell me that was one of the inconveniences of park life; you have to import friends for your children. But still this environment has to be one of the best anyone could offer a child. Plus, how many kids get to see their dad every day at lunch?

As for myself, I couldn't imagine life anywhere else but in a park. We enjoy driving through old neighborhoods and admiring all the elegant homes shaded by majestic trees. Someday I'd like to own one. Then I wonder if I could adjust to living in the real world of neighborhoods and busy streets. Besides, living in a park bestows upon you a certain amount of notoriety. Whether it's in a town of 1,300 or a metropolis like Austin, few people can lay claim to a homestead like yours. ★



YOUNG NATURALIST:

# ANIMAL BODY LANGUAGE

by Ilo Hiller



Maslowski Photo

Most of us, at one time or another, have wished that we could “talk to the animals” like Dr. Doolittle, Tarzan or other storybook characters. And, if you admit it, you probably have wondered what your dog would say if it could speak instead of just barking, growling or whimpering.

Speech may be a human characteristic beyond the capabilities of any other animal, as some scientists believe; however, we cannot ignore the fact that animals can and do communicate—with



Mike Biggs

us, with their own species and with other animals. They can hiss, purr, roar, growl, snarl, howl, bark, grunt, neigh, whistle, sing, bugle, trumpet, squeak, buzz, click and make any number of other noises by using various parts of their bodies. We may not understand the sounds they make, but some of the meanings can be quite clear, especially when body language is added.

For example, a dog’s growl does not actually say, “Keep away from me,” but we understand its message. And when a dog adds the body language of drawn

lips and bared teeth, the message is reinforced as if these words had been added: “Come any closer and I’ll bite.” If the hair on its shoulders and back are raised, the message becomes even stronger. We understand the dog’s warning because we have been around these animals enough to learn what the consequences of ignoring such a message can be. If a wild member of the canine family, such as a coyote or wolf, displayed the same threat posture, we would understand its message loud and clear.

Many animals communicate warnings to us and other animals, and these messages are usually triggered when the animal feels threatened. The sounds and body language they use may be similar or quite different. Let’s explore a few of these warnings.

One of the most obvious is sound, and when it is loud, sudden or unexpected, we automatically react by backing up. For example, the explosive hissing or spitting of a small kitten can make even a large dog retreat for a second. Here again, the cat’s warning hiss is usually reinforced by body language. Its mouth is open, its teeth are bared and it may make a deep-throated “growl.” Its back is arched and its fur is bristled to make it look taller. It usually presents a side view of its body to its enemy to make it look even larger and more threatening.

Researchers who study animal behavior believe that animals using a side display as part of their threat posture do it for another reason as well. As the rear portion of the body is moved out to the side, the animal appears to be advancing even though its head is not moving any closer to the enemy.

We are all familiar with the sound of a hissing cat, but did you know that an owl uses a loud hiss as part of its threat display? An owl also reinforces this

warning hiss by making itself appear much larger than it really is. To do this, it fluffs up its feathers, spreads its wings, and lowers its head. You would be amazed how large and threatening a small owl can look in a matter of seconds.

The opossum starts its threat display with hisses and bared teeth, and it is not unusual for the animal to discharge a bad-smelling liquid at the same time. If its threat posture and bad odor do not frighten away the enemy, the opossum reacts in an unexpected way. You may have heard the term “playing ’possum” used before when someone is pretending to be asleep. However, when the opossum does it, the animal isn’t pretending to be asleep. It actually goes into a coma-like state and appears to be dead. The opossum normally has a lower body temperature and slower heartbeat than comparable size mammals, but when it “plays ’possum,” its breathing and heart rate become so slow that they can hardly be detected. It lies still with its tongue hanging out. Its legs are stiff and have little or no feeling. Anyone finding an opossum in this condition would assume it was dead. Later, if the possum has not become a meal for a predator while playing dead, it will come out of its coma and go about its usual activities as if nothing has happened.

Rodents can be very vocal animals as a part of their threat or warning displays. Squirrels bark, mice squeak, porcupines growl, prairie dogs bark, marmots whistle, and a little grasshopper mouse in western North America actually stands up on its hind legs and howls like a miniature wolf. Rodents may also show hostility by noisily grinding their teeth.

Tooth chattering or gnashing is often a preliminary to biting whether the animal is a small rodent or a large camel.



John Peslak

When animals chomp their jaws together quickly, the action increases the flow of saliva. As the chomping continues, it converts the saliva into a froth and the animal foams at the mouth. When humans get extremely angry, we sometimes use the slang expression that they “foam at the mouth” or that they have gone into a “foaming rage.” (Rabid animals may also foam at the mouth as a symptom of the disease, and we say that they have “gone mad.”)

The teeth are an important part of the javelina’s threat display and its large tusks can be dangerous weapons. When aroused, the animal makes a “whoof, whoof” noise accompanied by loud pops that sound like two large bones hitting together. To make this popping sound the javelina opens its mouth wide and then snaps its teeth



John Peslak

*A long-eared owl makes itself appear larger by fluffing up its feathers and spreading its wings (opposite page, top).*

*A coyote sends an unmistakable message with its drawn lips and bared teeth (opposite page, bottom).*

*If an opossum’s threat posture doesn’t frighten the enemy, the possum goes into a coma-like state and appears to be dead (left).*

*A javelina bristles the hair along its back and makes loud popping noises by snapping its teeth together (below).*

together. It can do this about four times a second. These warning sounds are reinforced by a bristling of the hair along the animal's back.

Displaying an open mouth and bared teeth is a threatening posture, no matter which animal is doing it, but perhaps in addition to saying, "Stay away," the animal is also saying, "I'm afraid." Those who have worked with chimpanzees claim that when a chimp opens its mouth wide, bares its teeth and raises its eyebrows, it is showing fear. But when a chimp's eyes are wide open and its lips are tightly closed, not frowning, it is threatening to attack. The chimp interprets our normal upright posture as a threat of aggression and our friendly smile as a sign of fear.

The cottonmouth water moccasin, although usually a rather sluggish snake, will quickly draw back its head and open its mouth wide in a threatening manner when approached. This action exposes the white tissue lining inside its mouth that is responsible for its common name. In addition to this open-mouth threat, the cottonmouth vibrates its tail when annoyed. When the tail is lying among



John Peslak

dry leaves, or when it strikes a hard object, the resulting sound may be similar to the warning buzz of the rattlesnake's rattles. Since the cottonmouth and rattlesnake are two of our large, poisonous snakes, their warnings should never be ignored.

The shivering movements of a mouse's tail also produce a rustling sound in the leaves. Perhaps the mouse makes this sound so a predator will think that a snake instead of a mouse is nearby.

Tails are often used for communication. Did you know that the beaver slaps its tail on the surface of the water as a warning of danger? Probably more familiar tail messages are the lashing movements of an annoyed cat's tail and the friendly wag of a dog's tail.

Most outdoor enthusiasts, especially hunters, are familiar with the warning tail flag of the white-tailed deer. A combination of body language and sound occur when a whitetail feels threatened. If the animal is only mildly disturbed it will stamp its front feet. It may use only one or may alternate between the two. As the suspicion of danger increases, the deer may snort along with the stamping action. This snort may become an explosive whistle just before the whitetail leaps into action. When it runs in response to fright, it usually lifts its tail to expose the white underside. With hairs erect, the tail makes a conspicuous splash of white, which may serve as a warning of danger for other deer or as a beacon to guide the fawns that may be bounding along

behind a doe.

A tail warning that should never be ignored is the one made by the skunk. When threatened, the skunk may actually give three warning messages before using its potent spray. First, it lowers its head, arches its back and lifts its tail, except for the tip, which hangs limp. If the threat continues, the skunk may stamp its front feet. Finally, it lifts the tip of its tail and prepares for battle. If startled, the skunk shoots immediately without warning.

When a porcupine senses danger, it quickly lifts its quills into a vertical position. The next step in its warning display is to waggle its tail from side to side while stamping its back feet. If these warnings are ignored and the threat continues, the porcupine whirls around and presents its prickly backside to the enemy. With teeth chattering and tail thrashing, it advances in this backward position.

Pawing or stamping the ground may be nervous reactions, or they can serve as warnings of action to come. If the front feet are involved, the pawing or stamping may signal that the animal is getting ready to advance, as in the case of a bull pawing the ground. When the back feet are involved, the action may signal escape. However, since a porcupine advances backward, the stamping of its back feet means advance. In the case of rabbits, thumping the hind feet serves as an alarm signal.

The ears of an animal can also be indicators of its intentions.

A horse may lift its lip or open its

Maslowski Photo





Gilbert Palmer

mouth and show its teeth, as either a threat or a greeting. The key to its meaning is the position of its ears. If the ears are laid back close to the head in a protected position—beware. If the ears are upright and turned forward, the horse is offering friendship; however, the open mouth and exposed teeth still indicate that it is willing to defend itself if friendship is not returned.

Studies of the aggressive behavior of white-tailed deer have shown that males display five warning postures to challenging bucks—each more aggressive. The first, and mildest, is when the buck

drops its ears along its neck. In the next position, the buck extends its head and neck, flattens its ears along the neck and glares at its challenger. In the third position the buck turns its head and body about 30 degrees from its adversary and advances with several sidling steps. Its head is erect, its chin is tucked in and the hair along its neck and hips is raised to show anger. The next step is for the buck to drop its head and present its antlers. If the challenger stands his ground and responds with his own antler threat, both bucks rush together, making violent contact with their ant-

*The deer in the foreground has dropped its ears, the mildest warning posture (left). The buck behind is presenting its antlers, a more threatening stance.*

*An alarmed deer's erect tail makes a conspicuous splash of white, which may serve as a warning to other deer (opposite).*

*The cottonmouth draws back its head and opens its mouth wide if threatened (opposite page).*

lers, shoving, twisting and testing each other's strength. The battle ends when one or the other has had enough.

Female whitetails follow the same first three warning steps; however, since they do not have antlers they must use their front feet in the final stages. In step four the doe lunges at her challenger and strikes out with one or both front feet. In the final step the does stand up on their hind legs and slash out at each other with both front feet. Their sharp hooves are wicked weapons and battle injuries are common.

Warnings made by large animals may be easier to see, but smaller creatures also display them. When the tarantula or the crab spider rears up on its back legs, it is sending out a warning that it is ready to defend itself. The tail curled over the back of a scorpion also says loud and clear, "My stinger is in the attack position."

It may be true—as Flavius Josephus, a historian of Roman times wrote—that being able to talk with the animals was lost when man was banished from the Garden of Eden. However, we can be thankful there is still some communication taking place between them and us when we take the time to understand what they are "saying." ★

PICTURE THIS



# PANORAMAS

by Leroy Williamson

**H**as the standard format of your camera become boring, too confining? Then it's time to expand your horizons with some panoramic views of your world.

Your eyes view a much broader panorama than the normal camera can see. To create a scene more like what your eyes see is relatively simple. All you need is your camera, any lens you choose and a tripod.

To create panoramas, place your

camera on a tripod, making sure the camera will remain level as it is panned to photograph the number of exposures you choose—two or three, or enough to cover a full 360 degrees. Most often, three exposures will be sufficient to create the scene you desire, but don't hesitate to make a broader panorama of five or six exposures if the scene calls for them.

Pan through the scene once or twice, picking some object on the frame line

for lining up each subsequent exposure. Some overlap is necessary—how much is debatable. I limit my overlap to a minimum, perhaps the width of a tree trunk, or only half its width if it is in the foreground.

Select the one frame in your panorama which is the most important and set your exposure for that frame. It is important that all subsequent frames be made the same exposure so the scene can be reproduced as you see it. If you



are using color negative film, your processor may correct the exposure when developing and printing your film. This may make the prints vary in density and not look good when placed side by side. But they will be good enough to determine whether you wish to have an enlargement made.

If your scene works and you want to have an enlargement made for the wall, take your negatives and prints to the photo lab and show them what you want. Tell them which picture to analyze for color balance and exposure and have all the negatives in the series printed at the same exposure with the same filter pack. The results will be stunning. Frame your pictures in metal frames (or skinny wooden frames) and hang with a small space (an inch or two) between each frame. You will be pleased with the results and your friends will be

amazed that you did it yourself.

The same procedure applies for users of color slide films except you won't have the problem of first print density not matching. Just make sure your lab knows you are making a panorama so they can print accordingly.

If you don't want to hang your panorama on the wall, you may want to trim and glue the photos together for your scrapbook.

Although panoramas are generally horizontal, there is nothing wrong with making a vertical panorama. Buildings and tall waterfalls are excellent subjects for striking vertical panoramic photographs.

There are special format cameras on the market for making panorama pictures, but most are rather expensive, ranging in price from hundreds to thousands of dollars. However, Kodak has a

*For this panorama of Caddo Lake State Park, exposure was determined for the center picture, then all three frames were exposed accordingly. For best results, the camera should be tripod-mounted and care must be taken to have the camera level for each panoramic exposure.*

disposable "stretch" camera on the market that comes loaded with Kodacolor Gold 200 film, has a 25mm f/12 lens and a fixed shutter speed of 1/125 second. You'll get 12 astounding panoramic exposures from a camera with a list price of \$12.50.

Making panorama photos opens one more door in the wonderful world of photography. ★

by Kay M. Fleming

# The Ups and Downs of East Texas Squirrels

*Squirrels and other wildlife benefit from Keechi Creek's hardwood bottomlands.*

The youngster sat across from the big oak with his back against a stump. Cradling the rifle in his lap, he worked the safety one last time—just to be sure. As the morning light silhouetted the huge pin oak tree, he could barely make out the dark outline of a cavity about two thirds the way up the trunk.

This was the same cavity that had donated four cat squirrels to last year's camp stew, giving him the bragging rights at that night's campfire. Two years ago this same den hole had all but exploded with squirrels as the bushytails scattered and scampered in a frantic escape. His grip on the .22 rifle tightened as his eyes searched the limbs and branches.

Birds began to break the morning's silence with their chatter as the sun now hit the tops of the taller trees. Leaves of the sweetgums, blackgums and hickories colored the wooded creek bottom with patches of red and yellow. Still no squirrels. He heard a crow and then, in the distance, the high-pitched squeal of a lone squirrel indicating its displeasure.

The three men and young boy who hunted the hardwood bottom that fall morning had dropped only six squirrels into their game bags by dark. What had happened to the squirrels that had appeared everywhere

the year before? Had they been overhunted?

This scenario has undoubtedly been repeated many times, and will be again. What happened to the squirrels within this beautiful hardwood creek bottom was predictable, but unavoidable. The squirrels had simply reacted to changes within their environment.

The Keechi Creek Wildlife Management Area in Northeast Texas was first opened by the Texas Parks and Wildlife Department to public hunting in the fall of 1986. Those first

hunters were astonished at the number of squirrels. An average of 6.5 squirrels were harvested per hunter, and many hunters quickly got their limits.

The Keechi Creek Area is excellent gray squirrel habitat. It is located in northeastern Leon County, about 10 miles south of Oakwood. The area is predominantly bottomland hardwood with mature stands of water oak, willow oak, overcup oak and hickory. Post oaks and red oaks flourish on the upland sites.

In both 1985 and 1986 there were good mast crops on the area. The ground was covered with acorns and hickory nuts. But then late freezes in March and April 1987 severely damaged many of the oaks that were just beginning to leaf out and flower. This drastically reduced acorn production.

When mast production is low, squirrel populations usually respond with poor survival and low reproduction. A failure of the mast crop is usually catastrophic to the squirrels, since acorns are the squirrel's primary food source and are eaten almost 10 months of the year. This is what happened in the woods along Keechi Creek. Even when the habitat is good, nature sometimes strikes a blow; wildlife in good habitat often suffer but will recover quickly.



Glen Mills





*The Keechi Creek Wildlife Management Area (above) is excellent habitat for the gray squirrel (right). In 1985 and 1986 there were good acorn crops in the area and squirrel populations were high. But late freezes in 1987 severely damaged many of the oaks and squirrel populations dropped.*

In the spring of 1988, only 0.4 squirrels were harvested per hunter, and the fall hunts fared only a little better with an average harvest of 1.5 squirrels per hunter. Squirrels had not been over-hunted; they had run out of food. The lack of food during the winter of 1987 had completely eliminated any reproduction. No juvenile squirrels and only one sub-adult squirrel were harvested by hunters during the fall of 1988. In a normal year, more than 60 percent of the squirrels bagged by



Glen Mills

Gracy Allen

hunters are young-of-the-year.

To remain in good condition, adult gray squirrels require three or four ounces of nutritious food daily. They would have to consume 75 to 100 water oak acorns a day to receive their daily food requirement from acorns alone. Since a 12-inch diameter water oak produces about four pounds of edible acorns per year, it would take all of the acorns from 22 of these trees to provide enough food for one gray squirrel for a year. When you consider the use of acorns by other woodland animals, it is obvious that a diverse and productive hardwood forest is of paramount importance.

The gray squirrel often prefers the mast of hardwoods such as pecan, shagbark hickory and white oak. This mast is considered "sweet mast" since it lacks much of the bitter tannic acid in red oak and water oak acorns. This

does not mean however, that a squirrel will avoid these bitter acorns. All acorns are readily consumed. A squirrel is just as likely to be found cutting acorns in the top of a water oak as it would in the top of a white oak or a pecan tree.

The different species of oak have different methods of making acorns. Not only do the various types of trees flower at slightly different times, they form acorns at different times. A mast producer, such as the white oak or overcup oak, will flower in the spring and produce mature acorns by fall. Other oaks, such as the red oak and water oak, will flower each spring, but it takes two years for these flowers to form mature acorns. When the forest has a variety of these different hardwoods, a late spring freeze usually will not eliminate the mast crop completely. Acorns that have been forming

from previous years will not be damaged. In a diverse hardwood forest, a variety of mast species will help reduce the impact when a few of the species have a bad year and turn out to be poor producers.

Squirrels, of course, do not eat only hardwood mast. About 25 percent of their diet consists of other items. During the early spring, squirrels supplement their diet of nuts and acorns with mushrooms, flowers, buds, stems, seeds and fruit. Later in the year, they will eat wild plums, blackberries, grapes and even insects. Occasionally a squirrel will even eat a lizard or a frog. They get calcium from mineral-rich deer antlers and bones; it is rare to find the fallen antler of a buck without finding the gnaw marks of a squirrel or other rodent. Most shed antlers are consumed almost totally by mid-summer.

The squirrel ranks as one of the most popular game animals in the state. The Texas Parks and Wildlife Department's "1989-90 Hunter Survey" estimated that 135,800 squirrel hunters harvested approximately 572,600 squirrels. Squirrels are hunted throughout a large portion of the state but the majority are harvested in East Texas. It is here that the woodlands offer premium habitat for the gray squirrel.

While fox squirrels are tolerant of open country and frequent the forest edge, gray squirrels require dense bottomlands with mature forests and thick understories of shrubs and younger trees. They demand a forested area dense enough for them to travel easily through the overstory canopy.

A good forest for squirrels will have hammocks of mast and fruit-producing trees and shrubs. Prime areas usually are thick with vegetation and climbing vines. Plants such as rattan, trumpet creeper, and wild grape often provide this canopy that offers excellent escape cover.

Predation on squirrels is common but rarely observed. Hawks, owls, raccoons and bobcats all make life perilous for the squirrel. Squirrels are in even more danger when food is scarce and they are forced to forage over new and larger areas. Thick cover and an abundance of den sites give the squirrels refuge and areas for escape.

Glen Mills



*Fox squirrels are more tolerant of open country and can survive in the parklike landscaping most homeowners favor.*



Glen Mills



Glen Mills

*Different species of oaks form acorns at different times, and in a diverse hardwood forest a variety of mast species will help reduce the impact when a few species have a bad year. Shown here are acorns of the water oak (left) and live oak. Gray squirrels (below) require dense bottomlands with mature forests and thick understories.*

Den cavities are particularly important to squirrels. Not only are they used for refuge from predators and bad weather, they are important as brood-rearing areas. If a forest is to be maintained as good squirrel habitat, large, mature trees with cavities in their trunks must be left for the squirrels.

Gray squirrels commonly build leaf nests that they use for both hiding and resting. When tree cavities are scarce, these nests of branches and leaves will even be used for dens. In late spring a squirrel will occasionally use one of these nests as a second home for its young. The mother squirrel will carry the tiny sucklings by the nape of their necks to these cooler sites. Females also have been observed moving young to these nests when their old den sites are threatened. During years of high squirrel production, these precarious looking nests will appear everywhere. Biologists sometime use the leaf nests as an index to squirrel production—a lot of nests is an indication of good production.

In spite of the squirrel's popularity, very little is being done to conserve its habitat. Increases in reservoir construction and the clear-cutting of woodlands are permanently destroying thousands of acres of prime squirrel habitat each year. Agricultural and logging operations often clear large tracts of bottomland hardwood.

Hardwoods also are being lost to urbanization and human encroachment. Subdivisions and condominiums are invading areas that have belonged to squirrels for hundreds of years. The landscaping most homeowners prefer is not favorable to the gray squirrel. Even when landowners are careful to leave the beautiful hardwoods on their lots, they usually clear brush, vines and damaged timber. This



Grady Allen

parklike landscaping is a slum area to the squirrel. It may be suitable for a few fox squirrels but will be shunned by the acrobatic gray squirrels.

Hardwoods are sometimes even destroyed by those who have the most to gain by preserving them—the cattlemen. To a few cattlemen more rangeland means more cattle, so they clear almost everything except the grass. This attitude will often come back to haunt them. When cattle prices are down, hunting lease revenues can help keep the rancher in business. The mast-producing hardwood tracts that provide good habitat for wildlife are highly marketable as hunting leases. Cattle producers who clear out their wooded tracts usually discover they have limited the earning potential of their land and have not looked at the long-term returns. It's a lot easier to grow grass than produce another ma-

ture stand of hardwoods.

Wildlife management areas like Keechi Creek are being purchased and managed to protect and enhance areas of prime wildlife habitat. Even though the Keechi Creek Wildlife Management Area was purchased primarily for its potential as waterfowl habitat, all woodland species have benefited. Squirrel, deer and waterfowl all reap the rewards when we save hardwood bottomlands. We have invested in their future along with that of another important woodland species—the outdoorsman. The Texas Parks and Wildlife Department is constantly working to provide the best in outdoor recreation for us all as it protects and manages for the future.

*Kay Fleming is a Texas Parks and Wildlife Department wildlife biologist stationed in Athens.*



*Devil's Sinkhole in Edwards County (above) is one of several deep, vertical caves found in West Texas. At right are examples of stalactites, stalagmites and flowstone that can be found inside the Caverns of Sonora.*

# The World Beneath Your Feet

Article and Photos by Laurence Parent

**D**rip...drip...drip. No other sound breaks the silence. For millions of years, darkness has prevailed. The underground chamber seems lifeless, eternal, unchanging. However, appearances deceive. Over geologic time, an underground void forms, formations grow and eventually the chamber collapses or is opened to the outside world through erosion.

Dripping water may be the only sound, but life exists. Small, furtive animals inhabit the hidden recesses of the cave, some spending their entire life there. The underground, a world of darkness and mystery and legend, is largely ignored by man.

Most caves, especially the large ones, form in limestone, or calcium carbonate. Over the eons, calcium carbonate was deposited in ancient seas by lime-secreting algae and many larger water-dwelling creatures, such as coral, shellfish and sponges. Burial and compression formed the deposits into limestone. Heat and pressure sometimes metamorphosed the limestone into marble. When the calcium carbonate was mixed with magnesium carbonate, the rock became dolomite.

Tectonic forces raised and lowered blocks of the earth's crust, including layers of limestone, while erosion stripped away overlying sediments. These geologic stresses created fractures in the rocks. Rainwater absorbed

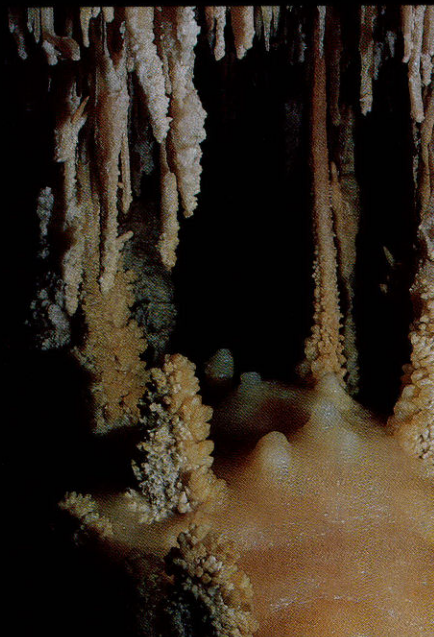
carbon dioxide from the air, forming carbonic acid, which flowed slowly downward through the fractures and pores in the rocks, dissolving the limestone and carrying it away. Voids in the rock were enlarged by internal collapse and erosion by underground streams. When a ceiling collapsed through to the surface or a surface stream cut into the wall of a chamber, the cave gained an entrance to the outside world.

A new theory has evolved to explain the formation of many of the massive caves of the Guadalupe Mountains of Texas and New Mexico. The theory of

carbonic acid dissolution does not explain the large quantities of gypsum found in some of the caves. In her book, "Geology of Carlsbad Cavern" Carol Hill proposes that the limestone was dissolved by sulfuric acid derived from hydrogen sulfide that seeped out of local oil and gas fields. Thus, oil and gas may not have produced only great mineral wealth for Texas and New Mexico, but also some of the world's greatest caves.

Caves are formed by other processes, as well. Gypsum caves form from the dissolution and underground erosion of beds of gypsum deposited by evaporating seas. Lava sometimes continues to flow underground even though a surface crust has hardened. When the volcanic eruption ends, the underground lava river flows out from underneath the hardened crust, leaving a long, tubular cave.

As soon as the water table falls and water drains out of a limestone cave, formations of an infinite variety of sizes begin to take shape. The same acidic water that creates the underground chambers also forms the cavern decorations. As the acidic rainwater trickles down through the limestone bedrock, it dissolves the calcium carbonate and carries it in solution. When the water emerges on the walls, ceiling, or floor of a cave through fissures, each drop leaves behind a tiny bit of calcium carbonate through either evaporation of the water



or the reduction in carbon dioxide held in solution in the water. As the carbon dioxide escapes from the water, its acidity, and thus its ability to carry calcium carbonate in solution, declines and leaves a deposit of calcium carbonate.

Formations grow drop by drop, each leaving an almost infinitesimal amount of calcium carbonate over thousands and millions of years. For unknown reasons, the mineral forms crystals of two types, calcite and the much rarer aragonite. Often the calcite is deposited on the ceiling as a tiny ring. Each drop adds another ring, one on top of another, until a tube forms. The slender, hollow tubes, or soda straw stalactites, can grow as long as 20 feet, although they may be no more than one-quarter inch in diameter. If water begins to flow down the outside of the

soda straw, the deposits gradually thicken the formation until it forms the familiar icicle shape of most stalactites.

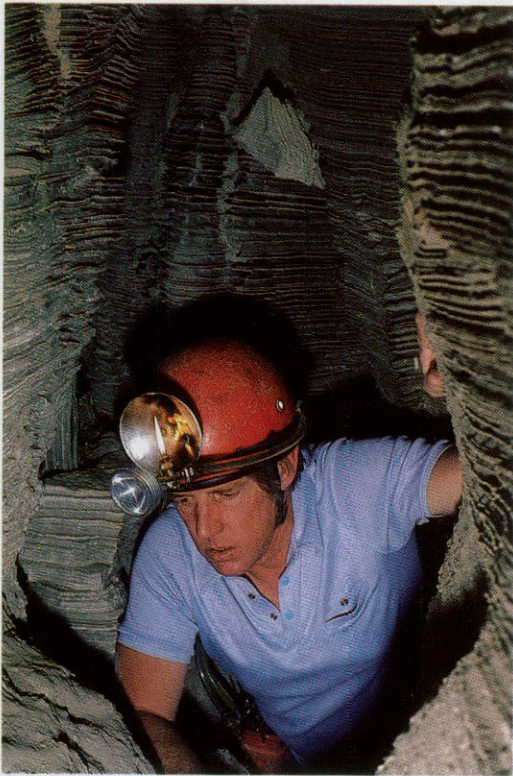
Water seeping evenly from a wall or ceiling crack forms thin, sheetlike formations known as curtains or draperies. Water dripping onto the cave floor can slowly build up into stalagmites. Because the water splatters as it hits the floor, these formations are usually broader and more massive than the stalactites hanging above. At times, the stalactites and stalagmites grow together, forming columns. Thin layers of calcite spreading across walls and floors create flowstone.

Helictites grow with seemingly total disregard for gravity. Apparently the central tube is small enough and the flow rate is slow enough that capillary action is more important than gravity.

The crystalline rings are deposited every which way, creating formations that loop and spiral, twist and turn. Uncommon in most caves, helictites grow profusely in the Caverns of Sonora.

"Glassy helictites glistened, like crazily contorted crystal worms suddenly frozen in place, their hair-thin nutrient canals visible throughout their sinuous courses—just a few, then writhed masses covering entire chambers so thickly that the limestone bedrock could not be seen," wrote Dr. William Halliday about the Caverns of Sonora in his book "Depths of the Earth—Caves and Caverns of the United States."

Aragonite often forms clusters of needle-thin crystals radiating outward from a common point. Long, thin transparent needles of gypsum and delicate curling tongues of gypsum resembling



*Gypsum caves, such as this one in Culberson County (above) form from the dissolution and underground erosion of beds of gypsum deposited by evaporating seas. Aragonite, shown here in Hicks Cave in the Guadalupe Mountains (right), often forms clusters of needle-thin crystals radiating outward from a common point.*



flowers festoon some cavern chambers. In Lechuguilla Cave, located in the Guadalupe Mountains just across the state line in New Mexico, 20-foot chandeliers of crystalline gypsum, or selen-

carbonate. Calcite, without constant dampness, weakens and turns to dust. Stalactites and stalagmites slowly crumble and fall. Without hydration, gypsum formations crumble even

evidence that they were there.

Texas is one of the premier cave areas in the United States. Limestone caves pepper the Edwards Plateau, from Austin to Langtry. Although most are small, Travis and Bexar Counties, sites of Austin and San Antonio, contain hundreds of caves, a number of which have been developed for tourism. Several caves lie in Texas state parks, although only one, Longhorn Caverns, is open to the public at this time.

The canyons and ridges of the Guadalupe Mountains conceal some of the largest and most famous caves in the world, including Carlsbad Caverns. The massive Capitan Reef, largest fossil reef in the world, lies dramatically exposed in the towering cliffs of Guadalupe Mountains National Park. Because the reef limestone's homogeneity gives it

## *The underground is a world of darkness, mystery and legend.*

ite, hang from the ceiling like tree roots. The gnarled white growths, the largest found in the world, terminate in sparkling blades of selenite.

Although caves seem timeless and unchanging to the human eye, none are static. Formation growth stops without the seeping water, laden with calcium

quicker than their calcite counterparts. The flowing water that created the void and decorated its chambers eventually may destroy the cave. Through entrances, streams carry dirt and debris into the cave. Cavern roofs become thin and collapse. Rivers cut down through entire cave systems, leaving no



*Water seeping evenly from a wall or ceiling crack forms sheetlike formations known as curtains or draperies (left). Helictites (above) are uncommon in most caves but grow profusely in the Caverns of Sonora. This helictite formation is known as the butterfly.*

exceptional structural strength, much larger chambers can form in Guadalupe caves than in most areas.

Hidden in the plains just to the east of the Guadalupe lie numerous gypsum caves, some of them several miles long. Ancient seas deposited the gypsum as they evaporated. Other important gypsum caves lie in North Texas counties including Childress, Cottle, King and Hardeman.

Caves are not always as empty as they appear. Life may not be as abundant or as obvious as in the surface world, but it exists nonetheless.

Virtually all food and nutrients must be imported into caves. Without sunlight to create photosynthesis, plants, the base of the food pyramid, cannot grow. Flowing water and animals bring in the only food available. Organic

*Caves are not  
always as  
empty as they  
appear.*

debris, animal droppings and the animals themselves upon death form the basis of the food chain. Even in caves well supplied by outside food supplies, the quantity of nutrients is still far less than that available on the surface. Thus, in comparison, caves are sparsely populated by only a handful of species.

Unlike animals on the surface, which

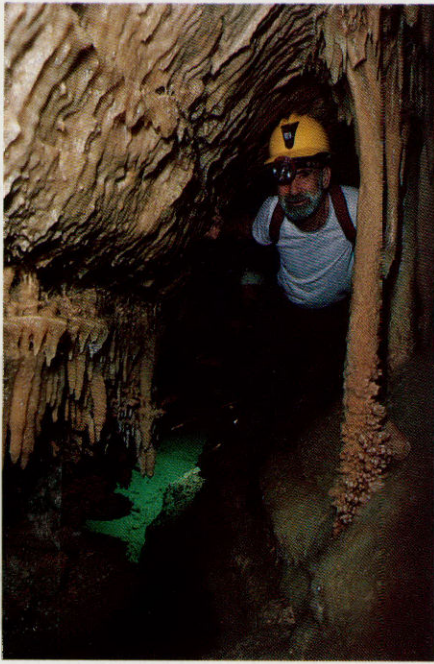
often eat only select plants or animals, most cave creatures must be opportunists and eat anything available. The animal and plant life in caves exists in very distinct zones. On the surface, several miles or thousands of feet of elevation gain may be necessary to change life zones, but in a cave, a few feet may be enough.

The area just inside a cave entrance that receives some light, the twilight zone, attracts many kinds of animals, not just specialized cave dwellers. On dry summer days, the cool, damp entrances provide a refuge for many surface creatures. Cave crickets and harvestmen cling to walls, waiting for night when they can hunt for food. Salamanders lurk under rocks, staying cool and moist. Raccoons, porcupines and ring-tails use entrance areas of caves for

*The Chandelier Room in Lechuguilla Cave, part of Carlsbad Caverns National Park, contains some unusual gypsum stalactites.*







*Cavers or speleologists explore, map and study unexplored sections in caves.*

daytime shelter between nocturnal hunting forays. Large carnivores, such as bobcats, mountain lions and bears, sometimes use the twilight zone for dens. In winter, snakes den up in caves and fissures to escape the cold.

Plants grow in the twilight zone, but no farther into the cave. The cool, damp air encourages lush clumps of mosses and ferns in the entrance. Farther into the cave, where the last rays of light reach, algae coat the damp rocks with green.

A bit farther, in total darkness, lies an area of varying temperature. This part of the cave is close enough to the entrance to experience some temperature change from weather variations and the course of the seasons. Without sunlight, only molds and fungi grow, fed by animal droppings or carcasses and or-

ganic debris. A mix of terrestrial animals and permanent cave dwellers inhabit this part of the cave. A wandering raccoon may stumble on a blind crayfish. Some species of bats roost in this area. Harvestmen and cave crickets are plentiful.

The constant-temperature zone, always dark, always the same temperature and humidity, contains the permanent cave-dwellers. Certain animals, such as bats and a few birds and frogs, spend part of their time in the totally dark, constant-temperature sections of caves, but all must spend time on the surface to eat and reproduce.

Successful cave dwellers must be able to find food and reproduce in total darkness. Since food supplies are often small, smaller animals with low metabolisms are best adapted. No mam-



*Just inside a cave entrance is an area known as the twilight zone that receives some light. Animals such as bobcats often use the twilight zone as their dens.*

*The Texas blind salamander (above) lives only in the water-filled caves of the Edwards Aquifer around San Marcos.*

*At left are gypsum flowers in Carlsbad Caverns' Lechuguilla Cave.*

## *Destruction of only one cave could cause extinction of an entire species.*

mals or birds live permanently within caves. Small blind fish, cave crayfish and blind salamanders usually occupy the top of the food chain in most caves. Many caves, especially dry caves, may have no dwellers more advanced than insects.

All cave inhabitants require keen senses of smell, touch and hearing to make up for their poor vision. Most permanent cave dwellers, or troglodytes, have lost all skin pigment and much, if not all, of their vision.

Bats are one of the primary importers

of food into a cave. Insects and bacteria feed off the bat droppings, or guano. Carrion beetles and other insects devour dead and dying bats that fall to the floor. Insects eat other insects, while blind fish and salamanders eat insects and tiny crustaceans.

Texas is home to many unique cave animals, particularly in Edwards Aquifer caves. The Texas blind salamander, *Typhlomolge rathbuni*, lives only in the water-filled caves of the Edwards Aquifer around San Marcos. It's found solely in a few caves and wells.

"The blind salamander was one of the first listed endangered species on the federal register," says Dr. Glenn Longley of the Edwards Aquifer Research and Data Center of Southwest Texas State University.

Another blind salamander, *Typhlomolge robusta*, has been found in only one cave in the San Marcos area. The Comal blind salamander is found in caves and sinkholes of the Cibolo Sinkhole Plain west of New Braunfels.

According to Andy Price, biologist with the Texas Parks and Wildlife Department, two species of blind catfish have flowed from Edwards Aquifer wells in the San Antonio area. One is toothless and the other, with teeth, is probably slightly higher in the chain of predators.

In Texas alone, 32 species of bats live,



*Big Skylight Cave in New Mexico (above) is an example of the long, tubular caves that were formed when a lava river flowed out from underneath the surface crust following a volcanic eruption. At right, a rappeller makes his way down the flowstone side of the Liberty Bell Room in Carlsbad Caverns.*



some year around, others migratory. The greater longnose bat, the only nectar-feeding bat in Texas, is endangered and four other species are threatened. The Mexican freetail bat has enormous colonies in Texas. Bracken Bat Cave is home to 20 million bats in summer. Bats perform a service to Texans by eating insects. According to Dr. Gary Graham of Bat Conservation International, the Bracken colony alone eats one-quarter million pounds per night. Because some species in other parts of the world are principal pollinators of plants, bats are doubly important.

For what other reasons are caves valuable to man? According to Graham, two bacteria found in guano have great industrial potential because of their ability to break down wastes. Cave animals have received relatively little in-depth research. Since caves are often isolated from each other, they sometimes have species that have evolved independently and occur solely in one site. Destruction or disturbance of only one cave could cause extinction of an entire species. Maybe that species would only be a bacterium, but maybe that bacterium holds the key to a new antibiotic.

In Central Texas, caves help recharge the Edwards Aquifer, the vital water source for more than a million Texans. The health of the cave dwellers is dependent on the health of the aquifer. If man pollutes or depletes the aquifer, many of the cave animals will disappear. Little research has been done on cave organisms, so little is known of their rarity. "It is difficult to assess the status of many of these species because of their cryptic nature and the general inaccessibility of their habitats," says Andy Price, "but, as the aquifer goes, so go these species." And, as the aquifer goes, so goes the well-being of many Central Texans.

With their delicate crystalline formations and unique animal life, caves will always be places of beauty and mystery. Beyond that, however, caves have important value to the surface world. Man has a responsibility to protect caves, both for his own benefit and for the benefit of all the vulnerable creatures that call caves home. ★



# Indigo

# meets

The scene was one I had imagined many times; I was about to witness a live encounter between a nonpoisonous snake and a very poisonous pit viper. Growing up in South Texas, working on my dad's ranch, I had seen hundreds of snakes, but I had never witnessed the legendary clash between the rattlesnake and the indigo snake.

Lying flat on my stomach three to four feet away from the excited reptiles, I nervously focused my zoom lens. This particular rattlesnake was a western diamondback, a member of the pit viper family of venomous snakes. There are 2,700 snakes known to mankind and the rattler is one of about 275 snakes worldwide that produce venom that can be fatal to humans. Rattlers inhabit most of the southwestern United States and occur as far south as Uruguay.

Diamondbacks can attain a length of seven feet. In 1977, an 85-inch diamondback was killed within the city limits of Rio Grande City in Starr County. Rattlesnakes bear their young alive and have few natural enemies. They prey on small mammals and birds, occasionally eating frogs and lizards. Their venom is predominantly hemotoxic (destroys blood vessels and blood cells) and to a much lesser degree, neurotoxic (paralyzes the nervous system). There are few human fatalities yearly from snakebite.

# eats

# Rattler

Rattlesnakes play a significant role in our ecosystem by eliminating rodents, which carry disease and do heavy damage to crops. However, they are scorned by ranchers and pet own-

ers whose livestock and dogs frequently are crippled by snakebite.

The indigo snake is named for its deep, metallic blue color. This reptile can be found across the southeastern and southwestern United States and in South America all the way to Argentina. It adapts well to Pineywoods or sandy hills, but does especially well in the South Texas Brush Country. Unlike rattlesnakes, indigo snakes hatch their young. Indigos can reach lengths of up to nine feet, but they have a gentle disposition and are popular pets. The indigo's diet also consists of small mammals, birds and other reptiles—including poisonous snakes. It's unknown whether the indigo is immune to rattlesnake venom or merely tolerates it, but the indigo will go out of its way to attack and eat a rattlesnake.

Hissing and rattling set the stage for the battle before me. The pit viper appeared to hold its ground, striking repeatedly at the advancing indigo. At first the indigo just seemed curious, but suddenly it took greater interest in its adversary. Taking numerous hits along its head and neck, the indigo, undaunted, slithered alongside the diamondback. Suddenly it clamped its jaw shut just behind the rattler's head. The struggle was over. ★

*Beto Gutierrez is a physician in Carlsbad, New Mexico.*

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by Beto Gutierrez, M.D.



# CARP

## Fishing Going to Waste

If we can ignore prejudice, a pretty good case can be made for the carp. It is found statewide in all public waters in abundant supply. It provides the opportunity for an angler to catch both large numbers of fish and some big ones, inexpensively and with no restrictions. It is a determined fighter, not flashy but strong. It can be caught from an easy chair on a dock or on the shore, as well as from a boat, by the experienced angler or the novice, on any kind of tackle, expensive or economy.

The carp could be the blue-collar fish of the masses. But to most fishermen, this golden-colored fish with a round mouth that looks as if it has been sucking on a sour lemon is nothing more than a worthless nuisance, a prolific and fast-growing exotic species occupying water that otherwise would support more desirable fish such as bass and crappie.

A pair of Austin fishermen, Lawrence Kohler and Mike Mantooth, think the carp has gotten a bum rap. To them, it is fun to catch and good to eat. "Fishing that's going to waste," says Kohler. A couple of years ago they coauthored and published a slim little book on carp fishing in hopes of upgrading the carp's image.

Kohler and Mantooth have been

fishing for carp exclusively for more than six years. According to Kohler, the methods they have perfected will catch carp anywhere the fish is found, and that's about any place in Texas where there is water. The carp can survive and thrive under conditions that few other fish can. Because of their adaptability, carp might be called an aquatic counterpart to the coyote.

"We just sort of got weary of fishing for bass," Kohler recalls. "It got to be too much of a hassle with all the equipment needed, everything from a big boat and a depthfinder to a couple of boxes jammed full of lures. It became too technical. Mike and I wanted to get back to fishing simply for the fun of fishing. The carp provided that opportunity."



*Carp can be caught easily from a lawn chair on the shore, as Lawrence Kohler demonstrates. Kohler says big carp such as the one at right are fun to catch on ultralight tackle.*



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Article and Photos by  
Russell Tinsley

Kohler thinks carp fishing inevitably will become more popular. With the heavy fishing pressure on most reservoirs, catching fish such as the black bass is getting more difficult all the time, particularly for inexperienced anglers and youngsters. Also, there are regulations restricting the size and number of sport fish a person can keep. But the carp is one fish an angler can catch and keep all he wants without feeling guilty about it. In fact, it is good ecology and sportfish management to remove the fish because of their potential damage to aquatic habitats.

But the biggest obstacle in the campaign for carp respectability, they admit, is the general attitude of the angling public. The carp is cursed more than it is discussed.

The carp doesn't owe us an apology; we invited it into this country. There is some dispute as to exactly when and how the carp arrived in the United States; some say J. A. Coppe of California brought the first ones here in 1872. But carp became distributed far and wide as the result of a government-subsidized program.

Carp were prized in Europe, having been imported from China as early as 1227, but it wasn't until May of 1876 that a gent named Rudolph Hessel, a fish culturist for the U.S. government, arrived in New York with 345 carp from Germany. He preached the virtues of the carp and carp fishing and Congress obligingly appropriated \$5,000 to construct a lake for carp propagation.

The carp promptly did what they do best, multiply like crazy. Congress-

men, sensing voter enthusiasm for the program, got in line to obtain carp for their districts.

This rather inauspicious start resulted in a population explosion since carp produce an average of 150,000 eggs per pound of body weight. It didn't take fisheries biologists long to realize that carp stocking was a mistake, but by then it was too late.

Today matters are worse. Carp are everywhere in both reservoirs and rivers. Like it or not, we are stuck with this hardy and adaptable fish.

"That's the point," Kohler argues. "In most Texas reservoirs the carp is the dominant species, and I hear people all the time complaining about not catching anything and how lousy the fishing is. I ask them if they've tried catching carp. They look at me as if I'm some kind of nut."

While carp and other "rough" fish

The book "Big Fun Fishing, Big Fish Fun," by Kohler and Mantooth, is available only by mail at \$9.95 (includes sales tax), plus \$2 postage and handling, from: Kohler Outdoor Supply, 603 W. 13th St., Suite 1A-165, Austin, Texas 78701.

"Consider the Carp" is a free leaflet with many recipes for making your own carp baits and also recipes for cooking the fish. Write the Texas Parks and Wildlife

Department, 4200 Smith School Road, Austin, Texas 78744. Ask for No. 9000-83.

C.A.R.P.S. (Carp Anglers Recreation & Party Society) is a nationwide organization that publishes a newsletter about carp and carp fishing and also sponsors tournaments. For more information write Mitch Tucker, C.A.R.P.S., 4505 Autumn Leaf Hollow, Austin, Texas 78731.

traditionally have been blamed for poor fishing for bass and other game fish, recent studies tend to vindicate the carp, at least in the larger impoundments. Declining game fish production can usually be traced to factors other than carp. Biologists have found little evidence that carp threaten healthy game fish populations in these large systems.

And there's another thing about the carp, Kohler says; it is tasty to eat if prepared properly. He and Mantooth often take along a propane cooker and fry some carp right where they are fishing.

But catching comes before cooking, and when to catch is no problem. "Anytime you can get the time, day or night," says Kohler. "We've caught carp throughout the year, even in the winter when it was 15 degrees and in the summer when it was 100-plus."

After the when, there is the where. A person must find the carp in order to catch them. Again, no problem. "We don't go looking for carp," Mantooth says, "We bring them to us."

They do this by baiting an area with range cubes, a high-protein cattle feed available at any feedstore, normally in water about five feet deep or deeper. "Cubes dissolve a little slower than cottonseed cake, which some people use to bait carp, and this keeps the fish milling around in the area longer," Mantooth said. "We like to bait about nine or 10 hours before we intend to fish. This allows the carp time to find the cubes and concentrate. Before we start fishing we scatter a few more

cubes to sweeten the area. The carp are rooting around, using their mouths like a vacuum cleaner to suck up the dissolving cubes, and if baits are down there with the cubes, they'll pick those up, too."

Bait is no problem either. A person can make his own at nominal expense. After trying every kind of bait imaginable, including commercial dough-baits, Kohler and Mantooth say a simple mixture of bran flakes and Big Red cola is the most productive of anything they have tried. "Just mix the two together until you get a consistency that can be rolled into a ball about the size of a large marble, or enough to cover the hook," says Mantooth.

The bait is fished on a No. 10 treble hook. Even a big carp, 20-pounds-plus, has a sensitive mouth and will go for a small bait while ignoring a larger one. The weight is a split-shot or core-lock sinker, the smallest you can use and keep the bait on bottom. "The carp is real suspicious, cautious, and if it picks up the bait and feels too much resistance, it will promptly drop it," Kohler explains. Some fishermen use no weight at all, since the dough ball is heavy enough to cast with light tackle and will readily sink to the bottom.

And it is important not to move the bait. "Since carp wander around and pick animal or vegetable matter off the bottom, they are not accustomed to anything moving," Mantooth says. "Movement only spooks them."

To avoid movement, once a bait is on bottom they lay the rod and reel on the dock or shore with the bail open or



*Anglers can make their own bait for catching carp out of bran flakes and Big Red cola. Push the ball of bait over a treble hook (above).*





*Carp can be found just about anywhere in Texas where there's water. Above, Lawrence Kohler nets a carp caught by the author's wife from Lake Austin.*

the reel spool disengaged. "You won't fail to do this but once," Kohler laughs. "Watching a rod and reel disappear into the water is an expensive lesson."

Mantooth explains further, "We have found that you will catch more carp this way than if you hold the rod. When holding the rod, there always is the temptation to reel in slack and that moves the bait."

Typically, a carp will pick up the bait, swim a short distance and pause, sometimes not even taking out all the slack. "When your line sort of shoots out for several feet and then stops, that's when you should set the hook," Kohler explains. "The carp has the bait in its mouth." Any kind of rod and

reel can be used for carp fishing, but Kohler and Mantooth prefer ultralight tackle, because it is more fun and a challenge, and also because they catch more fish on six-pound line.

Fishing for carp is a good way to introduce a youngster to fishing. That's how Mantooth started his son Max. A boy or girl of first-grade age usually is short of patience, and anticipation can fade to boredom pretty quickly if there is a long lull between bites. At the same time, playing and landing a fish weighing five pounds or more on light tackle is a way for the youngster to learn fishing fundamentals. And if a fish breaks off, so what? There are many more ready to cooperate.

Once Kohler and Mantooth get a fish or two on the stringer, they are ready to prepare the shoreline lunch. The first order of business, says Kohler, is to cut off the tails and let the fish bleed completely. This results in a milder flavor. After that, he fillets each fish, but in a different way than he would fillet a bass. Carefully, he cuts around the rib cage and separates the meat from the backbone. Then as he cuts the skin from each fillet, he removes the strip of dark meat along the side, leaving it attached to the skin. "This dark red meat is another thing that gives carp a strong taste," he stresses. "Make sure you remove all of it."

Next, the fillets are cut into cubes and dropped into a plastic bag containing cornmeal seasoned with salt and pepper. Shake the bags to coat the cubes thoroughly with the mixture. Cooking the meat in small chunks not only makes a tastier piece of fish, it also neutralizes the tiny intramuscular bones that are a problem with other carp-cooking methods.

Meanwhile, the cooking oil in the pot is heating. Kohler puts a wooden kitchen match in the oil. The floating match is a trick not many people know about. When it flames, the oil is at the right temperature for cooking.

Kohler drops a few cubes at a time into the sizzling oil. "Don't cook too many at one time; that slows the process and the cubes absorb grease instead of cooking properly," he warns. "And don't overcook. You don't want the fish too dry."

The darker-colored meat of the carp won't rival the flaky white meat of a crappie for taste, and the carp's slug-it-out fighting style might not generate as much excitement as a jumping bass. But this much-maligned fish will, by all accounts, give the angler his money's worth. Carp fishing is close-to-home economy fishing. It is productive fishing, fun fishing. "And it is fishing that's going to waste," Kohler says. "That's the shame of it all." ★

*For many years Russell Tinsley was the outdoor editor of the Austin American. He now freelances out of Austin.*



Southern Exposure

# A Tale of Two Marshes

*The story of wetlands at Sea Rim State Park  
and Murphree Wildlife Management Area.*

**H**eeding a warning to be cautious of alligators, we took our first paddle strokes tentatively. I half expected to see two or three monster-sized reptiles glide off the banks and plunge into the murky water.

Sea Rim State Park, about 40 miles south of Beaumont and 10 miles west of Sabine Pass in Jefferson County, consists of 5.2 miles of Gulf coastline on one side of Highway 87 and about 15,000 acres of marshlands on the other side. My husband and I and another couple planned to spend the next several days canoeing and camping in the park's seldom visited Marshlands Unit.

On a warm fall afternoon I helped load the last of the camping gear into our two canoes tied at the inlet to the marsh access channel. I could see the Gulf waters to the south. The coastal breeze tousled everyone's hair. To the north, I saw only the narrow canoe trail, disappearing in the distance like

an inviting path. According to my map, the passage led to miles of flat, coastal marsh. Wondering what we'd encounter out there, I listened to red-winged blackbirds and boat-tailed grackles calling from the horizons.

We paddled the first 100 yards with no sign of giant reptiles and began to relax. We never did see an alligator in the Marshlands Unit of Sea Rim State Park; populations are sparse and we were later to discover why.

Moments later, we ran into Charles "Stutz" Stutzenbaker, wildlife biologist with the Texas Parks and Wildlife Department. First we saw the johnboat powered by a small motor, then the cheery smile, then the Texas Parks and Wildlife emblem on his cap. Maneuvering our canoes close, we introduced ourselves as curious marsh explorers and started asking questions.

This chance encounter transformed our "poking around in some wetlands" vacation into a valuable field lesson in basic marsh ecology.

"The first thing you need to know," Stutz explained, "is that this is a marsh in trouble. I've been based here 30 years, and the fellow before me, Bob Singleton, began work here right after the second World War. There was a fellow even before Bob—Dan Lay, who worked in these marshes in the late 30s. With expertise going back 60 years, we have a pretty good idea what this marsh should look like. Can you believe this water used to be crystal clear?"

We were so interested in Stutz's story that he promised to meet us the next day and tell us more. He gave us a tip on a campsite and, before he left, asked us if we'd need anything from town when he came out tomorrow. We never expected to find hospitality in a marsh!

We paddled off into the breeze to

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by Kristi Streiffert

find the camp he suggested. All around us, we heard the rustling of the marsh hay cordgrass and the splashing of water. A few terns and gulls winged silently overhead, bound for some familiar roost.

In the morning we awoke to a fiery sunrise, the antics of a perky marsh wren, and yes, a few thousand mosquitos. Luckily, insect repellent works—most of the time.

We spent the day exploring the northern and central portions of the Marshlands Unit of Sea Rim State Park. Sea Rim's marsh is only one segment of more than 62,000 acres of coastal wetlands perpetually dedicated to wildlife in Jefferson County. Sharing common boundaries with Sea Rim State Park are McFaddin National Wildlife Refuge (managed by U.S. Fish and Wildlife Service) and Mur-

phree Wildlife Management Area (managed by the Wildlife Division of the Texas Parks and Wildlife Department).

At one time, this area from the Gulf Beach north into the tallgrass prairies near present-day Beaumont belonged to the cattle-ranching McFaddin family. The marsh area contained within the McFaddin Ranch was the uninterrupted drainage artery for practically

Kristi Strellfert



*Sea Rim State Park's Marshlands Unit comprises some 15,000 acres (above and opposite page). A boat ramp, boat channel and canoe trails provide access to the marsh. Platforms such as the one above are available to marsh visitors for camping and wildlife observation.*

all of central and southwest Jefferson County and portions of Chambers and Liberty Counties. Rainwater drained from the vast area of flat and gently undulating prairie to empty into the west-central portion of Sabine Lake. The drainage system was entirely fresh along the upper reaches and became slightly brackish as it neared Sabine Lake, historically classed as a lake rather than a saline bay because of the cypress trees and other freshwater vegetation it supported at its upper end.

Because this area was long recognized as a major waterfowl use area in the Central Flyway, over 90 percent of the original McFaddin Ranch south of the Intracoastal Canal has been acquired by the Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service since 1972. The 62,000 acres are perpetually dedicated wildlife and primitive park areas.

As the sunrise-blush in the sky was being supplanted by bright blue, I



Steve Bentzen

The nearly fluorescent roseate spoonbill can be seen in marshes such as those at Sea Rim and Murphree Wildlife Management Area.



**Location:** Jefferson County, 10 miles west of Sabine Pass on Highway 87. South of the highway is the 5.2-mile long D. Roy Harrington Beach Unit and the Gambusia Trail Marsh Interpretation Boardwalk. North of Highway 87 is the Marshlands Unit.

**Facilities:** The D. Roy Harrington Beach Unit contains the park headquarters, visitor center with observation deck, campground and showers. Visitors may camp along the shore or in the designated camping area which contains 20 sites equipped with water, electrical hookups and dump station. In the Marshlands Unit, a boat ramp, boat channel and canoe trails provide access to the marsh.

**Recreation:** The park has a beautiful coastline that draws campers and beachcombers year around. Visitors can easily enter into a healthy, naturally occurring salt marsh ecosystem on the Gambusia Trail, a 3,640-foot boardwalk. The

day we visited the boardwalk, we saw minks, raccoons and muskrats. We observed many species of birds including shy rails, perky marsh wrens and stately herons.

The visitor with a boat can access the Marshlands Unit to fish, camp on platforms, and observe and photograph wildlife from observation blinds.

To plan an overnight trip, visitors should consult the park superintendent about the status of camping platform facilities. Always inform park personnel of your departure and expected return date. Camping is allowed only in designated areas.

During regular open migratory waterfowl season, hunting of migratory birds is allowed in the Marshlands Unit on designated dates, with permit purchased on the day of the hunt.

**Information and Reservations:** Write to Sea Rim State Park, P.O. Box 1065, Sabine Pass, Texas 77655, telephone 409-971-2559.

spotted a small remnant of the morning's color overhead, a flock of nearly-fluorescent roseate spoonbills. Then a small "V" of geese honked in the sky to the north. Where were these birds going? Why weren't we seeing the swimming waterfowl and shorebirds we'd expected to encounter? Why were we paddling against a tide in a freshwater marsh? And why was the water turbid, instead of crystal clear, as Stutz said it once was?

We bombarded Stutz with questions when he visited our camp that evening. "The problem with Sea Rim is that salt water is intruding way beyond where it would have under natural conditions. Therefore, freshwater plants are diminishing, erosion of the organic soil is occurring (consequently the cloudy water), and wildlife carrying capacity is being reduced."

We learned that starting in the late 1800s until as recently as 1974, the

natural freshwater drainages were altered on a large scale. A ship channel to Port Arthur and the Intracoastal Waterway were constructed and deepened and widened. Natural drainages were rerouted. This allowed salt water to encroach into what was formerly a freshwater marsh environment. The entire marsh system has been affected, but since Sea Rim is closest to the source of the salt water and receives the most tidal influence, the impact

Kristi Streiffert



*Sea Rim's marsh (above) is part of more than 62,000 acres of coastal wetlands dedicated to wildlife in Jefferson County.*





Kristi Streiffert



Tom J. Ulrich

*Floating vegetation is abundant in the marshes of Murphree Wildlife Management Area (left). Anhingas (above) prefer the freshwater habitats of Murphree over Sea Rim, where salt water has intruded into what was once a freshwater marsh environment. Biologist Charles Stutzenbaker (below with Kristi and Tom Streiffert) has been based in the area for 30 years.*

there has been the greatest.

The three managing state and federal agencies have grown increasingly concerned about the continuing degradation of the estuary, especially in light of diminishing waterfowl populations throughout North America. In 1988, representatives of the agencies met and agreed to work together to develop a joint management plan.

Intensive field investigation followed, and a draft plan was formulated. Management actions will be aimed at curtailing present marsh deterioration and restoring the estuary to a more natural condition. Levee construction and repair and water control structures are planned for seven major locations throughout the system.

"What you need to do," said Stutz, "is load up your canoes and go to the other side of the Intracoastal Waterway and see a healthy marsh in the Murphree Wildlife Management Area. I want you to know what a healthy, vigorous marsh looks like. Murphree, because it is less influenced by salt water, contains some of the best habitat around for wetland wildlife."

The Lost Lake Unit of Murphree WMA, Stutz told us, is a freshwater "oasis" in the middle of a badly deteriorating brackish marsh. Lost Lake supports an outstanding plant community of sago pondweed and banana water lily. "The largest winter can-



Southern Exposure

vasback populations in Texas routinely are recorded on Lost Lake," he said.

Two days later we took his advice and found ourselves paddling in a verdant contrast to Sea Rim. First we noticed the cloudless water, through which we could see darting minnows. Then we noticed the vast amounts of aquatic vegetation: floating, emergent and submerged. Water lilies, pondweed, cattails, canes, bulrush, and the unwelcome, but beautiful water hyacinth encircled us. At times, the floating vegetation was so thick our canoes had trouble penetrating.

Birds obviously were drawn by all these natural groceries. The season was a little early for many migratory ducks, but teal and mottled ducks were abundant. We also saw coots, common

moorhens, purple gallinules, ibis, black-necked stilts, snipes and dowitchers. Late in the afternoon, I spotted a bird I'd never seen before. I thumbed through my bird guide looking for a glossy black bird at least three feet tall, with sharp pointed bill, and snakelike neck. It turned out to be an anhinga, and I wasn't at all surprised to read, "Anhingas prefer freshwater habitats . . ."

We were also not surprised to find, with all this abundant life, a large number of alligators. They were mostly small, about three feet long. As we stood on a bank, we saw in the water below what we fancied to be a family. One large alligator was surrounded by many miniature ones. We later learned that mother alligators faithfully protect the young until time to start another brood.

Our field lesson in marsh ecology ended here; it was time to go home. We'd seen the fascinating tale of two marshes. And it was reassuring to learn of Texas Parks and Wildlife Department's commitment to make sure the stories have a happy ending. ★

*Freelance nature writer Kristi Streiffert of Joshua spends several weeks out of the year in a canoe, and has written for Canoe and Backpacker magazine.*

*The Gambusia Trail at Sea Rim State Park is a 3,640-foot boardwalk from which visitors can enter a healthy salt marsh ecosystem (right). Mammals and a variety of birds can be seen from the boardwalk.*



Kristi Streiffert





Tom Ulrich

*Alligators are abundant at the Murpbree Area but populations are sparse at Sea Rim. Among the sights in the park's seldom visited Marshlands Unit unit are ancient Indian shell mounds. (below).*



Kristi Streiffert

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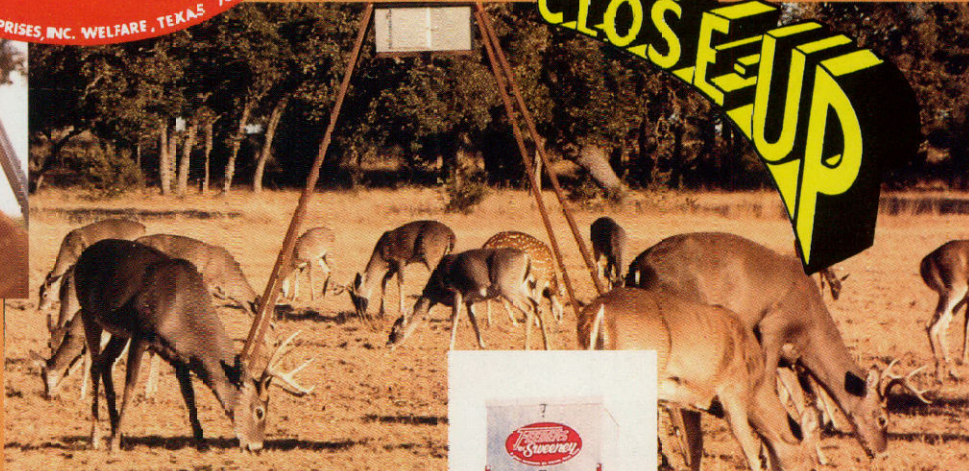
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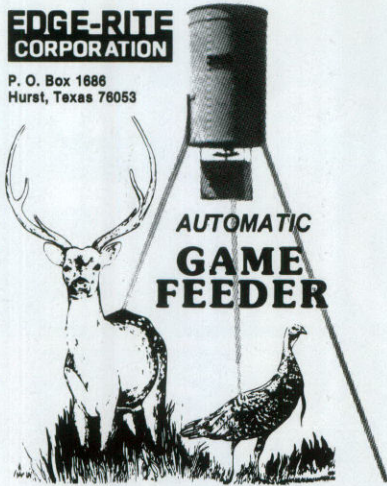


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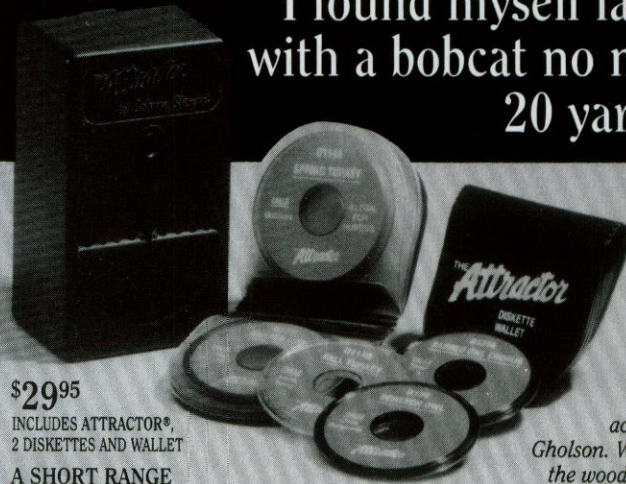
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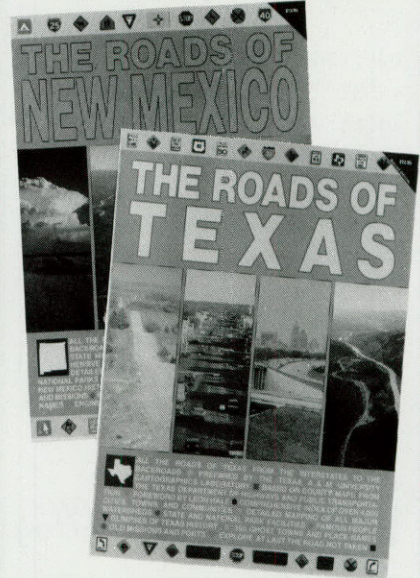
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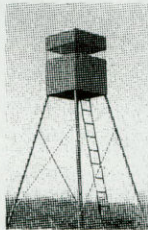


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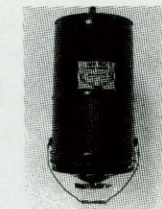


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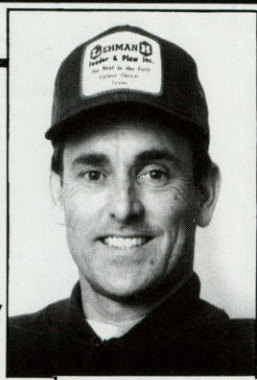
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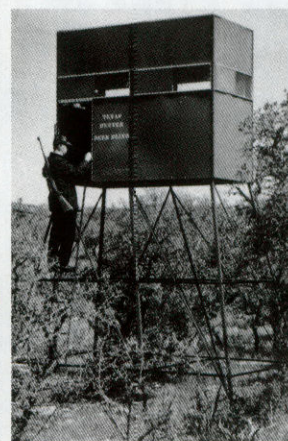


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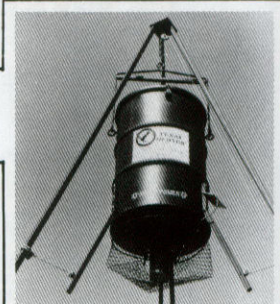
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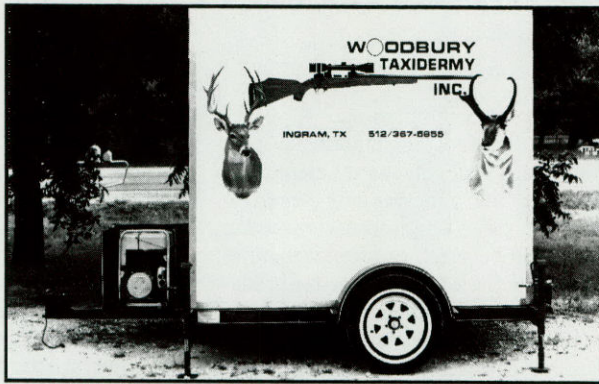
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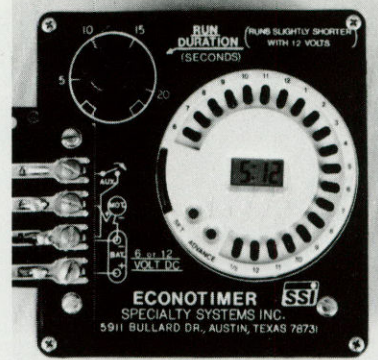
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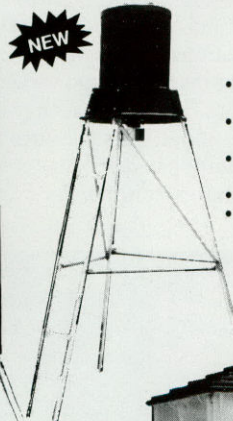
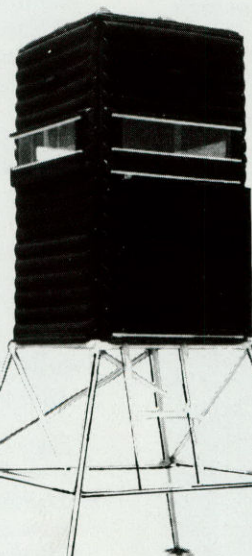
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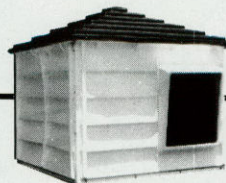
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## OUTDOOR ROUNDUP by Jim Cox

### Desert Bighorn Sheep Subject of Roundtable

About 60 people concerned about the future of desert bighorn sheep in Texas gathered in Alpine recently to discuss what may be the Texas Parks and Wildlife Department's most difficult wildlife restoration project.

Once numerous across the mountainous Trans-Pecos region of West Texas, desert bighorns fell victim to market hunting and disease by the turn of the century. A restoration program headquartered at the department's Sierra Diablo Wildlife Management Area near Van Horn has made strides, but the species' status remains in doubt.

The "Chairman's Roundtable" was hosted by Chuck Nash, chairman of the Parks and Wildlife Commission. Participants included landowners, sportsmen, department biologists and law enforcement personnel, and members of the Texas Bighorn Society. Also attending were Sen. Ken Armbrister of Victoria and Ray Lee, big game program director of the Arizona Wildlife Department.

Nash said the species' recovery may hinge on establishment of a long-range management plan. "Restoring these animals to self-sustaining populations will have to be a long-term project," Nash said, "and the response I've seen at this meeting indicates to me that the

program is worth pursuing."

Nash stressed that landowner participation is probably the key element in restoring the wide-ranging sheep in West Texas. Landowners receiving sheep will be asked to protect them as much as possible from disease and predators, prevent possible contact with exotic animals, provide watering areas and conform to strict harvest regulations.

The chairman also thanked members of the Texas Bighorn Society, whose donations of labor and money made construction of bighorn brood pens at the Sierra Diablo possible.

### Magazine Wins Awards At ACI Conference

*Texas Parks & Wildlife* magazine won two firsts, a second and a third place award at the Association for Conservation Information (ACI) recently in San Antonio.

The magazine was cited as best among the nation's conservation publications in competition with 22 other states' conservation agency magazines, including publications such as *South Carolina Wildlife* and *Michigan Natural Resources*, both nationally recognized.

"More than a year ago we went to our readers to find out what they liked and disliked about the magazine and how they would change it if they could," said David Baxter, editor of the Texas maga-

zine. "We found that, above all, subscribers wanted a larger magazine with more pages for stories and photos. They wanted to see and read about the state's scenic beauty and parks, as well as traditional fishing and hunting."

The magazine also placed first and second in magazine article competition in a field of 31 entries.

Mary-Love Bigony, the magazine's managing editor, won first place for her story, "Rivers in the Ocean," published in September 1989. "Rivers in the Ocean" examined how currents affect fishing, shipping and litter on Texas beaches. The article was designed to help readers understand the nature of ocean currents and man's relationship with them throughout the centuries.

Jim Cox, senior editor, won second place for his story, "Ranch on the Concho," published in October 1989. The 119-year-old Rocker-B Ranch is "replete with roundups, trail drives, bad hombres and good horses." The quintessential Texas ranch, the Rocker-B was the source of thousands of pronghorned antelope that helped build Texas' modern antelope herds.

Photo editor Leroy Williamson won third place in a field of 12 entries for color photography. His photos, "Sunrise, Sunset" were published in December 1989.

*Texas Parks & Wildlife* magazine has been published since 1942 and has a circulation of 190,000. ACI members come from conservation agencies throughout the United States.



The future of the bighorn sheep was the topic when landowners, sportsmen, biologists and law enforcement officers gathered in Alpine recently.

### Swallow-tailed Kites Subject of Study

The swallow-tailed kite may be the most striking in appearance of all the birds of prey that frequent Texas, and perhaps the least frequently seen.

The graceful birds, able to snatch dragonflies out of the air, can be seen hovering over the Sabine River bottoms near Jasper, according to biologist Dan Boone of the Texas Parks and Wildlife Department.

To learn more about swallow-tailed kites, the department is initiating a study



to determine if any are nesting in the state. "Historically the birds nested as far west as the Balcones Escarpment in Central Texas, but the last documented nesting was in Harris County during the period 1911-1914," Boone said.

The birds are fairly common in the southeastern United States where they nest and spend their summers after returning from their wintering areas in South America. "Reliable sightings of kites during the spring and summer may be an indication that the birds are nesting somewhere in the Sabine River drainage or at Taylor's Bayou in Jefferson County," Boone said.

Persons observing swallow-tailed kites, especially nesting activity, are urged to contact Boone at the TPWD, 1342 S. Wheeler, Jasper, Texas 75951.

The swallow-tailed kite is a striking, well-marked bird with sharply contrasting black upper body and tail and white under body. They have four-foot wingspan and a long, deeply forked tail.

The nest is a rather flat, loose collection of twigs and moss, normally located near the top and at the main stem of the nest tree.

## South Llano River State Park Now Open

On July 3 about 275 residents attended the dedication ceremony opening South Llano River State Park to the public, according to the Texas Parks and Wildlife Department.

The 506-acre park, located four miles south of Junction off U.S. Highway 377 in Kimble County, has about 1 1/2 miles of frontage on the scenic South Llano River's south shoreline.

"The South Llano park will be a valuable tourist attraction for the area," said Chuck Nash, chairman of the Texas Parks and Wildlife Commission.

State Highway 377 winds through scenic limestone chalk cliffs before reaching the new park. Canoeing, tubing and swimming are best when there is a slight rise in the spring-fed river. A low-water crossing near the entrance provides an ideal spot for loading and unloading canoes and tubes in the river.

Campsites have picnic tables, paved parking and fire rings with grills, as well as hookups for water and electricity. A picnic area is located in a pecan grove along the river. Large numbers of Rio Grande turkeys have congregated at a

winter roost site in pecan trees along the river since the early 1900s.

"The park provides for camping, hiking and wildlife observation, but as in all our parks, recreational activities will be balanced with environmental concerns," said Nash.

For campsite reservations, contact South Llano River State Park, HC-15, Box 223, Junction, Texas 76849, or call 915-446-3994.

## State Fish Hatcheries Win Environmental Awards

Both the GCCA-CPL Marine Development Center and the Dow Satellite Facility recently received Environmental Achievement Awards from Renew America's 1990 National Environmental Awards Council.

Officials said the two facilities were selected because their combined production resulted in the release of 58 million red drum fingerlings and 200 million fry into Texas bay systems since 1983.

The GCCA-CPL facility is a cooperative effort among the Gulf Coast Conservation Association (GCCA), Central Power and Light Co. of Corpus Christi and the Texas Parks and Wildlife Department (TPWD). The newly expanded hatchery is located in Corpus Christi and consists of 34 rearing ponds totaling 39 acres, three spawning buildings, one research building and visitor center. Information about hatchery tours can be obtained by calling 512-939-7784.

The Dow Satellite Facility, a cooperative effort among GCCA, Dow Chemical and TPWD, is located at the Dow Chemical U.S.A. Texas Operations in Freeport. It has 12 acres of rearing ponds and an office/laboratory building. Mike Ray, program director for marine fish culture, said the success of the two hatcheries influenced the TPWD, GCCA and Dow Chemical to sign an agreement for construction of a new 60-acre marine fish hatchery located on property donated by Dow near Lake Jackson.

## Paddlefish Stockings Exceed Expectations

In May and June Texas Parks and Wildlife Department personnel stocked more than 84,000 four- to six-inch



Glen Mills

*Paddlefish were stocked above B. A. Steinhagen Reservoir and in Lake Livingston this spring and summer.*

paddlefish above B.A. Steinhagen Reservoir in the Angelina River near its confluence with the Neches River. A similar number was stocked into Lake Livingston on the Trinity River in July and August.

This is the second year of a planned 10-year annual stocking program for the fish. Paddlefish are reared at the A.E. Wood State Fish Hatchery in San Marcos as part of a management program. Eggs are obtained from Missouri and South Dakota.

"Paddlefish production has dramatically increased due to intensive culture techniques developed at A.E. Wood last year," said program director Pat Hutson. "They are reared in the indoor raceway, fed an artificial diet and grow about one inch per week."

It is illegal to harvest paddlefish, an endangered species in Texas; therefore, anyone catching a paddlefish should release it immediately.

## Two State Fish Records Certified by TPWD

The Texas Parks and Wildlife Department's state fish records committee has certified two fish caught during May as new state records.

A 45-pound striped bass caught by

# OUTDOOR ROUNDUP

Tom J. Reavis of Del Rio at Amistad Reservoir on May 14 has been certified as a state record. The fish beats a 43-pound, 8.8-ounce striper caught from Lake Austin in March 1986.

Reavis said he was casting a lead-head jig from the bank in the Blackbrush Point area of the lake when he caught the 44-inch-long striper.

Also certified was an 82-pound long-nosed gar taken by Rance E. Allen of Bryan on May 13 in the Trinity River below Lake Livingston. Department biologists said the six-foot, five-inch gar, taken with archery equipment, may be the largest of its species ever documented in the nation.

The gar will establish a new listing in the unrestricted division of the state record book, reserved for fish caught by legal means other than rod and reel.

## New Limits Tailored To Deer Populations

Several counties in the south-central part of Texas will be involved in an experiment this fall to tailor the deer harvest to changing deer population patterns.

Mark Mitchell, a wildlife technician for the Texas Parks and Wildlife Department, said the "doe days" concept approved for the upcoming fall hunting

seasons is aimed at fine-tuning the harvest of antlerless deer in counties having low or spotty deer populations. The concept will be tried experimentally for three hunting seasons, he said.

"In all these counties the deer density ranges from high in good habitat to extremely low in poor habitat," said Mitchell. "In many instances the deer population is an island that may be surrounded by areas devoid of deer habitat."

The "doe days" concept allows hunters to take antlerless deer only on designated days. In Gonzales, DeWitt, Wilson, Karnes and portions of Guadalupe, Lavaca and Colorado Counties, hunters will be allowed to take one buck anytime during the general season and two antlerless deer during the first nine days and last nine days of the season only.

Similarly, the bag limit in Caldwell, Bastrop, Lee, Fayette, Washington, Waller, Austin and portions of Guadalupe, Lavaca and Colorado Counties is one buck and two antlerless deer, with antlerless deer being legal for harvest only during the first two days and last two days of the general season.

"Counties with the 18 doe days are characterized by moderate deer populations," said Mitchell. "Overpopulation is not widespread in these areas; however, it does occur more frequently than in the counties having four doe

days." In those counties, he said, landowners are given the opportunity to deal with a slight overpopulation or out-of-balance sex ratio, rather than harvesting a large number of deer. These areas typically have low deer densities with pockets of higher deer populations, he added.

Because this is a three-year experiment, the Wildlife Division will be monitoring deer populations in the affected counties, Mitchell said. Landowners are asked to keep accurate records of the time spent hunting and the number and sex of deer harvested on their property.

## Illegal Striper Catches Cost Anglers \$48,900

Judges in two East Texas counties assessed fines totaling \$48,900 against 64 fishermen caught committing violations below Lake Texoma.

After receiving several Operation Game Thief calls about anglers keeping undersized and excessive amounts of striped bass in the Texoma tailwaters, Texas Parks and Wildlife Department officials began a surveillance operation. The operation totaled about four days between June 30 and July 7, said Bill Daniel, Law Enforcement Regional Director from Mt. Pleasant. Oklahoma officials conducted an investigation from the Oklahoma side.

Daniel said officers contacted 64 anglers committing violations and confiscated 988 stripers. The largest weighed 26 pounds, but officers confiscated several fish weighing less than two pounds. Officers filed 433 cases in Justice of the Peace courts in Collin and Grayson counties. One fish constituted one case. The total number of fish confiscated doesn't include fish that were legal and didn't go over an angler's bag limit, he said.

"Work is still continuing at various times. It will continue until we feel like it's deterred (illegal fishing) in some way," Daniel said.

Judge Jim Murrell of Collin County and Judges Bob Umphress and Frank Jolls of Grayson County assessed fines totaling \$48,900. Through July 13, \$23,895 had been collected.

Only about the first 300 yards of the tailwater behind Texoma is in Texas waters, Daniel said. There is an 18-inch minimum length limit and five fish daily bag limit for striped bass.



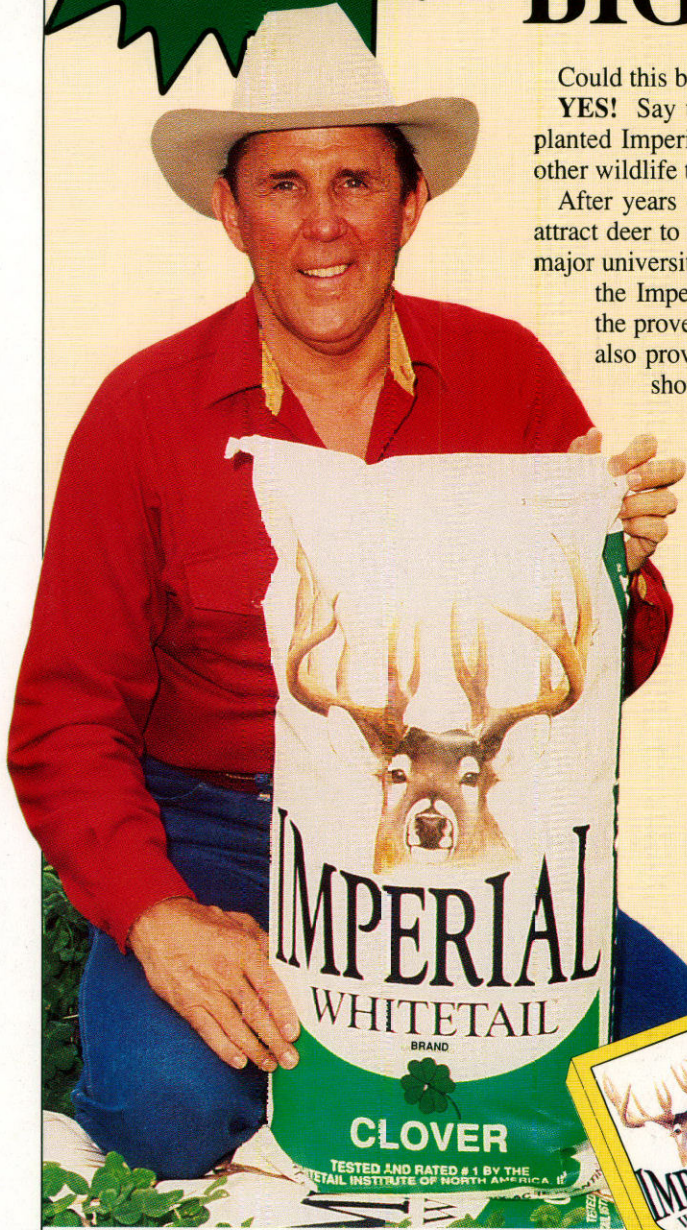
Leroy Williamson

*The "doe days" concept approved for this fall allows hunters in several south-central Texas counties to take antlerless deer only on designated days.*

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