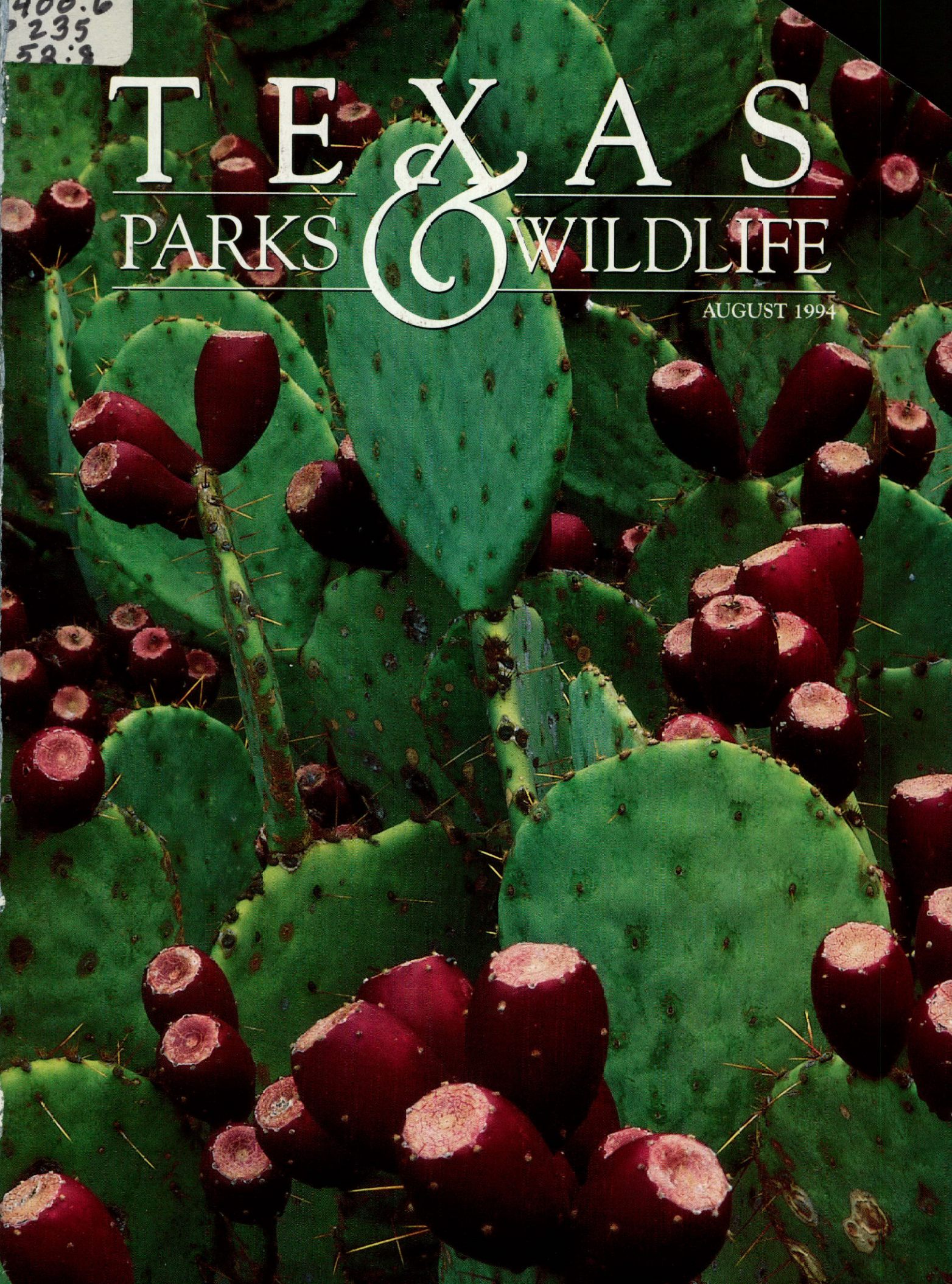


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TEXAS

PARKS & WILDLIFE

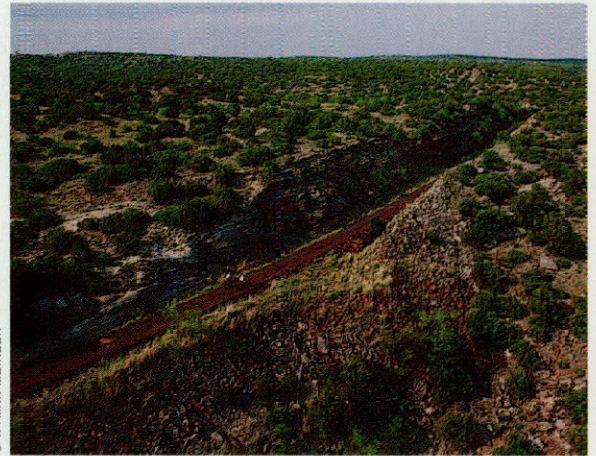
AUGUST 1994





TEXAS PARKS & WILDLIFE

- 4** **ALONG THE CAPROCK TRAIL** Once part of the Burlington Northern rail line, the new Caprock Trail gives hikers and bicyclists access to one of the West's least known and most beautiful canyons complexes. *by Dan Flores*
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Front Prickly pear cactus not only are a Texas icon, they also have beneficial uses for man and wildlife. See story on page 28. Photo © John Peslak. Nikon F-3 camera, 105mm Nikkor lens, 1 second at f16, Fuji Velvia 50 film.



© STEPHEN MYERS

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Inside Front Caprock Canyons State Park near Quitaque is headquarters for excursions on the new Caprock Trail. See story on page 4. Photo © Wyman Meinzer. Canon F1 camera, Canon 28-55mm zoom lens, f4 at 1/125 second, Fuji Velvia 50 film.



© RICHARD REYNOLDS

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Back Amanita caesarea mushrooms are typical of lowland vegetation to be seen at Lake Houston State Park. See story on page 46. Photo © Daryl R. Styblo. Nikon F2 camera, 55mm Nikkor macro lens with Capro ringlight strobe, f22 at 1/80 second, Kodachrome 64 film.

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AT ISSUE

My favorite professor at Texas Tech was named Bill Kitchen. He also was my mentor. More years ago than I'd like to acknowledge, he assigned me to locate, photograph and write the history of all railroad tunnels in Texas. Although the size of that challenge terrified me at first, I learned through my research that there were only five. One of them, which lies along the former Fort Worth and Denver South Plains Railway, is the subject of Dan Flores' story in this issue. Bill Kitchen was a visionary. In the early 1960s he envisioned a recreational trails system in Texas that would emerge from the abandoned rights-of-way left behind by declining railroads.

He was right.

In 1993, Governor Richards signed an executive order that for the first time in Texas facilitates the use of rail corridors as "greenways" for hiking, bicycling and equestrian trails, along with other alternative public uses, and as habitat for wildlife.

Nowhere has the promise of abandoned rights-of-way been more evident than in Quitaque. A couple of years ago, Rusty Sargent, superintendent of Caprock Canyons State Park, and I were visiting with some folks from Floyd County about the new state trailway. I remember one of them recounting to us that his son was trying to borrow enough money from him to set up a bicycle shop in Quitaque. As you will find when you read "Along the Caprock Trail," Quitaque is in Briscoe County and is the gateway to Texas's most exciting new outdoor recreation resource. Later that day we learned of new businesses including riding stables, restaurants and bed and breakfast inns coming to Quitaque with the promise of reinvigorating the town of 700 residents.

As the memorable day came to a close, our friend from Floyd County allowed as how he probably would lend his son the money. I thought of Bill Kitchen, who understood nearly 30 years earlier that old rail corridors and tunnels one day would provide Texans new opportunities to enjoy the outdoors and give small rural towns the opportunity for economic development.

—Andrew Sansom, Executive Director



BILL REAVES

In September...

It's almost time for Wildlife Expo '94, scheduled for September 30–October 2. We'll offer a preview of this year's event in the September issue. Also next month, Sea Rim State Park, feral hogs, Texas springs, predator calling for great wildlife photos, and more.

August 1994, Vol. 52, No. 8

TEXAS PARKS & WILDLIFE

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

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LETTERS



Taking Issue with "At Issue"

Several of our women readers took issue with Executive Director Andrew Sansom's May "At Issue" column, in which he stated: "Today, 25 percent of the families in Texas are headed by single parents and 81 percent of those single parents are women. I find it disturbing that of the nearly six million women in Texas of the age to require a hunting license, only 30,000 of them actually have one. Faced with these numbers, it is no surprise that more and more of our children reach maturity without ever being introduced to the outdoors."

Three of those letters follow.

Possession of a hunting license has nothing to do with enjoyment and appreciation of the outdoors. Mr. Sansom relates a story of going on archaeological digs with his father as a child. Do archaeological digs require a hunting license? Does camping out? Or hiking? How about picnicking? Flower and bird identification? Fossil hunting? Star gazing? Searching out the ultimate swimming hole? I have done all these things since I was a child, and my daughter has done them with me since she was a small child.

I am a single, female head of a household and I greatly resent your executive director's use of this ridiculous statistic to accuse mothers of not introducing their children to the joys of nature.

But there is a more sinister side of Mr. Sansom's mushy thinking. Mothers who are heads of households make up the largest percentage of citizens living in conditions officially deemed "poor," even working mothers. This means economic choices between working or staying on welfare, eating or transportation, health care or day care. Can you buy a hunting license with food stamps? Can you get to your lease on a bus? Is Mr. Sansom a closet misogynist?

Leah Lewis
San Antonio

The number of women who have hunting licenses is no index of the number of women who are enjoying the outdoors nor is it any indication of the cause of children not

being introduced to the outdoors. Perhaps you have not considered that many of us women enjoy the outdoors by watching birds and other wildlife, hiking, rock climbing, canoeing and boating, etc.

It is unfortunate that the woman's role in the past has been to take care of the house and stay home with the baby while "hunting, fishing, camping, hiking... was something you got to do on weekends with your father." You don't mention that any daughters were in on the "wonderful outing" with you and your father and friends. You say so much for the traditional role of women in American society. Maybe if you looked beyond the muzzle of your gun you might see that your statistics could simply show the lack of interest women have in hunting might be due to the role they have been expected to play.

Generation of financial resources by means other than hunting licenses might be the approach to the "5,970,000 potential customers out there..." Perhaps not only single mothers, but also two-parent families where both parents work, have little time for outdoor recreation after working all day, caring for children and keeping house. Providing quality care for children during school vacations and holidays can be a difficult task. Outdoor education that also meets the needs of working parents could fill this void.

Donna Browning
San Marcos

Many, many women as well as men regularly take their children camping. This is real living in the arms of nature. It involves hiking, swimming, cooking over a fire and

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relishing the special flavors of foods we don't prepare at home. It is watching beavers, seeing spiders weave webs and deer walking through the trees, hearing doves cooing softly. It is singing and playing cards around a campfire, telling stories and going to sleep in real darkness amid mysterious noises.

Many of these women who do not have hunting licenses are, instead, helping young girls or boys to be real outdoor lovers by serving as adult leaders of youth organizations or helping as parents.

Mary Elizabeth Montgomery
Dallas

■ Andrew Sansom replies:

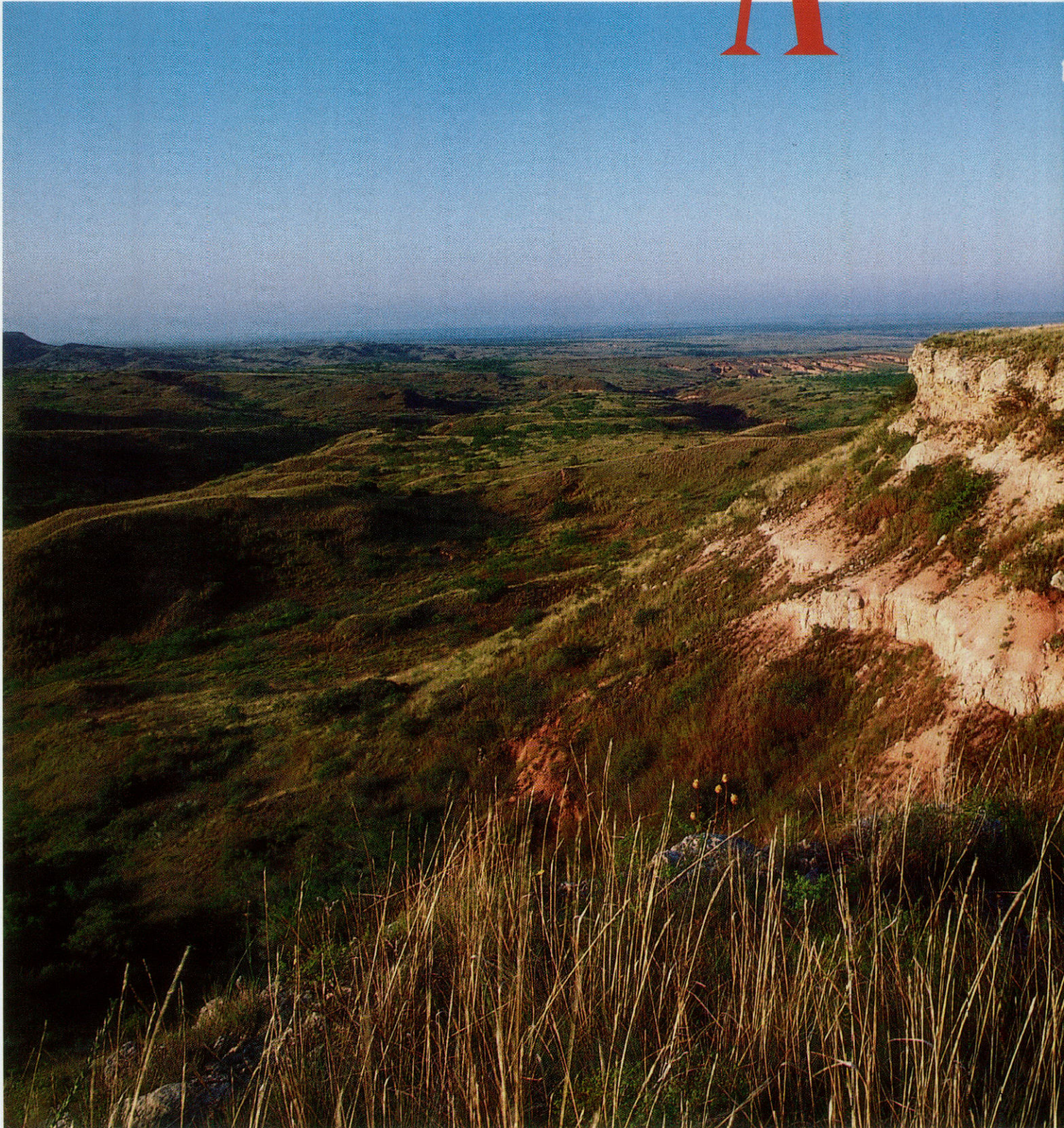
It looks as if I touched a nerve or two, and I appreciate the comments. There is more to the outdoors than hunting. What I was trying to say in my May column is that the outdoors can and should be enjoyed by everyone, and we want to reach out to new constituencies, including women, and provide them with opportunities to learn outdoor skills.

As I have written many times on this page through the years, we at Parks and Wildlife recognize the diverse interests of outdoor users, and support that diversity through a wider and wider range of activities. We sponsor youth camps, fishing clinics, hunter and boater safety courses, nature walks, slide shows, outdoor seminars and much more. Our game wardens, biologists and naturalists give thousands of programs each year to schools and private organizations. School children tour our fish hatcheries and historical parks daily. Our parks and wildlife areas offer numerous opportunities to enjoy both the natural and cultural resources of Texas. Thousands of people attend our Wildlife Expo every year, where they are exposed to all aspects of the great outdoors.

Yes, there is more to the outdoors than hunting. Outdoor users are as diverse as nature itself. But I'd like to think that there's one thing that unites all of us—our love for the outdoors and our commitment to conservation and ethical behavior, whether the activity is hunting, birding, rock climbing or kayaking. If we cannot build on that common ground, the resources of Texas will be increasingly at risk.

A LONG

by Dan Flores



THE CAPROCK TRAIL



1882

Question: What kind of place is Quitaqua?

Answer: It is one of the eastern breaks of the Staked Plain, a broken country, great many deep canyons.... It was a kind of headquarters for the Indians.

COMANCHERO JOSE TAFOYA

1994

Question: What kind of place is Quitaque?

Answer: It is a small Texas town in Briscoe County, in the eastern breaks of the Staked Plain, a broken country surrounded by a great many deep canyons. With Caprock Canyons—one of the largest and most beautiful state parks anywhere in the Southwest—bed and breakfasts, guided bus tours, guided hunts for upland birds and big game, a growing appreciation of the region's ecological uniqueness and diversity, and now the brand-new Caprock Trail, it is a kind of headquarters for redefining the future of West Texas.

The Panhandle-South Plains region of Texas is known mainly for flat croplands, but where the Staked Plain drops off into the Caprock country it presents a rugged panorama unseen by many Texans.

Toward the end of his fine book of nature essays, "A Natural State," Texas writer Steve Harrigan describes returning to Texas from a trip farther west and, heretical as it may sound, he confesses some disappointment with the Texas landscape. Except for the Trans-Pecos, with its canyons and mountain ranges that rival the scale of the interior West, Texas topography can appear gentler, flattened, drawn on a more human scale. That is partially what Harrigan's essay meant. But on a less aesthetic, subliminal level, what one of Texas's best nature writers was talking about was his disappointment at being held at arm's length from so much of the Texas landscape. Unlike the Rocky Mountains

This 64-mile stretch of former railroad land thrust

West with its vast public lands, much of Texas can strike you as a look-but-don't-touch kind of state, and that can be frustrating.

Harrigan was crossing the Texas Panhandle when he experienced those feelings, and his sentiments came, I think I can say, from some familiarity with this little-known part of the state. Long celebrated in Texas story and song as the Big Flat where the wind blows constantly, the skies are not cloudy, but the dust penetrates every orifice of your body, the Texas Plains can seem a tad disappointing, no matter the direction you're coming from.

But as the few, the brave, the adven-

turous-minded have known for awhile, the Texas Plains possess a big topographical secret. Furrowed away and mostly hidden in the Big Flat is one of the West's most unexpected and inspiring canyonlands complexes.

But this is the 1990s, and things are changing. I'm pretty sure Harrigan never has seen what I'm looking at as I'm clipping along, backpack snug and high, reflecting on his books and his observations. In June 1993, it became possible for Steve and me and the rest of nature-loving Texas to see up-close this part of the Panhandle I'm hiking.

So create this visual image: a line of pink-gray cliffs the height of small



© WYMAN MEINZER

ikers and bikers into a part of Texas few know about, and fewer understand.

mountains caps off curving, mounded grasslands accented nicely by the occasional motte of hackberries. Now mirror that image to complete the valley, and separate the two sides with the coiling sand ribbon of a stream lined with cottonwoods, whose leaves shimmer and wink gently in the yellow afternoon light. Picture, too, a gravelly roadbed beckoning downcanyon.

Now here's the rest of the sensory download. Aural: a pair of pretty new boots with good rubber is crunching the pumice trail at the heartbeat rhythm of an effortless grade. Olfactory: the air smells of dust-droughty summer with a tang of juniper heated to fragrance.

Tactile: the 3,200 altitude is there, in my sinuses, and every time I pass into a shade the dry wind quickly evaporates my sweat. Taste? Well, I plan to taste this place (the Chickasaw plum bushes look heavy with fruit), but right now I still have the taste of town in my mouth. It won't be there long. Quitaque Canyon, out there in the Big Flat where the Pease River heads, is fast purifying me. The short version is that Quitaque Canyon, at least a 100- to 600-foot-wide corridor through its heart, joins the piece of Palo Duro Canyon preserved in Palo Duro Canyon State Park, and

In order to construct the Caprock Trail, the department must convert some 48 railroad bridges and trestles such as the one at left to pedestrian use along the 64-mile route. The aerial photo above is of a long stretch of trail between the tunnel and Quitaque.



© WYMAN MEINZER

the red sandstone canyons of the Little Red (Caprock Canyons State Park), as part of the High Plains cadre of public preserves along the dramatic Caprock Escarpment.

In fact, the short version is even sweeter than that. The new Caprock Trail that accomplishes this commences atop the Llano Estacado, in cotton fields near the burg of South Plains, before drop-

ping (within less than two miles) into the deepening furrow of Quitaque Canyon. Nine miles later the trail exits the widening canyon via (of all things) a 742-yard-long tunnel, to enter the historically famous Valle de las Lagrimas, or Valley of Tears, where the Comanches and Kiowas once traded meat and horses and sometimes Euroamerican captives to New

Mexicans. It then continues for another 50-plus miles through the juniper breaks and mesquite flats of the Texas Rolling Plains. Before it concludes at Estelline, on the south bank of the Red River, the new trail corridor performs one more topographical magic trick, carrying you down and into the brick-red badlands and hoodoos of the otherworldly Permian Formation. Start at either end and go to the other, whether you do it via horseback, mountain bike, cross-country skis, or as a modern Kokopelli (biped with backpack), and you'll have traveled 64 miles of Texas. Outside Big Bend, that kind of point-to-point transect is possible nowhere else in the state.

The passage of the National Trails Bill in 1968 is one of the keys to the Caprock Trail. A spawn of the outdoor recreation revolution of the postwar era, it was designed to give Americans a network of transverses of the American countryside, and in states with extensive public lands holdings, magnificent trail systems such as the Continental Divide Trail and the Pacific Crest Trail were the result. Even in regions of the country with fewer public lands, cre-



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Bicyclists emerge from a tunnel through which trains of the Fort Worth and Denver South Plains Railway steamed during the 1920s. The rail line, abandoned by the Burlington Northern Railroad in 1988, is being converted to a recreation trail.

ations such as the Appalachian Trail connecting the Eastern mountain states and the recently completed Trans-Arizona Trail have been possible with some intensive work at joining together the bits and pieces. But in Texas, with little public land, such trail projects have been almost impossible.

Until now.

If you are a Texas backpacker or wildlands enthusiast, it has been easy enough from a distance to dismiss the Llano Estacado as that flat, desert-like expanse

surrounding Amarillo and Lubbock. Isn't it an endless cotton field, or wheat field, populated by a few bleak small towns, and a couple of big towns that strike even the locals as not nearly as imaginative as the big cities downstate? Good country to turn Molly Ivins loose on and enjoy the result, right?

As with most things, the Llano Estacado takes some intimate knowing to appreciate its culture and potential. Ever heard of Texas Swing, rock and roll, contemporary Texas folk music? How about Bob Wills, Buddy Holly, Butch Hancock, Joe Ely, Jimmie Dale Gilmore, Nanci Griffith? The McMurtry family name strike a chord? They all have roots in the Llano Estacado country. Now for a tougher test. Tule Canyon? The Valley of Tears? Yellow House Canyon? Los Lingos Canyon? Quitaque Canyon?



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Coyotes, above, are one of the many mammal species to be seen along the Caprock Trail, along with birds such as the graceful Mississippi kite.

Along with the Trans-Pecos, the western stretches of the Hill Country and the Big Thicket area, in the 1990s the Llano Estacado actually is home to some of the most extensive wildlands left in Texas—and I don't mean vast stretches of tumbleweed-infested croplands. The canyon country along the Llano's Caprock Escarpment comprises a wildlands strip varying from 10 to 40 miles wide that stretches almost 300 miles north and south and spawns the headwaters of three of Texas's major rivers—the Red, the Brazos, and the Colorado. Surrounded by an agricultural empire that is facing a crisis of declining water supplies and rural outmigration, it's a surprising country of deep canyons and

high color. It's where the Big Flat falls into the Big Rough, and it is a land of enormous ecological and recreational potential.

The problems of the Caprock Canyonlands comprise a long list. While in most cases the ranchers who settled the canyons a century ago have been good stewards, there are worries about exotics like aoudad sheep and their possible competition with native mule deer. We also worry about tacky frontier theme parks (several are proposed for the canyons), and especially about the steady inclination in West Texas to regard the canyons as reservoir sites to solve the area's water problems.

The Caprock Trail, below, cuts a straight path through Quitaque Canyon near the city of Quitaque, giving hikers and bikers a close look at the Caprock country's rocky environs.

Making some effort to return the decimated native fauna of the Southern Great Plains to this prime wildlands corridor is a principal rationale for preservation activities on the Llano. Another—maybe the most important—is fashioning a human society in Texas that has access to and familiarity with its bioregions.

There are lots of ideas about how to expand on the base of the two present state parks (Palo Duro and Caprock Canyons) in the canyon country. But a trail system long has been one of the most promising, and that is where the Rails-to-Trails Conservancy comes in, a national organization dedicated to acquiring for recreation the thousands of miles of abandoned rail lines in the U.S. Founded only in 1986, the express purpose of the Rails-to-Trails Conservancy has been to assist in the

acquisition of abandoned rail lines, to help pull up the tracks and ties, and grade the rights-of-way for multi-use back-country trails available for hiking, mountain biking, cross-country skiing and horseback riding. There is something supremely satisfying about watching the machine age reverse itself.

Rails-to-trails works like this: according to the 1983 Federal Railbanking law (an amendment to the National Trails Systems Act), state or local governments can petition to transfer sections of rail corridor to public ownership when a railroad abandons a line. Conversion is complex and varies depending on exactly who owns the right-of-way. The Conservancy estimates that it costs, per mile of conversion, about \$60,000 to create a paved trail surface, and \$10,000 to \$20,000 for gravel. Once converted, though, one of the great advantages of



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a rail trail is that the grades are mild and the trails are wide.

The deeper origins of this particular trail lie in the confrontation between early 20th century railroad engineers and the Caprock Escarpment, which presents an abrupt north/south face 250 to 700 feet high in West Texas. The so-called Texan-Santa Fe Expedition, which left Austin during the years of the Texas Republic with the added assumption that with a little encouragement Santa Fe really wanted to belong to Texas, fell apart when it confronted the Escarpment here. But the Indians and New Mexican traders used the canyons to ascend to the Llano Estacado, and in the 1920s the Fort Worth and Denver South Plains Railway decided the Indians and New Mexicans had been pretty shrewd about the deal. They selected Quitaque Canyon, one of the shallower and longer canyons of the region, for a surmounting of the Llano, and by 1928 (just about in time for the Dust Bowl to knock the props



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Visitors to the Quitaque Chamber of Commerce's "Trail Day" celebration June 4 got to travel the new Caprock Trail the easy way, on a covered trailer, above.

from under Llano agriculture) the railroad had conquered the Caprock Escarpment, although it took the Clarity Tunnel to do it. For the next 60 years the machine mastered the garden, as the trains of the Fort Worth and Denver South Plains Railway and later the Burlington Northern, chugged up the incline, gaining 1,200 feet of elevation in the 64 miles from the Red River to

the head of Quitaque Canyon. Meanwhile, interstates and 18-wheelers were eating into its profits. In the late 1980s the railroad decided to abandon the line.

The story gets a little complicated at this point, but essentially events unfurled like this: Quitaque, population 513, in one of the declining areas of the Great Plains, got an economic revitalization

PARK POLICY FOR OVERNIGHT CAMPING

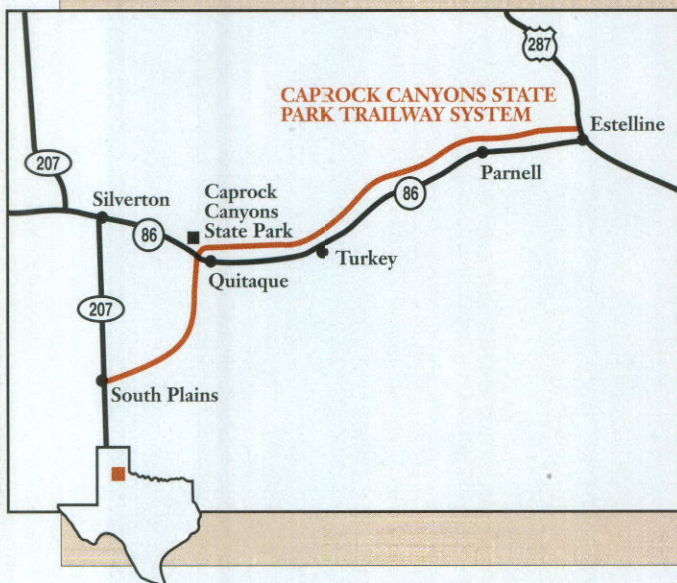
Limited primitive camping is allowed on the Rail-Trail. All overnight camping permits must be acquired at Caprock Canyons State Park headquarters, located

three miles north of Quitaque on FM 1065. The staff will provide up-to-date trail status and information concerning camping areas, water availability and trail maps. This is a long-distance trail and advance plans must be made. Call the park at 806-455-1492.

CAMPING ON THE TRAIL

Neither law nor local custom requires that you camp overnight in order to hike the Caprock Trail, but for the full canyonlands and badlands experience of the Texas High Plains, a night or three out is highly recommended. Unfortunately, full development of camping facilities, access

and interpretive markers along the 65-mile length of the Caprock Trail is said to be a six-year project, so what trail travelers have now is an interim situation. The plan is eventually to develop a trail-adjacent campground for every 10-mile stretch, but at present only the upper third of the trail, between the towns of South Plains and Quitaque, offers possibilities for overnight camping. Three primitive-camping locations—one on private land near the falls of Quitaque Creek—currently are in place at five-mile intervals in Quitaque Canyon, from its beginning down to the Clarity Tunnel. Camping permits (\$7 a night), obtainable at Caprock Canyon State Park headquarters, which is located three miles north of Quitaque on FM 1065, are required to stay overnight on the Caprock Trail. Day hikers can pay daily fees at honor boxes located at trailheads.



© MAP BY DEBRA MORGAN

by the opening of nearby Caprock Canyons State Park in 1981. The Quitaque Chamber of Commerce took to the park like a turtle to sunshine, and was alert for other possibilities. When Burlington Northern announced its plans to abandon the line in 1988, a multi-party agreement allowed the Texas Parks and Wildlife Department to acquire the corridor by donation. The railroad corridor was converted to a trail with legal help from the Rails to Trails Conservancy, financial help from a salvage contract arranged through Montey Sneed, railroad consultant, South Plains Railway Services of Vernon, Texas; local

advocacy by the Quitaque community; and Burlington's willingness to work with the various parties. Some of the financing came from avoiding the half million dollar price tag of demolishing the trestles and bridges.

Some bed-grading was required, along with planking and some handrailing on the 48 trestles and bridges along the trail. As this is written, early in 1994, not all the work is done yet. But in June 1993, a classic Texas dedication ceremony, replete with barbecue, twangy guitars and acres of cowboy hats paid homage to community and posterity and recreation—and the Quitaque Canyon leg of the trail was opened to the public. Quitaque may not be an ecotourism destination yet, but this was a big step.

So what's it like on the trail? Well, the Caprock Trail is the first long distance rails-to-trails conversion in Texas, and I will tell you now that the bugs aren't all out yet. Hiking it with Julie Shannon last summer, and again with Blake Morris and Marissa Blanco this January, there was some collective dissonance. Not, if you know where to go,

with the scenery, because Quitaque Canyon along the upper trail and the Permian badlands in the lower are lovely and inspiring—even if there are big stretches around Quitaque, Turkey, and Estelline where the corridor essentially is traversing farm country. Not with High Plains ecology, either (especially after a few natural history interpretive signs go up), because you'll see plenty of mule deer, wild turkeys, coyotes, of course, and raptors like the graceful Mississippi kites and quite possibly golden eagles. The floral riches of the canyonlands still are intact, and the autumn cottonwood displays along Quitaque Creek will imprint yellow on your retinas for weeks. The trail also is marvelously easy to walk (it's essentially a gravel road), and descending the whole of it will carry you through three major geologic strata (Tertiary, Triassic, and Permian) that span the tidy sum of about 240 million years.

The Caprock Trail's major problem in its infancy has its basis in simple arithmetic: most of the access points are eight to 10 miles apart. There are as of now no overnight campsites developed anywhere along the trail, but the state park can make arrangements for camping on adjacent private land.

I know I probably am in the minority on this one, so take this vision for what it may be: the ravings of a romantic environmentalist. But I see the Caprock Trail as the mere budding tip of a Texas trail network that's going to put horse folks and mountain bikers and (my Texas fantasy) cross-country skiers and ordinary bipeds in intimate touch with this state.

Maybe it'll even turn Quitaque into a Texas version of Moab, Utah. ☆

Dan Flores divides his writing time between his place in Yellow House Canyon near Lubbock, and 25 acres in the foothills of the Bitterroot Valley, Montana.



Prairie dogs, left, are one of many species of native animals that still can be seen in the Caprock country. The pond below is located in Caprock Canyons State Park, headquarters for the Caprock Trail.



One-Arm Dove Hunting

Even the loss of an arm can't stop these wingshooters from having a good time.

Take two one-armed politicians, add a Texas tall tale and a couple of shotguns, and stir in a flock of high-flying doves. It sounds like the recipe for an Alfred Hitchcock movie. Instead, the small North Texas town of Olney used these odd ingredients to cook up a dove hunt that has become a tradition nearly a quarter-century old.

Every September scores of one-armed men, women and children head for Olney not only to hunt doves but also to take part in what co-founders Jack Northrup and Jack Bishop say is really more of a reunion.

These two one-armed Jacks hatched the idea during a drug-store coffee-drinking session in 1972. City administrator Northrup, who lost his right arm in 1956, and county commissioner Bishop, who lost his left in 1923, were talking about the upcoming dove season with-in earshot of a group of gullible visitors. "We talked about shooting doves with muzzleloaders, pumps, and bolt actions—we laid it on thick," Northrup recalled. "Then we got to thinking, why not?"

The hunt began as just a hunt for the 15 or so people who showed up the first year. Word spread and events were added until nowadays more than 60 amputees (people with any limb missing are invited) and several hundred friends and family attend. Townspeople turn out by the score as well for two days of ten-cents-a-finger breakfasts, barbecues, horseshoe pitching contests, trap shoots, live entertainment and an auction.

"The hunt has become secondary," Northrup said. "What

we have now is a reunion with fellowship that helps each of us to a better way of life. It's a transition for the new folks. Most are reserved at first, but in about an hour they realize they are not the only person in the world with one arm and that it's not the end of the world."

"If we just wanted to shoot doves, we could stay home," said David Jones of Oklahoma City. "No one has a need to come down here and be with their own kind. No one is here to compensate for their loss. Missing arms are simply something we have in common."

Joyce Baughn of Jacksonville, Florida, became the first female

member of the group in 1990. She lost both arms while playing under a train when she was six years old. Her husband told her about the one-arm dove hunt after seeing a newspaper article. "I wasn't too crazy about the idea at first," she said. "But it just took about 15 minutes until I knew I was home. Now coming to the hunt each year is like coming home to family."

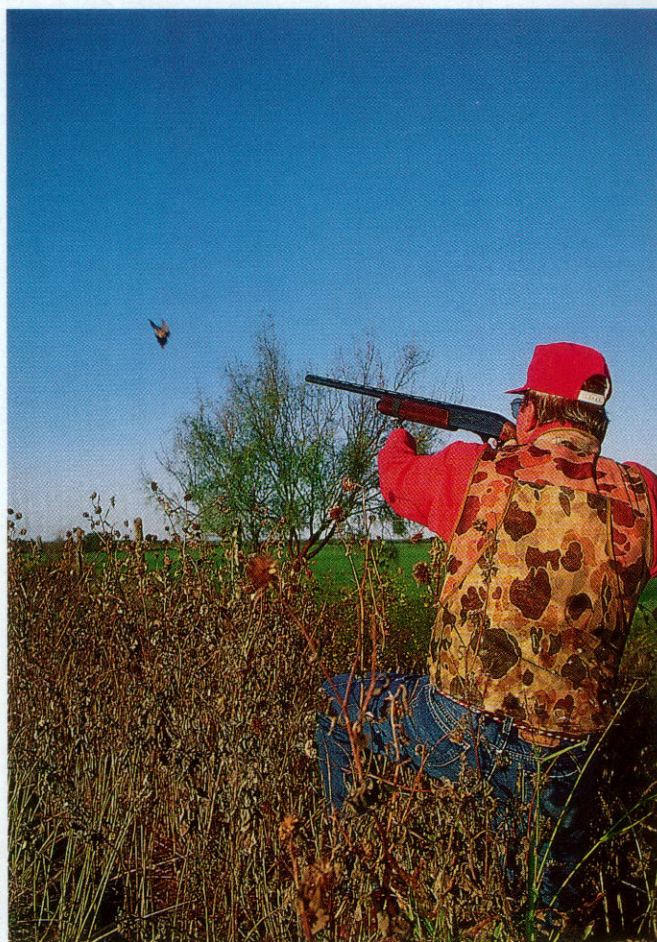
First-year attendees receive special attention and a lot of good-natured ribbing. ("There are very few gimp jokes we haven't heard," said C. D. Dickens of Paducah.) All are introduced and tell how they became amputees. Kay Doyle of Villa Ridge, Missouri, a neophyte in 1993, lost an arm in a car accident. "It's nice to be here where one-armed people outnumber the rest of you," she joked. Ike Ransford of Moses Lake,

Washington, lost an arm shooting pheasants out of season. "But the game warden didn't catch me—I was lucky," he grinned.

Matter-of-fact stories are swapped about how limbs were lost, but the amputees live in the present, not the past, and are proud of their accomplishments since their accidents. In 1973 Allen Smith of Arlington loaned his shotgun to a friend who removed the plug and returned the gun loaded. "I jacked three shells out and leaned on the gun barrel," Smith said. The gun discharged, taking off his left arm. Today Smith flies charter jets out of Dallas Love Field and is a flight instructor. "You have to do everything twice as well as everybody else," he said.

"He's the most capable man I've ever known," said his wife Lori. "That's not what you say when you get home from work and dinner's not ready," Allen retorted.

Shooting with one or both

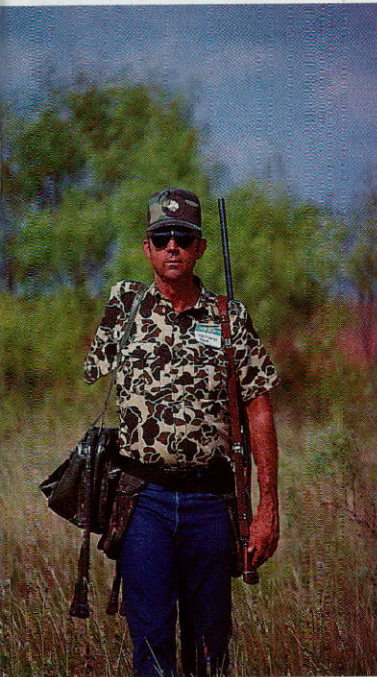


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Jim McCarson of Olney, left, brings down a dove during the annual hunt. McCarson was one of the first participants in the dove shoot and won several times. Participants use a variety of guns, from the autoloader McCarson is using, to an over-and-under double, above.



© ROBERT LILES

Cliff Etheridge of Rescoe lost his right arm in a cotton-stripping machine. Etheridge has been hunting in the annual event for the past several years.

limbs missing poses a few problems, none of them insurmountable. "You have to learn to handle the weight of the gun," said Jack Northrup. "You have to get it up and on target and squeeze the trigger quickly." A right-handed shooter, Northrup also had to learn to aim with his left eye. Jack Bishop, who lost his arm 70 years ago at age 14 months, snorted at the idea of being handicapped when it comes to shooting. "If I had two guns, I'd put one under each arm," he said. "I've never known anything different."

One-armed shooters are no slouches, either. According to a major manufacturer of shotshells, the nationwide average for dove hunters is one bird downed for every eight shells fired. "We do better than that," Northrup said. "We let the two-armed people go out opening day and get the ones in the trees, on the ground and the slow flyers. They get the birds wild. Then we go out and bring home the doves." Each year the dove hunt features

two contests for the most doves bagged during a timed period. One contest is for people with an arm off below the elbow, the other for people with an arm off above the elbow, on the theory that a longer stump is an advantage in shooting. Winners receive autoloading shotguns. C.D. Dickens won his division two years in a row—once with a limit of birds in 30 minutes—before voluntarily disqualifying himself.

Double amputees are lobbying for their own contest, but not for the reason you might think. "I figure I can win both shotguns," said Jimmy Shadden of Dublin. Shadden has one arm off below the elbow and one above and craftily wants to enter both divisions. He shoots an autoloader equipped with a hydraulic trigger actuated by biting down on a small plastic bottle connected to a piston with surgical tubing—all filled with cooking oil.

Like most dove hunts, social aspects of the gathering outweigh sport. Bidders vie spiritedly for donated items in a fundraising auction featuring a variety of useful objects as well as collectibles—at bargain prices. In 1993 a baseball autographed by Willie Mays went for \$90, while a dress worn on television by Barbara Mandrell fetched a few dollars less. The event enjoyed most by the crowd, however, features Northrup and Bishop seated on porcelain plumbing fixtures while contestants attempt to fling cowchips into the bowls. It gives a whole new meaning to dodging the issues.

The One-Arm Dove Hunter's Association can be contacted at P.O. Box 582, Olney, Texas 76374, or you can call 817-564-2102. Everyone is welcome, whether missing a limb or not.

by Larry D. Hodge

Anglers Ask For, And Get, Stricter Bass Limit

If you don't think bass fishermen's attitudes have changed in the last decade, check out the latest happenings at Fayette County Lake.

For several years the 2,600-acre power plant lake near LaGrange has had a 14- to 21-inch "slot" limit for largemouths, along with a daily bag limit of three. The slot limit requires that all bass between 14 and 21 inches be returned to the water alive. During the 1993-94 license year, an additional regulation limited the daily take of 21-inch-plus bass to one per day.

One would think the limit, designed to grow bigger bass, would be restrictive enough to suit Fayette anglers. It wasn't.

Led by fishing guides Rick Rule and Gene Ballard, a group of big-bass enthusiasts circulated a petition, collecting more than 1,000 signatures from anglers who wanted to increase the upper end of the slot to 24 inches.

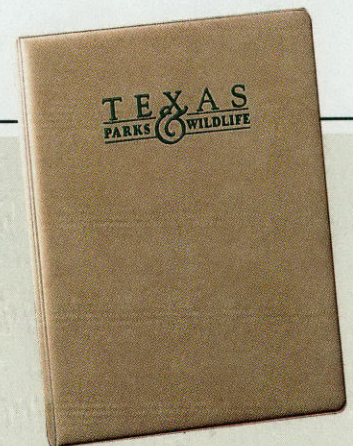
This means a Fayette angler conceivably could catch a nine-pound bass that would have to be released, according to Phil Durocher, director of the Texas Parks and Wildlife Department's Inland Fisheries Branch. "Our field biologists previously had mentioned raising the limit, but we felt it would be best to wait, since we had just made the bag limit change last year," said Durocher, "but when we saw the results of the anglers' campaign we decided to go ahead with public hearings and rec-

ommend the change."

Fayette long has been a hotspot for quality bass fishing, but it has failed to break into the elite list of lakes that produce bass in the 13-pound-plus class. The current lake record, caught in 1982, weighed 12.25 pounds, and is far from cracking the top-100 list.

"The slot limit has been tremendously popular at Fayette, because it provides a tremendous catch-and-release fishery for quality-sized bass," Durocher said. "Now maybe with the higher slot limit we'll start to see more trophy-sized ones as well."

The new slot limit will go into effect, along with other new fishing and hunting regulations, on September 1.



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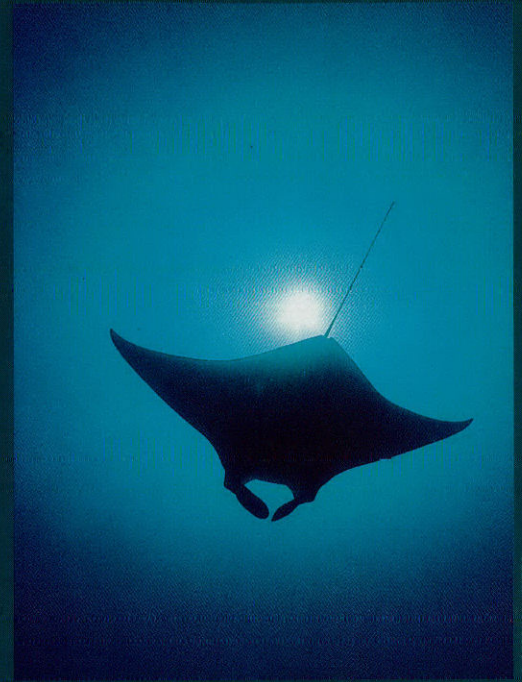
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Salmon-colored creole fish swim in large schools around the Stetson Bank's perimeter, above. Manta rays, above right, seem to want to interact with divers, but don't touch their wing tips or tails.



© STEPHAN MYERS

Still in awe, I stretched out in the sunshine on the deck of the *M/V Fling*, opened my log book to a fresh page, and began to write:

Stetson Bank
Visibility: 100 feet.
Water temperature: 82 degrees.

At the beginning of the dive, I descended near the pinnacles. The fire coral on the pinnacles looks like cream-colored melted wax, and urchins with long, dark spines are scattered in cracks and crevices. I swam past several queen angels and large groupers on my way to the wall where I hovered at 80 feet, staring into the blue abyss, searching for the giant pelagics—southern rays, sharks or manta rays.

At first, I thought it was my hopeful imagination, but no, there was a shadow moving along the wall. A manta ray with a seven-foot wingspan was swimming toward me. I took a long hard breath from my regulator and resisted the urge to hurry toward it. The ray approached cautiously, lingering just beyond the wall, then turned in a graceful arc and swam directly toward me. I removed my glove and reached up to stroke the textured, white stomach as it sailed overhead. The ray was just as curious about me as I was about him!

The gentle manta ray lingered and swam effortlessly with me and the other divers for more than two hours in what became an unforgettable August afternoon.

by Elaine Acker

Divers and researchers hope federal sanctuary designation will preserve the delicate ecosystem of this salt dome under the Gulf of Mexico.

Saving Stetson Bank

© STEPHAN MYERS

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nce-in-a-lifetime memories such as this one lure divers to exotic destinations worldwide, but for Texans remarkable dives are as close as the Gulf of Mexico. Located approximately 70 miles southeast of Freeport, Stetson Bank is one of more than 500 salt dome formations in the Gulf Coast region that attract a wide variety of marine life.

Another commonly known salt-dome dive site is the Flower Garden Banks National Marine Sanctuary, situated 30 miles south of Stetson Bank. The 350-acre Flower Gardens are the northernmost coral reefs on the continental shelf of North America.

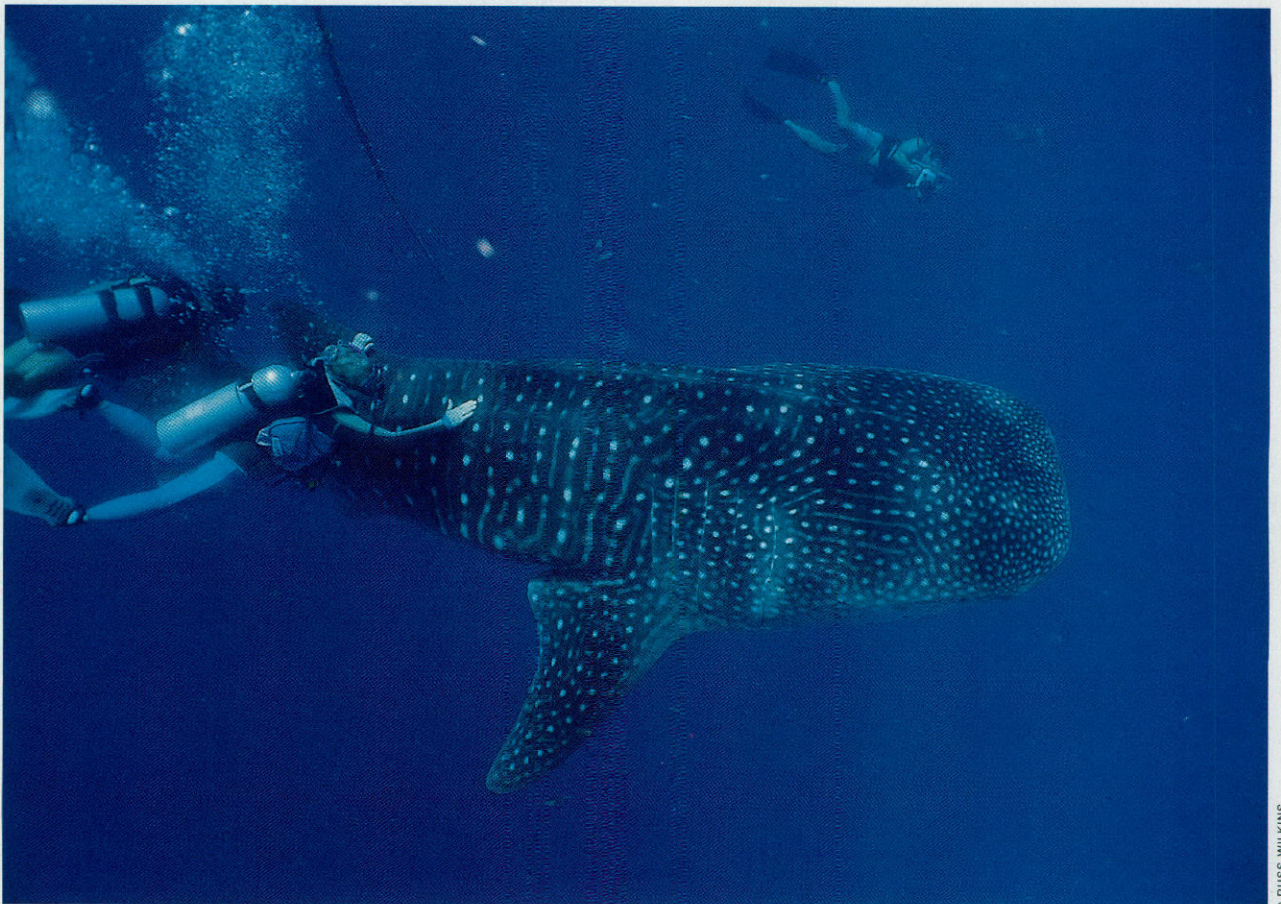
Both banks were formed when sub-

terranean pressures forced columns of pure salt through the sedimentary strata toward the earth's surface. "Like the Flower Gardens, Stetson is a bank that has been thrust upward by intrusion of Jurassic salt deposits originating approximately seven miles beneath the sea bed," said Dr. Tom Bright, professor of oceanography at Texas A&M

University. "The bedrock is clay stone and siltstone, which over time has been covered by a veneer of corals and sponges." Only the peak of the dome rises from the ocean floor from a depth of 190 feet. If the salt intrusion that formed Stetson Bank were completely above ground, it would stand nearly twice as high as Alaska's Mount



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McKinley, the highest peak in North America.

Stetson Bank originally was named for Henry C. Stetson, one of the first oceanographers to survey the bank. However, most divers know Stetson by its familiar geographic profile, which bears an uncanny resemblance to a submerged Stetson hat. The "crown" of the hat is a flat plain, 70 to 80 feet deep, with pinnacles of clay stone that rise like steeples pointing toward the surface. Fire coral and sponges encrust the pinnacles, and brain corals grow alongside boulder formations.

When I swam out over the edge of the crown, the gray, striated sea floor dropped away dramatically toward Stetson's "brim" another 100 feet below. "It's more like a moonscape than a coral reef," said Dr. Steve Gittings, manager of the Flower Garden Banks National Marine Sanctuary. "It's only about 100 acres in size, and it's unfortunate that it's not a bigger place because a lot of people consider Stetson to be a unique dive."

Captain Gary Rinn of the *M/V Fling* agrees. "Stetson is an oasis out there in the middle of nothing," said Rinn. "You'll see just about any species of tropical fish at Stetson that you will see in the Caribbean." Fish commonly found on Stetson Bank include French, blue, and queen angelfish, rock hinds, squirrelfish, spotfin butterflyfish and barracuda. Schools of creole fish with salmon-colored bodies swim in large schools around the perimeter of the reef. Stetson's miniature marine life includes blennies, arrowcrabs, featherdusters, shrimp and neon gobies.

Rinn offers charter trips to both the Flower Gardens and Stetson Bank aboard the *M/V Fling* and *M/V Spree*, 100-foot live-aboard dive vessels. "The fish, particularly the angelfish, seem to be larger than anywhere I've ever seen them," he said. "We also see sharks, spotted eagle rays, turtles, octopus,

whale sharks and manta rays."

Rinn is especially protective of the manta rays and carefully teaches his divers manta ray etiquette. "Manta rays are the one sea creature I've had actually seek me out and want to interact," said Rinn. "I don't have any problem with people petting them as long as they don't touch their wing tips or their tail. That tends to spook them and they'll leave." Mantas that are treated respectfully will sometimes linger with divers for hours.

People familiar with beautiful underwater photographs of divers riding manta rays can be tempted to reenact the experience, but Rinn advises against it. "They're not built to be dragging people around. That's an unnatural behavior," he explained. "Most other creatures—turtles and fish—will tolerate encounters with divers, but the manta rays seem to thrive on it." My own experience with the manta ray is shared by many other divers each year. "If non-divers had that experience they would be a lot more aware of the marine environment and the animals in it," said

Rinn. "We'd have a lot more conservationists out there."

Conservation is becoming increasingly important on Stetson Bank as the tiny ecosystem experiences the effects of increased human activity. The most profound threat to Stetson, as it was at the Flower Garden Banks, is anchor damage. "Stetson is not a coral reef per se," said Rinn. "In other words, the reef was not built by corals. When an anchor tears apart one of those pinnacles, it's gone forever. It's a rock that won't grow back."

In response to the severe anchor damage at the Flower Garden Banks, Rinn formed the Gulf Reef Environmental Action Team, or GREAT, in 1989 to raise money to install mooring buoys. With private donations, funds from the Gulf Coast Council of Dive Clubs and matching funds from the National Oceanic and Atmospheric Administration, volunteers placed buoys on the Flower Gardens Banks. In January 1992, after a 15-year struggle, the banks became the nation's 10th marine sanctuary.



© STEPHAN MYERS

Banded cleaner shrimp, top, pick ectoparasites off various marine species. Left, divers investigate a whale shark. The *M/V Fling*, right, offers charter trips to Stetson Bank.



© RUSS WILKINS

The endangered Atlantic ridley sea turtle is one of five sea turtle species found in the Gulf of Mexico. An adult ridley weighs up to 90 pounds.

Although GREAT was created specifically to promote the mooring buoy project, its members chose to continue working together to encourage conservation throughout the Gulf of Mexico. "The emphasis went into education and preservation of existing reefs in the Gulf of Mexico," said Rinn. Group members speak at schools, marinas, organizational meetings, and churches about the GLE, the Flower Gardens and Stetson Bank.

In 1992, GREAT volunteers installed two moorings on Stetson Bank. Using a hydraulic drill to remove a core from the claystone, volunteer divers installed stainless steel u-bolts and filled the holes with cement. "At the Flower Gardens, we drilled two feet deep," said Rinn, "but on Stetson, we decided to drill down five feet deep because we did not know how brittle the claystone was. You see an anchor hit it, and it breaks apart." The buoys were installed in flat areas away from the peaks and pinnacles so the mooring lines would not damage them.

The bank also exhibits the effects of sport diver activities, including collecting and spearfishing, and sport fishing activities. "Stetson has suffered a tremendous loss in its shellfish," said Rinn. "Just three years ago you could look under ledges and find cowries, lion's paws and spiny murex all over the place. They're

still there, but not in the numbers they once were." Rinn, who once operated dive boats in the environmentally sensitive Florida Keys, does not allow live collecting and encourages a complete "hands-off" policy. "In Key Largo, I'd catch people with shells in their pockets," said Rinn. "Divers used to do that a lot, but now the mentality has changed. People realize that the shells don't look as good on the shelf at home as they do when you see them in the water."

More than 2,000 divers visit Stetson Bank each year and, as Rinn spoke, I envisioned what it would be like to host an average of 38 people in my home every weekend, each of whom left smudges on the wall, accidentally broke pieces of furniture or took small mementos. Rinn acknowledges that divers must actively protect the resource. "Sport diver traffic is detrimental if the divers are careless, if they don't watch their buoyancy and their fin tips, and if they collect things. We ask divers to try to be as gentle around the reef as humanly possible."

Spearfishing is illegal at the Flower Gardens, and the practice has declined at Stetson Bank as divers, dive shop owners and charter boat operators have become aware of its effect on the delicate ecosystem. Sport fishing—bottom fishing—has been a problem on Stetson, but not because it has decimated the

fish population. Fishermen often drop old fishing lines into the water. "Nests of monofilament line are tangled up in the fire coral," said Rinn. "The reason people fish Stetson is it's easy to find, but the fishing there is not as good as other areas around it and the rigs."

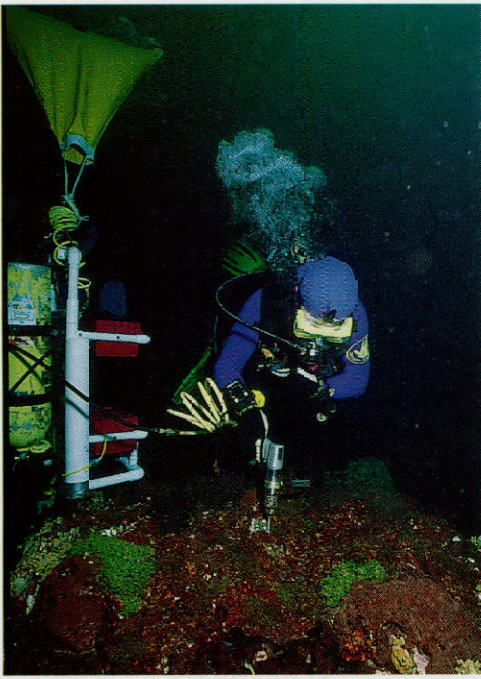
Many fishermen also do not use the mooring buoys. "I've pulled up there in the morning and there'll be a fishing boat anchored between the two mooring buoys," said Rinn. "Either they don't understand, or they don't care. If the buoys are occupied, politely ask someone if you can tie to their stern. We do that all the time. Those mooring buoys are sturdy enough to handle that."

In an effort to track the effects of various environmental influences, GREAT initiated a monitoring study in 1993. The researchers will study coral growth, conduct a fish census, and map the area. "A number of scientists from Texas A&M are involved," said Rinn. "They're volunteering their time to go out and assist in the monitoring." Participants

DIVING TRIPS

Two- and three-day excursions to the Flower Garden Banks National Marine Sanctuary, Stetson Bank and oil rigs are available through Rinn Boats, Inc. Trips are scheduled from February through November, and are subject to weather conditions. Trip prices are set by individual dive-store retailers, but average costs range from \$275 to \$395.

For complete information including a monthly schedule and a list of dive retailers currently offering trips aboard the *M/V Fling* or *M/V Spree*, write: Rinn Boats, Inc., 313 Juniper, Lake Jackson, Texas 77566, or call 409-265-3366.



© CARL BEAVER

A diver drills to establish a photo station for a monitoring project, above. A tiny flenny peeks out from behind a purple sponge, below.

emphasize the importance of the ongoing monitoring study as a source of scientific data that will document any changes in the resource, and that will support Congress's efforts to designate the bank as a marine sanctuary.

In March, in response to a grassroots movement by divers and boaters who were concerned that Stetson's fragile ecosystem was in danger of being irreversibly damaged, the U.S. House of Representatives passed H.R. 3886, which would amend the boundaries of the Flower Garden Banks National Marine Sanctuary to include Stetson Bank, 30 miles north-

west of the current boundaries. The measure should be considered by the U.S. Senate this fall.

As a sanctuary, Stetson Bank will enjoy the same protection as the Flower Gardens. There, federal laws restrict the anchoring or mooring of vessels longer than 100 feet within sanctuary boundaries and prohibit destructive fishing techniques, the use of explosives, dumping, dredging, or oil and gas exploration and production.

And as a sanctuary, Stetson Bank will continue to welcome divers who entertain gregarious manta rays. Every summer, I leave my hiking boots dockside and climb aboard the *M/V Fling* for a brief journey to underwater Texas for an encounter with aquatic wildlife. I look forward to saying hello to old friends, turning to a fresh page, and entering another unforgettable dive in my log book. ★

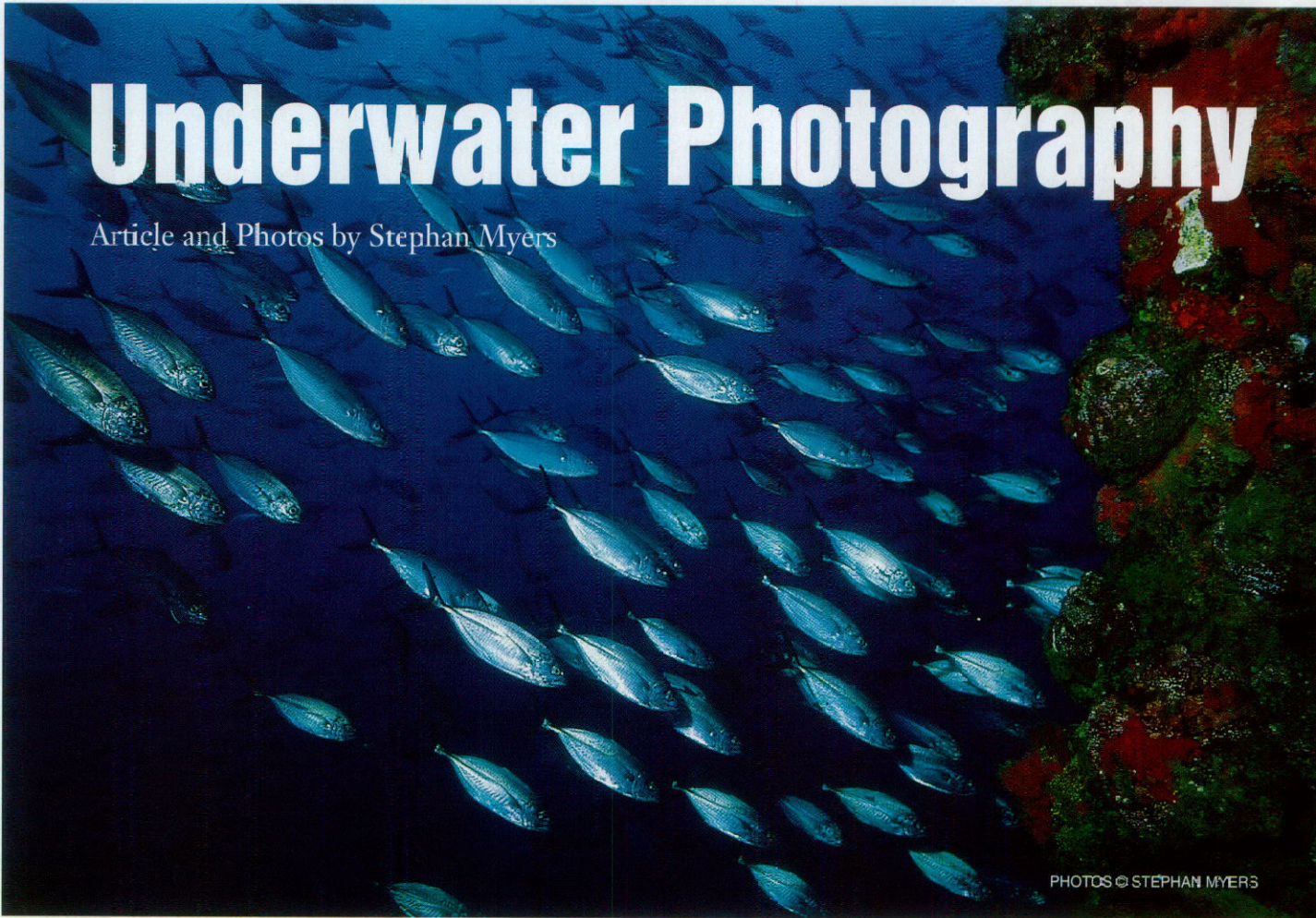
Elaine Acker is a Houston-based freelance writer and a veteran diver.



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Underwater Photography

Article and Photos by Stephan Myers



PHOTOS © STEPHAN MYERS

Most people agree that a good underwater image can be compelling, but few would argue they are easy to get. Yet, despite the expense and difficulties involved in mastering both scuba diving and underwater photography, more people each year are lured by the idea of capturing the undersea world on film. With careful study of the choices of equipment available and setting specific goals, you can obtain stunning images on your future diving trips. You should, of course, be certified as a scuba diver before attempting underwater photography.

The underwater realm is both beautiful and hazardous. The dangers to air-breathing creatures are obvious, but electronic cameras and strobes fare no better if they flood. Adding to the

problems of obtaining innerspace images is the fact that few topside photographic rules apply there. In fact, you may begin to feel you are learning how to take pictures all over again.

The first decision for a beginner is the type of camera to use. Your basic choices include one of the many water-resistant cameras usable to a depth of about 10 feet and selling for around \$15, or a more expensive, complex 35mm underwater system usable at greater depths. Besides being relatively inexpensive, the water-resistant types are usually "point and shoot," thus not requiring complicated exposure calculations that vary with depth. They also can be purchased at a variety of locations, in addition to camera specialty stores. When using these simple cam-

eras remember to get close to your subject (five feet or less), and *don't* exceed the recommended depth. Satisfactory snapshots can be obtained with these cameras, especially on sunny days.

With the sophisticated 35mm underwater "system" units, both price and equipment choices escalate greatly. A camera body, lens and underwater strobe capable of depths to 150 feet or greater can start at about \$750 and reach a wallet-busting \$6,000 or more. Most people, however, usually invest around \$1,500 to \$2,000 for a versatile setup capable of producing high-quality images.

The two 35mm setups used most commonly by advanced amateurs and pros are the Nikonos amphibious camera or a conventional topside camera

placed inside special plastic or metal housings. The Nikonos is smaller, but housed cameras are more versatile. Both have a number of lens choices. These systems are radically different, so thorough research is recommended before any purchase is made. It's also a good idea to talk to an experienced underwater photographer before making your decision. Sources for advice and equipment include professional camera stores and dive shops.

To overcome the excessive bluish cast created underwater and achieve vibrant colors in your photos, a waterproof strobe is a must. Most small units have narrow beam angles (width of area covered) and are fine for close-up work, but may not completely cover the field of a wide-angle lens. Since wide-angle photos of large scenes are popular, careful evaluation of your present and future needs will prevent the need to purchase more equipment later. As a general rule, it's better to buy a larger, wide-angle strobe

Close-ups of small subjects such as these one-inch featherduster worms, above right, are the easiest types of underwater photography. Since strobe light is the exclusive illumination and lens settings are fixed through test shooting, even a complex camera system becomes "point and shoot." Larger subjects, such as this school of foot-long jacks, above left, are trickier. Using a wide-angle lens, the photographer also must balance strobe light with the ambient light of background water. Below, photographing a jack knife fish at Stetson Bank.



with variable power settings to prevent too much light output for close-ups than to be underpowered or undercovered for wide-angle shots you'd like to try sometime in the future.

Lens choices usually are dictated by the subjects you are most interested in shooting. For underwater macro photography, close focusing lenses, diopters or extension tubes will do the job. Macro work usually is the easiest of all types of underwater shots to accomplish, once correct lens settings have been established by test photos.

Medium range work, distances of 1½ to three feet from the camera, involves photographing fish and other subjects occupying an area up to two feet by three feet. With the Nikonos camera, this range is adequately covered by the 35mm or 28mm lenses. For housed cameras, use a 50mm-60mm lens. Most good fish portraits are taken in this range. But of all underwater subjects, fish by far are the most difficult. If they feel annoyed or threatened, they simply may swim away. Sometimes they

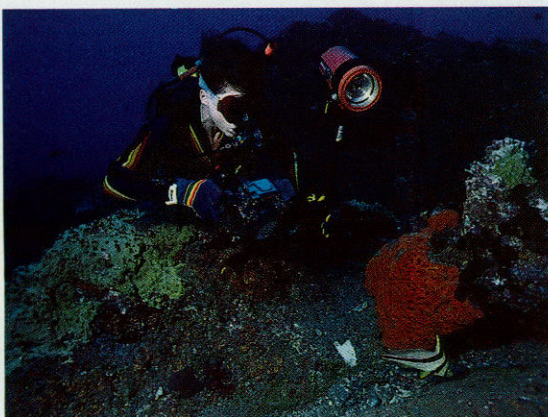
can be lured by food, but patience and a lot of practice will be necessary before mastering these moving targets.

Some of the most dramatic underwater images are captured by wide-angle optics, which allow the photographer to cover large subjects from a very close distance. The camera is moved farther away optically, but not literally. This allows the strobe to illuminate the scene brilliantly. Most scenics and diver photos are taken this way. Wide-angle lenses for the Nikonos system include 15mm and 20mm, while housed cameras utilize 15mm through 28mm. These lenses also are handy for that once-in-a-lifetime encounter with a 40-foot whale shark!

Finally, in the choice of film, high-speed films rarely are necessary for underwater images. Most photographers use ISO 50-200, with 50 and 100 being the most popular, in print or slide. Your surface film favorites probably will be fine underwater too.

Although underwater photo classes occasionally are available, the instruction generally is basic, and the instructors may have limited experience. Your best bet for specific information on equipment, lens ports (the viewing area the lens sees through) and techniques will be one of several excellent underwater photography books available in dive shops and some camera stores. No matter what system, lenses or film you choose, the most important strategy is to practice regularly in a pool or lake. This will help you become completely familiar with your equipment and learn its shortcomings. Also, remember that your underwater images will benefit greatly from topside composition and creativity. ★

Freelance photographer Stephan Myers of Corpus Christi has been taking underwater photos for 20 years.



Down on the Fish Farm

by Max Woodfin

It is an industry with the potential to feed the world, help alleviate the nation's trade deficit and provide a badly needed and lucrative diversity for Texas agriculture.

But it's also an industry that's viewed with skepticism by environmentalists and competitors because of pollution concerns and the potential release of harmful nonnative species into the Texas environment.

Aquaculture—fish farming if you will—has been at a crossroads in Texas for years. In a world desperate for new food sources, in a state seemingly eager to diversify its agricultural base, the proponents of aquaculture haven't yet figured out how to get over the twin obstacles of economics and potential environmental problems.

Aquaculture can be divided arbitrarily into three major branches. One is raising fish for commercial purposes. That includes raising fish to be made into feeds and other fish by-products, raising fish for bait, raising ornamental and tropical fish and raising fish to be sold for human consumption. A second branch is raising fish to supplement or restock the natural population of game fish. It's into this category that most of the energies of the Texas Parks and Wildlife Department fish hatcheries are directed. The third branch is raising fish such as hybrid grass carp and tilapia to be used for vegetation control.

As with any agricultural industry, suppliers play an important economic role. An aquaculture facility might need to purchase aeration systems, chemicals, hauling services, feed, plastic netting, processing and tanks, among other supplies.

Environmental Concerns

A large part of the problem in get-

AQUACULTURE MAY PROVE TO BE AN ECONOMIC POWERHOUSE IN TEXAS IF ITS PROMOTERS CAN CONVINCe CRITICS OF ITS ENVIRONMENTAL SAFETY.

ting this industry out of the niche market category and into mainstream agriculture is a nagging concern about the environmental impact of aquaculture.

"It's a reasonable industry," said Alan Allen, executive director of Sportsmen's Conservationists of Texas. "But we do have some environmental concerns."

Allen's attitude of basic support for the industry, tempered with questions of possible environmental problems, is typical of other environmentalists. There's no antagonism like that found between cotton farmers supporting increased chemical control for boll weevils and environmentalists pushing management and biological controls.

"Our major concerns are about the introduction of exotics into the Texas environment and the effects on water quality from their discharges," said Scott Royder, state conservation director of the Sierra Club. "We're not fighting the industry as long as it answers the environmental concerns up front."

The concern about the release of exotics is based as much on the experience of American agriculture with exotic plants as it is on the particular threats from aquaculture. Nonnative



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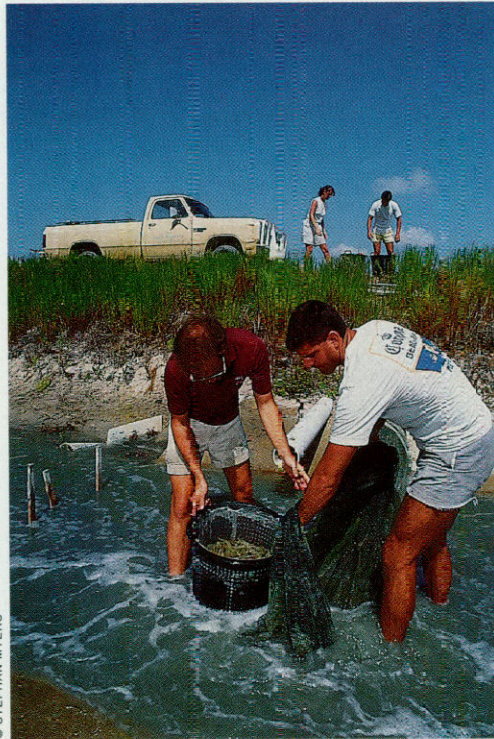
weeds cost American farmers up to \$5.4 billion a year in crop loss and up to \$2.3 billion in herbicide expenses annually, according to the congressional Office of Technology.

Allen, Royder and others want to be sure some renegade fish doesn't spawn crazily out of control, ruin the state's sport fishing industry and continue running amok in the environment. The fears have root in experiences with grass carp introduced to control vegetation in lakes but in one case wiped out all of the vegetation; the experiences of other states with such nonnative species as the zebra mussel that have fouled intake structures of power plants and several international incidents.

Norway's salmon farming industry, for instance, developed a black eye in the late 1980s and early 1990s when an estimated two million farmed salmon escaped—representing almost four times the annual wild salmon catch in Norway. Infections and diseases carried by the farm salmon led to the deaths of thousands of wild salmon.

State regulators in Texas have ordered the destruction of infected shrimp and disinfection of ponds in cases of diseases found among exotic species on Texas fish farms as precautions against accidental releases.

Tim Moore, past president and now director of governmental affairs for the Texas Aquaculture Association, said he prefers to use the term "hybrid" rather than exotic. "We are concerned about the potential for release, too," he said. "But keep in mind that there has been no self-sustaining agricultural oper-



© STEPHAN MYERS

ation that hasn't used hybrids. We must rely on those species that are faster growing and more disease-resistant. We have to have them to survive."

Moore said that although aquaculture regulation in Texas is relatively young and thus still developing, his industry thinks sufficient controls are in place to prevent some of the problems raised by critics.

The most pointed criticism of the aquaculture industry comes not from environmentalists and regulators but the competition. Deyaur Boudreaux, environmental director for the Texas Shrimp Association, said aquaculture does not live up to its obligations to be "stewards of the habitat."

"Whether you're a fisherman, a timber harvester or a trapper, you have to be stewards. We have to be advocates for the habitat and we have an extra role because our crop—shrimp—is the keystone species of the Gulf of Mexico. We're not only taking care of ourselves and the shrimp, we're taking care of the whole ecosystem," Boudreaux said.

To Boudreaux's general criticism, Moore responded, "If this industry is looked at properly by any environmentalist who doesn't have a self-serving interest, you find us to be a very green industry."

Texas A&M University has been doing research on shrimp farming for several years. Reproduction and growth rates of various species are studied to determine which are best for aquaculture.

Boudreaux insisted that she's taking a high road. She said that the \$8 million annual net worth of the shrimp farming industry (estimates range from Boudreaux's low of \$8 million to a Texas A&M University's high of \$17.3 million) poses little economic threat to a \$195 million annual shrimp take from the Gulf. But the practices of shrimp farmers, she said, do pose a long-term threat not only to the shrimp industry but other Gulf fisheries as well.

What, exactly, are the dangers of farming a nonnative species?

Dr. Larry McKinney and Dave Buzan of the Texas Parks and Wildlife Department's Resource Protection Division outlined two possible scenarios. One involved the release of an exotic species into the environment and a second would threaten the aquaculture industry rather than native species.

Under the first scenario, large numbers of an exotic species of shrimp escape from a South Texas fish farm during a storm. Because of the violent weather conditions, the shrimp are spread so far and wide that capture is impossible. Once in the new environment, under stresses that they were not subjected to in the fish farm operation, the exotic shrimp begin showing symptoms of a disease never seen in Gulf shrimp. Within an undetermined period of time, the Gulf shrimp population, having no natural resistance to the disease, is devastated.

Moore, citing a review of research literature by Granvil D. Treece, an aquaculture specialist at Texas A&M's Sea Grant College Program, countered that no case has been recorded in the United States of disease spreading from farmed shrimp to native wild shrimp.

In the second scenario, the fish farming industry finds an exotic species that performs extremely well, and most of

Government officials inspect water being discharged from the Hung Shrimp Farm in Arroyo City in the Lower Rio Grande Valley. The Hung and another shrimp farming operation discharge a total of 360 million gallons of water each day from their operations. The concrete structure holds screens designed to prevent the escape of exotic shrimp into the Arroyo Colorado.

the Texas shrimp growers are raising the species. But South Texas is hit with an unusually cold winter with several severe freezes. Native shrimp withstand the freezes, but the exotics don't, and the industry receives a setback similar to what freezes in the late 1980s did to the Texas citrus industry.

Boudreaux also charged that fish farms discharge high levels of suspended solids and low oxygen levels into downstream waters.

State regulators don't disagree. Buzan, for many years a water quality specialist at the former Texas Water Commission and now program leader for TPWD's "Kills and Spills Team," zeroes in on the issue of total suspended solids. "We see high quantities of total suspended solids, basically dirt, coming into the Arroyo Colorado (from fish farms). The resulting impact is destroying habitat and reducing water clarity.

"We're interested in recreational use of water as well as having environmental concerns. We hear comments that fishing has dropped off (as a result of discharges from shrimp farms), particularly speckled trout fishing," Buzan said.

Buzan also expressed concerns about excessive discharge of nutrients. "Shrimp farming is dependent on the ability to create a plankton bloom in the farm to support shrimp. Along with the feed, you can get excessive nutrients from aquaculture in general and shrimp farming in particular. Will we see toxic algae blooms in the environment? That's a concern."

Buzan said the status of shrimp farming is analogous to dairy farming in Erath County southwest of Ft. Worth. "We went from farming to factories," he said. When Erath and surrounding counties were populated by family dairy operations, any impacts on the environment went largely unnoticed. But when large corporations began operating huge dairies in a small area, both complaints and environmental damage went up.

He cited the example of two shrimp farms in the Lower Rio Grande Valley whose daily discharges of 360 million gallons of wastewater are almost 10 times



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the volume of all other discharges in the area.

"We've got situations that are no different from municipal wastewater treatment plants that don't treat their wastes," said McKinney, who is director of the TPWD Resource Protection Division.

Moore disagrees. "You don't find the heavy nutrient loading that comes from wastewater treatment plants," he said.

It's not a discharge problem, Moore said, but a public perception problem. "Our message is not well understood by the general public. Think about it objectively. It is an economic crisis for any fish farmer to downgrade his water supply. If you degrade that water so that it's not sustainable for you to farm, then you're going to have a whole lot less crop. The single largest contributor to the survival of our industry is water quality," Moore continued.

Moore termed it "absolutely self-defeating and ludicrous" for aquaculture to contribute to water quality problems.

While much of the concern about aquaculture is directed toward what comes out the downstream end of the farm, McKinney also is worried about the other end.

"The water in our estuaries is filled with larvae, phytoplankton and other nutrients," he said. "When a fish farm takes in this water without adequate screening, that's taking nutrients away

from the natural system. It's taking advantage of a public resource for private gains, with no return to the state."

McKinney said that's why Texas Parks and Wildlife has opposed all proposals to lease parts of bays to be fenced off for aquaculture.

The Economic Potential

"We have a policy in this country that always has been on the side of cheap food. That means aquaculture is pitted against wild catch, and as long as farm-raised fish are marketed against wild catch, we're at a competitive disadvantage. If we can't produce that unit of food at competitive cost, then the future of this industry is mixed," said Moore.

Aquaculture has been beset by bad press, always a rough hurdle for a new product or a growing industry to overcome. In fact, unless they happen to read an industry periodical or Texas A&M research papers, most Texans' exposure to aquaculture is probably limited to the Living Water Artesian

Shrimping in the Gulf of Mexico, above left, is a multi-million dollar industry. But dwindling natural stocks of shrimp have made aquaculture more attractive as a crop. Tom Holsworth, right, owns and operates a redfish hatchery near Palacios where he rears redfish for sale to restaurants. Below, water flows into the Taiwan Shrimp Village Association next to Hung Farms in Arroyo City.

Springs catfish farm fiasco. In that celebrated case, a fish farm fought to continue pumping some 33 million gallons of water daily out of the Edwards Aquifer. That's more water than nearby cities like San Marcos and New Braunfels consume each day. It wasn't a pretty sight at a time when the state, environmentalists, river authorities and agricultural interests were battling in federal court to see who would gain control over the ever more precious water in the aquifer—a key source of drinking and irrigation water for a large portion of South Texas.

The impressive economic potential of aquaculture isn't a staple of main-

stream publications. It isn't widely known, for instance, that the importation of fish is the single largest contributor to the national trade deficit among agricultural products—and second only to petroleum among all natural resources products.

Aquaculture also seems to be bucking the trend toward corporate agriculture. The Texas Department of Agriculture has licensed roughly 400 fish farms in the state. When that's divided into the high-end assessments of the industry's worth, about \$20 million per year, it's obvious that the equivalent of

the family farm is at least functioning in aquaculture.

"Every fish farm does three things," said Moore. "Every pound that's produced on a Texas farm reduces the trade deficit. Every farm produces jobs. And every farm helps develop rural America."

But the \$20 million-a-year Texas fishing industry obviously doesn't make much of a dent in a \$4.9 billion fisheries trade deficit.

The time seems ripe for aquaculture, just as it has for the last decade. The traditional American fishing industry is deeply troubled. In some traditional fishing areas, fish populations are collapsing from over-fishing. New England ground fish, including cod, haddock and flounder, have declined more than 50 percent since 1977. Overharvesting has cost the fishing industry some \$1 billion per year and thousands of jobs—jobs that are not being taken up by the emerging aquaculture industry.

Americans are eating more fish each year. On an average, we eat more than 16 pounds of fish annually, up from 12 pounds in 1970, a number that's expected to grow to 19 pounds by 2000. Thus the market is growing, some major fishing areas are being depleted and public health concerns are increasing about the purity of fish from the oceans and inland waterways.

So why can't aquaculture fill the void?

Texans lead the way in demand for fish, including aquaculture products. Texans eat 45 percent of all the catfish grown in the United States, but less than 2 percent of that amount is grown on Texas fish farms.

As with any industry, aquaculture needs start-up capital, and the money hasn't been there. In a 1990 report, Danny Klinefelter of the Texas A&M department of agricultural economics and two coauthors from the financial industry said that financing for aquaculture has been limited by "the lack of experience on the part of both lenders and producers."

Klinefelter wrote that in addition to lack of experience with aquaculture loans, lenders are wary of any developing industry, and lenders find it difficult to establish a value for growing products.

Moore agreed. "Traditional lenders don't have a comfort zone of traditional borrowers. They see aquaculture as a huge risk venture, sometimes requiring 30 to 40 percent equity on a loan."

The fundamental question remains—will aquaculture ever be a major force in Texas agriculture and a major supplier of food?

"We have no opposition to aquaculture," said TPWD's McKinney. "They need to operate in a way that does no harm, but I would sure like to see the success of this industry over some others I can think of."

McKinney's remarks seem to say it all. No one is against this fledgling Texas industry, but many people have reservations. No one can predict with any assurance if aquaculture will be able to overcome the myriad doubts about its economic stability and environmental impacts and reach the potential that for years has seemed to be just around the corner. ★

Max Woodfin is a writer and editor from Austin. He recently was appointed by Governor Ann Richards as the consumer representative on the Texas Agricultural Resources Protection Authority.



© STEPHAN MYERS



© DAVE BUZAN



© JOHN PESIAK

Raven 'bout Crows

No shy violets, this family of avian rowdies can eke out a living in just about any habitat.

Renowned for strong character and cunning, ravens and crows have aroused curiosity since their sonorous voices were first heard, centuries ago, cawing somewhere over the horizon. Today, an inquisitive observer with binoculars and a little time to investigate will find them to be all-black rainbows, as raucous as rowdy teenagers and as mysterious as midnight.

Ravens and crows have much in common. Both are members of the Corvididae family, along with jays and magpies. Both occur in open land, often foraging on the ground. And they are not particular about food. Anything edible will do: road-kills, grasshoppers or bread crumbs.

Unlike many birds, both sexes look alike, although the male can be slightly larger. Ravens and crows are gregarious and have complex social relationships.

So much for the similarities. Talk about differences between the two and things get as tangled as a crow's nest, especially

in Texas. Here, when you're wondering about the big, black, crowlike bird on the fence post, you have the possibility of five, not two, species: the American crow, fish crow, and Mexican crow, the common raven and Chihuahuan raven.

Each of these legend-spawners dwells in Texas, and it takes persistence, practice and some traveling to identify them all. The first step is to look at a map. Where you're standing might, in many cases, give you the answer.

The only place in the United States where you'll spot the Mexican crow is near Brownsville, where they are common at the municipal dump. Many birdwatchers, eager to add this Mexican bird to their lists, visit this dump. (The joke there is "Now let's leave this place as neat as we found it, for others to enjoy...") The Mexican crow is the smallest (14.5 inches from beak tip to tail tip) and glossiest of all North American crows. The upper part of the body shines

metallic violet, and the chest and flanks reflect greenish-blue. At the dump it appears smaller than the more numerous Chihuahuan ravens and shorter than the abundant great-tailed grackle, which is a member of the Icteridae family. Crows and ravens often are distinguished by their calls, and the Mexican crow's froglike *gar-lic* and *owwk* are easily distinguished from other crows' calls.

The mid-size crow of Texas (15.5 inches) is the fish crow. This is another crow where geography helps in identification. In Texas, it inhabits the coast from Galveston Bay to the Louisiana border. Its range extends several miles up large rivers such as the Sabine, Neches and Trinity.

Voice is the best way to tell fish crows from others, because the fish crow appears almost identical to the more abundant American crow. Listen for an explosive, nasal *bah!* or *car!* The fish crow feeds on dead animal life that floats to the gulf shore and also steals eggs and young from the rookeries of herons and other water birds.

The most common, and the largest, crow in Texas is the American crow (17.5 inches), found inland of the gulf and in the eastern half of Texas. On first glance the birds appear all black, but look more closely and you'll see a glossy iridescence. The American crow has a variety of calls but its loud, ringing *caab* is distinctive. This resourceful bird flourishes in forested and agricultural areas. It has been said that if humans wore wings and feathers, very few would be clever enough to be a crow.

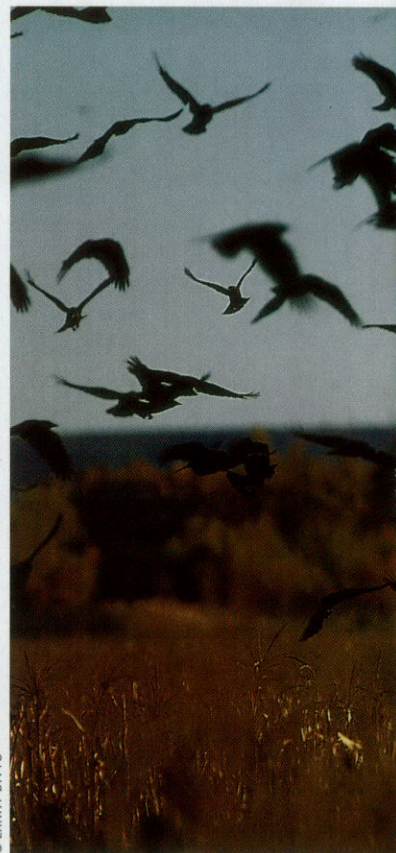
The range of the American crow overlaps in places with the fish crow and both species of ravens. The Chihuahuan raven feeds at the Brownsville dump with Mexican crows. And the ranges of the two raven species

overlap one another. So geography is only a partial guide to identification. One also must be aware of habitat preference, voice and physical characteristics of the birds.

Measuring about 24 inches from bill-tip to tail-tip, the common raven towers over any species of crow, and usually weighs about four times as much as the American crow. Unlike crows, common ravens have not adjusted well to civilization and have retreated to the wilder, untamed portions of former ranges.

While observing the birds in flight, look for these distinctions. Ravens have fan-shaped, or rounded, tails. Crows' tails are square. Ravens soar and glide like

Ravens, left and right, and crows, below, are similar in appearance and behavior. To identify them you need to listen to their call, observe them in flight, and know where in the state each species is likely to occur.



© LARRY DITTO



© ROB CURTIS

hawks, on flat wings. Crows' wings bend upward in a slight U. Ravens have pointed wings, compared with the relatively blunt and splayed wings of the crows.

In Texas, the common raven resides in the Trans-Pecos (ranging east to San Antonio) and in the far western sliver of the Panhandle. This great bird of dark myth and lore claims the

mountains and canyons for its home and nests on precipitous cliffs.

Texas's other raven is the Chihuahuan raven. While the common raven ranges across much of Europe and North America, the Chihuahuan occurs only in the hot southwestern deserts and Mexico. For habitat, the Chihuahuan raven appropriates the mesquite flats and yucca deserts of West Texas.

Known for its hidden white neck feathers, the Chihuahuan was formerly named the "white-necked raven." This field mark is hard to see, however, unless the wind ruffles its plumage. The Chihuahuan is smaller than the common raven, but still larger than any of the crows. To tell this raven from the common, look for the smaller size and listen for a low, drawn-out croak, slightly higher-pitched than the common raven's.

In "A Field Guide to the Birds of Texas," Roger Tory Peterson claims that in south and west Texas, Chihuahuan ravens are almost always wrongly called "crows." Although the range of the American crow overlaps this raven's on the Texas east/west mid-line, the crow prefers less arid, often riparian, habitats.

To differentiate Chihuahuan and common ravens from crows, remember to look for the raven's fan-shaped tail. If you spot one up close, look also for a heavier bill and throat feathers that are elongated and pointed, shaggy-looking instead of smooth. When a raven takes off to fly, it hops two or three times in the air; when a crow flies it jumps directly upwards.

To observe the crows and ravens of Texas, one might have to travel the state: the rural, the wild, the coastal areas and, at least once, to Brownsville's sanitary landfill.

To know those that live where

you take your evening walks, check out the range maps in your bird field guide, look closely at the big birds and listen to their voice. You never(more) know what you might hear.

by *Kristi G. Streiffert*

Don't Release Mud Minnows Into Fresh Water

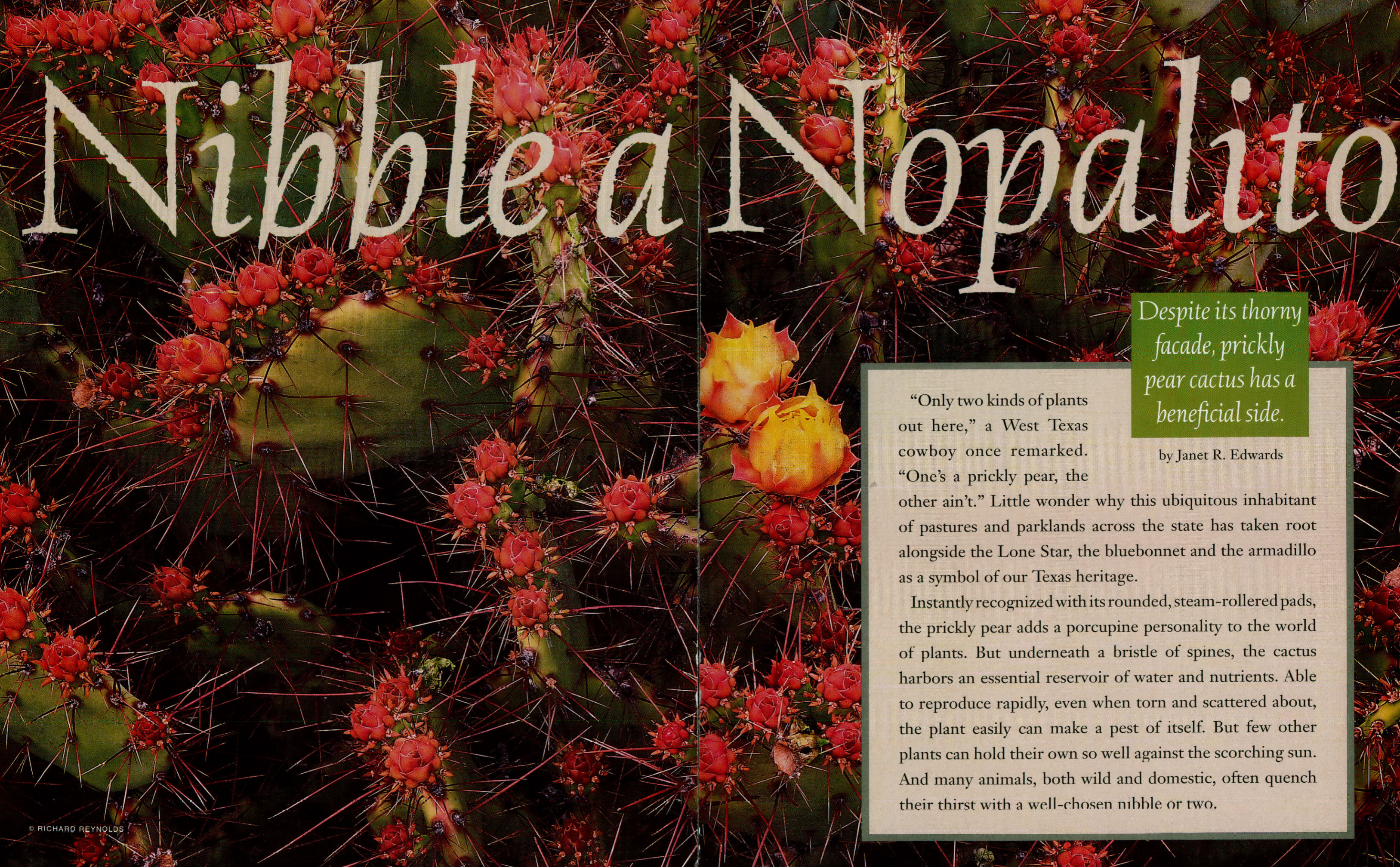
Nonnative fish introduced into new waters, whether intentionally or accidentally, often have caused problems. Good examples are the European carp and the African tilapia family of fishes.

Biologists now warn that it also can be harmful to take a saltwater fish out of its normal Texas habitat and release it into a freshwater lake or stream. TPWD biologist Galen Jons of Mathis said saltwater mud minnows, members of the killifish family, have turned up at bait houses in South Texas, and freshwater anglers may be using them for bait. "These fish are extremely tolerant of salinity changes, and this makes them more likely to survive and reproduce in freshwater areas," he said.

Some killifish species have been documented as being able to reproduce in fresh water, Jons said. It is not illegal to use mud minnows for bait, but Jons urges anglers not to use live ones as bait in fresh waters.

In West Texas, sheepshead minnows from the coast have been introduced into several areas. The fish hybridized with three species of native pupfish, almost causing the extinction of two species and threatening the other. Jons said Gulf killifish and sheepshead minnows both are abundant in much of the Pecos River drainage and in the Upper Colorado River basin.





Nibble a Nopalito

Despite its thorny facade, prickly pear cactus has a beneficial side.

by Janet R. Edwards

“Only two kinds of plants out here,” a West Texas cowboy once remarked.

“One’s a prickly pear, the other ain’t.” Little wonder why this ubiquitous inhabitant of pastures and parklands across the state has taken root alongside the Lone Star, the bluebonnet and the armadillo as a symbol of our Texas heritage.

Instantly recognized with its rounded, steam-rollered pads, the prickly pear adds a porcupine personality to the world of plants. But underneath a bristle of spines, the cactus harbors an essential reservoir of water and nutrients. Able to reproduce rapidly, even when torn and scattered about, the plant easily can make a pest of itself. But few other plants can hold their own so well against the scorching sun. And many animals, both wild and domestic, often quench their thirst with a well-chosen nibble or two.

Native only to the Western Hemisphere, between 160 to 250 species of prickly pear (which belong to the genus *Opuntia*) are found from the prairies of Canada to the shores of the Caribbean. Able to adapt to a variety of environmental conditions, prickly pears have been introduced into most of the tropical and temperate regions of the world. But when it comes to accurate identification, even the most experienced botanists wring their hands. For one thing, prickly pear hybridizes easily between species to create intermediate forms with mixed traits. On top of that, a given species may look hale and hearty in good soils with adequate moisture, but dwarfed and spindly in rocky, arid habitats.

Before conversion of native grassland prairies across the western U.S. to farming and ranching, natural fires kept the growth of larger plants in check. Since that time, the prickly pear, mesquite and a host of other thorny, brushy plants have slowly taken over. Perfectly suited to a dry, hot climate, the prickly pear is one of the most prolific plants seen today in arid or semi-arid regions of our state. Known as nopal in Mexico, prickly pear ranges in size from towering trees to sprawling shrubs and may be silvery gray, pale green or purple in color. In spring, its delicate flowers paint the desert landscape with brilliant dots of orange, yellow, red, rose or magenta. Its succulent fruit, known as tunas, helped save the lives of explorer Alvar Nuñez Cabeza de Vaca and

three companions during the early 1500s, after a narrow escape from Indian enslavement in arid regions of what became South Texas.

Like all types of cactus, the prickly pear is a succulent plant, with special adaptations for capturing and keeping large quantities of water. Although shaped somewhat like a leaf, the pear's oval pads (called joints) actually are enlarged stems. In some species, such as common chollas, the stems appear as cylinders or links of sausage rather than flattened pads. Filled with flexible storage cells, the stem can absorb enormous quantities of water through a large network of shallow roots.

Usually narrow at the base, prickly pear stems are peppered with numerous button-like structures called are-

oles. Accented with tufts of tiny, barbed bristles called glochids, the areoles also bear the larger spines. Along the stem's narrow, upturned edge, areoles produce new joints, flowers and fruit from March through June.

Like most cacti, the prickly pear essentially is leafless. However, small, pointed, succulent leaves do appear on new prickly pear joints just beneath the areoles in the spring, only to disappear within a few months. The stems then must carry on the process of making food, a task made easier by a thick coating of wax that helps reduce water loss from their relatively large surface area. The stems have fewer pores (called stomates) than most plants for exchange



© RUSTY YATES



© RICHARD REYNOLDS

of essential gases. But this cactus has taken even further precautions, opening its stomates only at night when cooler temperatures reduce the rate of evaporation.

Treacherous spines can reach lengths of four inches or more. Even if a hungry scavenger manages to nip off or chew away the needle-sharp thorns, thousands of infuriating glochids wait to penetrate flesh. Breaking off into the skin at the slightest touch, the glochids sometimes cause a rash or severe infection if left



© WYMAN MEINZER

The prickly bear's colorful tunas, above, are used to make fruit drinks, jellies and candy, and also are eaten raw. Prickly pear pads provide food for many wildlife species, including the javelina, left. This hardy and drought-tolerant plant can grow just about anywhere, including between two granite rocks at Inks Lake State Park in the Hill Country, opposite page.



© PAUL MONTGOMERY

embedded. Human harvesters know to use a sharp knife, a good-sized pair of tongs and leather gloves to remove any part of the plant.

But for a wild or domesticated animal, an empty stomach is a worse fear than a mouthful of prickles.

“In all the years I’ve conducted studies on white-tailed deer, I’ve never examined a rumen (stomach contents) collected west of U.S. Highway 281 that did not have prickly pear remnants in it,” said Dr. Lynn Drawe, range ecologist and assistant director of the Rob and Bessie Welder Wildlife Foundation near Sinton. “The prickly pear is extremely valuable as an emergency feed for cattle, javelina, rodents, rabbits, and who knows how many species of birds. It is one of the most drought-tolerant plants in South Texas and grows just about everywhere. Don’t overlook the fact that it also provides some cover from predators and shade from the sun. During a drought, it actually may be the only source of water for miles around.”

For those with prickly pear on their

Prickly pear ranges in size from tall trees to sprawling shrubs, and can be silvery gray, pale green or purple in color. The purple prickly pear above was photographed in Big Bend National Park. Yellow prickly pear blossoms add their color to a field of springtime wildflowers in Rennels County, right. Button-like structures called areoles contain tufts of tiny, barbed bristles as well as larger spines, below.



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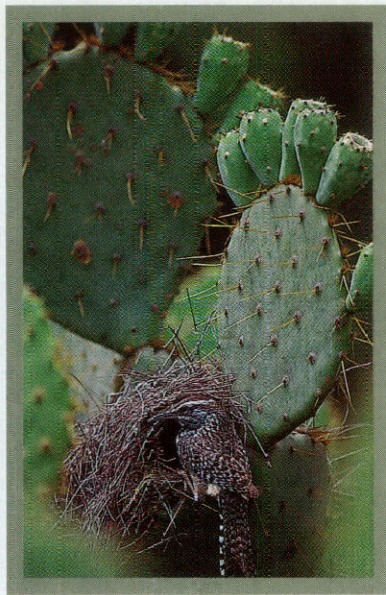
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Bees and other insect pollinators visit the colorful flowers, above, which bloom only briefly. Prickly pear is a fairly regular food item for white-tailed deer, left, and during a drought may be the only source of water for miles around.



© DARYL R. STYBLO

property, attitudes toward the plant are as fickle as the weather. During times of plentiful rain, it becomes a noxious weed, taking up valuable pasture space and moisture. But when the grass dries up and hay is scarce (during summer and mid-winter), the prickly pear begins to look a lot more palatable to both cattle and their caretakers.

"I've seen cows eat it raw," said Bill Bayfield, a rancher with 13,000 pear-covered acres near Hebbronville. "But they spend a lot of time chewing the thorns off and wallowing it around in their mouths. Sometimes their tongues and mouths swell up so much they can't eat at all. But when the weather gets real dry, I pick cut several plants about three to four feet in diameter and shoot a flame straight down in the middle with a propane burner. But you don't want 'em black. We burn just long enough to scorch off the thorns."

For centuries, the prickly pear has been a dietary staple for Native American and Mexican American people.

Recently, cactus pads have become a popular fad food in the U.S., served coast to coast in upscale restaurants and food markets. Before the spines emerge, the young pads (called nopalitos) are tender and green, with a taste similar to bell pepper or a tart green bean. Suitable for use in salads, casseroles and soups, nopalitos also can be cut into strips, coated with cornmeal and fried. Some prefer to boil them like okra and stir into scrambled eggs.

But the colorful tunas by far are the most popular and tasty treat the prickly pear has to offer. Low in calories and sodium, tunas (actually berries) are high in vitamin C, calcium and phosphorus. Delicious eaten raw, the tunas also make excellent fruit drinks, jellies and candy. The brief blooming flowers, which attract a host of insect pollinators including bees, are quite edible, as are the seeds.

"We're trying to develop strains of prickly pear ideally suited for three purposes: cattle feed, fruit and nopalitos," said Dr. Peter Felker, project leader of the Center for Semi-Arid Forest Resources at Texas A&M University in Kingsville. "We also are directly involved with the Texas Prickly Pear Council in marketing, education and research."

Early desert dwellers discovered other uses for the prickly pear as well. Cut open, the pads made a soothing poultice for scrapes and bruises. Dried in the sun, they served as a purse or pouch. Planted close together, the cac-

tus built a living fence. But the most valuable product came not from the plant, but from the cochineal, a tiny insect that feeds upon its roots and pads. A member of the genus *Dactylopius*, the cochineal's body contains a brilliant red fluid that makes a colorfast red dye. Highly prized by the textile and leather industries of Europe and North Africa after its introduction in Spain during the 1520s, cochineal dye rivaled gold and silver as the most valuable export from the Spanish colonies. Although still used in traditional Indian weaving and certain cosmetics, foods and medicines, the cochineal since has given way



PEAR CONVENTION

The Texas Prickly Pear Council Convention and Fiesta will be held August 12-14, 1994 at the J.K. Northway Center in Kingsville. This event will feature international chefs competing in a prickly pear cookoff for \$1,000 in prizes. There also will be educational displays and other entertainment. Contact Dr. Peter Felker, 512-595-4531 or Robert Mick, 512-877-6469.

to less expensive, synthetic dyes.

Should we think of the prickly pear as a pest or a prize? Although the answer depends on your point of view, a traditional Mexican saying, *Al nopal vienen solo cuando tiene tunas* (loosely translated, “the cactus gets visitors only when it bears fruit”), appears to be less true these days. As people watch it flourish beneath the parching heat of the Texas sun, this prickly plant is starting to get a lot more attention. ★

Corpus Christi freelance writer Janet Edwards is a frequent contributor to the magazine.



© BOB PARVIN



© RICHARD REYNOLDS



© STEPHEN MYERS

The cactus wren builds its nest among the prickly joints of a cactus, opposite page, or in the leaves of a yucca. Ranchers sometimes use a torch to burn off the prickly pear's spines, above, which makes the plant more palatable to livestock. Thickets of prickly pear cactus, top, provide shade and protection from predators for many small wildlife species.

Hot Links

Whether you prefer to hit a golf ball or enjoy a legendary hot sausage, Lockhart State Park and historic Lockhart have the fixin's for a satisfying visit.



GLEN MILLS

The park's 3,000-yard par 35 golf course is open to the public, and annual memberships are available.

Fore! A round of golf and a nature hike go hand-in-hand at Lockhart State Park. The picturesque nine-hole course offers lush fairways and close-cropped greens surrounded by wooded galleries filled with a variety of wildlife. A bubbling creek crosses the sloping terrain and slips softly under a canopy of post oaks and pecan trees.

Situated on 263 acres of rolling hills in Lockhart, the park is located approximately 30 miles south of Austin and regularly attracts

visitors from metropolitan areas who are eager to trade freeways for fairways. "It's quiet and semi-remote," said Mike Masur, park superintendent. "But it's convenient to both Austin and San Antonio." Other visitors enjoy swimming, camping and a taste of small town life.

Although golf courses are located adjacent to several other state parks, Lockhart's course is the only state-run facility. The 3,000-yard par 35 is open to the public, and annual memberships are available. "We have approximately 200 annual members, many from as far away as San Antonio," said Masur. "Our annual green fees are \$125 for individuals or \$175 for families, so it's very affordable." For non-members, the green fees are \$7 on weekdays and \$8 on weekends. Golf carts are available at the park headquarters. Golfers play on a first-come, first-served basis, with no tee-times required.

The golf course, along with

Kreuz Market in downtown Lockhart has been serving barbecued beef and sausage for 94 years.

most of the improvements on site today, were projects completed by the Civilian Conservation Corps (CCC). Organized after Franklin D. Roosevelt's inauguration as President in March 1933, the CCC provided jobs and family income during the Depression years. Only three months after its organization, the CCC employed more than 274,000 men nationwide. Recruits were enrolled for six-month periods and were paid \$30 per month. At least \$25 of each month's pay was sent directly to the recruit's family back home.

The land for Lockhart State Park was acquired in 1934, and crews worked from 1935 to 1938, constructing the golf course and the trademark native stone buildings found throughout the park. Lockhart State Park is one of 31 parks that inspired hope during a difficult era.

A wide variety of wildlife lingers in the wooded fringes of the course. "Golfers and hikers can expect to see deer, armadillos, squirrels and turkeys," said Howard Jones, park ranger. "We have a creek for fishing, camping, a recreational area with swings, and a swimming pool, which is open from Memorial Day weekend through Labor Day." The pool is operated seven days a week, from noon to 8 p.m., and a lifeguard is on duty. Admission is \$2 for adults and \$1 for children.

Visitors who explore the town of Lockhart, north of the park, will discover blue-ribbon barbecue, turn-of-the-century architecture and an array of shops surrounding the courthouse square.

At Kreuz Market (pronounced "Krites"), open fires burn at either end of the red brick barbecue pits—

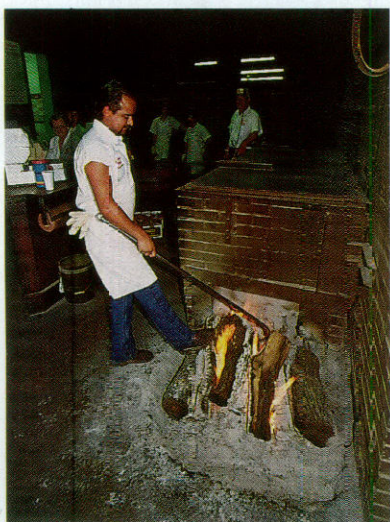
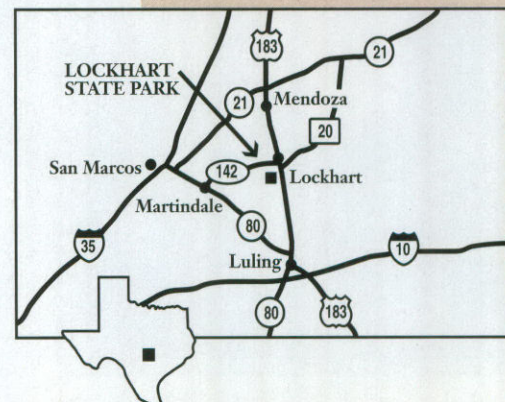
pleasant in the winter and stifling in the summer. But customers line up outside the door year around, anticipating the flavor of some of Texas's best beef and sausage. The meat is served on brown butcher paper, along with either white bread or saltine crackers. Do not ask for barbecue sauce.

"My father had a saying, 'It's not what you put on the meat, it's what you leave off,'" said Rick Schmidt, who owns Kreuz Market with his brother Don. Kreuz uses basic seasonings and smoke to flavor their meats, and most customers agree that meat this good does not need sauce. "Side orders" consist of tomatoes, pickles, onions or avocados. "This place was here before beans, coleslaw and potato salad," explained Schmidt. "Kreuz was originally a meat market and the barbecue was a way to keep from losing the meat to spoilage."

On January 19, Kreuz Market celebrated its 94th anniversary. The current building was built in 1924, and little has changed. The fir tables and benches are smoked to a deep mahogany color, and butcher knives are still

LOCKHART STATE PARK

Lockhart State Park is located southwest of Lockhart on FM 20, two miles west of U.S. Highway 183, 30 miles south of Austin. Park facilities include camping, picnic areas, swimming pool and golf course. Tent campers can enjoy creekside sites, and



GLEN MILLS



The Caldwell County courthouse is one of Lockhart's most impressive historical buildings.

chained to some of the tables. Before the advent of plastic cutlery, the butcher knives were the only utensils in the restaurant. An autographed picture of country singer George Strait hangs on the wall as a testimony to the Kreuz tradition. His message reads, "For Kreuz Market, the best BBQ in the world (including Texas)."

On Saturdays, the Schmidts serve up to 2,000 people who agree with Strait. "People brag on us, and I'm always afraid they'll expect too much," said Schmidt. "We're not fancy, but if you like good food and cold beer, you've come to the right place."

But Kreuz Market is not the only barbecue restaurant in town. Black's Barbecue has served Lockhart since the 1930s, and

trailer campsites are situated adjacent to the golf course. Daily entrance fee is \$3 per vehicle. Fishing is permitted in the spring-fed creek. No fishing is allowed in the fairways, and no trotlines or throwlines are permitted.

For information, write Rt. 3, Box 69, Lockhart, Texas 78644, or call 512-398-3479. For reservations, call 512-389-8900.

For maps and local information, contact the Lockhart Chamber of Commerce, 205 S. Main Street, P.O. Box 840, Lockhart, Texas 78644; 512-398-2818.

Chisholm Trail Barbecue offers a varied menu of daily specials such as fried catfish, fajitas or chicken fried steak. Local residents are reluctant to endorse a favorite, and love them all the way parents love their children—equally, yet differently. But with some coaxing they will confide their personal preferences.

"Black's has a basic menu but also has side orders," said one anonymous resident. "One of the best things on Black's menu is the pork loin. You'll find more local residents at Chisholm Trail, though. Everybody agrees that barbecue is great, but it's nice to have alternatives. And, of course, most of the tourists visit Kreuz because of its history."

"History needs to be preserved," said Rebecca Hawener, Caldwell County's first female county judge. "Lockhart is one of the few remaining examples of the town square form of architecture. In small towns today, the way of striving to stay alive is to preserve a way of life and make the town viable." The county courthouse is one of Lockhart's most impressive historical buildings. The green roofs and sandstone towers, visible from U.S. Highway 183, rise above the trees like a castle.

More than 25 historical buildings are located within a two-mile radius of the courthouse. Using maps and brochures available from the chamber of commerce, visitors can drive the town's shaded streets and view registered historic landmarks and private, Victorian-style homes. Built in

1899, the Eugene Clark Library is recognized as one of the most unusual libraries in the country. The building was modeled after the famed Villa Rotunda in Vicenza, Italy, and features stained glass, a pressed tin ceiling and ornate fixtures. The old county jail, built in 1908, now houses the Caldwell County Museum. The museum is open March through October, Wednesday through Saturday from 1-5 p.m. The Episcopal Church, built in 1856, is the oldest known protestant church still active in the state. History also can be found in a number of antique shops located near the town square.

Whether walking along the sidewalks of the courthouse square, or beneath the oaks and elms shading Plum Creek, visitors enjoy a small-town weekend of family fun. And, Masur noted, more and more golfers are discovering this quiet Central Texas hideaway. "A lot of people won't tell others about this park," said Masur. "They like to keep it a secret."

by Elaine Acker

Department Expands Park Reservation Hours

The new automated state park facility reservation system has been expanded to allow prospective park visitors to reserve campsites by calling in the evening during weekdays. The central number, 512-389-8900, is open Monday through Friday between 8 a.m. and 8 p.m. Reservations no longer can be made by calling the park directly. Indian Lodge, the Texas State Railroad and Lake Lewisville State Park are excluded from the reservation system.

Longhorn Roundup Set For Big Bend Ranch

The six-year management plan recently approved by the Texas Parks and Wildlife Commission for Big Bend Ranch State Natural Area calls for significant expansion of day and overnight use of the area and relocation of some 150 Texas longhorn cattle to other state parks.

Expanded access is expected this fall. Eventually as many as 250 campers per night will be allowed entry from interior roads and up to 400 people per night will be allowed to enter via the Rio Grande corridor.

The longhorns will be transported to LBJ and Fort Griffin State Parks, where herds already are being maintained. Officials said removal of cattle and exotic aoudad sheep and ibex are part of an effort to restore habitat damage caused by cattle ranching operations during the past century.

Project Manager Jim Carrico said details of considerations such as public hunts, wildlife research programs, volunteer projects, restoration of facilities and reintroduction of desert bighorn sheep will be dealt with in the near future. The objective, Carrico said, is to "make it accessible for controlled public recreation and scientific study without degrading its resources and primitive character."

Telephone Number Corrections

Two telephone numbers listed in our July issue were incorrect. The correct number for Indian Lodge is 915-426-3254. The correct number for Guadalupe Mountains National Park is 915-828-3251. We regret the errors.

Burning Question

by Heather Millar

Across Texas, you hear the fire ant stories: farmers tell of newborn calves blinded and sometimes killed. Wildlife managers say the insects swarm over deer fawns who try to lick them off, only to be stung even inside the stomach, where autopsies have found fire ants in the hundreds. Birders have discovered fire ants climbing into nests to eat bluebird hatchlings. Small animal researchers say they must treat their live traps with insecticide or find their subjects stripped to the bone by the voracious hordes.

Are the fire ants exterminating other forms of wildlife? Listening to the anecdotes, it's easy to get the idea that fire ants are an insect juggernaut killing everything young, slow or defenseless in their path. Anyone who's suffered a fire ant's burning sting, and lived with the blisters for as long as a week afterward, would find little reason to doubt that fire ants are a scourge upon the land. What's been missing, however, is hard scientific evidence to back up the hunch that something major is going on.

"Fire ants are causing a major revolution in the structure of natural communities. It's puzzling that it's been proceeding unnoticed under our very noses," said Dr. Sanford D. Porter, a fire ant specialist for the United States Department of Agriculture. "We still don't know nearly enough about what's happening here."

Slowly, however, evidence is mount-



© STEPHAN MYERS

ing that fire ants do affect wildlife. In 15 Texas counties, a study funded partly by the Texas Parks and Wildlife Department found that after the invasion of fire ants, the population of bobwhite quail dropped by 50 percent. "We were floored by these results," said Scott Lutz, a study participant and an assistant professor of wildlife management at Texas Tech University. "Other states haven't seen the dramatic reduction in wildlife that we have seen in Texas. We wonder if it's because we have more multiple-queen mounds here."

Scientists aren't sure if the insidious "multiple queen" or "polygyne" fire ant

Fire ant mounds, right, appear rapidly in spring and fall after rainy periods. The imported fire ant, above, is believed to have arrived in the U.S. on produce ships from South America. Biologists believe that fire ants are driving out other species, but they don't yet have the data to prove it.

is a different species or subspecies of the "single queen" ant. But they do know that multiple-queen mounds are more destructive and harder to kill. This form is central to the efforts of several researchers who now are attempting broad, ambitious studies of how fire ants affect the ecosystem.

The discovery of multiple queen colonies makes us wonder: could the fire ant invasion be even worse than we thought?

Most of Texas also has, or had, two types of native fire ants—native in the sense that they arrived from Latin America 500 years ago. They too are stinging ants, but their behavior is less aggressive and their bite milder than that of their recently arrived cousins, *Solenopsis invicta*, the aptly named “invincible ant.”

Invicta is a dark reddish-brown crea-

ture native to western Brazil and parts of Paraguay and Argentina. It first was found near southern port cities around 1918. For this reason, it’s commonly believed that this ant, also called the “imported fire ant,” smuggled itself into this country aboard produce ships from South America. No one knows for sure. But everyone recognizes that *Invicta* has thrived on foreign soil. It has no known

natural enemies in North America and its mounds have advanced steadily until they now cover 11 states, including 60 million acres in Texas.

The immigrant ant’s weapon of choice is a fiercely burning venom, an oily alkaloid mixed with a little protein. Once aroused to attack, the insect steadies itself by gripping the victim’s skin with jaw-like pincers called



mandibles. Then it injects venom into the victim with its stinger. Unlike bees, which eviscerate themselves when they sting, fire ants can sting again and again without harming themselves. They also can drag their “sting” along the ground, leaving a chemical trail to guide other ants to the hapless victim.

Fire ant attacks usually paralyze other insects. The ants then can consume them at their leisure. Larger animals usually feel a prickling sensation, followed by intense burning and blistering of the skin. Enough bites can lead to a toxic reaction in small children and animals. For those allergic to it, the venom’s protein can cause flu-like aches and fever, even anaphylactic shock and death.

For many decades, entomologists believed that colonies of these fiery insects had only a single queen. Like bees, the worker fire ants executed any pretenders to the throne. Accordingly, pesticides, marketed under various names, targeted the queens. They sought either to stop reproduction or to get the foraging ants to share tainted bait with the rest of the mound, especially the egg-laying queen. After a delay of a day or two, the toxin would kick into action, eviscerating all the ants that had eaten it. With any luck, the queen would be disemboweled too; and the mound would die.

Then in 1973, a USDA researcher was digging up some fire ant nests near Hurley, Mississippi, and came across a phenomenon never before reported. Instead of one queen, the researcher found “20 or 30 big fat girls that looked like queens.” Even more surprising, the worker ants weren’t executing the competing queens. Instead, the worker ants surrounded all the queens to protect them. The USDA dubbed the find “queen city.”

At first the reaction in the academic world was disbelief. Yet reports of multiple queen colonies soon began to come in from Georgia and Florida, and then from Louisiana and Texas. Researchers called the new form “poly-

gyne.” These renegade fire ant colonies seemed to be a new and improved form, with queens in the dozens, even hundreds. Fire ant populations swelled with the output of so many more egg-laying monarchs. Multiple-queen mounds could mean 10 times more fire ants, enough to overwhelm most other species in an area. Perhaps thinking wishfully, most researchers theorized that multiple-queen mounds made up only a small fraction of the total number of fire ant mounds.

In 1991, they found out they were wrong. Taking a census of fire ants in Texas, researchers found the ants had taken hold in most of the eastern part of the state. Even more surprising, they discovered that the majority of mounds housed multiple queens, and that there were twice as many mounds in the multiple-queen areas. Once they had thought that fire ants could at least be controlled. Now that didn’t seem so clear. The researchers concluded that the fire ant problem in Texas is much worse than previously thought.

Asked if fire ants are wiping out other creatures, Mark Trostle used a field near Austin as an example. The Texas

Department of Agriculture researcher said that 10 years ago there were only two or three fire ant mounds in that field. There were more than 30 species of other ants. Then the multiple queen fire ants moved in, he says, exasperation evident in his voice. Now there are so many fire ant mounds, a person could cross the field just by jumping from mound to mound.

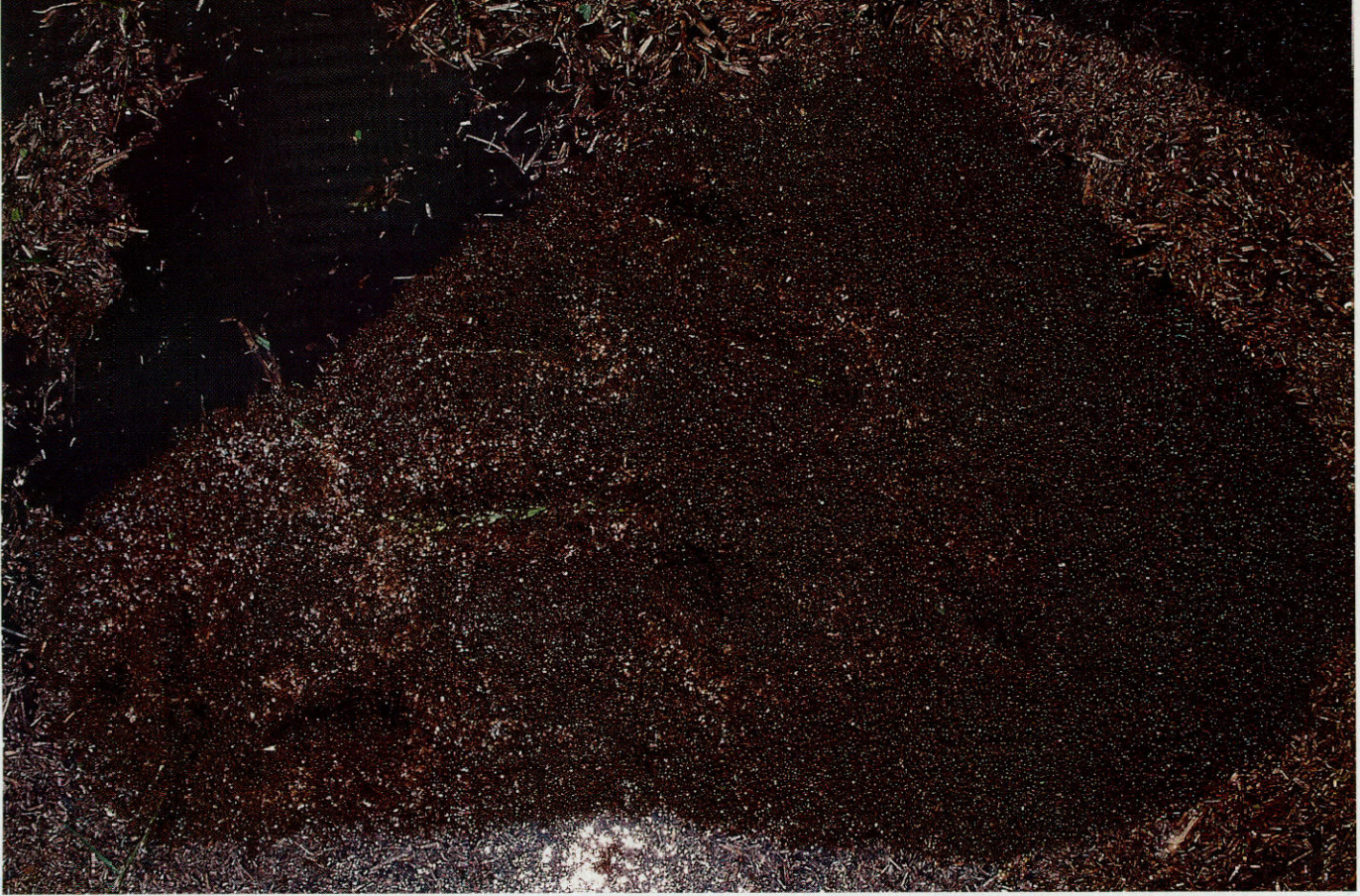
“It’s unsightly, all those mounds. The multi-queen fire ants are impacting immensely,” Trostle said. “I have no doubt that they’re driving out lizards, mice, snakes and whatever else gets in their way.”

Researchers have begun asking some disturbing questions: What if the ants with many queens were a new species or a hybrid, the result of some environmental disturbance? What if the pesticides people were using killed more single-queen colonies than those with multiple queens? Might we be creating more territory for a more deadly ant? Texas A&M Professor S. Bradleigh Vinson and many others started trying to find out.

Les Greenberg, one of Vinson’s graduate students, has spent almost a



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Biologists are finding white-tailed deer fawns that have been stung repeatedly by fire ants, left. The ants apparently are attracted to the fawn by the moisture around the eyes and nose. During a flood, colonies of fire ants can float for days, above, until they reach a spot where they can reestablish their colony.

decade creating multi-queen colonies in his College Station laboratory. To an unpracticed eye, the ants that could be the grim reaper for much of Texas wildlife look surprisingly unprepossessing. They live in a laboratory room, a small, windowless rectangle with industrial-looking stainless steel shelves. Dozens of plastic boxes line the shelves and each box essentially is a “mound.” Within the rusty-colored insects teem in the millions. They look like delicate, living foam moving over the clods of dirt they call home.

Vinson’s lab is comparing the DNA of single-queen and multi-queen ants. They have found some differences, but have yet to gather conclusive evidence to prove whether the multi-queen ants are a different species, or simply a socially progressive variant. Similar work is going on elsewhere. A University of Georgia lab has found that the multi-

queens lack an enzyme that single queens have. While the exact classification of multi-queens remains up in the air, researchers have found that multi-queen ants behave differently, in ways that make them more successful, harder to kill and more of a threat to other wildlife.

Ants that live in a colony with allegiance to only one queen are fiercely territorial. They build broad, conical mounds about a foot high and will attack anything that comes too close, including fire ants from other mounds. These inter-mound conflicts keep down the total fire ant population in a given area.

Multi-queen fire ants, by contrast, don’t fight. They slowly absorb other mounds, uniting them in a sort of “super colony.” Free to concentrate on eating and breeding, fire ants multiply exponentially in such areas. Although multiple queens are smaller and weigh less than queens that rule alone, they produce a larger total of eggs. As a result, an acre that might have 40 mounds of single-queen fire ants will support as

many as 400 mounds of multi-queen ants. Densities as high as 600 mounds per acre have been documented in a few areas. While there might be 20 million ants in an acre of single-queen territory, a multi-queen acre can have as many as 200 million ants.

More ants are more dangerous. If ants from one mound happen upon a good food source—a family’s picnic or a nest of helpless quail hatchlings—they can go back to their network of mounds and “recruit” millions upon millions of other ants. Within minutes, the quarry may be overcome by the insects.

Even though multi-queen fire ants are slightly smaller than single-queen ants, they may be harder to knock out. As the ants share food with one another, pesticide bait may travel quickly from mound to mound, but it has to reach every queen in order to destroy the mounds. If even one queen out of hundreds survives, the mounds may rebound after a pesticide treatment.

The density, cooperation and tenacity of multi-queen fire ants have forced scientists and wildlife managers to reconsider how these pests change the ecosystem. “The impact studies done

from the 1940s to the 1960s didn't recognize the multi-queen fire ants. Now all that work has to be reevaluated," said Bastiaan M. Drees, an associate professor of entomology at Texas A&M. "We're just at the foothills of that effort."

Scientists first looked at how the multiple-queen fire ants affected other insects, including their cousins, the native fire ants. In 1988, a University of Texas study concluded that multiple-queen fire ants were replacing native fire ants and then creating mound communities that were six times as dense. At about the same time, Vinson's staff at Texas A&M found that in areas where there once had been dozens of insects, only one or two species remained after an invasion of the multi-queen fire ants. They cut species diversity by 70 percent and numbers by 90 percent. Other studies by Texas Tech University and by the USDA yielded similar results: the multi-queen fire ants were decimating other insects.

They also may be endangering species already threatened with extinction. In 1990, a researcher found swarms of ants foraging as much as 80 feet underground. The researcher, a cave specialist, never had seen anything like it. He asked the

Texas Department of Agriculture to find out what was killing and carrying off Tooth Cave pseudo-scorpions, Bone Cave harvestman spiders and other species—some of which are on the endangered species list of the U. S. Fish and Wildlife Service. The predatory swarms turned out to be fire ants from multi-queen mounds.

What's happening to insects now may happen to larger animals later. Scientists point out that these insects form a base upon which is built the habitat of all other plants and animals, including humans. "Ants are one of the solid foundations of the food pyramid. If fire ants disturb that, the effect will be subtle but profound," said Les Greenberg, the A&M researcher specializing in multi-queen ants. "If we don't look for effects, we probably won't find them now. But then, years from now, we all may wake up and find dozens of species have disappeared, and then trace that all back to the multi-queen fire ant colony." In other words, if one insect species dies out, a food source for a small mammal may dry up. Fewer small mammals may cut down on the population of predatory birds,

and so on, up the food chain.

While this idea makes sense to many fire ant experts, it has been difficult to prove. To do so requires trapping and tracking animals in areas that don't support them in numbers large enough to make statistical analysis significant. Because it is too difficult and too expensive to study the impact fire ants have on every species in every habitat, researchers have to focus on one species or one type of animal in one specific environment. Inevitably, these efforts involve a certain amount of hit-or-miss risk.

One of the first efforts to quantify the effect fire ants have on larger animals was directed by Drees, in the Rollover Islands, a string of low-lying islets in East Galveston Bay. More than a dozen ground- and shrub-nesting waterbirds, including great blue herons, great egrets and snowy egrets, nest on the islands from March to August. The islands also are heavily infested with fire ants. Drees and his researchers treated some islands with pesticide and left others untreated. During 1989 and 1990, they compared the nesting success in treated areas versus that in untreated areas. In the ant-infested areas, Drees found that the insects did kill hatchlings, especially during the vulnerable time when the chicks have just "pipped," or broken through their shells. Fire ants completely wiped out the nests of some species that hatched during the last half of the nesting season, from June on. Drees's study, however, did not take into account whether the ants came from multi-queen or single-queen mounds.

Farther north, around College Station, Texas A&M Wildlife and Fisheries Professor Bart Wilson has been trying to find out just how multiple-queen colonies affect small wildlife. Wilson and his graduate students found

Worker ants tend larvae and pupae in a colony, left. During the last decade, scientists have discovered multiple queen fire ant colonies that contain up to 200 queen ants, as opposed to the traditional single queen colonies that contain only one queen.





© GRADY ALLEN

Ground-nesting birds can be killed by fire ants that swarm over the hatching eggs and the newly hatched chicks. These eggs belong to the threatened reddish egret.

that small animals react to fire ants as if they were a slow-burning prairie fire. When fire ants invaded the nests of cotton rats, pygmy mice or quail, the animals moved away. In another study of four counties in northeastern Texas, Wilson's students found that there were fewer rodents in areas infested with multi-queen colonies. This means less prey for larger animals, and that could have a devastating effect down the line.

"We're not finding some species where we used to or in the numbers that we used to," Wilson said. "I don't doubt for a minute the people who say fire ants are driving out other species. We just don't have the data to prove that yet."

Slowly, the data is beginning to come in. The United States Department of Agriculture, the Texas Department of Agriculture and Texas Tech University in Lubbock joined forces to study the impact multi-queen fire ants had on the wildlife on several private ranches near Victoria.

Researchers marked off 10 areas 400 to 600 acres in size. They grouped the parcels into five pairs, treating one parcel of each pair with insecticide and leaving the other in its natural state. Then they compared wildlife abundance in the treated versus the untreated parcels. In 1991, the researchers found little difference in wildlife in the treated and untreated areas. But when they returned the second year, they found twice as many quail in the treated areas, where the Amdro insecticide had reduced the fire ant population by 90 percent. They

were surprised by other findings: there were twice as many deer fawns in the treated areas. There was also a significantly larger number of loggerhead shrikes, birds that depend on insects as a major part of their diet.

"As biologists, we were amazed at how simple this seems to be," said Lutz. "The ants prey on newborn quail and deer fawns. They eat insects that birds need for food. Fire ants make a tremendous difference in the ecosystem."

It's not difficult to get a little alarmed about such results. Fire ants make formidable opponents. Don Wilson, a Texas Parks and Wildlife program coordinator for upland game, has seen the ants kill quail chicks in less than a minute. "They get under the natal down and sting all at once," Wilson says. "When they hit the chick, it was like he was snakebit; he convulsed. It only took 30 seconds." Trostle, of the Texas Department of Agriculture, said he most remembers the baby deer. "In the multi-queen areas, we find blinded fawns. It's pitiful. Their eyes are white from the stings and they're crying," he said. "The fire ants are preying on everything out there. They're really chang-

ing our ecology."

At the same time that they evoke these fantastic images, researchers also warn against panic. Wilson said he hasn't heard quail on his farm near Austin since 1987. "But that doesn't mean the fire ants did it," he said. "There are so many factors out there."

Perhaps the most ambitious attempt to get a definitive picture of the fire ant threat is the study scheduled to begin this summer at Lake Conroe, near Houston. Researchers Vinson and Wilson have found a natural laboratory in a large tract of publicly owned land free of pesticides. The tract is heavily populated with fire ants in mounds that are distributed fairly evenly. The area will be divided into a checkerboard, with ten sections 240 feet wide by 400 feet long. The team will treat the first tract with a pesticide such as Amdro or Logic, then leave the next tract untreated, alternating in this way through all the tracts. Then they will set a line of live traps through the plots. They will then compare the amount of wildlife in the treated plots versus the untreated plots.

"The problem with the small mammal studies is that we haven't caught enough animals to have significant numbers," said Vinson. "We hope with this study we'll finally get the numbers that tell us what's going on." ★

Heather Millar, formerly of Houston, is a freelance writer based in New York City.

VISIT CHOK CANYON

Choke Canyon State Park on the shores of 26,000-acre Choke Canyon Reservoir is one of the state's finest complexes for camping, fishing and enjoyment of nature. Wildlife is abundant in the park's Calliham and South Shore units, and visitors enjoy close looks at white-tailed deer, javelinas, turkeys, quail and a host of other birds. The park's brush country habitat is dominated by mesquite, blackbrush and cactus, with wildflowers in springtime. Visitors can reserve campsites or rent a large family pavilion complete with kitchen and gymnasium, adjacent to an olympic-sized swimming pool. Visit our park store for concessions and souvenirs. Choke Canyon provides educational and recreational programs for park visitors, schools, clubs and other groups. The park is located between Three Rivers and Tilden on State Highway 72.

**Call 512-786-3868 for information
or 512-389-8900 for reservations**

OUTDOOR DATEBOOK



© JERRY D. GREEN

AUGUST

Aug. * Bat emergence tour each Thursday and Saturday, Old Tunnel Wildlife Management Area near Fredericksburg, 210-868-7304

Aug. * Gorman Falls tour each Saturday and Sunday, Colorado Bend State Park near Bend, 915-628-3240

Aug. * Wild cave tours each Saturday and Sunday, Colorado Bend State Park near Bend, 915-628-3240

Aug. * Lower Edwards Plateau ecosystem tour each Saturday, Honey Creek State Natural Area near Bulverde, 210-438-2656

Aug. 4, 13, 18, 27: * Boat tour of coastal marsh, Sea Rim State Park near Sabine Pass, 409-971-2559

Aug. 6: * Fishery station tour, Heart of the Hills Fishery Research Station near Ingram, 210-866-3356

* The activities marked with this symbol are available to people who have a Texas Conservation Passport, which may be purchased for \$25 at most state parks, Parks and Wildlife offices, Whole Earth Provision Co. locations in Austin, Houston and Dallas and RE in Austin and Dallas.

Aug. 6: * Bus tour of Fort Leaton and Big Bend Ranch State Natural Area, 915-227-3613

Aug. 6: * "The Lows vs. the Highs," Martin Dias, Jr., State Park at Steinhagen Reservoir, 409-383-0144

Aug. 6: * Nature tour, Caddo Grasslands WMA near Paris, 903-884-3833

Aug. 6: * Wildlife track identification, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

Aug. 6, 20: * Birdwatching tour, Caddo Lake State Park and WMA, 903-884-3833

Aug. 6, 13, 20, 27: * Nature walk, Pedernales Falls State Park in Blanco County, 210-868-7304

Aug. 7, 14: * Birdwatching, Pedernales Falls State Park in Blanco County, 210-868-7304

Aug. 7, 27: * Marine ecosystem tour, Matagorda Island State Park and WMA, 512-983-2215

Aug. 10: * Exploring Las Palomas WMA in the Lower Rio Grande Valley, 210-585-1107

Aug. 13: * "When the Fish Don't Bite, Bowfish," Fairfield Lake State Park near Fairfield, 903-389-4514

Aug. 13: * Birding and hatchery tour with slide show, GCCA/CFL Marine Development Center at Corpus Christi, 512-939-7784

Aug. 13: * Follow the horse trails with the Rancall County Sheriff's posse, Palo Duro Canyon State Park near Canyon, 306-488-2227

Aug. 13-14: * "The Natural Approach to Landscape Design and Management," Landmark Inn State Historical Park at Castroville, 210-538-2133

Experience nature close up at a nature walk through Pedernales Falls State Park each Sunday in August.

Aug. 13, 27: * Last Pines bus tour, Bastrop State Park at Bastrop, 512-321-2101

Aug. 13, 27: * Ecosystem boat tour, Caddo Lake State Park and WMA, 903-679-3743

Aug. 13, 20, 27: * Alligator nesting tour, James E. Daughtrey WMA at Choke Canyon Reservoir, 512-786-3868

Aug. 14: * Horseback tour, Hill Country State Natural Area near Bandera, 210-796-3984

Aug. 18: * Bird banding observation, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

Aug. 18, 20, 25: * Bat flight and interpretation at Green Cave, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

Aug. 20: * Bus tour, Big Bend Ranch State Natural Area, 915-424-3327

Aug. 20: * Primitive cavern tour, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

Aug. 20: * "Canyon Rumbblings," Caprock Canyons State Park near Quitaque, 806-455-1492

Aug. 20: * Twilight nature hike, Ray Roberts Lake State Park Isle du Bois Unit, 817-686-2148

Aug. 20: * History tour, Penn Farm Agricultural History Center at Cedar Hill State Park, 214-291-3900

Aug. 20: * Plant walk, Lake Arrowhead State Park near Wichita Falls, 817-528-2211

Aug. 20: * Traditional cowboy music concert, Cleburne State Park at Cleburne, 817-645-4215

Aug. 20, 27: * Bird tour, Balmorhea State Park and Phantom Cave Springs near Balmorhea, 915-375-2370

Aug. 27: * Jelly cooking with native plants, Honey Creek State Natural Area near Bulverde, 210-438-2656

Aug. 27: * Bat flight and sinkhole observation, Devil's Sinkhole State Natural Area near Bracketville, 210-563-2342

Aug. 27: "Summer Days of History," Sebastopol House State Historical Park at Seguin, 210-379-4833

Aug. 31: All 1993-94 hunting and fishing licenses expire.



Heed the call of the wild at Fairfield Lake State Park on September 3.

SEPTEMBER

Sept.: * Lower Edwards Plateau ecosystem tour each Saturday, Honey Creek State Natural Area near Bulverde, 210-438-2656

Sept.: * Gorman Falls tour each Saturday and Sunday, Colorado Bend State Park near Bend, 915-628-3240

Sept.: * Wild cave tours each Saturday and Sunday, Colorado Bend State Park near Bend, 915-628-3240

Sept. 1: Morning dove hunting season opens in North and Central Zones.

Sept. 1: All 1994-95 hunting and fishing licenses and stamps go into effect.

Sept. 3: * "Call of the Wild," Fairfield Lake State Park at Fairfield, 903-389-4514

Sept. 3: * Captive cooking contest, Penn Farm Agricultural History Center at Cedar Hill State Park near Cedar Hill, 214-291-3900 or 291-6505

Sept. 3, 10, 17: * Children's fishing seminar, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

Sept. 10: * Evening walk and hatchery tour with



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Mark your calendars for Wildlife Expo '94, to be held September 30–October 2 at the Texas Parks and Wildlife Department headquarters in Austin..

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RII BEAVES

slice show, ECCA/CPL Marine Development Center at Corpus Christi, 512-939-7784

Sept. 10: * "Raccoons of Fairfield Lake," Fairfield Lake State Park at Fairfield, 903-389-4514

Sept. 10: * "Thanksgiving for Turkeys," Moore Plantation WMA near Pineland, 409-383-0144

Sept. 10, 24: * Spotlight deer census, Colorado Bend State Park near Bend, 915-628-3240

Sept. 16-18: Second annual Harvest Moon and Times Festival, Fort Davis, 800-524-3015

Sept. 17: * History tour, Penn Farm Agricultural History Center at Cedar Hill State Park near Cedar Hill, 214-291-3900

Sept. 24: * Autumn art, Cedar Hill State Park near Cedar Hill, 214-291-3900 or 291-6505

Sept. 24: * Horseback tours, Lake Somerville State Park Nail's Creek Unit near Somerville, 409-289-2392

Sept. 24: * Alabama-Coushatta 4-H Windwalkers, Martin Dies, Jr. State Park at Steinhagen Reservoir, 409-383-0144

Sept. 24: * Birdwatching, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

Sept. 24: * Birdwatching, Jasper State Fish Hatchery at Jasper, 409-384-9965

Sept. 24: * Nature tour, Lake Tawakoni State Park at Lake Tawakoni, 903-425-2332

Sept. 30-Oct. 2: Texas Wildlife Expo '94, Texas Parks and Wildlife Department headquarters in Austin, 1-800-792-1112

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| Corpus Christi KEDT, Ch. 16 | Thursday Friday | 7:30 11:00 |
| Dallas/Ft. Worth KERA, Ch. 13 | Friday | 6:30 |
| <i>Also serving Abilene, Denton, Longview, Marshall, San Angelo, Texarkana, Tyler, Wichita Falls, Sherman</i> | | |
| El Paso KCOS, Ch. 13 | Sunday | 7:00 |
| Harlingen KMBH, Ch. 60 | Tuesday | 8:00 |
| <i>Also serving McAllen, Mission</i> | | |
| Houston KUHT, Ch. 8 | Monday | 7:30 |
| <i>Also serving Beaumont/Port Arthur, Galveston, Texas City, Victoria</i> | | |
| Killeen KNCT, Ch. 46 | Tuesday | 3:00 |
| <i>Also serving Temple</i> | | |
| Lubbock KTXT, Ch. 5 | Saturday | 7:00 |
| Odessa KOCV, Ch. 36 | Saturday | 7:30 |
| <i>Also serving Midland</i> | | |
| San Antonio KLRN, Ch. 9 | Thursday | 12:00 |
| <i>Also serving Laredo</i> | | |
| Waco KCTF, Ch. 34 | Sunday | 1:00 |

Programming schedules are subject to change, so check your local listings

Look for these stories in the coming weeks

JULY 31–AUGUST 7: A canoe trip down the Colorado River to celebrate its cleanup; oak wilt; on location with an archaeological field school.

AUGUST 14–21: Captive rearing could be the last hope for saving the endangered Attwater's prairie chicken; beneficial insects; the benefits of xeriscaping

AUGUST 21–28: One of nature's most spectacular shows: springtime wildflowers in Texas; the Rio Grande; Texas coastal birds.

Lake Houston State Park

With almost 5,000 acres of woods and waters, this new state park offers a natural getaway practically in Houston's back yard.

A coolness rises from the forest trail, lifted by the warbling song of birds hidden among a canopy of East Texas bottomland hardwoods. Cushioned by a carpet of pine needles and damp, colorful leaves, the path meanders past sheltered glades, boggy cypress wetlands and open fields of undulating grass. Farther on, far below the arch of a narrow bridge, Peach Creek fills the air with liquid music as its amber waters ramble on toward Lake Houston.

Embraced by the fragrance of blooming dogwoods and stately Southern magnolias, it's hard to believe this lush, serene habitat lies just 30 minutes north of Houston's traffic-snarled Loop 610. Only the distant roar of a jet airplane departing from the Intercontinental Airport hints of the city's proximity. But this minor disturbance is forgotten quickly beneath the sheltering limbs of loblolly pine, willow oak and sweet gum that thrive in one of Texas's least known and most promising outdoor getaways; Lake Houston State Park.

"I love it here," said Joe Munguia, park superintendent. "It's real quiet, especially in the evenings. We see white-tailed deer, all kinds of birds and even an occasional bobcat. It often seems strange to have something like this so close to a big city. But when people need a break from the noise and traffic, they can spend a nice quiet day away from it all without having to drive so far."

Originally encompassing 4,710 acres, the park was purchased in the early 1980s from Champion International, which had utilized the property as a hunting facility. In August 1990, the acquisition of Peach Creek Girl Scout Camp increased the park site area to 4,913 acres, at a total cost of \$14 million. Located



© DARYL R. STYBLO

at the southern extreme of the East Texas Pineywoods ecological region, the park is bounded on the east by the eastern fork of the San Jacinto River and on the west by Caney Creek and its tributary, Peach Creek.

Currently, the park is open without fee from 8 a.m. to 5 p.m. for day use on weekends only. Visitors can enjoy a snack beneath a covered group picnic area or spread a blanket in a host of shady pastures and grassy groves near park headquarters. Early mornings and late afternoons are the best times to hit the trails, when sightings of gray squirrels, white-tailed deer, raccoons, butterflies and colorful birds are most likely.

For first-time visitors, the park's name can be a bit misleading.

"Most people don't realize the park does not border Lake Houston," said park ranger Roger Biedanski. "The

lake actually is about 10 miles away by car. We've had several people show up with jet boats looking for deep water, only to be disappointed. But we do offer 10 miles of river and creek frontage within the park for canoeing, fishing, wading and nature watching."

Canoeists can put in along Farm Road 1485 at the San Jacinto River and travel south to Peach Creek, then head back north (upstream) and take out at the footbridge, a distance of about 10 miles. For an easier trip of around five miles, put in along Highway 59 and take out at the Peach Creek footbridge. However, be ready for frequent portages around log jams and sand bars along the way.

Good catches of catfish and white bass have been reported in the San Jacinto River, particularly at the juncture of Caney Creek and Peach Creek. During periods of low rainfall, the river and creeks may run less than two feet deep, the perfect depth for young and old to wade or splash about in calm, clear waters.

Whatever you do, don't

Just 30 minutes north of Houston, Lake Houston State Park provides a tranquil setting to enjoy turtles sunning themselves on the river, right, and an abundance of birds, such as this immature red-shouldered hawk, above left. The park is renovating overnight lodging facilities, above right, that were part of the Girl Scout Camp that once occupied the site.

© DARYL R. STYBLO

by Janet R. Edwards

forget your walking shoes. Many visitors agree that the park's luxuriant trails are its most alluring attraction.

"We already have more than 10 miles of hike and bike trails, even though the majority of the park acreage remains undeveloped," said Munguia. "This was accomplished primarily by clearing and connecting former logging trails. We hope eventually to include about four miles of trails specially designed for equestrian use. Because trails are so cost-effective and provide access to nature for people with a wide range of physical abilities, we feel our trail system will continue to spark a lot



© STEPHAN MYERS



of interest in its future development.”

A master plan for the entire park is currently in the works, Munguia said. “In the meantime, we’re concentrating on renovating the existing overnight lodging facilities that once were part of the Girl Scout Camp, as well as sites for tent camping. Eventually, we hope to have cabins, instead of screened shelters, for overnight use and hookup facilities for RVs. We also may renovate the pool, horse corrals and bleach-

Although not on Lake Houston, the park has 10 miles of river and creek frontage for wading, canoeing and fishing.

ers that once were part of the Girl Scout camp.”

Community groups, including the Boy Scouts, already have lent a helping hand with landscaping, cleanup and trail-building projects at the park. Local citizens also are planning special exhibits and offering nature tours for park visitors.

“I’m excited about getting our interpretive center going,” said Dan Crissman, a park volunteer. “We hope to have a series of displays describing the different kinds of wildlife that can be seen in the park. Because it’s so boggy, we have a lot of snakes, both poisonous (including the coral snake) and non-

poisonous. So we plan to offer weekend talks and slide shows with more detailed information about them.”

Many birders already have discovered what avian pleasures the park has to offer, with help from Marlin Crane, a local volunteer who guides birding tours on request.

“I believe the value of the park is that it will preserve a large, unfragmented, wooded area—a habitat that many of our neotropical bird species, such as warblers and summer tanagers, need for successful nesting,” said Crane. “Much of the nearby Houston area is becoming more and more fragmented as development progresses, which even-



© WYTOID SKRYPCZAK

Several species of snakes are found in the park's boggy bottomland hardwood habitat, including the northern scarlet snake, right.

tually will push out many birds.

"At the end of March, we tallied 91 different species, but we still have a lot more work to do. The best bird area is near the southern end of the park near a small lake about five miles from the headquarters. But it also is the most difficult to reach because the dirt road often becomes impossible to travel in wet weather."

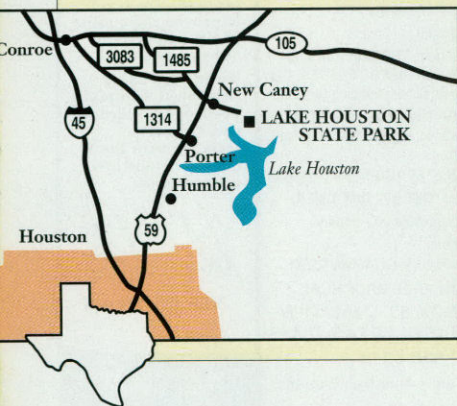
Although day use of Lake Houston State Park gradually is increasing, park staff and the local community eagerly await the opening for overnight use, an event scheduled for late 1994 or early 1995. Twenty-four walk-in tent camp

LAKE HOUSTON STATE PARK

To find the park, travel two miles east of New Caney on FM 1485, then turn right on Baptist Encampment Road to the park headquarters.

The park currently is open from 8 a.m. to 5 p.m. for day use on weekends only. Opening for overnight use is scheduled for late 1994 or early 1995.

For more information contact the park at Route 7, Box 900, New Caney, Texas 75034, telephone 713-354-6881.



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sites (eight in three locations) are planned, along with a full restroom facility with hot showers, another restroom with an outdoor shower and two group camping facilities. State park entrance and camping fees will apply at that time.

"I really enjoy being involved in the process of developing something as special as Lake Houston State Park," said

Munguia. "In fact, I look forward to coming back here 20 years from now and being able to say I had a part in that." ★

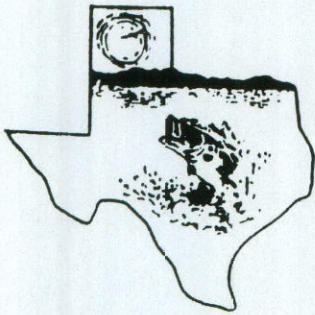
Corpus Christi freelance writer Janet Edwards specializes in topics dealing with natural history, medicine and travel and is a frequent contributor to the magazine.

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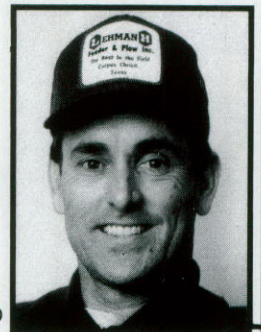
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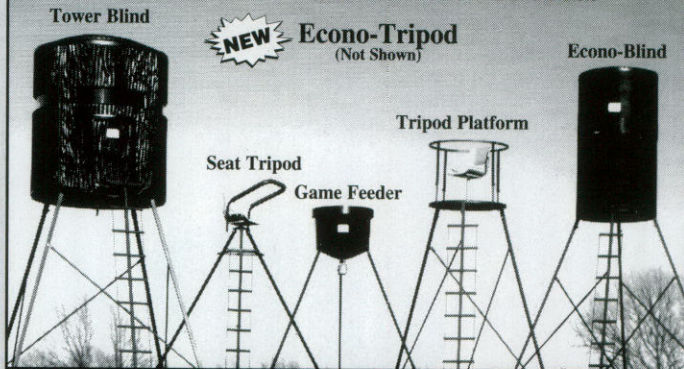
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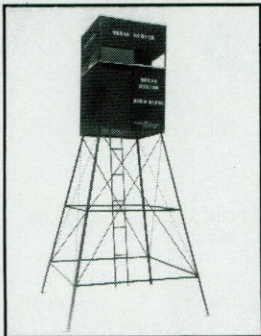
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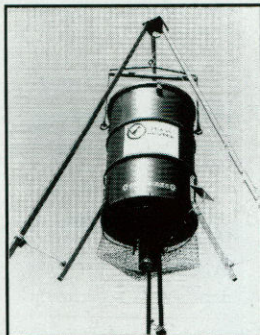
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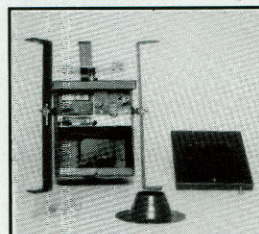
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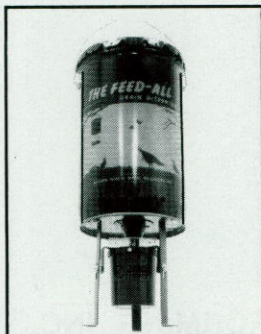


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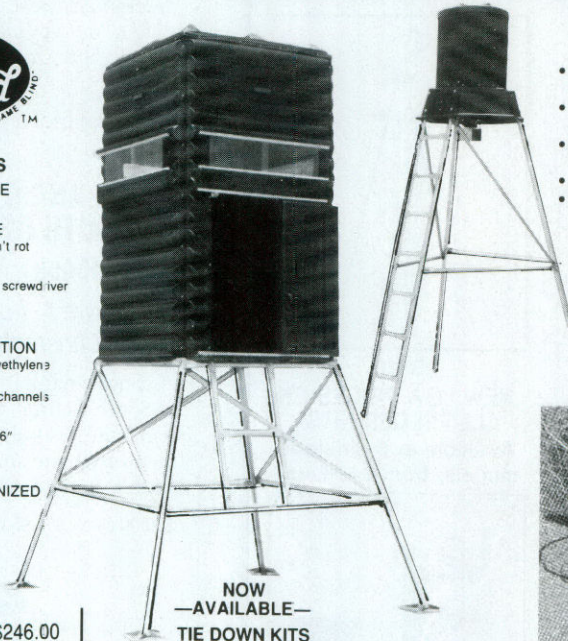
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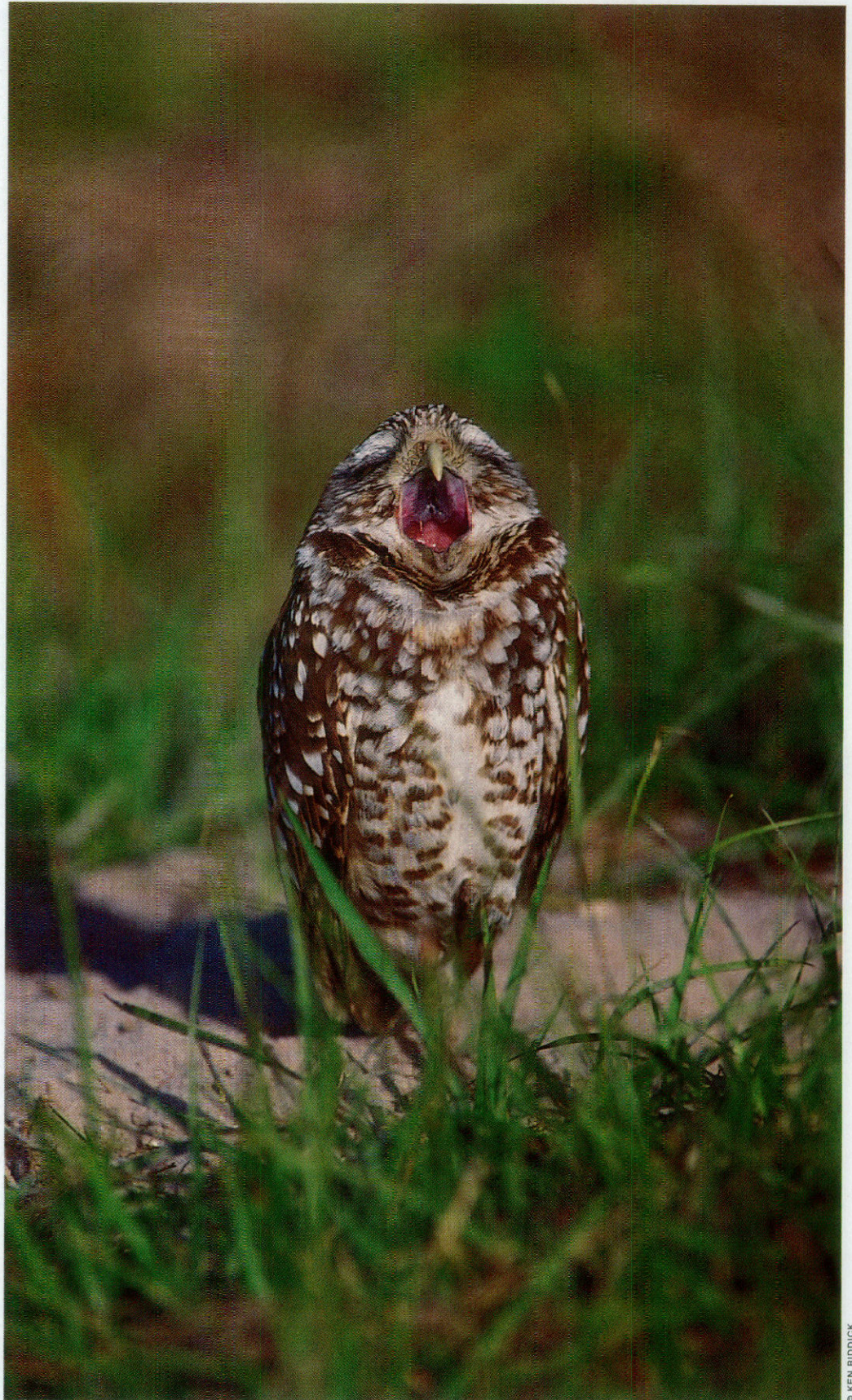


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A Ho-hum Day at the Burrow

This immature burrowing owl's late-afternoon yawn was captured by freelance photographer Ken Riddick of Fort Worth. The fledgling emerged from the family burrow to resume its nocturnal training program for catching rodents and insects. Unlike most owl species, burrowing owls nest underground, normally in dens appropriated from prairie dogs or other rodents. However, biologists say that with proper soil conditions burrowing owls can excavate their own dens.



© KEN RIDDICK

The Coastal Collection



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A large, stylized signature in blue ink that reads "Steve Russell". The signature is written in a cursive, flowing style and is positioned above a horizontal line.

Steve Russell's unique eye for detail and affection for scenes from the Coastal South is apparent in this lithographed series. Copano Designs LLC is making these images available in the limited edition of 650 prints each, signed and numbered by the artist.

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