

ON THE BORDER SPECIAL ISSUE

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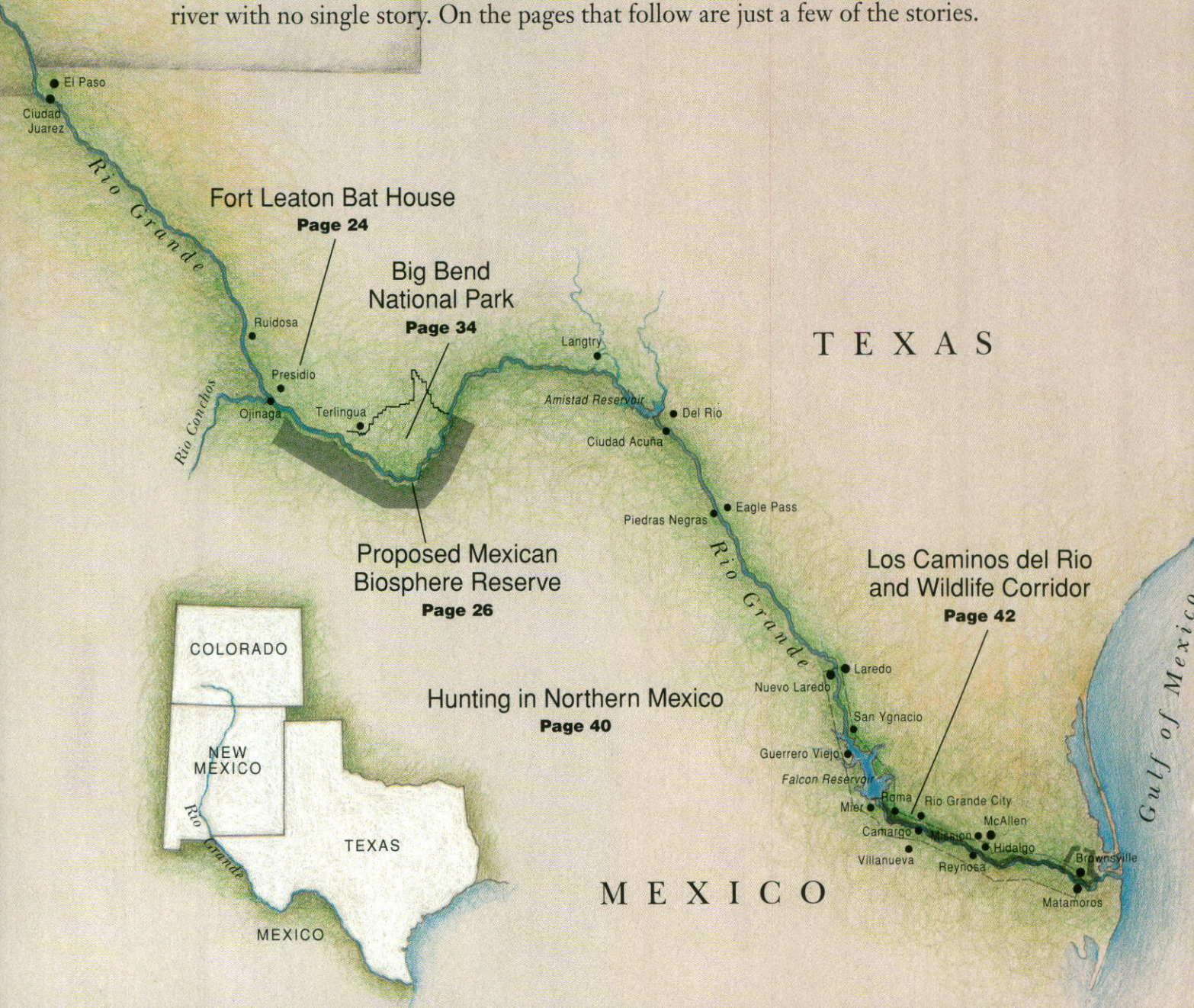
TEXAS PARKS & WILDLIFE

APRIL 1994



THE RIO GRANDE

We tend to think of rivers as being linear, as starting in one place and ending in another place downstream. As the maps below show, the Rio Grande begins as an alpine stream in Colorado's San Juan Mountains and finishes its journey when it empties into the Gulf of Mexico some 1,885 miles later. But the Rio Grande is many rivers with many different faces. It has not one but two mountain sources, one in the American Rockies and the other in the Mexican Sierra Madre Occidental that gives rise to the Rio Conchos joining the Rio Grande near Presidio/Ojinaga. The Rio Grande contains the clear waters that gush from springs out of the sides of limestone hills bordering the Devils River, and it is joined by the waters of the Pecos River to fill Amistad Reservoir near Del Rio. And sadly, the Rio Grande is the waste of humans and their industry, pouring into the river all along its reach from hundreds of sewers and outflows. The Rio Grande is no single river with no single story. On the pages that follow are just a few of the stories.



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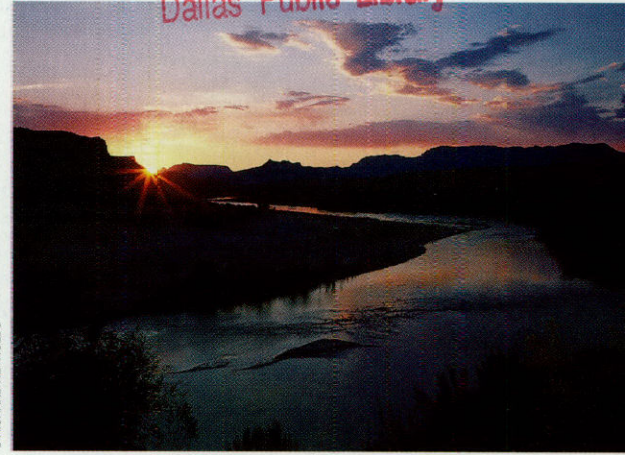
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42 RECLAIM THE ROOTS OF THE LOWER RIO GRANDE Two ambitious projects—the Rio Grande Wildlife Corridor and Los Caminos del Río Heritage Project—are working to preserve the culture and natural resources of the Lower Rio Grande Valley. *by Bob Parvin*



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COVERS

Front The Rio Grande/Río Bravo winds past Big Bend National Park and Mexico's Sierra del Carmen. Running from southwestern Colorado to the Gulf of Mexico, the Rio Grande is the second longest river in the United States. Photo © Lynn Herrmann. Hasselblad camera, Zeiss 150mm lens, f/32 at one second, Fujichrome Velvia film.



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Back Texas-style deer management in Northern Mexico has resulted in more whitetails and greater hunting opportunity. See story on page 40. In the back cover photo, a rutting buck sniffs the air for the scent of a doe. Photo © Dave N. Richards. Canon AE-1 camera, Canon 300mm 2.8 lens, 1/125 second at f/4.5, Kodachrome 64 film.



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AT ISSUE

We camped the first night in Canyon Media Luna near the village of La Noria in northern Coahuila. Eight of us had crossed the Rio Grande at Boquillas on a mid-October day, and were headed up the steep slopes of the Del Carmen Mountains on horseback at one of the most beautiful spots on the U.S.-Mexico border. As we stopped on a high bluff to let the animals rest, two peregrine falcons streaked toward each other about 500 feet above us, locked their bodies in a fierce embrace and plummeted straight down the cliffs for hundreds of feet, disengaging and resuming flight only seconds before they would have slammed into the desert floor.

We were fascinated by the sight, but it was only the beginning of a remarkable week of exploration in the area now proposed to be part of an international biosphere reserv .

In this issue, we take you on a conservation journey down the Rio Grande. From El Paso to the river's mouth at Boca Chica are some of the most striking and biologically significant resources in the Americas along with some daunting management challenges. Two emerging threads make the potential of large-scale conservation efforts along the border more possible than at any time in the history of these two neighboring countries. The first is passage of the North American Free Trade Agreement (NAFTA), which is expected to bring unprecedented prosperity to the region but also requires greater attention to environmental protection.

Just as important has been the growing involvement of a dedicated coalition of public and private organizations that already have changed the landscape of the borderlands, and are about to change its history. It is difficult, for example, to imagine that the Lower Rio Grande National Wildlife Refuge would exist at all today without the efforts of the Frontera Audubon Society.

Farther upstream, the Meadows Foundation of Texas has taken the lead in bringing about one of the nation's most exciting cooperative agreements in the Los Caminos del Rio project. The Nature Conservancy, the Conservation Fund, Lower Laguna Madre Foundation and many more organizations, state and federal agencies have come together to help ensure that the natural and cultural richness of the region will prosper even as the economy flourishes in the coming years.

As we came out of the mountains on the last day of our trip the peregrines, now joined by a third, circled high above in the noonday heat. Thanks to a growing consensus on both sides of the border, our grandchildren also may be able to experience these rare birds' unbelievable aerobatics.

— Andrew Sansom, Executive Director

In May...

Next month we'll celebrate the approach of summer by visiting one of the state's most popular vacation spots, Galveston Island State Park. The 2,000-acre park offers a fascinating mix of Gulf beaches, bayside marshes and Broadway-style musical productions. Also in May, snook fishing, shooting sports for women and the first in a three-part series featuring the best fishing spots in state parks.



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

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LETTERS



Never Knew His Name

I enjoyed the story about the Buffalo Soldiers in the February issue. In today's 82nd Airborne Division racism is zero due to the valor of colored soldiers in World War II.

During an attack in Anzio, Italy, machine gun fire tore into my shoulder. After about 18 hours, I heard the doctor say, "Unless he gets blood at the hospital he won't last another hour." When the Jeep I was lying in hit a shell hole in the road, the colored soldier who was driving and I eyeballed each other while machine gun tracers and bullets flew about our heads. I quickly passed out. Later I wondered if he ever got a medal for saving my life at great risk to his own life.

The colored soldiers' valor in World War II was the beginning of the end of racism. I owe my life to a "Buffalo Soldier," and I don't even know his name.

Ed Moorehead
Combes

Squirrels

The squirrel hunting articles in the February issue brought some pleasant memories to mind.

About 1939 I was an apprentice baker in Houston. We got off at 3:15 a.m. during the week. A fellow worker, Elzy Thompson, and I used to go squirrel hunting when we got off.

As soon as we got three squirrels we cleaned them and headed to his grandmother's house on a farm a few miles east of Houston. The grandmother was very fond of squirrels. She cooked breakfast for us, including homemade biscuits, and she got to keep the squirrels.

Tris J. LaVergne
Houston

I enjoyed the articles about squirrels by Russell Tinsley and Morris Gresham. We have gray squirrels here in Virginia and, as some hunters say, they are hardly worth skinning.

Many years ago I was hunting on the banks and bluffs along a creek in Travis County, and shot what I thought was a fox squirrel. The animal was entirely gray and the

same size as a fox squirrel, but it had a less-luxurious tail. I showed it to a native who had been in the area since the turn of the century and he said it was a rock squirrel. He explained that they stayed along canyon walls, rocky hillsides and rock fences.

I was wondering if either Mr. Tinsley or Mr. Gresham had seen or heard of such an animal.

H. P. Vance
Richmond, Virginia

■ Rock squirrels are fairly common in much of the Edwards Plateau and Trans-Pecos regions of Texas, but many Texans never have seen one because of these squirrels' preference for steep, rocky habitat. Although they are able to climb trees, rock squirrels normally dig burrows rather than building nests in trees. Classified as an unprotected nongame species, they can be hunted at any time, but their secretive nature and relatively low population densities probably keep them from getting much attention from hunters.

Right River, Wrong City

Here I was, at home in the Rocky Mountains of Wyoming with my February issue of *Texas Parks & Wildlife*—a gift from my uncle in Longview. Imagine my excitement over the article about the Guadalupe River, the river that ran through my heart and my life for 20 years.

I showed it to my friend, a transplant to Wyoming from Chicago. When I told her about growing up on Lake McQueeney she showed genuine surprise. "There's a lake in Texas?" she asked. I flipped to page 12 to show her the photo of the old waterworks building at Max

Texas Parks & Wildlife magazine welcomes letters to the editor. Please include your name, address and daytime telephone number. Our address is 4200 Smith School Road, Austin, Texas 78744. Our fax number is 512/707-1913. We reserve the right to edit letters for length and clarity.

Starcke Park in Seguin, a stone's throw away from my folks' house on the river. Only I had to hold my thumb over the caption claiming the landmark from my youth was in Gonzales.

Thanks for a great article, but folks, that beauty belongs to Seguin!

Linda Swope
Jackson Hole, Wyoming

■ Thanks for the correction. We also heard from Don Whited at Sebastopol State Historical Park in Seguin. Max Starcke Park will be the site of the fourth annual Sebastopol Historical Festival on April 16 from 10 a.m. to 7 p.m. For information about the festival call 210-379-4833.

Motivational

I cannot begin to tell you how much my fourth-graders enjoy *Texas Parks & Wildlife*. They actually read the articles! No other magazine has motivated them so much.

In fourth grade we focus on studying Texas in Social Studies, and we have a big unit on animals in Science. Your magazine covers both extremely well. My students (most anyway) probably will never get out of our small town. With your magazine they still can see everything Texas has to offer. Maybe it will motivate some of them to further their education and do more with their lives than hang chickens in the local chicken factory.

Thank you for producing such a wonderful magazine.

Kathy Nichols
Center

Texian at Heart

I now live in North Carolina, but *Texas Parks & Wildlife* brings back pleasant memories of my 40 years in Texas and I remain a Texian at heart. Your pictorial January 1994 issue especially refreshed my memory of the many Texas parks and forests in which I have camped, so many of which you have depicted.

Dr. Virginia Perrenod
Tryon, North Carolina



Poisoning a Region's Lifeblood

*The Rio Grande's waters have nourished civilizations for centuries.
Because of human pressures, the 20th century
may have been the river's worst.*

by Larry D. Hodge

IN 1993 THE ENVIRONMENTAL organization American Rivers named the Rio Grande the most endangered river in North America. The announcement cited "headwaters-to-mouth degradation" and "pollution by newly developed industrial plants along the Mexican side of the border formed by the river."

Thrust into the national spotlight, the Rio Grande attracted a flurry of media and political attention. Newspaper headlines branded the stream "Sewer Grande." One state official called portions of the river "a virtual cesspool."

Does the Rio Grande deserve the appellation "most endangered river in North America?" The answer is not a simple yes or no. To

understand the Rio Grande and the problems it faces, one must first understand that while it is convenient to think of the Rio Grande as one river, the truth is far different. The Rio Grande can be thought of as four different rivers, each with its own set of characteristics and problems. Yet all four have this in common: they are the lifeblood of the communities through which they flow, and without the river the Texas-Mexico border would be devoid of much of the bustling economic and recreational activity it enjoys.

The Four Rio Grandes

In the course of its 1,896-mile jour-

ney from high in the San Juan Mountains of southwestern Colorado to the Gulf of Mexico, the Rio Grande flows through Colorado, New Mexico and Texas. For 1,248 of those miles it is the international boundary between the United States and Mexico. After the Mississippi-Missouri system, it is the second-longest river in the United States.

The Rio Grande's headwaters rise in two valleys covered with spruce, fir and aspen in the San Juan Mountains at nearly 12,000 feet elevation. In its infancy the Rio Grande is a tumbling mountain stream flowing through steep-sided valleys that are home to mule deer

and elk. Trout anglers wade its rocky bed; beavers pool its precious water; campers, ranchers and hunters throng its grassy banks. Below Rio Grande Reservoir the fledgling river spills into the broad San Luis Valley of central Colorado and quickly loses its innocence. Withdrawals for irrigation are heavy in the San Luis Valley; as early as 1900 farmers were draining the river dry during the peak growing season.

For the first 70 miles in New Mexico, the steep canyon walls of the Rio Grande Gorge and White Rock Canyon fend off those who would take the river's water. The rugged, beautiful terrain and a free-flowing river attract rafters and other visitors. A 48-mile stretch of the stream is designated a Wild and Scenic River (see accompanying article). Emerging from the chasm, the Rio Grande flows across a plain bordered on east and west by mountains. Irrigators take water out as fast as it's added by streams such as the Rio Chama, Rio Costilla, Rio Ojo Caliente, Galisteo Creek, Jemez River, Rio Puerco, Rio San José and Rio Salado. The 200 miles between Española, north of Santa Fe, and Elephant Butte Reservoir are heavily used; only rarely is one out of sight of a dwelling or tilled field.

Within this first reach—some 635 river miles—the fundamental irony of the Rio Grande is cast. The Rio Grande

is a desert river, with decreasing elevation and latitude and increasing aridity hemming the verdant floodplain with thirsty lands. In a list of the world's principal rivers, the Rio Grande ranks dead last in the amount of water discharge per square mile of basin—a measly 0.02 cubic feet per second. In comparison, the yield of the Mississippi–Missouri system is 26 times greater. The Rio Grande, a river of limited resources, flows through an arid region of substantial needs.

Elephant Butte Reservoir marks the end of the “first” Rio Grande. The division is political, not physical; perhaps not even logical. From this point the river becomes increasingly mired in a bog of interstate and international pol-



© LARRY HODGE

itics. Once water reaches Elephant Butte, its use is controlled not by New Mexico but by the Bureau of Reclamation, the International Boundary and Water Commission and the Rio Grande Compact Commission, an interstate agency formed in 1939 to allocate the waters of the upper Rio Grande equitably among Colorado, New Mexico and Texas.

The “second” Rio Grande begins at the foot of Elephant Butte dam and con-

Two contrasting views of the Rio Grande illustrate the stream's changing nature. At left the river meanders through Rio Grande National Forest in Colorado. Below is a scene more familiar to Texans, with the river's murky waters winding through Big Bend Ranch State Natural Area's Colorado Canyon.



© EARL NOTTINGHAM

tinues to Fort Quitman, an abandoned U.S. military post whose ruins lie on the river southwest of Sierra Blanca, Texas. During its 110-mile passage from Elephant Butte to the Texas state line, the river is shunted by three diversion dams into ditches that furnish irrigation water for more than 90,000 acres.

Just at the international boundary in El Paso, the American Dam directs most of the water belonging to the United States into the American Canal, which then reconnects with the river just downstream of the International Dam at the northwest edge of downtown El Paso/Ciudad Juárez. Mexican water remaining in the river is diverted into the Acequia Madre ("Mother Ditch") at the International Dam; some 20,000 acres in Mexico are irrigated, growing mainly cotton. Fifteen miles below, the Riverside Dam spills American waters into another canal from whence it is spread over 50,000 acres of farmland growing chiefly Pima cotton. Between the Riverside Dam and Fort Quitman the only water, if any, in the Rio Grande generally comes from irrigation return flows, occasional storm runoff and occasional discharges from the drain that disposes of Ciudad Juárez's untreated sewage. Water that entered the Rio



Wide and shallow, the Rio Grande just above El Paso (above) shows the effects of water diverted for agriculture and municipal uses in New Mexico. A number of governmental agencies are involved in allocation of the river's precious water.

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Grande in Colorado or New Mexico almost never passes beyond Fort Quitman.

The "third" Rio Grande winds from Fort Quitman to Lake Amistad near Del Rio. The initial 200 miles—from Fort Quitman to the confluence of the Rio Conchos—often bake dry in the desert sun from October through January, when irrigation water is turned off. The river passes through a series of valleys and canyons. At most the valleys are only a few miles across, and views of nearby mountains dominate the scene on both sides of the river.

Just above Presidio, the Rio Conchos injects new life into the dying stream. For all practical purposes, the American river we know as the Rio Grande ends here. From this point on, as much as two-thirds of the water that enters the river originates in Mexico, and some argue that the Mexican name for the river—Río Bravo del Norte—would be more correct. The Rio Conchos rises in the Sierra Madre Occidental of Chihuahua and Durango. Five tributaries feed the river year around, with peak flows coming from snowmelt in the spring and tropical rains in late summer. It is this water that flows through the Big Bend region of Texas and Mexico, furnishing recreation for river

rafters and much of the irrigation water for the Lower Rio Grande Valley.

In the Big Bend the Rio Grande flows through some of its most scenic canyons and desert surroundings. Narrow valleys and deep canyons make irrigation impractical in most places, and the smattering of people who live in the region make few demands on the river. There is no control over the flow. The river borders Big Bend National Park for 107 miles; a total of 196 miles were designated a Wild and Scenic River in 1978 and are managed by the National Park Service.

Among the larger tributaries between the Rio Conchos and Lake Amistad at Del Rio are Alamito and Terlingua Creeks, the Pecos and Devils Rivers. Gauging stations on both Mexican and American tributaries are read weekly by both United States and Mexican workers. The United States is credited with water coming from its side and with 30 percent of the Rio Conchos flow; Mexico is credited with the flow from tributaries on its side and for some water coming out of the United States. The amount of water in Lake Amistad at any one time is thus divided between the two countries based on where the inflows originate.

Below Lake Amistad begins the



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Symbolizing demands on the Rio Grande's waters, a massive water treatment plant in El Paso (above) doubled the city's capacity to treat river water for municipal use when completed in 1993. El Paso and the Franklin mountains are in the background.

“fourth” Rio Grande, which twists and winds through increasingly flat and more heavily populated country until it reaches the Gulf of Mexico below Brownsville. Between Lake Amistad and Lake Falcon, five Mexican rivers—the Las Vacas, the San Diego, the San Rodrigo, the Escondido and the Salado—and three U.S. creeks—the Las Moras, the Elm and the Sycamore—spill their waters into the Rio Grande. On the American side, a trend begins that continues all the way to the Gulf of Mexico: the land generally slopes away from the river to the north, draining Texas rainfall toward the Nueces.

Lake Amistad and a sister reservoir downstream, Falcon, serve multiple purposes—flood control, recreation, storage for irrigation water and power generation.

Downstream from Falcon for 250 miles the river basin is narrow and flat. The two major tributaries in this stretch both begin in Mexico: The Rio Alamo and the Rio San Juan Catarinas. In this last run to the sea the Rio Grande becomes more delta than river, twisting and turning

upon its flat floodplain, forming numerous resacas. Here the greatest demands for water are made on the river. Nearly a million acres in the United States and a like amount in Mexico grow melons, sugar cane and vegetables with water drawn from the river. So much land has been cleared for agriculture that only snippets of wilderness remain in the vegas, the lands in the riparian zone.

Near Brownsville the Sabal Palm Grove Sanctuary maintains the last 32 acres of a 40,000-acre palm forest that once extended 80 miles up the river. The sanctuary is the only place one can see the plants and animals that once existed along the resacas and oxbow lakes formed in the Rio Grande delta. “The sanctuary is a little piece of old growth forest for Texas,” said Sabal Palm Grove manager Rose Farmer. “We are preserving a habitat and its wildlife. The sanctuary is like a library—it has the seeds, the plants, the animals the whole area had 5,000 years ago.” The Rio Grande furnished a rich habitat for species that occurred nowhere else in the United States. “Researchers keep finding insects new to science here, because the Rio Grande was an oasis,”

Farmer noted.

Even this last remaining postage stamp of native habitat along the river is threatened. “Until dams were built on the Rio Grande, the resacas and oxbow lakes flooded whenever the river flooded,” Farmer said. “We don’t yet know what effect the lack of flooding will have on the palm trees. They need water, and they’re not getting as much as before. Biologists think the trees may be okay, but we just don’t know.”

While much is not known about the long-range impacts of human activities along the Rio Grande, three problems are evident. One, there simply is not enough water to meet the demand. Two, the quality of water in the river is hurt by a variety of human activities. And three, efforts to deal with the first two problems are complicated by the fact that the Rio Grande is both an interstate and an international river. The “endangered” status of the Rio Grande comes not only from its present condition but also from the web of restraints hampering efforts to deal with problems facing the river.

Problem One: Quantity

“When the well is dry, we know the worth of water,” Benjamin Franklin wrote. The well does run dry at times along the Rio Grande. “The Rio Grande is over-appropriated,” said John Hinojosa IV of Weslaco, Rio Grande watermaster. “Currently we have over 3 million acre-feet of water rights [in Texas], yet the firm yield of the system is only 1.3 million acre-feet. On a system-wide basis, we are doing

Amistad Reservoir near Del Rio (left) is one of Texas’s clearest reservoirs. Its 60,000 surface acres of water provide fishing and other water recreation and a constant flow for irrigation of croplands on both sides of the border downstream.



okay. But on an individual basis, there are already people in trouble—farmers as well as cities.”

Shortages are nothing new. In the 1890s irrigation in Colorado and New Mexico so depleted the river's waters that it often failed to flow at El Paso. Texans and Mexicans howled in protest. In 1906 the United States and Mexico agreed on a division of the waters of the Rio Grande above Fort Quitman. Under the terms of this treaty, the United States is obligated to deliver 60,000 acre-feet of Rio Grande water to Mexico annually. Elephant Butte Reservoir, 110 miles north of the Texas/New Mexico line, was completed in 1916 to store water to supply Texas and Mexican users. “The state of Texas goes to Elephant Butte dam for purposes of the compact,” said Jack Hammond of El Paso, who represents Texas water users’ interests on the commission. “The people in New Mexico are under the jurisdiction of Texas as far as compact water is concerned. I don’t know of another situation like it.”

A limited water supply divided among three states makes uneasy bedfellows. Each year Herman Settemeyer, engineer advisor to Texas Rio Grande Compact Commissioner Jack Hammond, inspects the Rio Grande from El Paso to its source to be sure no new diversions have been added and no additional areas are being irrigated. “We have to keep an eye on the situation,” he said. “What New Mexico and Colorado take out affects what Texas receives, and so do climatic conditions in the basin. We feel it is beneficial to have first-hand knowledge about what is going on up there, because they won’t tell us anything we don’t ask about.” To some extent, it’s still every state for itself when it comes to claiming a share of the precious water.

The 1906 treaty did not address the question of water supplies below Fort Quitman, and problems on the lower Rio Grande continued to be an irritant in relations between the two nations.



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This aerial view of the Sabal Palm Grove Sanctuary gives an impression of what much of the Lower Rio Grande Valley looked like a century or two ago. The sanctuary near Brownsville is operated by the National Audubon Society.

“Prior to 1944, everybody and his brother was drawing water from the river as they saw fit,” said Don Crawford, LBWC project manager at Lake Amistad. A 1944 treaty apportioned the Rio Grande’s flow from Fort Quitman to the Gulf. Each country receives the preponderance of the water from its own tributaries plus a share of water originating in the other country. An extensive network of gauging stations documents the origins of flows and determines the amount of water in Lake Amistad dedicated to the respective nations at any particular time. In general, the United States owns between 56 and 58 percent of the water in Lakes Amistad and Falcon, with the rest belonging to Mexico.

The 1906 and 1944 treaties and the Rio Grande Compact assured that Texas and Mexico would get water for irrigation, but maintaining streamflows for the support of recreational activi-

The Rio Grande’s role as a water source for agriculture can be measured in the billions of dollars, with canals like this one near El Paso feeding crops ranging from soybeans to oranges as it flows toward the Gulf of Mexico.

ties, habitat or wildlife is not an objective of those who manage the river. Between the last irrigator near Fort Quitman, south of El Paso, and the junction with the Rio Conchos just above Presidio, the Rio Grande is dry much of the year except for storm flows and irrigation return flows. Farther downstream, the desire remains to use every drop of water. “Unlike any other river in the state of Texas, we actually control releases of water,” said Rio Grande Watermaster John Hinojosa. Water is released from reservoirs on the Rio Grande only when the watermaster or the Mexican government requests it. “If I do my job well, the river will be ankle deep at Brownsville. Our goal is to use 95 to 100 percent of the water released,” Hinojosa said.

The emphasis on irrigation as opposed to other beneficial uses of water—household or municipal use, livestock watering, mining or power generation—is rooted in history and is based on the legal doctrine of prior appropriation. Prior appropriation means that the first person to begin using water



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has a legal right to continue using it that takes precedence over the right of a later user. To paraphrase Confederate General Nathan Bedford Forrest, "He who got there firstest got the mostest." Based on Spanish law, the doctrine of prior appropriation is the cornerstone of water law throughout the Rio Grande basin and much of the American West. Simple in concept, the system proved to be unworkable as land and the associated water rights changed hands over more than a century and demand outstripped supply. Disputes over water were the rule rather than the exception. "Everybody carried a gun, the big guys got water, the little guys didn't, and the guys at the end of the river never got water," said John Hinojosa.

Prior appropriation holds that the state is the owner of all surface water, and this proved to be the mechanism by which the water rights disputes were resolved. The State of Texas sued water users along the Rio Grande and forced them to prove their right to water. In 1969 some 800 water rights in the Lower Rio Grande Valley were recognized by the courts. Other cases resulted in the adjudication of water rights along the middle and upper Rio Grande in the 1970s and 1980s. Currently, 19 users claim rights to water along the stretch from Fort Quitman to the New Mexico state line, but these rights have not been adjudicated.

Inevitably, the reliance on historical use of water to justify granting of a water use permit stacked the deck in favor of agricultural users, since they were there first in most cases. Excluding hydroelectric users, adjudicated rights have been granted for the diversion of just over 3 million acre-feet of Rio Grande water within Texas. Withdrawals for irrigation account for 88.4 percent of the total, municipal and domestic 8.8 percent, industrial 1.7 percent, recreation 0.7 percent, and mining 0.3 percent.

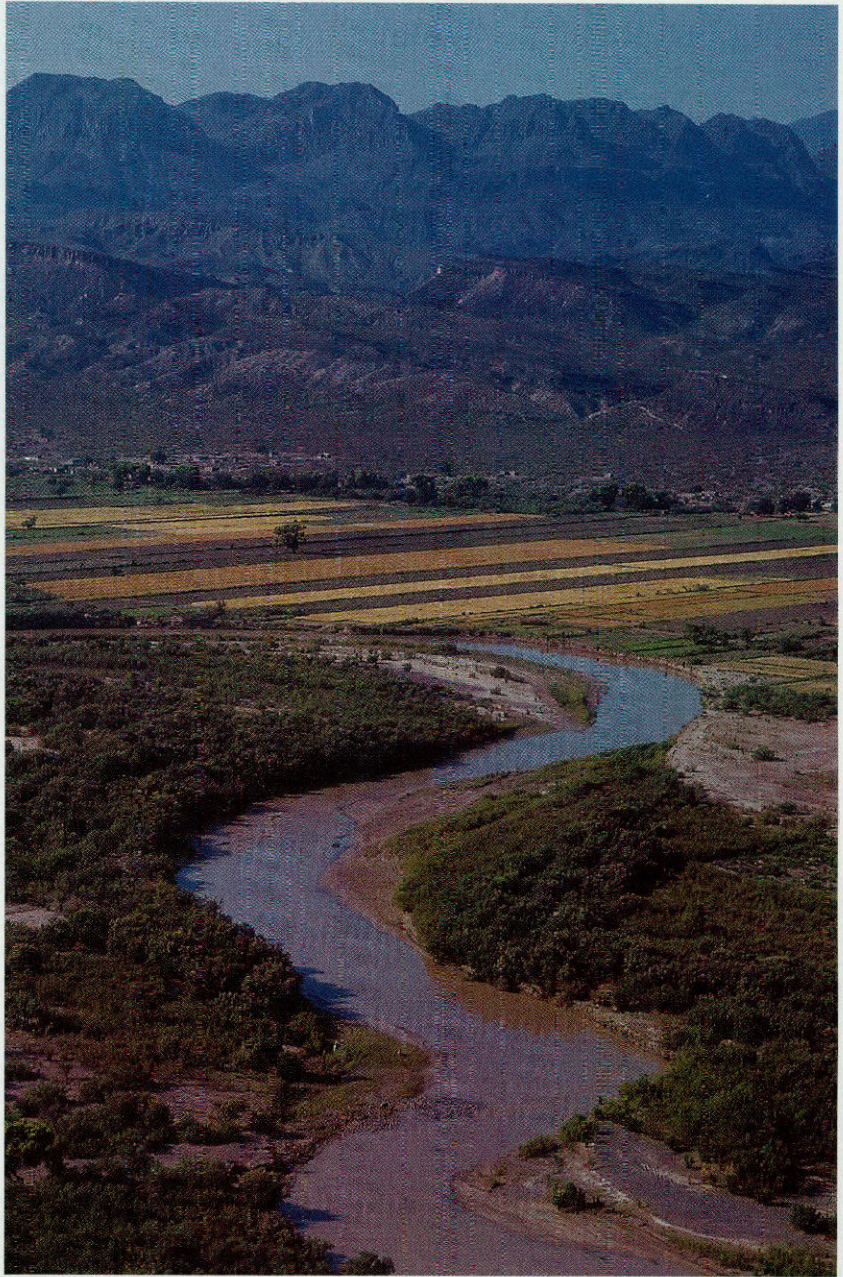
Shackled by water-use laws written during an era when natural resources were important only insofar as they could be exploited and no city of any size exist-

ed anywhere along the river, the managers of the modern Rio Grande recognize that change is coming to the river. "Today we have a lot more people tugging at the water—farmers, recreationists, environmentalists, cities, industry—any number of different entities that feel they need the water," said Hammond.

Increasing demands on the river have led to the present crisis, Hammond believes. "While there are laws on the books that protect everybody's water rights, I don't think anybody anticipated

The Rio Grande gives life to an otherwise arid Chihuahuan Desert landscape (above). Farms on the Mexican side of the river at right in the photo draw water to irrigate a variety of crops.

the growth along the river," he said. Today nearly 4 million people live along the Texas-Mexico border. Much of the growth along the border has been fueled by the burgeoning maquiladora industry; millions of Mexican citizens have moved to cities along the river to work in new factories, many of which



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are owned by American industries—a prime example of shared responsibility for the problems facing the Rio Grande. Texas cities along the Rio Grande have experienced a parallel boom. While water use for irrigation in Texas has declined slightly in recent years due to conservation efforts, Mexico's increasing population has created pressure to put ever more land into production along the Rio Grande, and water demand there is rising.

Problem 2: Quality

The specter of future water shortages is overshadowed by an ongoing clamor over water quality. Rio Grande water has been blamed for babies being born without brains in the Lower Rio Grande Valley, even though scientific documentation of a cause-and-effect relationship does not yet exist.

"Water quality in the Rio Grande/Río Bravo is bad and...has been declining



Extensive water distribution systems (above) make the Lower Rio Grande Valley a highly productive agricultural area for both Texas and Mexico. It also has caused the loss of most of the region's wildlife habitats.

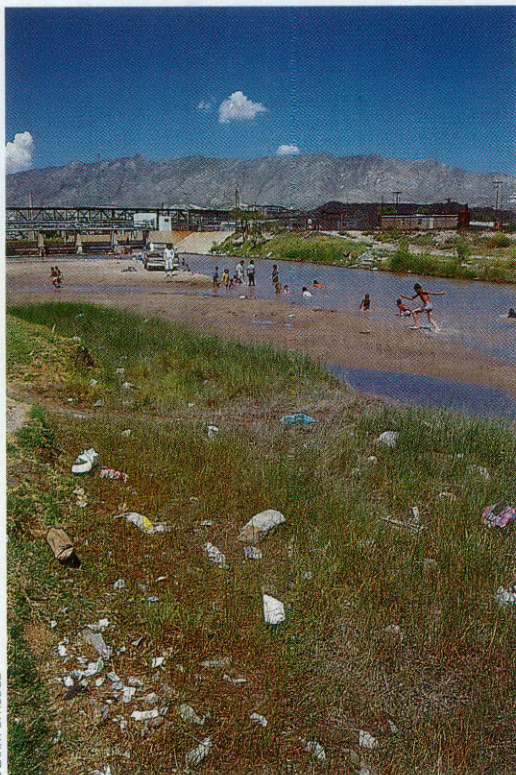
for the past 20 years," wrote David Eaton and David Hurlbut in a report published in 1992 by the Lyndon B. Johnson School of Public Affairs at the University of Texas in Austin. The report notes that while the quality of water in most of the nation's streams is improving, the Rio Grande bucks the trend. "The water in the river has many contaminants and bacterial levels that violate both Texas and Mexican standards," they stated. The incidence of waterborne diseases along the Rio Grande is higher than the statewide rate, partly because the several hundred thousand residents of colonias lack safe supplies of drinking water.

Cities along the Rio Grande—or, rather, the wastewater they produce—are responsible for most of the currently recognized water quality problems along the Rio Grande, and there are many. Inadequately treated or untreated sewage is dumped into the river by cities on the Mexican side and by colonias (unincorporated rural subdivisions lacking basic water and sewage facilities) on both sides of the river. More than 60 million gallons a day of untreated or partially treated sewage and industrial waste flow into the Rio Grande from just five Mexican cities: Ciudad Juárez, Ciudad Acuña, Piedras Negras, Nuevo Laredo and Reynosa. Nonpoint

pollution (runoff from agricultural lands, parking lots, streets, etc.) is a problem on both sides of the river as well.

Water sampling below major cities reveals persistently elevated levels of indicators of disease organisms. Below Laredo/Nuevo Laredo, where 27 million gallons a day of untreated sewage flush from the Mexican side, the ten-year average of fecal coliform colonies in the Rio Grande is 6,637 colonies per milliliter, almost 33 times the safe limit. Counts for individual samples have soared as high as 53 million. A binationally funded wastewater treatment plant currently is being built to alleviate the problem, but progress in general has been painfully slow. Projects to improve wastewater treatment facilities for the major border cities of Ciudad Juárez, Piedras Negras, Reynosa and Matamoros still are in the planning stages.

In recent years concern about water quality along the Rio Grande has increased as population and industry in the area have grown. An explosion of maquiladoras (factories on the Mexican side for the production of American goods) has resulted in some 1,700 factories along the Texas border within Mexico. The maquiladoras are



Swimmers frolic in the Rio Grande near the American Dam in El Paso (above) where the water flow normally is meager due to water diverted into the American Canal for downstream irrigation.



widely blamed for the degradation of water quality in the Rio Grande, but the fact is that until 1991 water quality monitoring focused on agricultural chemicals, heavy metals and disease-causing agents rather than on industrial chemicals, according to Stephen Niemeyer, project manager for the Texas Natural Resource Conservation Commission Rio Grande/Río Bravo regional assessment of water quality. For the first time, sampling will be carried out for an extensive list of toxic chemicals known to be used in industry. "We will monitor upstream and downstream of El Paso–Ciudad Juárez, Presidio–Ojinaga, Del Rio–Ciudad Acuña, Eagle Pass–Piedras Negras, Laredo–Nuevo Laredo, Anzalduas Dam, Hidalgo–Reynosa, and Brownsville–Matamoros," said Niemeyer. "Everybody blames the maquiladoras, but we really don't know. This study

The city of Reynosa (below) is one of several major Mexican cities along the Rio Grande whose inadequate wastewater treatment facilities are blamed for serious pollution in the river. Reynosa is across the river from McAllen.

will give us the answers." Initial sampling was completed during 1993, but by international agreement no data can be released without the agreement of both countries. At the time of writing, results of the study were scheduled for release in April 1994. (See accompanying article).

The issues of quantity and quality go hand-in-hand. Irrigation results in about two-thirds of the water being lost to evaporation and plant transpiration. The one-third that is returned to the river or to groundwater contains from two to 10 times its original mineral content. These mineral salts (measured as total dissolved solids) can result in the water becoming unfit for irrigation and/or difficult to treat adequately for domestic consumption; this is especially likely to occur where streamflow is limited due to heavy withdrawals or to lack of inflow. The stretches of Rio Grande between Fort Quitman and Presidio and downstream of Brownsville, both of which are at "the end of the line," experience frequent problems with elevated levels of dissolved solids. Low flows also can

result in depleted oxygen levels that can be detrimental to wildlife.

Turbidity due to suspended solids characterizes the Rio Grande from Lake Amistad upstream. Soils in much of the upper basin are loose aggregates easily dislodged during flash flooding, and the soft banks of the river are easily carved away during high flows. The upper Rio Grande thus is a muddy river bearing heavy loads of sediment that are deposited downstream when water velocity decreases.

Sedimentation of the river channel itself, coupled with obstruction of the channel by vegetation, decreases the river's ability to handle flood flows. Above Elephant Butte Dam, a partially blocked river channel prevents some water from reaching the reservoir. But the most insidious effect of sedimentation comes in the reservoirs themselves, which are slowly filling with silt. Lake Amistad is silting up at the rate of about one foot per year. At some point in the future, the reservoirs on the Rio Grande simply will not have enough storage capacity to provide both flood control and conservation storage for irrigation and other uses. Dealing with this problem may well become the water crisis of the next century.

Despite the many problem areas, water quality in some stretches of the Rio Grande is good. The Texas Natural Resource Conservation Commission (formed September 1, 1993, by combining the former Texas Water Commission and the Texas Air Control Board) rates the waters of Lakes Amistad and Falcon as excellent. Amistad ranks second of 106 major Texas reservoirs in clarity, a fact appreciated by the numerous scuba divers who use its waters—visibility can approach 100 feet. Falcon ranks 48th on the list, and both lakes are popular sites for a variety of water recreation, from parasailing to fishing. Fishing guide Dave Ross of Del Rio thinks that the pure water makes



© RICHARD STOCKTON

Amistad catfish the best-tasting in the world; numerous anglers would agree. Ironically, the clarity of the water allows so much sunlight to enter the water that both Amistad and Falcon and the river stretches below them experience some problems with the growth of aquatic vegetation, which sometimes reduces the oxygen content of the water to below the level recommended for higher aquatic life forms.

Except for the stretch between El Paso and Presidio—and downstream from urban areas—the Rio Grande meets Texas Natural Resource Conservation Commission standards for contact recreation and support of aquatic life throughout most of its length in Texas. Most

of the water in the river is diverted for irrigation near El Paso, and the low flows remaining in the riverbed typically are low in oxygen and dominated by effluent and irrigation return flows. Therefore, this section of the river is designated for noncontact recreational use. The influx of water from the Rio Conchos at Presidio rejuvenates the river and improves the water quality significantly, making the Rio Grande generally suitable for contact recreation in the Big Bend area. Downstream of Lakes Amistad and Falcon all the way to the Gulf of Mexico, the potential exists for periodic elevation of fecal coliform bacteria, dissolved solids and nonpoint source pollution. Industrialization of the area creates the potential for toxic wastes in the water. Rio Grande water fails to meet Texas Department of Health standards for contact-recreation use at many points from below Lake Amistad to the Gulf, especially downstream of cities.

Problem 3: Complexity

Dividing the waters of the Rio Grande and the responsibility for maintaining their quality equitably among all those who claim them would tax the ability of a modern-day Solomon. The Rio Grande is an extremely complex river system whose natural features are overlain by a Byzantine web of human laws, regulation and bureaucracy.

One example illustrates how complex dealing with the Rio Grande can be. The Bureau of Reclamation is charged with the responsibility of “reclaiming the arid West.” The Rio Grande Project fulfills that charge in New Mexico and western Texas. The bureau built the Elephant Butte and Caballo dams and reservoirs, diversion dams, canals and drainage ditches necessary to irrigate 159,000 acres in New Mexico and Texas. However,

the Bureau does not operate and maintain the canals; local water improvement districts do. Nor does the bureau decide who gets the water held in its reservoirs. The International Boundary and Water Commission is responsible for seeing that not more than 60,000 acre-feet per year are delivered to Mexico. That requires taking most American water out of the river at the International Dam in El Paso and putting it back in below the point where Mexico takes its water out. The Rio Grande Compact Commission oversees the delivery of Colorado and New Mexico water to Elephant Butte and shares it between New Mexico and Texas. Yet when any of these entities want water delivered, they must use the plumbing of the Rio Grande Project to do it.

The fragmentation of responsibilities is the first hurdle that must be overcome in improving water quality in the Rio Grande. As David Eaton and David Hurlbut noted in the LBJ School report, “No fewer than five agencies monitor water quality at various sites with diverse equipment. Construction is at least a three-part program, with each nation



Laredo, Texas, and Nuevo Laredo, Mexico, are in the midst of an economic boom because of their strategic location as a transportation link between the United States and Mexico. The marker above is on the international bridge.



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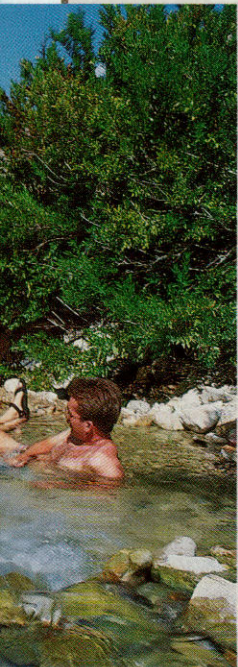
RECREATION ON THE RIO GRANDE

In her book “Rio Grande, River of Destiny,” Laura Gilpin notes that “Only one other river in the world is used so completely for irrigation—the Ganges of India.”

The Rio Grande works hard at watering the arid Southwest, but it plays hard, too. Anglers pluck trout from the swift-running mountain stream in Colorado’s Rio Grande National Forest. Whitewater rafters and kayakers shoot its frothy rapids in northern New Mexico. In Texas, Big Bend float trips offer thousands of people each year a wilderness experience in spectacular canyons. (Commercial guided trips operate from Lajitas and Terlingua, while bolder adventurers can rent equipment or supply their own. See page 38.) Amistad and Falcon Reservoirs offer some of the state’s best fishing for striped and largemouth bass and catfish. Wildlife refuges and parks in the Lower Rio Grande Valley attract birders from around the world during annual migrations.

In 1968 Congress passed the Wild and Scenic Rivers Act, which made it the policy of the United States to preserve in free-flowing condition selected rivers with “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.” Segments of the Rio Grande qualify on several counts. Forty-eight miles of the Rio Grande from

Rafters enjoy a refreshing dip in warm waters at Hot Springs Rapids in the Rio Grande’s Lower Canyons.



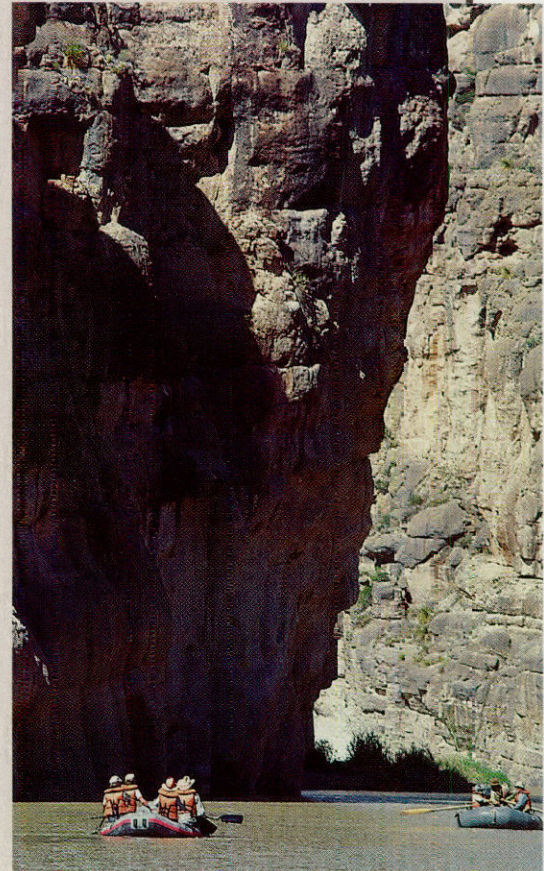
the Colorado state line southward into New Mexico were designated in the act, with an additional 196 miles in Texas added in 1978. Sixty-nine miles of this wild and scenic river form part of the southern boundary of Big Bend National Park, while an additional 127 miles are downstream from the park, ending at Langtry.

Float trips on the Texas stretch of wild and scenic river allow visitors to experience a rich variety of natural habitats as well as historical and archeological sites. Lush tropical vegetation crowds in upon the river, while the Chihuahuan Desert begins the length of a garden hose away. Surprisingly, side canyons may conceal waterholes called tinajas, miniwetlands or springs surrounded by ferns. Beavers tunnel the riverbanks, and occasionally the piercing cry of peregrine falcons echo from canyon walls. Rare plants cling to limestone cliffs alongside the mud apartment buildings of cliff swallows.

The National Park Service’s statement for management for the Rio Grande wild and scenic river categorizes the river as a natural zone. Lands and water within the zone are managed to minimize human impact. The number of persons allowed to float the river is limited through a system of river-use permits. The remoteness of the area and lack of access restrict use of the river; at the same time, they also help ensure visitors will have a quality wilderness experience. On a seven-day float trip through the Lower Canyons, for example, river rafters probably will not see anyone outside their party, and should an airplane pass overhead, it is an unwelcome reminder of civilization.

Lakes Amistad and Falcon serve primarily to supply irrigation water to the Lower Rio Grande Valley, but in another sense they are first and foremost fishing lakes, producing catfish,

crappie, largemouth and white bass and stripers. Access to the river above and below the lakes is limited by private property, but lucky is the angler who has the opportunity to fish there. In early 1993 a Del Rio resident caught



The Lower Canyons in Big Bend National Park draw visitors from many countries who marvel at the sheer canyon walls and whitewater rapids. This section of the Rio Grande is designated by Congress as a “Wild and Scenic River.”

a new state record striper weighing 46 pounds, 8 ounces, a few miles below Amistad Dam. Both Amistad National Recreation Area at Del Rio and Falcon State Park near Falcon have boat ramps, fish-cleaning stations and camping areas. These lakes are so large that hiring a fishing guide is perhaps the best way to learn them before setting out on your own. The Texas Parks and Wildlife Department’s weekly fishing report profiles what is biting, where, and on what baits.

RIO GRANDE WATER QUALITY

by Roy Kleinsasser

Although a recent flurry of articles and television news reports has focused attention on the condition of the Rio Grande, state and federal agencies have been working for almost two years to develop and implement a broad, inclusive contaminants study on the Texas reach of the river.

Coordinating a study between any two agencies can be difficult, much less one involving multiple state, federal and Mexican agencies. But despite potential logistical problems, that approach has worked successfully thus far, and the benefit will be increased knowledge of contaminants in the Rio Grande, or Rio Bravo as it is called in Mexico.

During February 1992, representatives from the U. S. Environmental Protection Agency (EPA), Texas Water Commission (now Texas Natural Resource Conservation Commission or TNRCC), Texas Parks and Wildlife Department (TPWD), and the International Boundary and Water Commission (IBWC), gathered in Austin to discuss the possibility of a coordinated study on the entire Texas reach of the river, from El Paso to Brownsville. Several agencies previously had conducted projects on various sections of the river, but all felt a need to take a unified look at the water body, given the impending pressures from industrial development and persistent rumors concerning contamination.

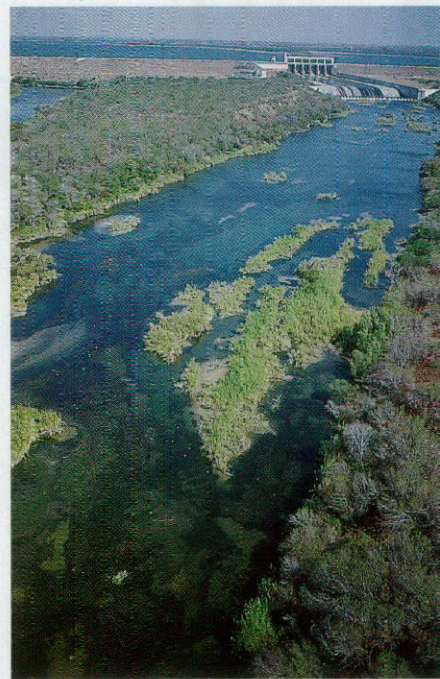
A work plan was developed, with additional data provided by the Texas Department of Health (TDH) and the U.S. Fish & Wildlife Service. The plan was presented to the Mexican government through the Comision Internacional de Limites y Aguas (CILA—the Mexican section of

IBWC) and some modifications were agreed upon. The study's objective was to collect and analyze water and sediment from 19 mainstream and 26 tributary sites along the Rio Grande and screen for the presence of 160 potential pollutants. An evaluation of fish tissue contamination and the status of fish and invertebrate communities also was planned for selected sites. The data collection effort was designed to provide a preliminary look at conditions in the river, and determine the direction for future efforts.

By November 1992, field sampling was initiated at El Paso/Juarez with United States representatives from TNRCC, TPWD, EPA, and IBWC working with members of Mexico's Comision Nacional del Agua and CILA. Cooperation among the multinational team of biologists was excellent and a camaraderie developed early on, allowing an efficient yet friendly sharing of responsibilities on the project. Field sampling was completed in spring 1993.

Biologists and water quality specialists currently are analyzing the results, and a report on the study should be completed during 1994.

Roy Kleinsasser is an aquatic biologist who coordinated fish sampling in the Rio Grande toxics study for the Texas Parks and Wildlife Department's Resource Protection Division.



Water flows through the Falcon Reservoir Dam (above), on its way to the rich farmlands of the Lower Rio Grande Valley. Falcon and the lands around it, including Falcon State Park, are magnets for fishermen, campers and birders.

Supporters of the North American Free Trade Agreement hope it will lead to construction of additional sewage treatment plants along the river, such as the one at Laredo (below).



responsible for its own infrastructure but under binational supervision. Planning consists of collecting and arraying plans of federal, state, regional and local governments along both sides of the Rio Grande. This system of partially coordinated bilateral activity has led to the current situation. The Rio Grande is polluted and no one political jurisdiction is responsible for improving the environment.”



© WILLARD CLAY

Much of the Rio Grande has been sullied by man's activities, but its beauty endures in spots. In the photo at left, soft morning light touches the rocky riverbed near Redford in Presidio County. The once-mighty Rio Grande, below, trickles unobtrusively into the Gulf of Mexico at Boca Chica east of Brownsville, having yielded almost all its water to human use during its 1,896-mile journey from the San Juan Mountains in Colorado.

Prognosis for a Sick River

Historically, the Rio Grande has suffered a fate common to the rest of the frontier area of the United States and Mexico it unites: it slumbers in the sun, ignored by both governments, until problems demand solutions.

That time has come.

Despite its vilification as the most endangered river in North America, the importance of the Rio Grande to both the United States and Mexico seems to assure that neither country can afford—economically or politically—to be responsible for the destruction of the one natural resource that makes life along the Texas-Mexico border possible: the Rio Grande/Río Bravo. ★

Larry D. Hodge is a freelance writer living in Mason.

The complexity of dealing with the Rio Grande has, in some ways, benefited both the United States and Mexico and laid the groundwork for solution of the current problems. The necessity of cooperating with each other has drawn the two countries closer. "It's one of the unique opportunities I know of in the world where countries coop-

erate in this way," said Don Crawford, IBWC project manager at Lake Amistad. Solving the problems of the Rio Grande will require building on this base of international trust. It also is likely to force both countries to make concessions of national sovereignty for the benefit of the international society dependent on the river's flow.



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Border Stopovers

16 interesting places to visit along the Rio Grande

As diverse as the Rio Grande itself are the parks and historic sites along the great river. Entering Texas almost due south of Casper, Wyoming, the upper part of the Rio Grande is the domain of the mountainous West. Almost 900 miles downstream, the river empties into the Gulf of Mexico due west of Nassau, Bahamas, in the subtropics. Between the two points are spots to experience the culture and recreational offerings along this international border.

One thing all the border parks have in common is a wealth of birds. "North meets South [in Texas], especially along the Rio Grande, where birds from the northern plains meet Mexican types," wrote Roger Tory Peterson in "A Field Guide to the Birds of Texas." Peterson also noted that the Rio Grande "acts as a highway for traveling birds." Check with individual parks about bird checklists and birding tips.

The Rio Grande enters Texas in the northwestern corner of El Paso County. Just miles from there, **Franklin Mountains State Park** provides a wilderness experience high above Texas's fourth-largest city. Currently open for day use, this 23,000-acre park has trails for hiking and backpacking through the desert mountains. Picnickers and bird-watchers also enjoy the solitude of this park. Call 915-566-6441.

East of El Paso is **Hueco Tanks State Historical Park**. This Chihuahuan Desert site has seen thousands of years of human history unfold. The park is named for the shallow rock depressions called huecos that have collected rainwater and sus-

tained life in this arid region for centuries. The park contains thousands of pictographs spanning 3,000 to 5,000 years and representing a variety of cultures. Vandalism at Hueco Tanks in 1992 caused park officials to revise the park's entrance policy. Day-use hours are 8 a.m. to 7 p.m., and overnight camping is available. Call 915-857-1135.

Near the banks of the Rio Grande in El Paso is **Magoffin Home State Historical Site**. Built in 1875, it was the home of Joseph Magoffin, a civic leader in the early days of this border city. Magoffin's adobe home incorporates a mix of architectural styles, including Southwestern Territorial and Greek Revival. Soon after the house was built, its outside walls were covered with plaster and scored to look like blocks. Now open for guided tours each week from Wednesday through Sunday, the Magoffin Home contains many of the original furnishings. Call 915-535-5147.

Also in El Paso, **Chamizal National Memorial** marks an adjusted international boundary that settled a longstanding border dispute between the United States and Mexico. The visitor center presents films in English and Spanish that explain the history of the border. There also is a theater in which American and Mexican theatrical groups perform. Call 915-532-8275.

Some 250 miles downriver from El Paso, near the confluence of the Rio Grande and the Rio Conchos, stands **Fort Leaton State Historical Park**. This huge adobe fort was built in 1848 by Benjamin Leaton, who



A wealth of outdoor adventures awaits visitors to Big Bend Ranch State Natural Area. Among them is a bus tour of the area complete with lunch (above). Bus tours take place every other Saturday, and a Conservation Passport is required.

had been a scalp hunter for the Mexican government before the U.S.-Mexican War. Unlike most of the other forts in West Texas, this was not a military fort but a fortified trading and supply post on the San Antonio-Chihuahua Trail. More than half of the fort's 45 rooms have been restored, and tours are available several days a week. Tour guides weave a fascinating story of Ben Leaton and his fort in this remote West Texas desert. A replica of the huge Chihuahua cart used on the San Antonio-Chihuahua Trail stands in the corral. Camping facilities are not available, but the grounds have a pleasant picnic area. Call 915-229-3613.

When **Big Bend Ranch State Natural Area** joined the state park system in 1987, its 260,000-plus acres doubled Texas's state park acreage. Dramatic scenery and intriguing geologic features characterize the region. Hikers and river runners may obtain a "Backcountry and River Guide" and backcountry permits at Fort Leaton in Presidio or at the Barton Warnock Environmental Education Center in Lajitas. Unimproved primitive campgrounds are available. People

who want to see the area without hiking can take advantage of twice-monthly bus tours. For information about permits, camping, bus tours and fees call 915-424-3327 or 915-229-3513.

Just downriver from the state natural area, in the legendary "big bend" of the Rio Grande, is **Big Bend National Park**. With more than 800,000 acres of mountains, canyons, grasslands and more, exploring this remote national park takes time, patience and stamina. More bird species have been reported from the Big Bend region than any other national park. For more information read "Texas's Beautiful Backcountry" on page 34.

Northeast of the national park is **Black Gap Wildlife Management Area**. This scenic, 100,000-acre management area in the Chihuahuan Desert has been the site of research on desert species such as mule deer, desert bighorn sheep, javelina and scaled quail. Holders of a \$10 limited use permit may take advantage of primitive camping, hiking, birdwatching and similar recreational opportunities at Black Gap. A \$35 annual public hunting permit is required for hunting and fishing on the area. From

the first weekend in March to the first weekend in June, area personnel host a variety of tours for holders of the \$25 Texas Conservation Passport. Tour topics include desert birds, desert plant identification and bird banding. Call 915-376-2216.

Between Del Rio and Langtry, near the confluence of the Rio Grande and the Pecos River, is **Seminole Canyon State Historical Park**, a rugged, 2,100-acre park with deep canyons first visited by early humans as long as 12,000 years ago. Exhibits in the park's interpretive center tell the history of this lower Pecos region, and guided tours of rock art sites are available. Eight miles of hiking trails include a route that leads to a remote bluff overlooking the Rio Grande and a shorter Windmill Nature Trail through typical far West Texas flora. Tent campsites and campsites with utilities are available. Call 915-292-4464.

Downriver from Seminole Canyon, where the Chihuahuan

Desert gives way to the South Texas brushlands, is sprawling Amistad Reservoir. **Amistad National Recreation Area**, operated by the National Park Service, occupies much of the reservoir's 540-mile Texas shoreline. Warm weather almost year around draws boaters and anglers to Amistad, with largemouth bass, stripers, catfish and crappie the most frequently caught species. The international boundary is in the middle of the lake, and Texas and Mexico fishing licenses are required in their respective waters. The recreation area has three boat ramps and three unsupervised swimming areas. Primitive camping is permitted in the recreation area at designated sites, and commercial campgrounds with utilities are available nearby. Camping in boats is permitted on the shore below the 1,144-foot contour except in restricted areas. Call 210-775-7491.

The Rio Grande's other international reservoir, Falcon, covers some 87,000 acres along the western borders of Zapata and Starr counties. Fishing is good year around, and Falcon is considered one of the state's top lakes for winter bass fishing (see "Headstart Bass," December 1993). As at Amistad, a Mexico license is required to fish on the Mexican side of the reservoir. **Falcon State Park**, on the reservoir's southern end, offers lake access and a variety of camping facilities, including campsites with full utilities and screened shelters. This 572-acre park is popular with birders, especially during the winter. Call 210-848-5327.

One of the best-kept secrets in South Texas is **Lake Casa Blanca State Park**. Formerly a county park, this 371-acre site in the eastern part of Laredo is open to visitors while undergoing renovation. Park officials say Lake Casa Blanca State Park boasts a family atmosphere with basketball and tennis courts, volleyball pits, a playground and a swimming pool open during the summer. The centerpiece of the park is 1,100-acre Lake Casa Blanca, with a four-lane boat ramp, two fishing piers and two designated swimming areas. The lake is popular with boaters, skiers and fishermen, who enjoy good catches of largemouth bass, catfish and crappie. Overnight camping, including a few sites with electricity, is available while the park is in the development stage. Call 210-725-3826.

The fertile soils of the lower Rio Grande Valley long have been a magnet for agricultural interests. While this has been a boon to the economy it has been detrimental to wildlife habitat. Widespread clearing for croplands in the early 20th century reduced native brush and much of the wildlife it supports. **Bentsen-Rio Grande Valley State Park** on the Rio Grande near Mission, with 587 acres of subtropical woodlands in the midst of agricultural and urban development, provides a haven for a wealth of birds and animals, many of them seen no farther north than this southernmost part of Texas. Overnight camping is available in tent and RV sites. Call 210-585-1107.

Santa Ana National Wildlife Refuge near Alamo has been called the jewel of the national wildlife refuge system for the stunning variety of birds it hosts. The refuge is open 9 a.m. to 4:30 p.m. on weekends, 8 a.m. to 4:30 p.m. on weekdays. Visitors can drive through the refuge or take an interpretive tram tour

Thursday through Monday. There are several miles of hiking trails and photography blinds. Call 210-787-1481.

A stroll through palm forests is in store for visitors to the **Sabal Palm Grove Sanctuary**, operated by the National Audubon Society near Brownsville. Like Bentsen-Rio Grande and Santa Ana, Sabal Palm Grove Sanctuary preserves unique Lower Rio Grande Valley habitat that once was more widespread than it is today. Visitors can see a variety of birds and wildlife in their natural habitat. The sanctuary is open 8 a.m. to 5 p.m. seven days a week. Call 210-541-8034.

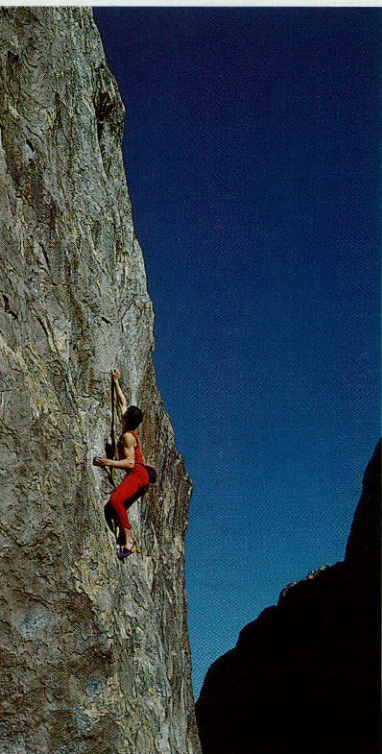
A few miles north of the point where the Rio Grande empties into the Gulf of Mexico stands **Port Isabel Lighthouse State Historical Park**. Point Isabel (renamed Port Isabel in 1930) was a busy harbor during the 1850s, and the lighthouse was completed in 1853 to guide shipping vessels through Brazos Santiago Pass. During the War Between the States, Confederate and Union troops alternately used the lighthouse as a lookout. Visitors today can climb to the top of the historic structure and gaze across the Laguna Madre and the Gulf of Mexico. The lighthouse is open daily from 10 a.m. to 11:30 a.m. and 1 p.m. to 5 p.m. Call 210-943-1172.

by *Mary-Love Bigony*

Centralized Reservation System Available For Parks

Prospective park visitors now can call a central number in Austin to reserve a campsite or other facility at any park in the system.

Continued on page 54



© LAURENCE PARENT

Rock climbing is a popular activity at Hueco Tanks State Historical Park. Overnight camping is available in this Chihuahuan Desert park some 30 miles east of El Paso.



Great, Wild River of the North

The Rio Grande binds the destinies of the nations it divides

Jerry M. Sullivan



ABOUT 15 YEARS AGO, this writer stood at the edge of a plowed field several miles northwest of Presidio watching farm hands plant a new onion crop. I asked the farmer how far it was to the river. He pointed to a nearby thicket of salt cedar. "Right there," he said. I followed a narrow path into the greenery, unprepared for what I saw. Before me was a gully, no more than a trench, really, a trickle of murky water spanned by the bleached trunk of an old cottonwood. Could this be the Rio Grande del Norte of myth and legend? Was this the river that Cabeza de Vaca crossed near this spot in 1535, less than 50 years after Columbus first set foot in this hemisphere? This could not be that great river.

I realized, of course, that I stood just upstream from La Junta de los Rios, the confluence of the Rio Grande and the Rio Conchos, which rises hundreds of miles to the west in Mexico. The Rio Conchos always has provided much of the water in the Rio Grande below Presidio. Yet I was saddened by the muddy ditch that lay before me.

Just a short time ago, I visited San Ygnacio, a historic little village on the Rio Grande below Laredo, at the head of Falcon Reservoir. I wandered down to the banks and was startled by the stench of raw sewage flowing into the lake from upriver. Near here, about 250 years ago, courageous Spanish farmers

and ranchers risked their lives and fortunes to establish a foothold north of the Rio Grande, the first in this region. Could they have foreseen this reeking morass as their legacy to the future? Again, I reflected on what time has wrought upon this noble river.

The history of the Rio Grande is an amalgam of multiple histories. At every bend along its 1,500-mile course, the great river has a different story to tell. From the subalpine Colorado Rockies through deserts and brush lands to the subtropics far to the south, the tales are as diverse as the peoples who have lived, died and traveled along its banks. In every story, whether called Rio Grande,

Rio Bravo or Rio del Norte, the river is a major character, imposing its influence on the course of history. Today, in Texas, the river's overriding influence is as an international boundary, but one must remember that this boundary is only 150 years old, one-third of the time that has passed since Cabeza de Vaca first saw it and just a few ticks of the clock in the more than 10,000 years humans have lived along its banks.

For thousands of years before Columbus set sail for India, Native Americans drew their sustenance from the Rio Grande's waters. Evidence of their presence still may be found scattered along its course. The first Americans, called Paleoindians, hunted mammoths and other giant animals, now extinct, in its valley, leaving behind their magnificent stone spear points. Archaic hunters and gatherers left strange and wonderful galleries of rock art for us to ponder, especially in the burned-out badlands near Albuquerque and in the canyons around the confluence with the Pecos River. In more recent times, since about 1300, sedentary native peoples farmed the arable floodplains of the Rio Grande and its tributaries from Taos to Presidio, growing corn, beans and calabashes. Descendants of those farmers still live in the pueblos along the river in north-

ern and central New Mexico, their remarkably resilient culture surviving for more than 700 years. It was among the Pueblo peoples the first Europeans, the Spaniards, came and conquered. It was there, in New Mexico, the river received the name Rio Grande, so called by the Spanish colonizer Juan de Oñate in 1598.

With the conquest and settlement of New Mexico in the early 17th century, Spain began more than two centuries of dominance along the Rio Grande. In the spirit of the “Trinity” of the *conquistadores* —“God, gold and glory” — the Spanish built towns and missions, and all but enslaved the natives, the *padres* attempting to bend them to the ways of Spanish Catholicism. In 1680, the long-suffering Puebloans rebelled and drove the Spaniards from their homelands. The Spanish withdrew southward to El Paso del Norte for 12 years before reconquering New Mexico. In the valley at El Paso del Norte, where the Rio Grande cuts through the mountains, the Spaniards founded the first European settlements in present Texas. Present Juárez was the original community of El Paso. The travel route along the river from northern New Mexico to El Paso would remain in use until railroads replaced wagons in the late 19th century.

Farther south, at La Junta de los Rios near Presidio, the *conquistadores* first appeared among the native farmers in 1581 during their earliest explorations of the region. But they did not establish missions there until 100 years later, in the 1680s. The effort proved short-lived, as Spanish attention was drawn to eastern Texas by the intrusion of the Frenchman, LaSalle, and back to New Mexico after the Reconquest in 1692. In the late 1750s, the Spanish returned to La Junta to stay, establishing several missions in the valley and a presidio in Del Norte, present Ojinaga. Along



© STEPHEN MYERS

Impoundment of Amistad Reservoir on the Rio Grande near Del Rio flooded numerous Native American rock shelters and pictographs. One that survived is Panther Cave at Seminole Canyon State Historical Park (left).

the south bank of the river a series of presidios, or military outposts, was located at major crossings to attempt to protect settlements from raids of Comanches and Apaches from north of the river. All were abandoned by 1780.

Today we call the area along the Rio Grande below Presidio the Big Bend. The Spaniards called it *el despoblado*, the empty region. Seldom did they enter

the area, and the true course of the river through the Big Bend remained unknown and uncharted until the first international boundary survey in the early 1850s.

Beyond the unexplored canyons of the Big Bend, Spanish settlement on the river began in 1700 with the founding of a mission and presidio complex called San Juan Bautista del Rio Grande on the south bank below present Piedras Negras. The outpost protected the Camino Real, the road into the Texas interior, and helped supply the East Texas missions. In 1718, the Spaniards established San Antonio farther east on the King’s Highway.

In 1746, José de Escandón received a charter from the King of Spain to establish the colonial province of Nuevo Santander in the lower Rio Grande region. With the colonizing of Nuevo Santander, Spain changed its settlement



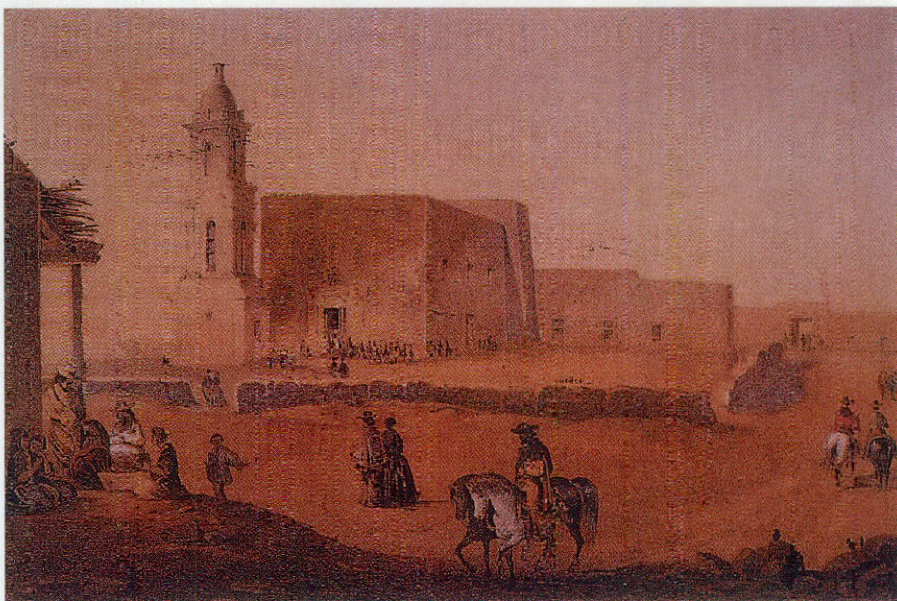
© CARR CLIFTON

Evidence of early cultures can be seen along many parts of the Rio Grande, such as this site in Big Bend National Park where Native Americans used stones for grinding food.

strategy. Instead of focusing on a religion-driven policy, as applied in New Mexico and other colonial provinces, they implemented an economic-driven policy. To encourage settlement of the region, land grants were issued to wealthy patrons to establish ranches and farms in the hinterlands. By 1750, Escandón's efforts had resulted in the founding of several towns along the Rio Grande including Camargo, Reynosa, Revilla, Mier and Dolores. The latter, Dolores, was the first settlement on the north bank. Located near present San Ygnacio, Dolores endured until 1815, when Indian raids became so severe the village was abandoned. All that remains of Dolores today is an extensive pile of rubble and foundations. Laredo, Escandón's other major settlement north of the river founded in 1755, survived the hardships of the raw frontier.

Spain's grasp on its colonies in the New World began to erode in the early 19th century. Mexico won its independence from Spain in 1821. In the remote regions along the length of the Rio Grande the overthrow of the Spanish government had little direct impact. But the Spanish language and Catholicism, the twin legacies of Spain's colonialism, remained and today deeply permeate all the cultures touched by the Great River.

At the same time, in the early 1820s, a new historical force was gathering to the east—a force that ultimately would change the meaning of the Rio Grande. It began with the Anglo-American set-



tlement of Texas and climaxed 25 years later with the Treaty of Guadalupe Hidalgo, ending the American war with Mexico.

When Texas won its independence from Mexico in 1836, Sam Houston ordered the Mexican Army to withdraw south, beyond the Rio Grande. The nominal boundary between the Mexican province of Texas and the state of Tamaulipas (old Nuevo Santander) had been farther north, along the Nueces River. As an independent republic, Texas officially claimed the Rio Grande as the boundary between the two nations. In fact, Texas claimed an empire reaching northward into Wyoming, with the Rio Grande as its western boundary, extending to its source in the Rockies, thence northward to the 42nd Parallel. Of course, Mexico did not recognize Texas's independence, much less its boundary claim.

Another independence movement created the short-lived Republic of the Rio Grande in January 1840. The republic was centered in Guerrero (old Revilla) and Laredo and included parts of the states of Coahuila, Nuevo Leon

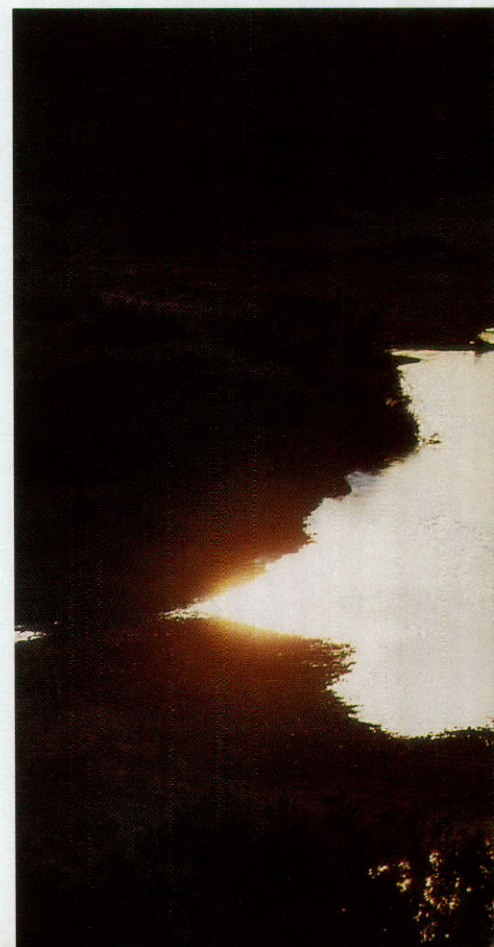
and Tamaulipas. The Mexican Army crushed the little revolution before the end of that year. The incident proved that while Texas claimed the Rio Grande as its boundary, it did not control the area south of the Nueces River.

Mexico made several attempts to recapture Texas in the early 1840s. After one such foray in 1842, a large group of Texans followed the intruders back



© REAGAN BRADSHAW

A crude rock fortification on a hilltop in the Quitman Mountains (left) is a silent memorial to a battle between black Buffalo Soldiers and Indians near the Hot Springs area of the Rio Grande. At right, a lone river crosses the river in Big Bend National Park.



At left is a reproduction of a painting of the main plaza in El Paso during the early 1850s, rendered by A. de Vandecourt for the U.S.-Mexico boundary survey commanded by Col. William H. Emory, for whom Emory Peak in the Chisos Mountains is named.

to the Rio Grande and seized Laredo. But after crossing the river, the Texans were captured at Mier. On the forced march to Mexico City, an ill-fated escape attempt resulted in the notorious "black bean incident" in which 17 Texans were executed.

Finally, in December 1845, the United States annexed Texas into the Union. The Mexican government called the annexation an act tantamount to a declaration of war, and within months went to battle with the United States over the issue of Texas.

The war between the United States and Mexico began in May 1846, near the mouth of the Rio Grande at places called Palo Alto and Resaca de la Palma. The American army quickly pushed southward across the river. Most of the war was fought deep inside modern

Mexico, because the Mexican government was not prepared to mount serious resistance in its most remote provinces. On the upper Rio Grande, American armies marched into Santa Fe and down the old Spanish trail to El Paso with little opposition. The war ended in 1848 with the Treaty of Guadalupe Hidalgo. In addition to ceding all the territory west of the Rio Grande and north of the Gila River in Arizona, including California, to the United States, the treaty stipulated the Rio Grande as part of the border between the two nations. The war changed the river's place in history forever.

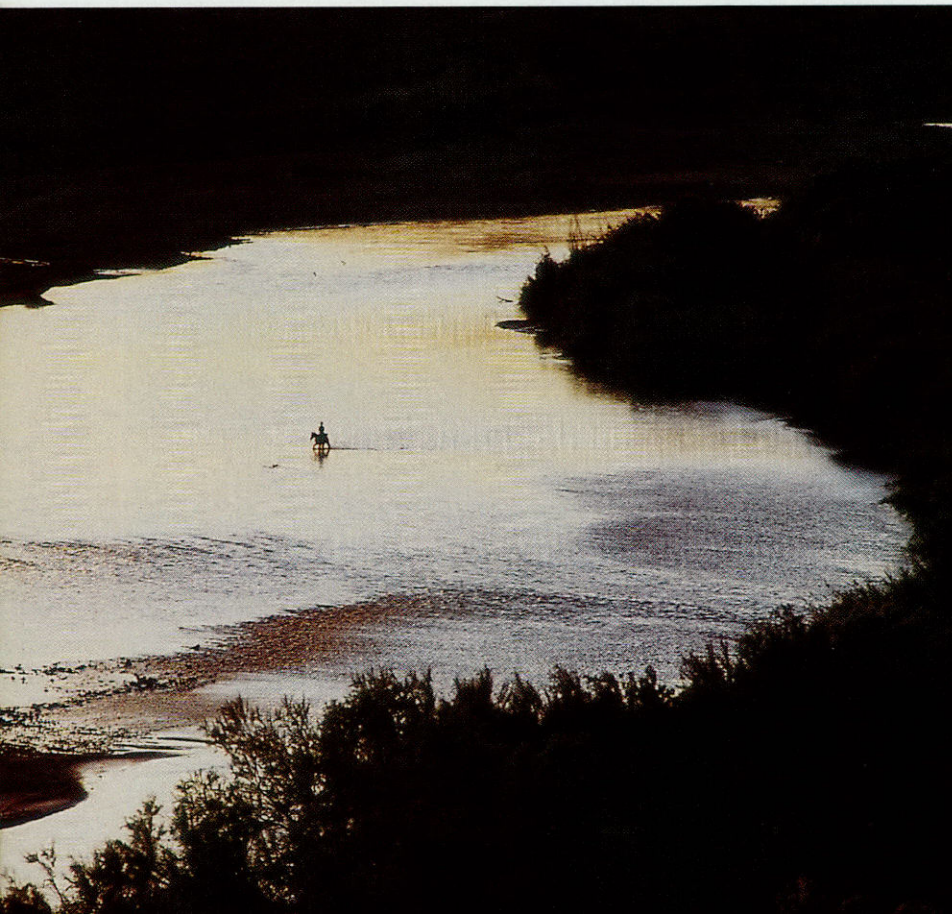
Immediately after the war, Texas began exercising its previous claim to all the lands east of the Rio Grande. The state created a county government in the Anglo community that would become modern El Paso, but the American military occupying Santa Fe refused to allow a similar government to be organized there. Part of the proposed Santa Fe County would have been north of latitude 36° 30', in violation

of the Missouri Compromise of 1820, which stated that no new slave state could extend beyond that degree of latitude. Through the Compromise of 1850, which established the current state boundaries, Texas received ownership of its public lands and federal assumption of its public debt in exchange for its claims to these northern territories. Had the local civil government in El Paso not been established, far western Texas might have been lost in the compromise negotiations, as well.

The Treaty of Guadalupe Hidalgo also stipulated that each nation would be responsible for restraining nomadic indigenous peoples living in their territories from raiding across the border. The Native Americans knew no boundary for their activities, but quickly learned that after raiding on one side of the river, they could find sanctuary on the other. The American military established numerous posts along the river, from Fort Bliss at El Paso del Norte to Fort Brown at Brownsville, but on very few occasions did the army cross the river. Indian raids continued to be a problem for both nations for 40 years.

After the war, Anglo settlement swelled along the entire length of the Rio Grande Valley, from Santa Fe to Brownsville. Adventurers and speculators poured into the several key fertile areas seeking new economic opportunities. The native Mexican populations suffered from the influx, losing much of their property to land-grabbers. Emigrants from the American Midwest followed the Chihuahua extension of the Santa Fe Trail to El Paso and that important crossroads soon boomed with activity. Benjamin Leaton built a trading post near present Presidio, where the San Antonio-Chihuahua Trail crossed the river. The lower valley was inundated by the *norteamericanos*. Even before the war ended, steamboats were carrying goods between Brownsville and Roma and spreading commercial prosperity as far as Laredo. Among the early riverboat captains was

© JOHN ELK



Richard King, who began amassing the land holdings that would become the giant King Ranch.

Prosperity attracted more and more business and settlers. The cultures facing each other across the Rio Grande began to grow disparate. Within decades the region developed a "borderlands" culture, combining cultures of the deeply contrasting populations of both nations and marking the division between them. Currently, the U.S.-Mexico boundary, more than half of which is the Rio Grande, separates nations that are more culturally diverse than nations along any other border in the world. Cultural differences have been the root of many borderlands problems since the U.S.-Mexican War, creating tensions that occasionally led to armed conflict, but more often requiring only international agreements to resolve.

Resentment toward the conquering Anglos bared itself in many areas. Most notable was in the personage of Juan Cortina, leader of a resistance movement in the valley below Laredo. The so-called "Cortina Wars" lasted from the 1850s well into the 1870s. The American Civil War fueled the conflict, as the resistance took advantage of the turmoil in the United States, attacking at will all along the river. The Mexican

government could do little to thwart Cortina's and others' activities, because that nation was in the throes of war against the French insurgency that resulted in the ascension of Emperor Maximilian to power and more revolution.

Meanwhile, Union naval forces had blockaded access to the Rio Grande and occupied Brownsville in 1863. But the blockade did not deter enterprising Confederates from transporting their cotton, some from as far away as Arkansas, across the river to be shipped to foreign markets from Mexican ports. The last battle and final shot of the Civil War occurred at Palmito Hill, just a few miles from the mouth of the Rio Grande, when Colonel John S. "Rip" Ford's Confederate troops sent a Union regiment into retreat on May 16, 1865, one month after the Confederacy had surrendered.

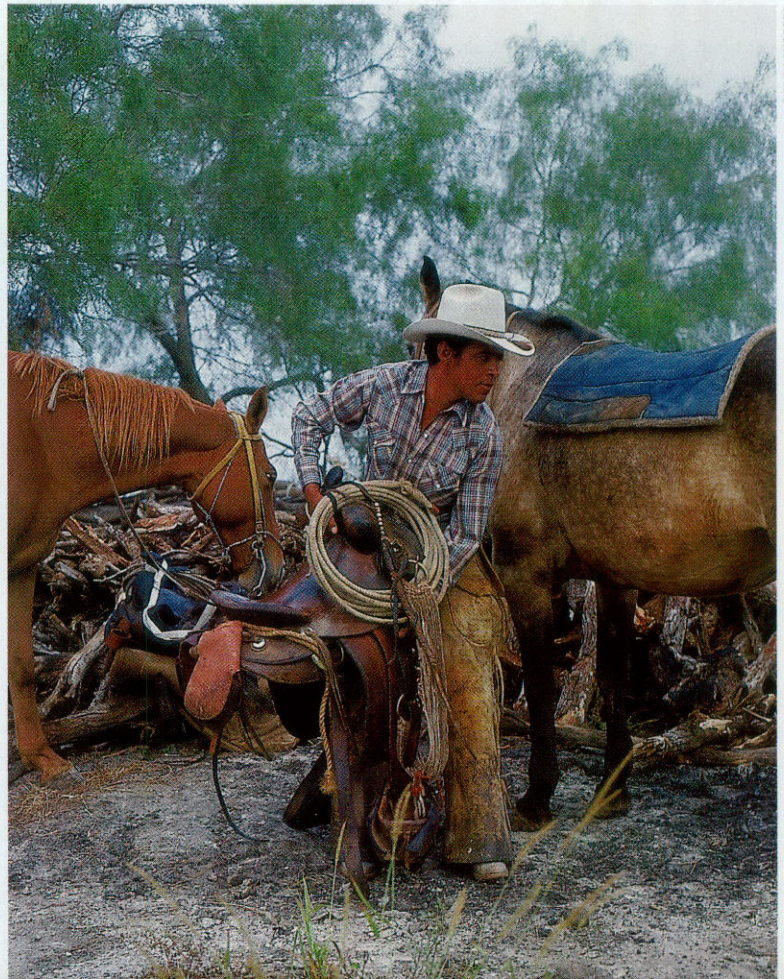
Political upheaval and turmoil dominated life in Mexico throughout the last half of the 19th century and well

into the 20th, culminating in the Revolution of 1910. During the period, American border towns consistently provided refuge for Mexican revolutionaries. After the expulsion of the French in 1867, Mexico suffered a decade of upheaval, until Porfirio Diaz gained absolute power in 1876. The nation struggled against the Diaz dictatorship until he fled into exile at the beginning of the revolution in 1910. In addition to the threat of revolutionary conflicts along the border, bandit raids across the river increased dramatically.

In reaction to the revolution and recurring bandit raids, the U.S. Army reinforced its garrisons from Fort Bliss to Fort Brown and established a line of small military camps in the thinly populated region along the Rio Grande from above Presidio to below the Big Bend. The State of Texas, too, sent a large force of Texas Rangers to the lower border to help curtail the raids. One of the most notorious raids occurred in 1916, an attack on a military outpost at Glenn



A pistol, sword and rifle and cannon balls (above) are artifacts recovered at Palo Alto Battlefield National Historic Site at Brownsville, where the first major battle of the Mexican-American war was fought on May 8, 1846. At right, a present-day vaquero prepares to saddle his horse and work cattle, a profession that dates back to the early days of Spanish settlement along the Rio Grande.



A crossroads for centuries, El Paso is seen at left from a vantage point in the Franklin Mountains on the city's northern outskirts. Juarez, Mexico, is across the Rio Grande in the background.

were built to channel water from the river to the rich new fields and orchards. Each facility could pump enough water to irrigate as much as 40,000 acres. Today, tens of thousands of acres of citrus and vegetable crops give the region claim to the title "Texas's bread-basket."

Tourism, too, has emerged to play a major economic role in the Rio Grande borderlands, as the temperate climate attracts thousands of "Winter Texans" from frigid and often snow-bound Plains states. Residents of the border area are recognizing the economic value of their cultural heritage, and are busy with preservation and conservation efforts, such as the

Los Caminos del Río Project, an international heritage development plan from Laredo to the Gulf. (See page 42).

Historically, life along the Rio Grande may be described as a series of geographic pockets of social, cultural and economic interdependent activity, each with its own traditions and heritage. Long among the most depressed regions in the nation, the river corridor looks toward tomorrow with both great hope and uncertainty. The North American Free Trade Agreement may hold great promise for both the United States and Mexico, but many problems remain to be resolved, including those associated with immigration and pollution of the river. But regardless of what the future may hold for the borderlands, the Great River has always been the lifeblood of the land through which it flows, and will forever be the tie that binds the destiny of the nations it divides. ★

Jerry M. Sullivan is an interpretive planner for the Public Lands Division of the Texas Parks and Wildlife Department.

Springs, in present Big Bend National Park, where several soldiers were killed. Foremost among the numerous bandito leaders was Pancho Villa who, after serving with distinction in the revolution effort, began preying on rural settlements and ranches from the Big Bend area to New Mexico. Although the revolution finally ended in 1917, bandit activities persisted sporadically until the late 1920s.

While Mexico was embroiled in revolution, the economic development of the American side of Rio Grande progressed unimpeded in most areas. The arrival of the railroads boosted farming and ranching economies along the entire length of the Rio Grande Valley. The need for water from the river led to water rights disputes, and resulted in the construction of the Elephant Butte Dam in central New Mexico in the 1930s. The new reservoir released sufficient water to supply farmers from the Mesilla Valley in New Mexico to well below El Paso, but not enough to extend through the rugged terrain of

the Quijman Mountains to Presidio.

That muddy ditch near Presidio was the result of water rights issues farther upriver.

Two other impoundments, Falcon, below Laredo, and Amistad, near Del Rio, followed in the 1950s and 1960s, mostly for flood control. The two new reservoirs inundated many important historic and cultural sites. Falcon covered several villages dating to the 1700s, including much of the old city of Guerrero, while Amistad flooded numerous ancient Native American rock shelters and their irreplaceable pictographs.

The progress in agriculture along the Rio Grande in West Texas and New Mexico paled compared to the boom fomented in the lower valley just after the turn of the 20th century. The combination of the broad, fertile floodplains, the long, subtropical growing seasons and new transportation links to world markets provided the impetus for the development of large-scale irrigation projects. Several huge "pump houses"

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Bat Transit

How do you persuade 30,000 bats to change their address?

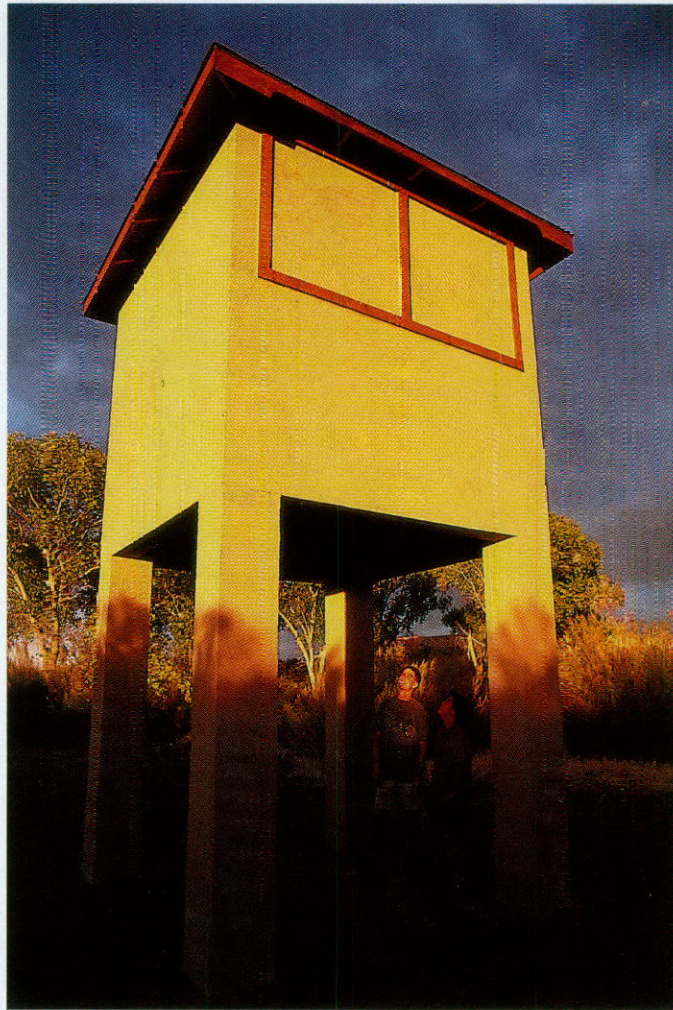
It is said that two people can look at the same thing and one sees a problem while the other sees an opportunity—and both can be right.

Consider the bats that roost at Fort Leaton State Historical Site. Superintendent Luis Armendariz has worried about this situation for years. Some 30,000 bats show up each spring from their Mexican wintering grounds and move into the ceiling of the fort, a sprawling adobe structure east of Presidio near the Rio Grande. A few bats live there year around.

Their presence might not be considered a problem if it were not for the unmistakable ammonia odor of their urine, which greets visitors the minute they set foot inside the front door. "Besides the smell, the bats have been ruining the ceilings, and that is very expensive to repair," said Armendariz.

The bats easily enter the fort through small openings around the heavy doors. "They only need a fraction of an inch to get in," said Armendariz. Once inside, they squeeze through openings in the *rajas* (lengths of split cottonwood) of the ceiling and roost in the space between ceiling and roof. Suspended upside down in this cozy enclosure, they sleep all day and rouse themselves at twilight to forage for food. Eventually their guano stains the white plaster ceiling and destroys it.

Despite these management headaches, nobody wants to eliminate the bats, which consume enormous quantities of night-flying insects—in the case of Fort Leaton's bats, an estimated 825



The 12-foot by 12-foot bat house is built of native cottonwood. It stands nine feet above the ground on four piers, safe from potential floodwaters and predators.

pounds each night. Besides, bats are in.

Enter batman Bob Burnett, the person who saw opportunity. A Texas Parks and Wildlife Department resource specialist, Burnett used a little imagination and an excellent working knowledge of bats to design a new home for them. With Armendariz' enthusiastic support, Burnett and his team came up with a plan to move the bats to a new structure close by, thus retaining their insectivorous benefits and eliminating their liabilities.

"But bats have strong fidelity to their roost sites," Burnett said. "Efforts to relocate them

rarely have been successful." If excluded from their normal roosts, bats usually leave the area entirely. So how to change those bat habits?

First part of the plan was an irresistible design. The resulting 12-foot by 12-foot enclosure is built of native cottonwood, or *alamo*, and it stands nine feet above the ground on four piers, safe from potential floodwaters and intruders. But the primary reason for elevating the structure: "Bats like to drop down to take flight," said Burnett. The stucco exterior is finished in an adobe color to resemble the fort, which overlooks the bat house

from a rise some 50 yards away.

Inside, Burnett placed a vertical arrangement of narrow, four-foot-long wooden slats variously spaced $1/2$ to $1 3/4$ inches apart, to accommodate the bats' varying habitat preferences.

"We used aged cottonwood, which has a low resin content and low aroma—it's a neutral wood and fibrous. Then we dimpled it to provide good thumb holes for the bats," Burnett said. One wall of the building pops out so the spacing of the slats can be changed, if needed. Burnett estimates this modest condominium can handle up to a quarter-million bats. The bats crowd together closely when they roost, he explained.

Four species inhabit Fort Leaton. Most plentiful are the Mexican (or Brazilian) free-tailed bats. Also occurring are significant numbers of pallid bats, Yuma myotis and cave myotis. "Although the colony is mixed," Burnett said, "the species do not roost together. The pallid bats have their own corner, and so on."

Efforts to populate the house in 1993 (its first year) were postponed because very few bats returned from Mexico, probably because an unusually warm, wet winter there may have provided the plentiful insects these species require. This year Burnett and his assistants will catch the bats in early morning as they return to the fort after the night's feeding. Devices known as "harp traps," vertically strung filaments that stop the bats in flight and cause them to slide downward into receptacles below, will allow researchers to retrieve them quickly for placement in temporary cages. The cages fit neatly into the bottom of the bat house to facilitate the animals' release into the structure. Trials have shown so far that the bats readily occupy the house when thus

© JEAN HARDY

released but probably return to the fort after their next outing. Capture and transfer activities will be repeated several times before the bats are completely excluded from the fort. Movable screenlike excluders already installed over the bats' normal access points will be activated once the animals seem to be getting the idea.

"If we bother them enough at their old house, we hope they will decide to move next door," Burnett said. And if the Fort Leaton experiment works, it will provide a model for any other park or similar facility where bats are a problem.

Texas claims 32 of the 42 bat species found in the United States. Fort Leaton is adjacent to Big Bend Ranch State Natural Area (BBSNA), where probably more bat species reside than at anywhere else in Texas, perhaps even in the U.S., said David J. Schmidly, who codirects the

Bat Center of Texas A&M University. Studies are underway to ascertain exactly how many species occur on BBSNA, but Schmidly estimates about 25.

Some of the world's largest bat colonies occur in Texas—a cave near San Antonio owned by Bat Conservation International shelters a population of 20 million. Public bat viewing sites in Texas include the Congress Avenue Bridge in Austin (one million bats), the Old Tunnel Wildlife Management Area near Fredericksburg (one million), Green Cave in the Kickapoo Caverns State Natural Area near Del Rio (two million), and the Texas Nature Conservancy's Eckert James River Cave near Mason (six million). The Old Tunnel and Green Cave sites are accessible to holders of Texas Conservation Passports.

Fort Leaton's Bat House is on view, but at this writing it is wearing a "vacancy" sign. As summer returns and the bats fly in from Mexico, researchers and bat managers alike hope they will seize the day and

move into their new home.

Being intelligent creatures, maybe they will take a cue from the bat emblem on its roof.

by Jean Hardy

A Close Encounter

As evening fell along the Rio Grande floodplain one day last November, three of us rested near the west wall of Fort Leaton. We had driven 130 miles from Alpine under black clouds and scattered rain that had threatened to ruin our photographic expedition.

Late in the day the horizon suddenly cleared, allowing a stream of golden light to fall across the scene—the fort, the bat house, the shimmering cottonwoods and, nearby, the rich earth freshly tilled for planting winter onions and melons.

We had worked hard for less than half an hour before the clouds closed again and the sun sank below the Mexican horizon. Now we gazed across the darkening plain, watching the last light fade beyond distant mountains.

A bird flew close by—an owl or a nighthawk, we wondered aloud. No, wait. It wasn't a bird, it was a bat. It swooped out over the fields and dipped swiftly for some indiscreet insect. Then appeared another, and another.

Just behind us stood massive wooden doors set in the fort's thick adobe walls. Although the doors were bolted shut, we could hear a chittering noise behind them. Somehow, bats were squeezing through an invisible opening between one corner of the door and the jamb.

One at a time they came, apparently having found only a single crack big enough to allow exit. Their strange vocalizations grew more excited at times, as if they were urging on the next in

line, perhaps a fat bat or a reluctant juvenile.

Soon obscured by nightfall, the bats became mere phantom shapes, the swoosh of their wings and their softening chatter the only sounds in that still place.

We were intruders. It was time to leave.

Government Canyon Park A Boost For San Antonio

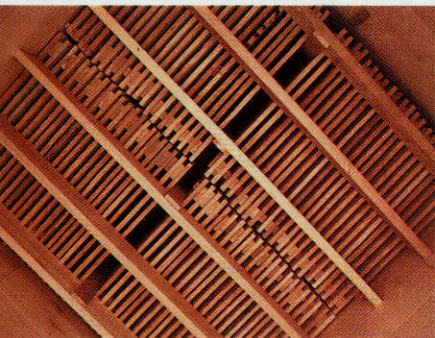
San Antonio area residents can look forward to the eventual opening of a 4,700-acre park just outside Loop 1604 on the city's northwest side.

Planning is underway for development of the Government Canyon tract, which is known to be important habitat for endangered golden-cheeked warblers and black-capped vireos. Most of the tract also lies within the Edwards Aquifer recharge zone, a water-collecting rock formation that supplies water for much of the region.

The land was purchased from the government's Resolution Trust Corporation through a cooperative agreement between the Texas Parks and Wildlife Department, the San Antonio Water System and the Edwards Underground Water District, with mediation assistance from the Trust For Public Land. The purchase also was backed by the Government Canyon Coalition, made up of some 400 individuals and neighborhood groups.

Government Canyon will be operated by the TPWD as a state park or state natural area with funding support expected from private grants and endowments.

The land is located just west of Loop 1604 (Anderson Loop) at its intersection with Bandera Road.



© BLAIR PITTMAN

Sul Ross graduate students Joe Ashley and Denise Louie examine a lab specimen of the Mexican free-tailed bat (below), the most common species at the fort. Inside the bat house are narrow wooden slats (left).



© JEAN HARDY



Two Nations, One Land

Biosphere concept could link two nations' efforts to preserve Chihuahuan Desert ecosystem.

by Jean Hardy



AFTER 60 YEARS of hope, hype, talk and inaction, it seems that progress toward a Mexican park or biosphere on the south side of the Rio Grande in the Big Bend area could become a reality. And if so, public land stewards on both sides of the river will have stitched together one of the world's larger ecosystem preserves.

It may all become possible through the United Nations Educational, Scientific and Cultural Organization's Man and the Biosphere (MAB) Program, which designates qualifying parks and preserves as International Biosphere Reserves. These are special places where natural ecosystems enjoy protection but where humans live and

work in ways that do not irrevocably destroy natural resources.

Such reserves also foster scientific research, and scientists can share what they learn worldwide. (For more details about the program, see accompanying article.)

Big Bend National Park (BBNP) has been designated an international biosphere reserve since early in the program, which was launched in 1976. Now officials of the Texas Parks and Wildlife Department and the National Park Service want to add Big Bend Ranch State Natural Area and Black Gap Wildlife Management Area, both contiguous to BBNP, as components of the MAB Program. Together these three Trans-Pecos areas represent just over

one million acres of rugged, majestic landscapes already secured for public recreation and/or protection. To expand the Big Bend Biosphere Reserve, officials must apply to a special UNESCO committee, which will review the application to ensure applicants meet the criteria.

What's the point of becoming a biosphere reserve?

"The biosphere reserve concept gets you a couple of things," said Texas Parks and Wildlife Executive Director Andrew Sansom. "Number one, it unifies and heightens the visibility of the protected areas on the American side of the Rio Grande, and it could do the same for [any future] protected areas on the Mexican side."

Park managers say that belonging to the International Biosphere Reserve Program would ensure that scientists and other interested parties on both sides of the river could engage in consistent dialog on issues of mutual concern. "It would strengthen our knowledge of the region and allow us to address some fundamental problems, such as air pollution," Sansom said.

Right now a framework for continuing discourse does not exist, say state and national park officials. Participating in the biosphere reserve program "would allow different interests to coordinate their activities," said TPWD's Jim Carrico. Carrico has been involved in Mexico-U.S. park issues for several years, currently as special administrative aide to Sansom and before that as superintendent of Big Bend National Park. "We would have a forum for discussing and working out problems with desert bighorn sheep management, mountain lion control/management, and mining and timbering. All of these activities are interwoven, and right now we have no mechanism for consistent policy development on both sides of the river."

Other thorny problems could be addressed, such as drug smuggling, illegal immigration, livestock control, river water quality, black bear and other endangered species protection, range



© LAURENCE PARENT

management, and conflicts between landowners and government. Cooperative efforts and community education in the Mapimí Biosphere Reserve in Durango, Mexico, for example, have helped save the endangered bolsor tortoise, which was hunted almost to extinction. Easy prey and prized as food, the tortoise now has become a symbol of pride and protection to local residents.

The Chihuahuan Desert Biome

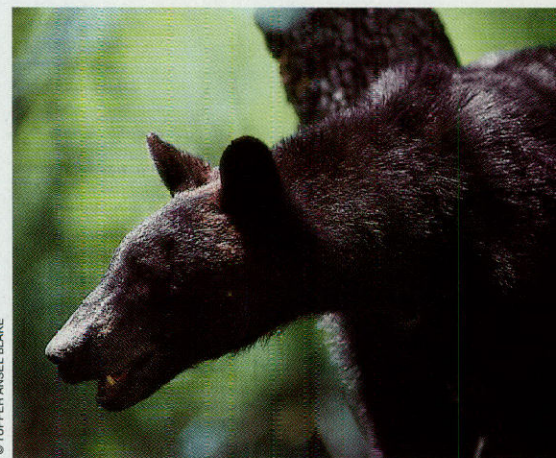
Big Bend National Park, at 800,000-plus acres, is only a small chunk of the Chihuahuan Desert biome, which stretches through the heartland of Mexico between the vast bicoastal ranges of the Sierra Madre. A biome is a distinct geographical area that shares common life forms in a physical setting of similar geology and climate. It is a unique and dynamic collection of

plants, animals and other life forms that have adapted to one another and to the region's geology, soils and climate.

From the city of San Luis Potosí on the south, this great biome reaches northward through five Mexican states: northern Durango, Nueva Leon and Zacatecas; and much of Coahuila and Chihuahua. Then it extends across the Rio Grande and covers Texas west of the Pecos River, spilling over into southern New Mexico and a small corner of Arizona. (See "High and Dry," *Texas Parks & Wildlife*, September 1992.)

The desert's parched terrain supports a spiny array of lechuguilla, cacti, tough shrubs and other organisms specially adapted to the harshest and lowest elevations, where annual rainfall typically measures less than 10 inches and summer lasts nine months a year.

But mid-elevations in some areas of



© TUPPER ANSEL BLAKE

If Big Bend Ranch State Natural Area (top) and Black Gap Wildlife Management Area are added to the Big Bend biosphere reserve established in the 1970s, the reserve will contain more than one million acres. A similar protected area on the Mexican side of the Rio Grande would allow officials in both countries to coordinate efforts on a number of issues, including protection of endangered species such as the black bear (above).

the Chihuahuan Desert such as the Marathon Basin boast rich grasslands studded with maguery, yucca and sotol, while the higher mountains stand tall enough to garner the moisture and cooler air necessary to support oak, pine, juniper and even Douglas fir and aspen. The Sierra del Carmen mountain

range lies on the eastern boundary of Big Bend National Park and extends eastward and southward deep into the Coahuilan outback. Its bold horizontal beds of Comanchean limestone rise 5,000 feet above the river. The ramparts catch the rays of the setting sun, reflecting a dazzling array of pink,

coral, orange, red, lavender, mauve and purple—shades that shift and ebb season to season, minute by minute and second by second, much to the delight of an unending stream of photographers in Big Bend Park. The cliffs obscure an even taller range behind them, the so-called “Sierra Fronteriza,” or



TEXAS PARKS AND WILDLIFE

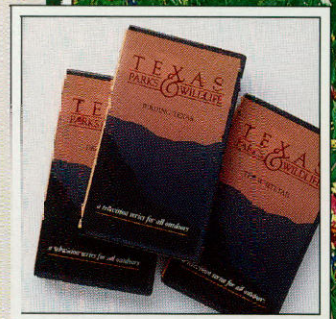
1994 SPRING GIFT COLLECTION

Response to our first Gift Collection last fall was tremendous. So we have made this Spring Gift Collection even better, while continuing to emphasize Texas-made products that increase environmental awareness and promote the outdoors. Spring-inspired, the collection highlights hummingbirds, bluebonnets and backyard gardening. And, to remind us that some resources cannot be renewed, we are featuring the ancient rock art of Southwest Texas and endangered species. We hope you enjoy these products with the knowledge that proceeds are helping to protect and preserve our natural resources for future generations of Texans.

Sincerely,

Andrew Sansom

Andrew Sansom
Executive Director
Texas Parks and Wildlife
Department





ANCIENT ARTISTS OF TEXAS

Before there was a written language, people recorded their lives by drawing pictures, many of which survive on the walls of caves today. These rock paintings speak to us through the ages, describing tribal ceremonies, religious symbols and masks, successful hunts, headdresses, birds and animals. Many of them are being protected by the Texas Parks and Wildlife Department, and can be seen at places like Hueco Tanks and Seminole Canyon State Historical Parks, as well as Devil's River and Big Bend Ranch State Natural Areas.

Shaman T-Shirt

From Seminole Canyon comes the magical, mystical Bird Shaman, a holy man dressed like a bird. 100% cotton. Pre-washed and pigment-dyed, the garment has a "time-worn" finish with subtle color variations. Short sleeve. Gray smoke color. A TPWD exclusive.

- | | | |
|------|-------|---------|
| 3015 | L, XL | \$19.00 |
| | XXL | \$20.50 |



Wrought Iron Sculpture

Inspired by rock paintings of the Lower Pecos, Texas artist Perry Barnard transformed ancient images into modern-day metal sculptures. Each piece is hand cut from 1/4" weathered sheet metal, brushed and signed.

- | | | |
|------|--------------------------------------|---------|
| 8001 | Dancing Buffalo Shaman, 11" high | \$39.00 |
| 8002 | Anthropomorphic Figure, 13-1/2" high | \$39.00 |



Children's Book of Masks

Youngsters will enjoy reading about the rock art in Texas parks, and then coloring and wearing the six cut-out masks featured in this 28-page activity book created exclusively for us by Debra Morgan with the help of consulting anthropologist Kay Sutherland, PhD, St. Edward's University. The pencil colors were selected by an archeologist to match closely those colors used in ancient rock paintings. Includes five long lasting, high quality color pencils, sharpener, elastic ties and carrying pouch. Ages 5-12. Size 8-1/2" X 11".

- | | | |
|------|---------------|---------|
| 1009 | Book of Masks | \$14.00 |
|------|---------------|---------|

Hueco Tanks Jewelry


Pictographs are pictures painted on stone; petroglyphs are pictures etched in stone. Now we have silverglyphs, jewelry created by Texas artist Margaret Berrier. Pieces include Sun Burst earrings (a TPWD exclusive) from a design thought to be Mescalero Apache, a whimsical Roadrunner pin and a Rain Spirit bolo tie with a cloud terrace as part of its headdress. Every silverglyph is individually created and is signed and dated by the artist. Shown actual size.

- | | | |
|------|--------------------|----------|
| 7001 | Sun Burst earrings | \$ 49.00 |
| 7002 | Roadrunner pin | \$ 65.00 |
| 7003 | Rain Spirit bolo | \$110.00 |





Lower Pecos Petroglyph Jewelry

Rock art from the Lower Pecos in West Texas inspired artist Kenneth Grey Wilson to create these sterling silver earrings and pin. The human figure is a Shaman/Hunter, holding an atl-atl, a spear-throwing device which preceded the bow and arrow. The earrings depict a notched circle signifying the cycle of life. They were created exclusively for our collection. Shown actual size. 

- | | | |
|------|---------------------|---------|
| 7004 | Petroglyph Pin | \$38.00 |
| 7005 | Petroglyph Earrings | \$32.00 |


JOIN THE DANCE OF LIFE

Texas' Native American pictographs inspired this dynamic composition, "The Dance of Life," by designer Debra Morgan of our Graphics Department. Texas Parks and Wildlife protects these species, but preserving the state's biodiversity—the full range of native plant and animal life—requires the help of every nature lover. (Shown below.)

Handmade Mug


Handmade ironstone mug, printed in Texas, features a three-finger handle. Dishwasher and microwave safe, 12 Oz.
5001 \$8.00 each, \$15.00 for 2, or \$28.00 for 4

Note Cards

Make a statement about your commitment to the environment when you use these note cards. Paper and packaging are recycled. Set of 12 cards and bright blue envelopes. 4-3/4" x 6-1/2". 
201C \$10.95



Rock Art Stone Coasters

These stone coasters will survive the ages, so future generations will know of your interest in preserving ancient rock art figures. Artist Gerald Cox has used a unique etching process, unlike the common silk-screen method, to indelibly capture the rock art figures of a Bird Shaman, a Dancing Buffalo, a Roadrunner and a Panther on 4" rounds of porous rhyolite, a volcanic stone, which naturally absorbs liquids. Variations in color add to the beauty and uniqueness of each individual, hand-created piece. Cork-backed to protect your furniture. 


- 8003 \$40.00 for set of four

Dance of Life T-Shirt

The design is boldly reproduced on a canvas of environmentally friendly unbleached cotton. Short sleeves and neck are lined in rich black. Comfortable, oversized cut; youth (S, M, L) and adult (S, M, L, XL) sizes. (Shown above.)

- | | | |
|------|-------|---------|
| 3011 | Adult | \$19.00 |
| 3012 | Youth | \$13.00 |

Bandanna

A matching bandanna features multi-colored "Dance of Life" design on a natural background. 22" x 22." 100% cotton. (Above right.) 

- 3016 \$8.00

Also see rock art videos on Page 4.

★
1-800-580-5050
CALL TOLL-FREE

Cougar Box

Put a lion in your den (or office) when you select this unique box, created by noted Texas environmental artist Arielle, whose work has been represented in galleries and museums nationwide, including the Smithsonian Collection. It's perfect for business cards. Arielle used recycled cherry wood for the box, and sculpted the mountain lion in bronze. 4-1/2" W x 3" D x 3-3/4" H.
8008 Cougar Box \$120.00

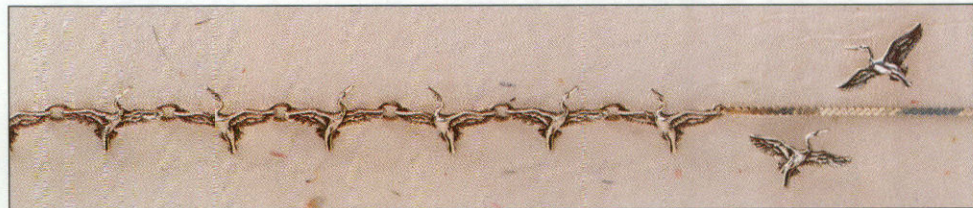


Mesquite Box

A piece of the Texas Hill Country will be yours with this mesquite box crafted by Dan Adams, who preserves the uniqueness of each mesquite log and brings out its warm red color and beautiful grain. The box has an inner tray and can be used for desk items, jewelry or coins. No two boxes are alike. 6-1/4" W x 5-1/2" D x 4-1/2" H. TX
8009 Mesquite Box \$40.00



This symbol denotes items that are truly Texas – designed, manufactured and produced in Texas. They have been selected for their high quality and uniqueness.



Noteworthy Cards

Illustrator Clemeuz Guzman III renders the Wild Turkey, Black-Capped Vireo, and Clapper Rail in beautiful detail. Each card includes a description of the bird and its environmental predicament. The inside is blank to carry your own personal message. Twelve cards, four of each design, with matching envelopes. Recycled papers and packaging. TX
2001 (4-1/8" x 9-1/2") \$7.95
2002 (4-3/4" x 6-1/2") \$6.95

Egret Necklace

Austin artist Arielle has recreated the beauty of elegant egrets flying in a row (ten in all, each having a wingspan of 7/8", total length of necklace is 15") on a sterling silver necklace, with matching earrings. Exclusively ours for this Spring Collection.
7013 Necklace \$45.00
7014 Earrings \$18.75



Mesquite Birdhouse

A genuine mesquite log makes the perfect natural birdhouse. The entrance hole will accommodate wrens, titmice, chickadees and nuthatches. The lid is removable for easy cleaning. Simply hang it from a tree or attach it to a fence post. TX
3010 \$20.00

Hummingbird Feeder

This 32-ounce Best 1® Hummingbird Feeder will keep your birds humming a happy tune. It's made in Poteet, Texas — and sixteen years of field research has gone into the development of its features. It's bee proof, has a built-in perch and eight feeding stations. TX
5003 \$12.00





Attwater's Prairie Chicken Shirt

As of 1993, there were 440 Attwater's Prairie Chickens in existence, all in eight Texas coastal plains counties. This classic short sleeve polo shirt is made of high quality 100% combed cotton pique. It has a knitted collar, two-button placket, welt sleeve cuffs, 2" side vents and a 2-1/2" tail for a better fit. The Attwater's Prairie Chicken embroidered on the front is a reminder that your purchase helps support the Nongame and Endangered Species Fund. Men's sizes.

3019	S, M, L, XL	\$45.00
	XXL	\$46.50



HORNED TOAD

Leapin' lizards! Yes, they're lizards, although many people call them horny toads. As with other threatened and endangered species, all of us will have to make sure the proper conservation measures are taken in order to save this native Texas lizard. But there's no harm in your wearing replicas of the lovable creatures.

Horned Toad Jewelry

Once again, we've called on the skills of artist Kenneth Grey Wilson to create these sterling silver and brass earrings and pins. As with all our jewelry, the earring posts are hypoallergenic.

Shown actual size. 🇺🇸

7006	Earrings	\$28.00
7007	Pin	\$36.00
7008	Lapel Pin	\$15.00
	(not shown)	



Horned Toad T-Shirt

No prince (or princess) should be without one of these T-shirts with a horned toad on the front designed by TPWD artist Clemente Guzman III.

The shirt is 100% cotton. Preshrunk, natural, short sleeves. 🇺🇸

3017	S, M, L, XL	\$16.00
	XXL	\$17.50



Javelina T-Shirt

Javelinas thrive in Southwest Texas, probably because their main diet is the prickly pear cactus. This "info-shirt" by TPWD designer Linda Wells is natural-colored and has short sleeves. It's made of 100% cotton, preshrunk. 🇺🇸

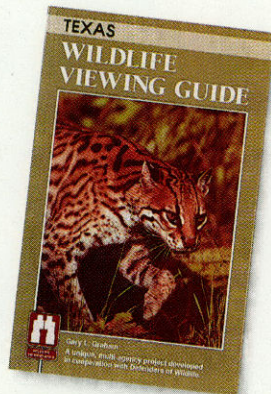
3018	S, M, L, XL	\$15.00
	XXL	\$16.50



Texas Wildlife Viewing Guide

by Gary L. Graham. Offers maps, trips, and facilities guides for 142 premier wildlife viewing locations across the state. Just pack this guide and your binoculars, and you're ready for the adventure of wildlife worth watching. 6' x 9", 160 pages, 90 color photos, soft cover.

1007 \$7.95



★
1-800-580-5050
CALL TOLL-FREE

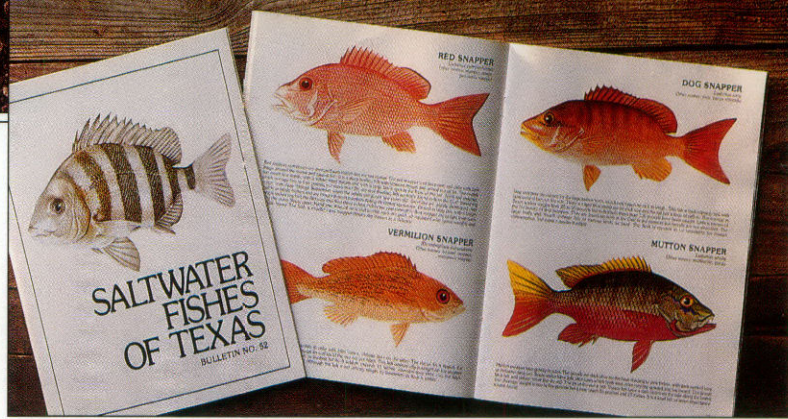


Saltwater Poster

Now you can point out "the one that got away." This Texas-size poster (25" W x 38" H), suitable for framing, will help you to identify the saltwater fishes at a glance. Includes all of the fishes from the Saltwater Fishes of Texas book. 2012 \$13.00

Sportsman's Guide to Texas

by Dick Bartlett and Joanne Krieger. See everything the state has to offer the angler and hunter in one comprehensive volume. Descriptions of major game animals, where to find them, and when; 200 color photos; wild game recipes; and more. Quantities limited. 320 pages, hard cover, 9-1/4" x 12-1/4". 1004 \$29.95

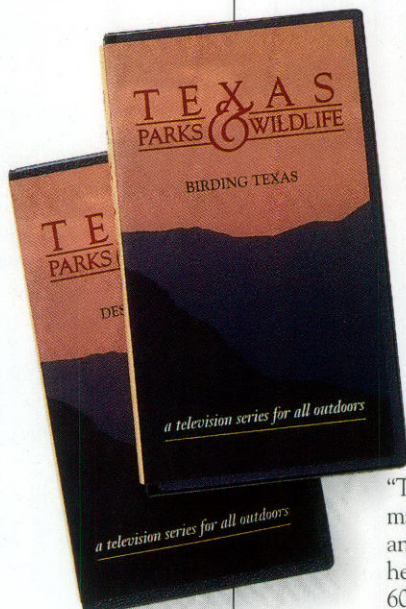


Saltwater Fishes of Texas

Informative fish tales, appropriate for the boat or the coffee table. This colorful, 42-page guide provides everything you need to know to catch and identify saltwater fishes. Each species is identified by a large, full-color illustration, a detailed description, and pertinent details of habits and habitats. Soft cover, 8-1/2" x 11", Texas Parks & Wildlife Press. 1003 \$9.95

BEST SELLING VIDEOS

Selections from the award-winning PBS television series, *Texas Parks & Wildlife*, are now available on high-quality VHS cassettes. Begin your collection now, and enjoy the best of Texas at home.



"Birding Texas" showcases the state's stunning selection of birds, their habitats, and migratory patterns, and provides practical tips on attracting them. 35 minutes. 6001 \$15.00

"Destinations" takes you from a tour of Central Texas swimming holes to a river rafting expedition down the Rio Grande and from Texas wildflowers to the rugged Big Bend Ranch State Natural Area. 50 minutes. 6002 \$15.00

"The Whitetail" offers information on managing land for a healthy deer herd, and examines the significance of heredity and nutrition on development. 60 minutes. 6003 \$15.00

"Outstanding Texans" features Texas' most valuable resource, its people. Included is a profile of noted botanist Dr. Barton Warnock, a visit with a group of physically disabled Texans who maintain an active lifestyle, and a shoot with nature photographer Wyman Meinzer. 45 minutes. 6004 \$15.00


"Down Under Texas" explores the awesome beauty of Texas caves, a subterranean world which is home to endangered species and a repository for groundwater supplies. 28 minutes. 6005 \$15.00

"The Rock Art of Texas" takes you on a tour of Texas rock art, recognized nationally as some of the most impressive in North America. Noted archeologists and historians reflect on the beauty and mystery of these ancient works. 28 minutes. 6006 \$15.00



Walking Sticks

Backpackers, hikers and walkers will enjoy these walking staffs, shaped and sanded by hand from straight-grained oak. Sizes 48" and 55". Either staff comes with optional sterling silver Star of Texas imbedded in the shaft.

Specify light or dark finish. 

80C4 48" Staff \$19.00

80C5 55" Staff \$19.00

80C6 48" with Star \$27.00


80C7 55" with Star \$27.00



1-800-580-5050

CALL TOLL-FREE

Bags/Day Pack

The roomy Hunter Day Pack in forest green is expertly designed for a rugged day in the outdoors. Comes with removable backpad, padded shoulder pad and waist strap. Gusseted front pocket and open side pockets will hold accessories, thermos, spotting scope, water bottle or whatever. Four extra tie-down straps are included. Retrofitted fanny pack has zippered side pockets ergonomically designed for a super-comfortable fit. The shell/bird bag in charcoal brown has four roomy compartments that slide on 2-1/2" adjustable nylon web belt. No more sitting on your birds! All in tough cordura nylon. 


9001 Day Pack \$76.00

9002 Fanny Pack \$34.00

9003 Shell/Bird Bag \$37.00



Outdoors Journal

Birdwatchers, nature writers and outdoor philosophers will love this Parks and Wildlife Journal, a beautifully bound book where you can record your thoughts and observations. The softcover book includes illustrations by Rob Fleming of our Graphics Department and quotations from Texas naturalists such as Roy Bedichek and J. Frank Dobie. A TPWD exclusive. 

1010 Journal \$8.95

Hunting Stamp T-Shirt

The dramatic Archery Stamp artwork of Texas Parks and Wildlife's Rob Fleming is outstanding on this natural T-shirt of 100% cotton.

3016 S, M, L, XL \$16.00

XXL \$17.50





Wildflower Prints

"Spring Remembered" is the title of this portfolio of five Texas wildflower prints by renowned Austin artist Rose Baxter. The original paintings were done in watercolor as botanical studies. This gift portfolio is a limited edition of 1,000 on acid-free paper, signed and numbered by the artist. Surround yourself with the beauty of the Texas Bluebonnet, Indian Paintbrush, Pink Evening Primrose, Indian Blanket and Yellow Primrose. 11" x 14". Unmatted. TX
 2015 Gift portfolio (all 5 prints) \$125.00
 2016 Separate prints, \$30.00
 (please specify species)

Wildflower Cards

Native Texas wildflowers by Rose Baxter are printed in full color on high quality, recycled paper, with botanical descriptions on the back. 4-1/2" x 6-1/4". Set of 12, with envelopes. (Shown far left.)
 2014 Wildflower Assortment \$10.00

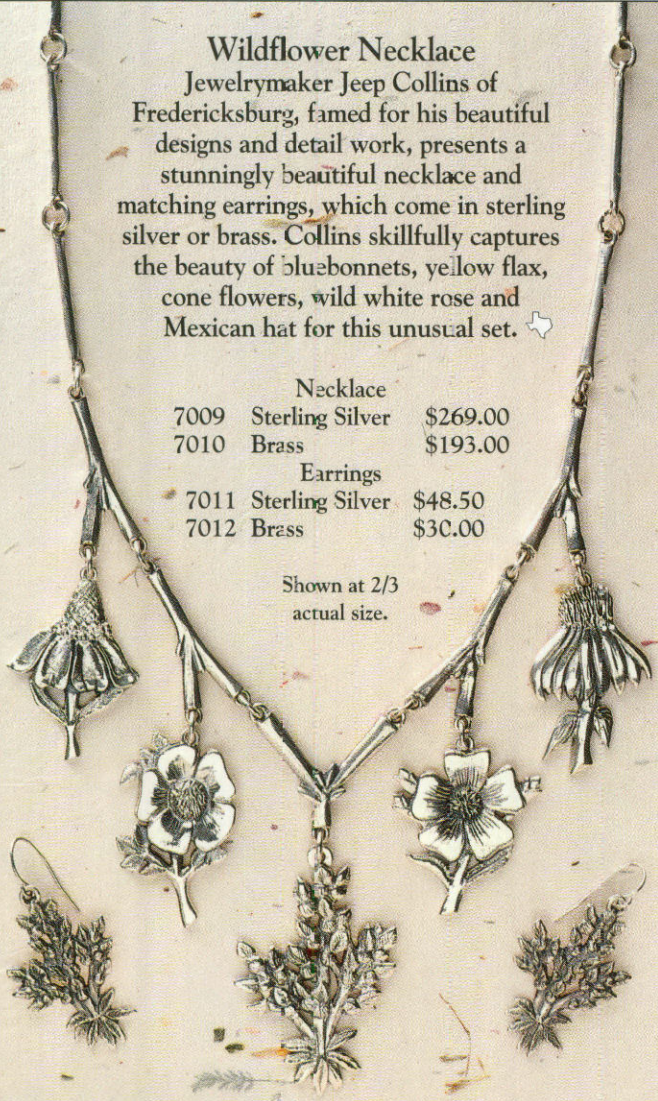
★
1-800-580-5050
 CALL TOLL-FREE

Wildflower Necklace

Jewelrymaker Jeep Collins of Fredericksburg, famed for his beautiful designs and detail work, presents a stunningly beautiful necklace and matching earrings, which come in sterling silver or brass. Collins skillfully captures the beauty of bluebonnets, yellow flax, cone flowers, wild white rose and Mexican hat for this unusual set. TX

	Necklace	
7009	Sterling Silver	\$269.00
7010	Brass	\$193.00
	Earrings	
7011	Sterling Silver	\$48.50
7012	Brass	\$30.00

Shown at 2/3 actual size.



Hummers

Tiny hummingbirds hover near a wildflower for this necklace in sterling silver and vermeil (14kt. gold over sterling silver) with a moonstone pendant. Hummingbird earrings are in vermeil or silver. These pieces were created for our collection — an exclusive this Spring — by Austin artist Arielle. Shown actual size.
 7015 Hummingbird Necklace \$48.00
 7016 Hummingbird Earrings (vermeil) \$22.00
 7017 Hummingbird Earrings (silver) \$20.00

Select from the quality items in this Collection, and at the same time share our goal — all proceeds from the sale of these items will be used to preserve, conserve and protect Texas's natural resources.

Conservation starts with you. If you receive duplicate copies of this please pass one on to a friend.

Brochure Credits:
 Conservation Communications Division,
 Texas Parks & Wildlife
 Leroy Williamson,
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 Motheral Printing

TEXAS PARKS AND WILDLIFE

Texas Parks & Wildlife Collection
 P.O. Box 17308 • Austin, TX 78760-7308

Printed on recycled paper.

“Maderas del Carmen,” which have the best example of a mixed coniferous forest community in Northern Mexico, according to TPWD Natural Resource Program Director David Riskind.

The Mexican Plan

For months, a group of Chihuahuan



© TRACY LYNCH

The Rio Grande forms the border between Texas and Mexico (left) but the Chihuahuan Desert extends into both countries. If areas under consideration for protection on both sides of the river ever were consolidated under a single biosphere reserve, that reserve would exceed 2.5 million acres. The Sierra del Carmen range, on the eastern boundary of Big Bend National Park, has areas of rich grasslands (above).

officials and academicians has been working on a plan to establish a separate Mexican biosphere reserve in the Big Bend. Under the sponsorship of Chihuahuan Director of Urban Development and Ecology Francisco Jose Prieto Muñoz, the Mexicans have named it El Proyecto Reserva de la Biósfera Santa Elena-Sierra del Carmen, and on August 5, 1993, they received the endorsement of Mexican President Carlos Salinas de Gortari at a ceremony in Ciudad Juárez.

According to Chihuahuan official Gina Uribe Zuñiga, the current plan calls for a 600,000-hectare (about 1.5 million acres) preserve, half in Chihuahua and half in Coahuila, that would extend along the Rio Grande from a point near Redford, Texas, eastward to La Lirida, a river distance of about 200 miles. This region would roughly coincide with the borders of the Big Bend Ranch State Natural Area, Big Bend National Park and Black Gap

Wildlife Management Area. It would measure approximately 30 by 200 kilometers and would include much of the Sierra del Carmen range of Coahuila on the east and the Sierra Rica range of Chihuahua on the west, its size exceeding that of the three corresponding areas in Texas by about 50 percent. If ever consolidated under a single biosphere reserve designation, the total area would exceed 2.5 million acres, or almost 4,000 square miles.

In Mexico, a “biosphere reserve” is a national management category of protected area distinct from the UNESCO program, and it is formed by presidential decree. It does not become affiliated with the United Nations network of biosphere reserves until it applies for and is accepted into the MAB program. The Santa Elena-Sierra del Carmen planning document ultimately calls for the Mexican government to solicit UNESCO for international biosphere reserve status.

Mexico currently has five MAB-affiliated biosphere reserves—Mapimí, Michilia, Montes Azules, El Cielo and Sian Ka’an. In addition, that country has been expanding the number of presidentially designated biosphere reserves at an accelerated rate. Salinas named three new reserves in the Sonoran Desert near the Arizona border last year,



© WYMAN MEINZER



The many faces of the Chihuahuan Desert: a waterfall in Mexico's Sierra Madre Oriental, on the desert's eastern edge (below); agave and pinyon pines in Big Bend National Park's Chisos Mountains (below right) and the rugged and majestic view from the top of Mexico's Sierra del Carmen, east of the national park (above).

and his interest in the northern Chihuahuan Desert reserve is seen by some observers as an essential first step toward achieving that long-held goal. Other Mexican-designated biosphere reserves include large (over 10,000-hectare), ecologically significant tracts at Vizcaíno, Clackmul, Lacantún, El Triunfo, Sierra de Manantlán and Pantanas de Centla. A second category of Mexican biosphere reserves of

less than 10,000 hectares lists 13 additional sites.

The new plan's first phase calls for an ecological study of the plan area, said Uribe, who is chief of promotions and education in the Department of Ecology in Chihuahua. A group of scientists from the University of Chihuahua has begun an inventory of the natural, historical and cultural resources of the area, she said.



© LAURENCE PARENT



© CARR CLIFTON



© TRACY LYNCH

Will It Really Happen?

Mexicans and Americans alike long have relished the prospect of a huge park or natural area that would meet at this spectacular stretch of the river. In fact, the proposal in varying forms has been discussed for so many years (since 1935) and with so little real progress

that skeptical observers, a few longtime residents of South Brewster County among them, meet each new wave of park rumors with derisive comments.

But this time, it just might be different.

The failure is usually blamed on a number of political and economic real-

The Biosphere Program: What It Is, What It Does

The United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and the Biosphere (MAB) program was launched in 1971 to provide a worldwide mechanism for conserving natural areas and the genetic material they contain, but with the caveat that the needs of humans must be taken into account. The term "biosphere" is a general one referring to all living beings and their earthly environment.

A biosphere reserve is a unique category of protected area dedicated to helping discover solutions to problems that arise from humanity's need to use natural resources—solutions to such devastating problems as tropical deforestation, desertification, air pollution, the "greenhouse effect" and other ills. In short, the MAB formula is designed to protect biological diversity, conserve resources, encourage research and promote sustainable development.

Countries that propose sites for reserves retain full control of their reserves but promise to participate in the MAB program. The first sites were designated in 1976, and today 311 biosphere reserves in 81 countries represent 110 out of 193 terrestrial biogeographical provinces, according to MAB sources.

Ideally, each reserve consists of a core area, a buffer zone, and a transition area. The core area has secure legal protection and allows only those activities that do not adversely affect natural processes and wildlife. Thus "wilderness" por-

tions of national parks often serve as core areas of biosphere reserves.

In the buffer zone, which typically adjoins or surrounds the core area, uses and activities are managed in ways that help protect the core. The outermost part of a biosphere reserve is the transition area, which typically surrounds the core and buffer zones. This usually is a less strictly defined, dynamic "zone of cooperation," where conservation knowledge and management skills are applied, and uses are managed cooperatively and in harmony with the purposes of the biosphere reserve. The area may contain settlements, croplands, managed forests, areas for intensive recreation, and other economic uses characteristic of the region.

The MAB program thus emphasizes multiple functions within a given reserve and links each site into an international framework of ecologically sound development and information-sharing.

National MAB committees are responsible for preparing biosphere reserve nominations and for involving appropriate institutions and individuals in preparing the supporting documentation. Each nomination is evaluated by a small, independent group of experts, which recommends areas believed to satisfy selection criteria for review by the Bureau (executive committee) of MAB's International Coordinating Council. If the Bureau approves the site, the national MAB committee receives a certificate of designation from UNESCO.

Most Mexican park efforts in the past have been almost exclusively focused on the Sierra del Carmen and Maderas del Carmen ranges in northwestern Coahuila. But Uribe emphasizes the importance as well of the Sierra Rica range in northeastern Chihuahua. Though generally not as well known as the del Carmen range, it is said to resemble the Davis Mountains of Trans-Pecos Texas and boasts a tremendous range of biological diversity in a relatively unspoiled state, Uribe said.

Cooperation from Coahuila is critical to the plan's success because half of the proposed biosphere reserve lies in that state. Eager to work with the Coahuilans, Chihuahuan officials held up on formal talks until a recent changeover in Coahuilan government leadership took place. Representatives of both Mexican states as well as Texas currently are trying to hammer out a cooperative agreement on reserve issues.

"We are very excited about this plan and are pleased that our president has endorsed it. We have asked him for help in getting the money for the plan," said Uribe. Part of the region is privately owned, part is owned by the federal government, and part is held by ejidos, which are small communal farms established by the land reforms of the 1930s.



© LAURENCE PARENT

ities within Mexico. First, there is the tension between state and federal control. Much of the impetus in the past has come from the state of Coahuila; now it is coming from Chihuahua. "However, support from Mexico City is important," said Sansom. That is one reason Salinas' endorsement could be so significant for the current plan.

Another problem is the absence of a state-level park system in Mexico. Howard Ness, U.S. National Park Service director of Mexican affairs, said this need not be a serious obstacle for the Chihuahuan proposal. "The strategy in Mexico is to let the states take the lead in planning and research, and then present their findings to the federal government to take over, once the preliminary work is done."

A third problem is the lack of a longstanding tradition of major public parks within the Mexican federal government. While there is a national park system, said one observer, it never has functioned in quite the same way as its counterpart in the U.S., which has a long history of managing large parcels of land and the money necessary to do it.

Especially significant about the UNESCO biosphere reserve concept in relation to the Mexican park initiative is that it would allow some economic development and use of the land. Such a plan for the remote "Gran Comba" of the Río Bravo del Norte in Mexico would counter the traditional argument that Mexico cannot lock away its resources in nature preserves because of the needs of its rural poor.

Some say Mexico's desire to implement the North American Free Trade

The Sierra del Carmen range in Coahuila (above) is part of the proposed Mexican biosphere reserve. On the other side of the river, Big Bend Ranch State Natural Area could become part of the existing international biosphere reserve established in the 1970s. Big Bend Ranch's Solitario (right) is a domelike formation with a huge depression in the center. This geologic formation known as a laccolith is nine miles in diameter.

Agreement may have played some part in initiating this latest park movement. Also at work is the prospect of a booming ecotourism trade in this economically depressed region.

NPS's Ness ascribes more idealistic notions for the park effort: "Environmental issues are near and dear to the heart of President Salinas," he said. The ceremony in Juarez was significant "because it publicly launched an initiative by a Mexican state, with



© GLENN HAYES

Mountain lion control and management is a concern of both countries.

the blessing of the federal government, to establish a major biosphere reserve in northern Coahuila and Chihuahua.” And even though the Salinas government will be replaced (by constitutional law) in January 1995, Ness speculates there won't be major changes in envi-

ronmental initiatives in Mexico because the desire to protect the natural resources is genuine and comes from the people.

“The philosophy of raising environmental awareness in Mexico is real,” he said. “Yes, they have a problem in getting the funds to do what they want to do, but the intention [to conserve resources] is real.... And make no mistake about it, they are doing it for their country, not for anything to do with the U.S.”

A great deal of interest from the American side historically has been focused on officials in Mexico to carve out a park. But lately Texas and U.S. park policy has downshifted into a quieter mode.

“It's a very sensitive thing for American officials to comment on,” said Sansom, “because we really can't do anything about it at all. So we and the [national] park service have selected an enlightened approach over the past several years. That is to concentrate our efforts on technical assistance—spending time helping our Mexican colleagues with major park issues, [showing them] what the opportunities and liabilities are, how to do it; because in the end, they're not going to do it because of pressure from the United States.” ★

Jean Hardy is a freelance writer and editor based in Marathon and Houston. She currently is pursuing graduate studies in biology at Sul Ross State University in Alpine.



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Big Bend National Park: Texas's Beautiful Backcountry

by Ann P. White

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ERPENDICULAR CLIFFS of Santa Elena Canyon rise 1,500 feet on either side of the Rio Grande. To the east the Chisos Mountains paint the desert sky. Changing patterns of light and shadow play across a landscape that creates a feeling of almost limitless space.

No doubt about it, this is big country. You don't go by Big Bend on the way to somewhere else. You reach it as your destination. You are at the end of the road, with only a rowboat to take you across the Rio Grande to a small village in Mexico. The river snakes through canyons, desert and mountains for 118 miles, forming the southern boundary of Big Bend National Park and making a giant curve that

cradles this 1,254-square-mile chunk of the Chihuahuan Desert.

This remote park's headquarters at Panther Junction is some 125 miles from the nearest interstate highway, with only one small town in between. This in itself attracts many visitors to Big Bend—to raft through the canyons, to hike or ride a horse along the trails and to camp under the cottonwoods or in the mile-high basin. Others come to relax in comfort at the Chisos Mountain Lodge and just enjoy their surroundings.

Back in the 19th century, local residents called Santa Elena Canyon "utterly impassable." It held treacherous passages, perpendicular cliffs, whirlpools and rapids, but in 1881 a survey party led by a Texas ranger succeeded in float-

ing the canyon. The same dangers that deterred early explorers now attract rafters.

"Santa Elena Canyon's two-day, one-night float trip has become our most popular program and we offer it all year," said Steve Harris who, with Mike Davidson, owns Far Flung Adventures. As one of three outfitters who offer guided trips through the park's three canyons, they also guide rafts through Colorado Canyon bordering Big Bend Ranch State Natural Area and the Lower Canyons downstream from the park.

For a memorable day's run on the river, join two or three raftloads of enthusiastic vacationers with guides and put in at Lajitas on a sparkling day. Add 19 miles of a river that curves through

desert, mountains and vertical cliffs that reach high into the deep blue sky and often surprise you with lacy greenery at their base. Mix in a relaxing couple of hours before stopping for a gourmet picnic lunch on the Mexican shore where the Rio San Carlos flows into the Rio Grande. Then add a few small rapids with a labyrinth of rushing currents through the Rock Slide for excitement. Stir in a short exploratory walk into the blue shadows of Fern Canyon, an uncounted number of photos shot and a pleasant flow of information from the guides. This recipe for a Santa Elena Canyon float guarantees a feast of rafting pleasure.

This allure of the canyons that brings visitors to Big Bend country often has recruited people to its way of life. Harris and Davidson launched their rafting service after a 14-day Rio Grande float from Talley, at the southern tip of the Big Bend, through numerous canyons all the way to Langtry.

"Rafting guides Gary 'Catfish' Callaway and Betty Moore both liked it so well after a canyon float that they decided to make it a permanent address," Harris said. "Callaway had a background in Houston theater and Moore served on the staff of a major regional magazine in Austin." In addition to guiding, Moore works in conservation on a national scale, with special interest in



© TRACY LYNCH

Towering limestone cliffs line the Rio Grande as it passes through Mariscal Canyon. Big Bend National Park's scenic canyons provide a feast of rafting pleasures.

the peregrine falcon, an endangered species that lives in the canyons and mountains of Big Bend.

Although Santa Elena is the best known, other canyons in the park have rafting personalities of their own. Mariscal sits at the tip of the Big Bend and, like Santa Elena, cuts through lime-

stone layers of an ancient seabed. This 10-mile trip is noted for its "splendid isolation (25 miles down a primitive, rocky road) and the high degree of sculpting in its walls," their brochure tells you. "On an overnight trip one has the feeling of being 'a thousand miles from the nearest streetlight or well-

trimmed lawn,' as one visitor remarked."

The 31-mile run from Boquillas Crossing to La Linda has no rapids, but offers "lots of spectacular canyons to float through and side canyons to hike into." It is listed as a three- or four-day trip.

Following a 1978 designation of the Rio Grande as a Wild and Scenic River, an additional 127 miles downstream from the park came under management of the National Park Service. Like the three canyons of Big Bend, the Lower Canyons are steep and sheer-walled. Harris calls this run "Texas's premier wilderness trip." A guided excursion here combines up to seven days of camping, canyons and rapids. (The park service issues warnings to novices concerning this stretch. To float any of the canyons on your own you must obtain a free permit at any ranger station.)

"We've taken lots of interesting groups through our canyons," Harris said. "One of the most memorable was a group of Norwegian bankers brought here by some Houston bankers. Other groups include National Audubon Society, the Arizona-Sonora Desert Museum and numerous executive retreat excursions. Such trips frequently focus on natural history."

In the stretches of the Rio Grande between the canyons, the flow runs generally slowly and quietly. A wide band of green borders the river here, and on clear days can be seen from the South Rim, 2,500 feet above the desert floor. This southwestern edge of the high Chisos Mountains, reached only by trails, also provides views of Santa Elena Canyon, 20 miles to the west, and peaks that are some 80 miles to the south in Mexico. To the east, mostly in Mexico, lies the range of mountains called the Sierra del Carmen.

Along with river running, day-hik-

ing and backpacking rank high as favored activities in Big Bend. From the short self-guiding nature trail at Panther Junction to the maze of strenuous trails on the Mesa de Anguila above Santa Elena Canyon, the park offers hikers more than 40 trails rated in stages from “easy walking” to “strenuous—backpackers only.”

In summer the High Chisos Complex of six developed trails provides a cool retreat from the lower desert locations. The South Rim Trail, one of this network, rates as probably the most spectacular. With a distance of 13 to 14.5 miles round trip from the Chisos Basin Trailhead to the South Rim, a day hike can be strenuous. Backpacking or a one-day trail ride offer welcome alternatives.

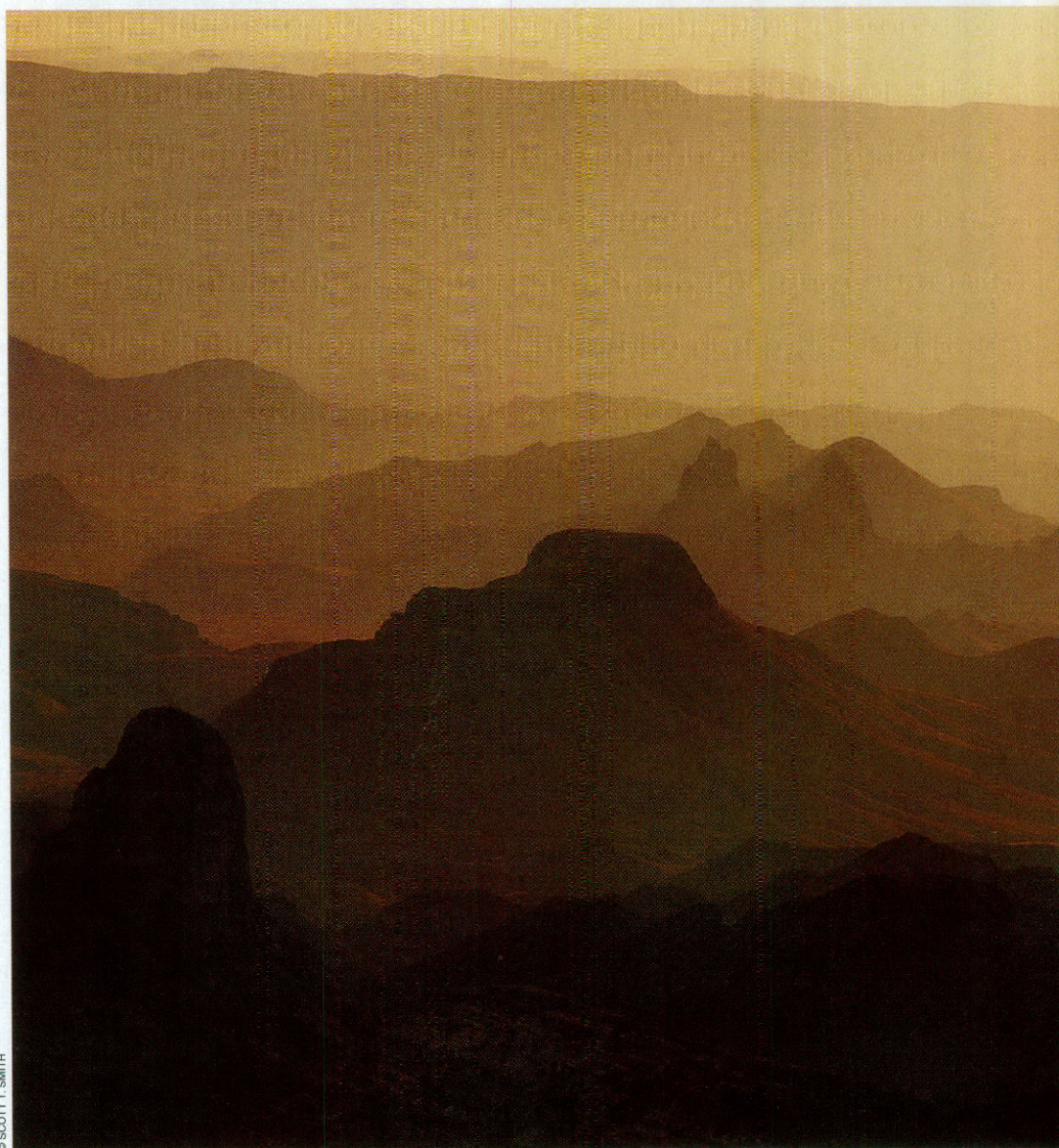
The Emory Peak Trail also includes impressive vistas. It leads to the top of the 7,835-foot peak, the highest point in Big Bend, but the last 50 feet become a scramble up a rock wall to reach the all-direction views.

The Lost Mine Trail, a popular park trail outside the High Chisos Complex, begins at Panther Pass adjacent to the road that leads into the Basin. One legend says that early Spanish *conquistadores* discovered rich gold and silver deposits near the summit of the peak, then forced captive Indian workmen to walk blindfolded to the mines so they wouldn't know the locations. On this trail you can

The South Rim of the Chisos Mountains, 2,500 feet above the desert floor, can be reached only by trails. Views from the South Rim (right) include peaks some 80 miles to the south in Mexico, the Sierra del Carmen to the east and Santa Elena Canyon to the west.



© CARR CLIFTON

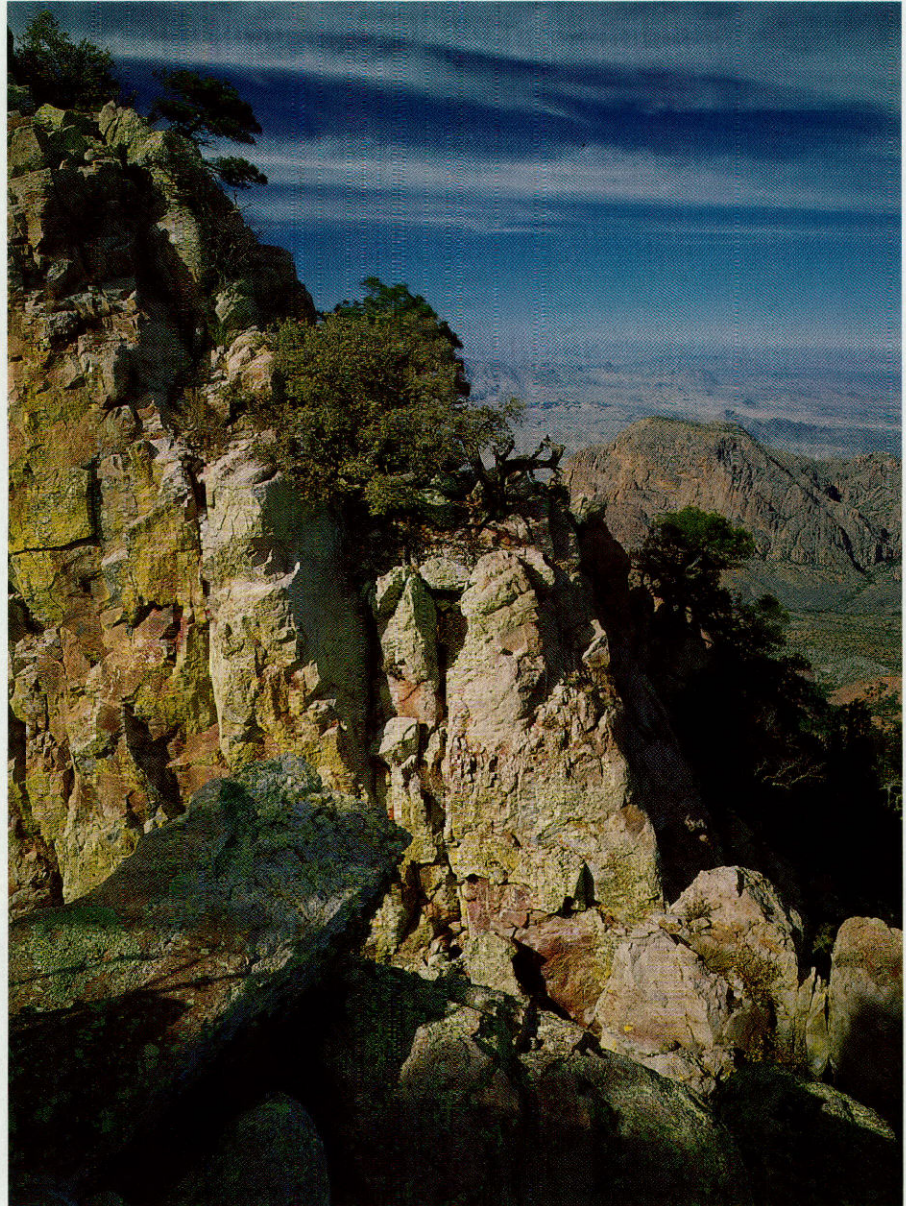


© SCOTT SMITH

reach one of the finest views in the park by hiking to a saddle that overlooks Juniper Canyon, one mile from the trailhead.

Hardier hikers can choose from 17 primitive routes. Many of these follow old roads and trails in use from the late 1800s until the park was established in the 1940s. Park Ranger Jeff Selleck emphasized the importance of camping only in designated locations when backpacking. "In this way we can minimize the impact on the park's natural resources," he said. "We want to pre-

The windows of a long-abandoned adobe ruin frame the distant Chisos Mountains (left). At right, the view from the summit of Emory Peak, the highest point in the Chisos.



© SCOTT T. SMITH



serve the valuable wilderness experience for everyone."

In addition to back-country designated camping areas, you'll find developed campgrounds at the Chisos Mountain Basin, Rio Grande Village near Boquillas Canyon, and Castolon on the river, eight miles east of the Santa Elena Canyon Overlook. The two river campgrounds are popular in the winter while the 5,400-foot elevation of the Basin makes for cooler camping during the summer.

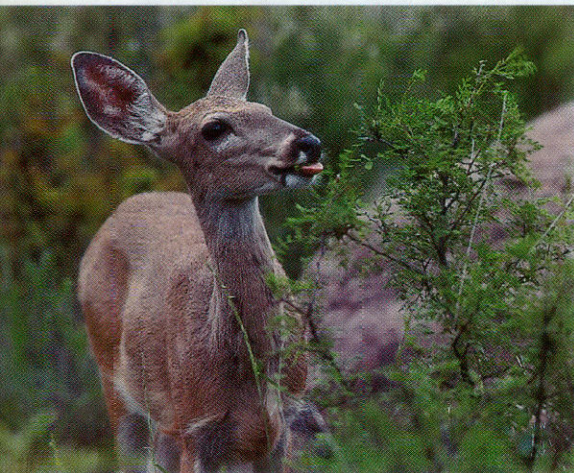
Rio Grande Village, with its cottonwood-shaded campground, store and other facilities, is popular with "winter Texans" from February through April. A volunteer campground host from the

VIP (Volunteers in Parks) program usually lives on the premises. "We have 178 volunteers in this program who averaged approximately 25,000 hours last year," said Park Ranger Alisa Lynch, VIP coordinator. "Volunteers are a valuable complement to the park's services and will help with our 50th anniversary rededication event as well as other special events." The anniversary rededication will be June 11, 1994, at the Chisos Mountains Basin.

Some 3,500 feet higher in elevation, the Basin Campground is surrounded by a backdrop of Casa Grande, Tell Mountain, Emory Peak and Ward Mountain. Extra precipitation at the higher elevation promotes stands of

junipers, small oaks and pinyon pines on the higher slopes, along with plentiful desert blooms.

In April the desert flower show of yucca, ocotillo and prickly pear mixes with native wildflowers along the roadsides. On an eight-mile auto trail to



© TUPPER ANSEL BLAKE

Dagger Flat, you can see a forest of giant yucca where many plants grow 15 to 20 feet tall. When in bloom, the brilliant, creamy-white blossoms can be seen across the desert close to the Dead Horse Mountains.

Along this route, a booklet trail guide identifies some 15 other plant species native to Big Bend—honey mesquite and leadtree with their yellow blooms, sotol, strawberry cactus with a brilliant red blossom, several varieties of prickly pear cactus, lechuguilla and others. Although spring blooms are showy, the Chihuahuan Desert becomes greenest in late summer or early fall when thunderstorms bring moisture welcomed by

Carmen Mountains white-tailed deer look like miniature versions of the whitetails found over most of Texas. Their range in the United States is limited primarily to Big Bend.

both plants and animals.

Big Bend's desert and mountains teem with life. The river's fringe brings unexpected birds and animals. Summer tanagers, painted buntings, vermilion flycatchers and cardinals accent the greenery, and sometimes beavers leave their marks on cottonwoods and willows. On arid lands above the river much of the wildlife is well equipped for desert survival—the jackrabbit with its long, sensitive ears, the kangaroo rat that can metabolize water from carbohydrates, the roadrunner that can pursue lizards and snakes at a speed up to 20 miles per hour.

“At times we close some of the trails to protect the nesting peregrine falcons,” said Selleck. “Other very special birds here at Big Bend are the Colima warblers, which nest nowhere else in the United States. Golden eagles can be seen occasionally and Lucifer humming-

BIG BEND NATIONAL PARK

Big Bend National Park lies 329 miles southeast of El Paso and 406 miles west of San Antonio, along the Big Bend of the Rio Grande and the Texas/Mexico border. Park entrances are reached from U.S. 385, 40 miles south of Marathon (north entrance), from Texas 118, 78 miles south of Alpine, or Texas 118 and 170 from Presidio and U.S. 67 from Marfa (west entrance). Marathon, Alpine and Marfa all are located on U.S. 90. The park headquarters is at Panther Junction, 915-477-2251.

This 802,541-acre national park, larger than Rhode Island, ranks sixth in size of parks in the lower 48 states.

Campgrounds (available on a first-come/first served basis): Rio Grande Village, Class A Campground, 100 sites, \$5 per night, elevation 1,850 feet. There also is an overflow adjoining campground for \$5 per night, open holiday periods only. RV hook-ups are available

only at a concession-operated trailer park at the grocery store/service station, 25 sites, \$11 per night, no reservations.

Chisos Basin Campground, 63 sites, \$5 per night, elevation 5,400 feet.

Cottonwood Campground, 35 sites, \$5 per night, elevation 1,900 feet.

If you come during a busy holiday period (primarily Easter/Spring Break, Thanksgiving or Christmas), the park service recommends you come prepared to camp in the Rio Grande Village overflow area or at one of the backcountry roadside camps. Bring along a portable table, folding chairs, water containers and a portable grill or stove. A free permit is required for backcountry camping.

Backpacking: Because of the unreliability of desert springs, you need to consult with park personnel about a planned hike. They can assist you in tailoring a trip to your needs and abilities. As with backcountry camping, obtain a

free permit from a ranger station and information on requirements for mountain desert hiking, such as taking at least one gallon of water per person per day.

Float trips: You may bring your own raft or canoe, rent equipment and go on your own, or take a guided trip with one of the outfitters, who provide everything needed for the excursion.

Outfitters for rafting excursions: Far Flung Adventures, Terlingua Ghost Town, 30 miles west of Panther Junction headquarters on Texas 170, phone 800-359-4138 or 915-371-2489; Outback Expeditions, Study Butte, 26 miles west of Panther Junction on Texas 118, phone 800-343-1640 or 915-371-2490; Big Bend River Tours, Lajitas, 40 miles west on Texas 170, phone 800-545-4240 or 915-424-3219; Texas River Expeditions, 915-371-2633.

A free permit is required for river trips within the park or on the Wild and Scenic River stretch. The park service maintains a clearinghouse for Lower Canyons use to ensure that groups do not “bunch

birds are abundant in summer.

"Black bear sightings have increased greatly in the last few years," he continued. "From 1944 into the '60s there were only one or two sightings a year, but in 1993 some 300 to 400 sightings were reported. The black bear remains an endangered species in Texas. We now provide steel boxes at campsites and require that they be used for food storage. Black bears have not been a threat to people, but the park service advises caution at all times. Some damage has been done to tents and equipment when food was not stored in the steel boxes." Mountain lions, coyotes, Carmen Mountains white-tailed deer, mule deer and javelinas also live in Big Bend.

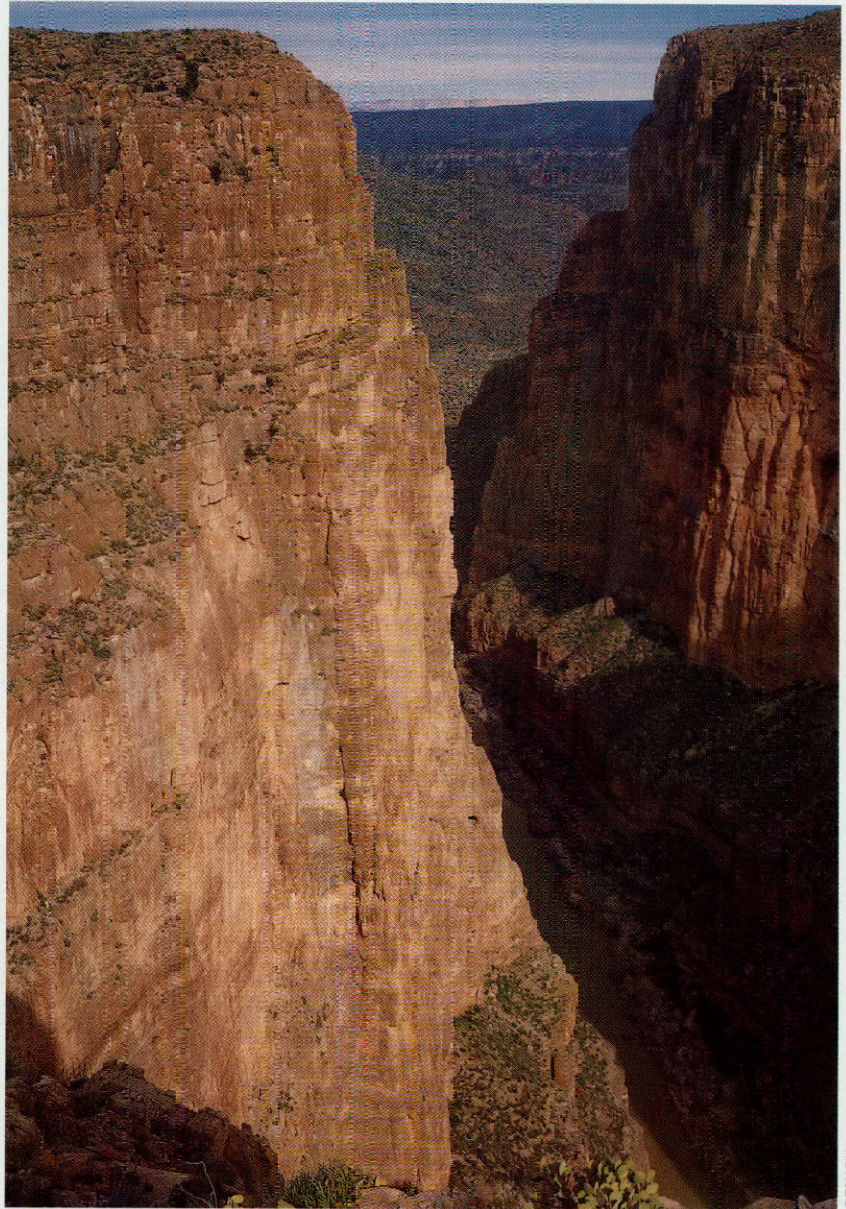
Since Big Bend became a national park in 1944, it has attracted increasing numbers of visitors. Between 275,000 and 300,000 come each year

up" on the Lower Canyons and spoil the wilderness quality of the trip. For Lower Canyon information, call 915-477-2393.

Equipment sales or rentals: Terlingua Trading Co., 915-371-2234 or 915-371-2424. Office is just off Texas 170 in Terlingua Ghost Town.

Chisos Basin facilities: Chisos Mountains Lodge, phone 915-477-2291. Rates for motel rooms range from \$59.46 per night for one person to \$85.86 per night for four, including taxes. A cottage for one to three people is \$69.96 per night. For reservations, call three to six months in advance and up to a year in advance for holiday times. Chisos Remuda, phone 915-477-2374 for information and prices on all-day guided trail rides to the South Rim and short rides to the Window. Must be six years or older. Weight limit 210 pounds.

Facilities and services outside the park: These are available at Study Butte or Lajitas. Call the park headquarters at 915-477-2251.



Mariscal Canyon cuts through the limestone layers of an ancient seabed. Several outfitters offer rafting excursions through Big Bend's canyons.

to this spacious land of desert, high mountains and steep canyons. "Some 10 percent of these are international guests from Mexico, Canada, Germany, Switzerland and Great Britain," Selleck said. "However, the largest numbers come from the heavily populated urban areas of Texas." Big Bend's desert vistas and uncluttered miles hold the same attraction today that the early settlers must have felt during the last century. Although historical markers and traces of ranches testify to a harsh existence,

Big Bend saw more than four centuries of Spanish conquistadores, Apaches and Comanches, surveyors, explorers and pioneer ranchers.

Today, as Big Bend's visitors come to float the river in the deep recesses of a canyon, to watch the moon rise from a high Chisos camp or enjoy the brilliant colors of desert blooms, they might feel a kinship with those who came before. Now the grandeur and drama of Big Bend offer pleasure to many with the opportunity to preserve its vast treasures for the future. ★

Ann White is a regular contributor to the magazine. She also writes for Texas Highways and several other publications.

Northern Mexico's Whitetail Revolution

How South Texas-style deer management is working in Mexico

South Texas ranchers and game managers are justifiably proud of their region, which has gained a reputation as one of nation's premier hunting areas, especially for trophy-class white-tailed deer.

Texas landowners and hunters might be surprised, however, to hear their counterparts south of the Rio Grande also are applying the same management practices that have become gospel in South Texas—and with similar results.

In a way, the whitetail revolution in the Mexican provinces of Coahuila, Tamaulipas and Nuevo Leon is even more remarkable than the Texas experience in that the deer resource had sunk so precariously low by the 1960s that few expected it to survive, let alone flourish.

A keen observer of range and wildlife management in the region is Jorge Villarreal González of Monterrey, a civil engineer with a master's degree in agricultural water management from the Instituto Tecnológico y de Estudios Superiores de Monterrey. In addition to teaching at the university level, Villarreal during the 1980s served in three branches of the Mexican government dealing with natural resources and land use, and also has been range and wildlife consultant to more than 40 cattle ranches in the three border provinces since 1976.

Villarreal said it's difficult to overstate the seriousness of the Northeastern Mexico deer situation of 30 years ago. "Hunters who have visited this region in the past five years probably could-

n't believe that in the 1960s, white-tailed deer were practically extinct," said Villarreal. "Some of my rancher friends tell me that in those days it was almost impossible to see a deer—buck or doe—daytime or at night."

The causes for the decline may ring a familiar note to people on the United States side: illegal hunting, inadequate law enforcement, massive land clearing and planting of nonnative grasses, screw worm infestations and a lack of economic incentives such as lease hunting all probably contributed, Villarreal believes.

Villarreal notes that no single factor brought about this new awareness of wildlife resources, but cooperation by agencies on both sides of the border to eradicate the screw worm brought landowners together in the 1960s. "The near loss of their wildlife during the 1960s persuaded Mexican ranchers to form the National Association of Diversified Ranchers," said Villarreal. "This organization is made up of 350 members who manage about 3 million acres of land. They worked together to eliminate illegal hunting, reduce habitat destruction, increase water sources and establish wildlife management in combination with sound cattle management."

Villarreal explained that diversified ranching in this sense means the conservation of bio-

diversity. "The ranching practices that make good grazing for cattle also are beneficial for white-tailed deer," he said. "Also, these changes have brought on population increases in a variety of nongame as well as game species." He said species such as coyotes, javelinas, armadillos, badgers, raccoons, songbirds, mountain lions and even endangered ocelots appear to be on the rise as habitats continue to improve. "In reality, many of these

diversified cattle ranches serve as true regional refuges for both plants and wildlife," he said.

The enhanced populations of whitetails during 1992 made possible a program of trapping and relocation of 125 animals by helicopter and net gun from the San Jose and El Estribo ranches of Anahuac, Nuevo Leon, to other ranches in Nuevo Leon and Tamaulipas.

One sure sign of the Northeastern Mexico deer herd's



Ranchers in Mexico's northern provinces have adopted South Texas-style deer management techniques to produce quality whitetails like the buck at right.

rebound is the number of record-book bucks taken in that region each hunting season. The current records are a nontypical buck that scored 223 6/8 under the Boone & Crockett scoring system, and a typical rack that scored 181 7/8, according to Villarreal. Lease hunting is on the rise in the region, offering a major incentive for landowners to develop wildlife management programs.

The geographic area where most of the prime whitetail hunting occurs is bordered roughly by the Rio Grande, extending about 60 miles along an imaginary line that follows the river. The western boundary begins at the foot of the Eastern Sierra Madre southwest of Del Rio and extends east almost to the Gulf of Mexico.

Texas deer hunters visiting this region are likely to notice the rolling thorn scrub habitat is almost identical to much of the South Texas brush country. Familiar plants such as guajillo, catclaw, blackbrush, granjeno, various cacti and mesquite dominate the semiarid landscape where annual rainfall is only 18 to 24 inches.

Villarreal said Mexican landowners, like their Texas counterparts, are beginning to realize the income potential their lands hold in the fields of birding, ecosystem and other education-oriented outings, nature photography and the like. "These concepts have not yet been developed fully, but they promise to be an important component in the process of diversification," he said. "The combination of profitable cattle ranching, hunting and other wildlife-oriented uses makes us hopeful that the biodiversity of these beautiful arid lands will be preserved."

by Jim Cox



White-tailed deer have become so numerous that hunting opportunities occur in all but a few Texas counties. Statewide whitetail population estimates range between 3 million to 4 million animals.

What's Required To Hunt Mexico's Whitetails

Texas deer hunters accustomed to making hunting arrangements with private landowners will find a quite different situation in Mexico. Nonresident hunters are required to make arrangements for hunting through outfitters authorized by the Mexican government.

The hunting season varies from year to year, but generally coincides with the rutting season, the last three weeks of December through the first three weeks in January. The bag limit is one buck per season, with no antlerless hunting allowed. A special license is required to hunt in certain intensively managed trophy deer areas in Northeastern Coahuila, Northern Nuevo Leon and

Northwestern Tamaulipas.

For general information about wildlife areas, outfitters and hunting regulations in Mexico, write to:

Dirección General de Flora y Fauna Silvestre y Áreas Naturales Protegidas, S.A.R.H.
Ave. Insurgentes Sur No. 476,
Octavo Piso
Colonia Roma
Mexico, D.F.

To arrange a hunting trip, contact either of the organizations below:

A.N.G.A.D.I.
Toluca No. 3639
Colonia Mexico
Nuevo Laredo, Tamaulipas
Mexico, 88280
FAX: 91 (87) 14-93-77

F.A.O.C.I.M.E.X. A.C.
Bvd. Tamaulipas No. 2025 NTE
Ciudad Victoria, Tamps.
Mexico
FAX: 91 (15) 12-42-92

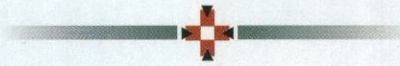
Whitetail Stocking Program No Longer Needed In Texas

A half-century of trapping and releasing white-tailed deer in Texas has come to a successful conclusion.

During January, 85 deer trapped from Inks Lake State Park in Central Texas were released in northern Hunt County east of Dallas. The Hunt County habitat was the last remaining area with suitable habitat but few or no deer, according to Scot Williamson, TPWD big game program director.

Chances of this final stocking program succeeding appear to be excellent, thanks to a cooperative agreement involving some 1,000 Hunt County landowners controlling about 100,000 acres. "These landowners have agreed to protect the deer for at least three breeding seasons to give the herd a chance to grow, and the landowners also will work with our wildlife biologists to improve the habitat," said Nathan Garner, TPWD regional wildlife director in Tyler.

During the past several decades deer were captured in high population areas of the Edwards Plateau and South Texas Pineywoods and Post Oak Savannah ecological regions. Restocking, law enforcement and other management practices have combined to make Texas the nation's number one white-tailed deer state, with an estimated statewide population ranging from 3 to 4 million animals.



Los Caminos del Río and Wildlife Corridor push forward to Reclaim the Roots of the Lower Rio Grande

Article and Photos by Bob Parvin

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HE WEATHERED SMOKESTACK of the Old River Pumphouse pokes above a resurgent strip of brush on the Lower Rio Grande at Hidalgo. It looms at a midway point along the river's last 200 miles, a setting where the aims of ambitious programs to reclaim the vanishing heritage of the borderlands overlap.

Inside the cavernous structure, huge conduits and snail-shaped turbines gleam with fresh coats of silver paint. Immense steam boilers are ready for cleanup. A swaybacked roof awaits fixing, too, as volunteers of the Hidalgo County Heritage Foundation press on with restoration plans.

The Hidalgo plant is the last of a series of mesquite-fired

irrigation pumps built along the river to nourish the burgeoning agricultural economy of the "Valley," as the four-county delta of the Rio Grande is called. Operating from 1908 to 1983, the pump helped devour some 72,000 acres of wildlife-rich brush habitat at the heart of today's citrus and vegetable "Winter Garden" around McAllen. From brush came steam power to simultaneously irrigate these newly cleared lands.

Where once the Hidalgo plant presided over a landscape manicured for crops, today it reposes amid tracts of river brush zealously preserved for wildlife.

"Whether you see it as a blessing or a curse, the Old River Pumphouse dramatically changed the environmental

and cultural history of the Valley," said Dr. Bob Norton, a retired veterinarian from McAllen who heads work to retrofit the pumphouse into an agricultural museum.

Norton looks like a mechanic in his greasy blue overalls. With a resounding clank he sets down a pipe wrench to assert: "If you want a place to integrate both sides of the Valley story, this is it."

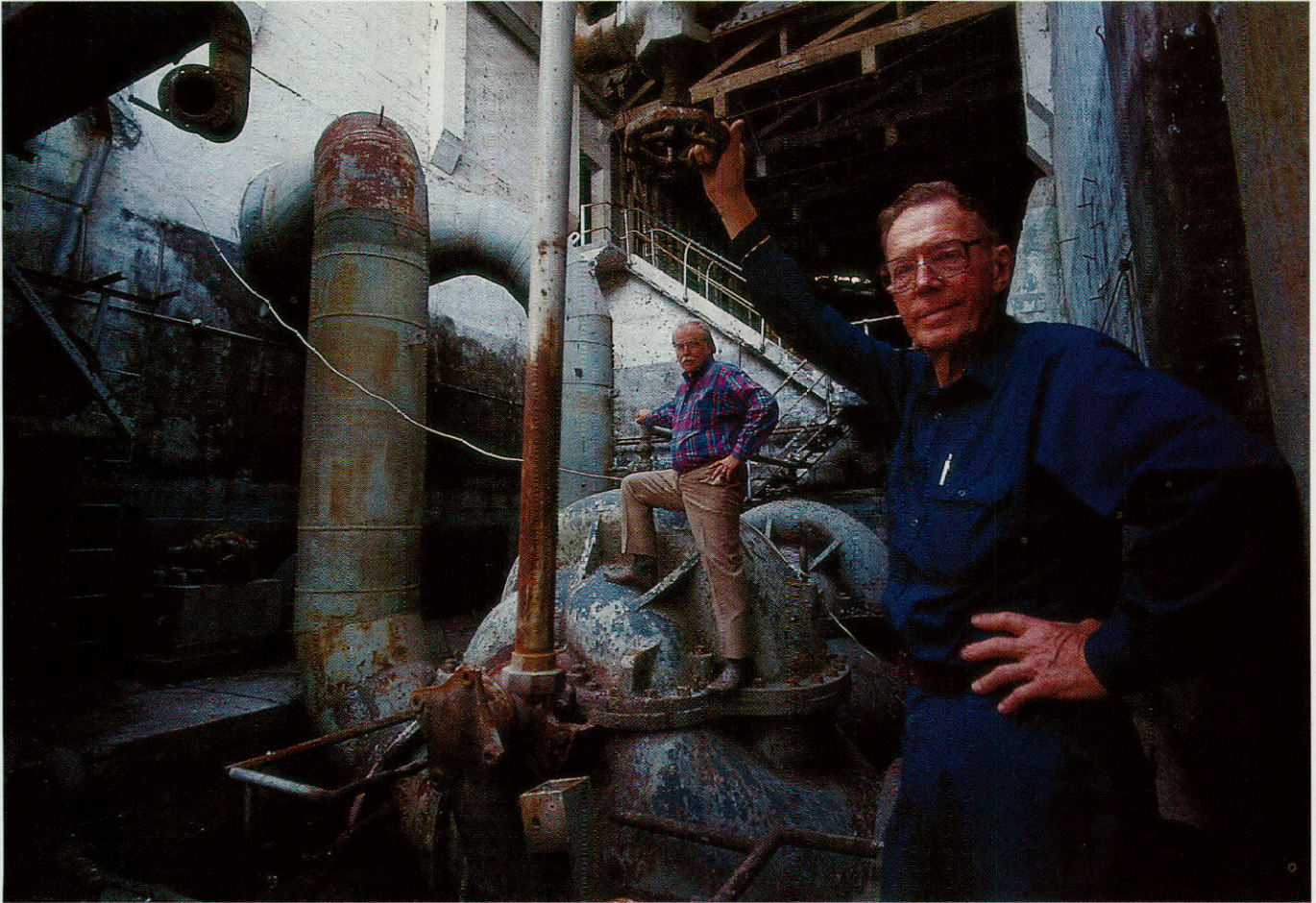
The pumphouse adjoins the Lower Rio Grande National Wildlife Corridor where massive federal programs are underway to mitigate some of the native habitat loss agriculture caused. Less than five percent of the Valley's original 8,000-square-mile wilderness is left, most of it scattered piecemeal at the

edges of farms, urban areas and along the river.

Alarmed by this loss, the U.S. Fish & Wildlife Service in the late 1970s initiated a regional plan for habitat reclamation. Focused on reconnecting fragmented habitat areas along the river from Falcon Dam to the tidal flats of South Bay off Brownsville, the innovative if not desperate project targets the population maintenance of some 100 species listed as endangered, threatened or at the periphery of their range.

Like no other place, the wedge-shaped delta region blends an array of plants and wildlife from the four compass points. Birders need field guides for the whole Northern Hemisphere to tag sightings of some 370 native, seasonal and peripheral species. The Valley ranks with the tip of Florida as the nation's most ecologically complex biotic province. It hosts 11 distinct habitat communities ranging from arid thorn woodlands to vestiges of luxuriant, subtropical palm forests. All but three of these settings tie to the meandering, 190-mile Rio Grande Wildlife Corridor.

Since its outset, the Wildlife Corridor has earned higher levels of funding than any other refuge in the federal system. So far, about 63,000 acres have been acquired through purchase and easement agreements. Another 70,000 acres



Dr. Bob Norton (top photo, right) and Bill Forester of the Hidalgo County Historical Foundation inspect huge, snail-shaped turbines of the Old River Pump House, restored as part of Los Caminos del Rio Project.

With less than five percent of the Valley's original expanse of native habitat left to save, the Lower Rio Grande Valley Wildlife Corridor focuses on preserving fringes of river brush.

await legislated, year-by-year acquisition dollars.

"The emphasis is on closing gaps in the Wildlife Corridor and building large perpendicular tracts down from less-disturbed upland areas to 'capture' the Corridor," explained Mike Bryant, Lower Rio Grande Valley Refuge manager. "This will greatly improve the territorial range and survival chances of endangered species like the ocelot and jaguarundi."

While wildifers tie pieces of river habitat into a so-called "string of pearls," another effort, also focused on linking remnants, is adding the sparkle of historical gems to the corridor. The relic Hidalgo Pump House is just one of many borderland cultural treasures taking on a shine for the Los Caminos del Río Heritage Project.

Initiated by the Texas Historical

Commission and The Meadows Foundation, Los Caminos has stirred a renaissance of cultural pride along both sides of the river from Brownsville to Laredo. It touts the "shared experience of the borderlands" and has successfully challenged communities to take stock of deep historic roots and to capitalize on heritage tourism potentials.

"You can't separate one bank of the river from the other," said Dr. Mario Sanchez, a historical architect from Austin. Endowed with a research grant from The Meadows Foundation of Dallas, Sanchez inventoried historical settings along the Lower Rio Grande in 1990 for the Texas Historical Commission. Visions for a National Heritage Corridor arose from his findings.

"The borderlands are a single historical unit—a continuity of unified traditions, architecture and ways of life spread over some 250 eventful years," Sanchez said.

The idea of dusting off this heritage

landscape while boosting local economies with restoration work and tourism has attracted unprecedented binational support for Los Caminos project. A Texas task force led by the Texas Historical Commission, the Texas Parks and Wildlife Department, the Department of Transportation and the Department of Commerce has been bolstered by the Rivers and Trails Conservation Program of the National Park Service and the U.S. Fish & Wildlife Service. Private sector partners include The Meadows Foundation, the World Monuments Fund and The Conservation Fund. From this network comes the planning, technical and financial support to encourage such grassroots initiatives as the Hidalgo Pumphouse restoration.

Los Caminos del Río banner also waves across the river. All the leading conservation and tourist development agencies from the neighboring state of Tamaulipas and of the Mexican national government are involved. As a facilitator for binational efforts, the twin nonprofit organizations Los Caminos del Río of Texas and de Mexico help raise funds, provide technical assistance to regional historical groups and serve as the project's communications liaison. Listing some 200 historic sites as likely heritage corridor attractions, the group expects a 30-percent increase in tourism jobs and an additional \$13 million in state and local tax revenues as the program unfolds.

But waiting on opening announcements for grand restoration projects isn't advised. Several years and millions of dollars lie ahead of the finished corridor.

"We don't have a 'build it and they will come' project philosophy," said Bill Dolman, Los Caminos del Río Taskforce leader for Texas Parks and Wildlife. "Even in an undeveloped

state, the historical points along the corridor reward discovery. Visitors at this point would be interested in archeology, border culture, architecture and the ongoing process of conservation."

Los Caminos del Río is time-travel down 190-mile stretches of the paralleling highways US 83/US 281 and Mexico 2. It maps explorations via period themes that span three centuries along the length and breadth of the river. Five heritage trails are in the works as key interpretive sites develop by locale.

Upstream, from points above Laredo to below Falcon Reservoir, themes trace Spanish Colonial settlement and early ranching backgrounds. Farther down, at Roma, Rio Grande City and the historic Mexican towns of Mier and Camargo, the focus is on river commerce and prosperity built from steamboat trade. By mid-delta, agricultural

and environmental themes unfold at spots such as the Old River Pumphouse and the nearby Santa Ana National Wildlife Refuge. Finally, at Brownsville and Matamoros, some of the river's military past is preserved by the area's 19th century forts and battlefields.

Historic architecture, the bindery of Los Caminos del Río tableau, begins with Spanish settlement in the 1750s. By that time, New Spain determined to extend its grasp to the "Seno Mexicano," a void on mid-18th century maps that ranged from the Nueces River to Tampico and eastward to the slopes of the Sierra Occidental.

Hot, humid, thorny and populated by Indians, the region was no place for the Crown to bet on success with heavily subsidized colonization. Instead of nurturing its remote claim with protective mission and presidio outposts,



One of the top birding spots in the nation, the 2,500-acre Santa Ana National Wildlife Refuge is a highlight of both the Rio Grande Wildlife Corridor and Los Caminos del Rio programs.

Worshippers have entered the carved sandstone portals of La Purísima Concepción in Mier, Mexico, since the 1780s. Historic Mexican communities have joined their Texas counterparts under the Los Caminos del Rio banner to promote a 200-mile binational heritage corridor.

the Spanish government dangled incentives for open settlement. It ruled that lands would be deeded to self-sufficient homesteaders who could prove up to taming the territory after 10 years of occupation.

The Viceroy chose a hero to plan and lead the colony, José de Escandón, a respected military officer and Indian fighter from Queretaro. Mounting seven columns of dragoons in the winter of 1747, Escandón efficiently scouted all points of the region. Fourteen settlement sites were strategically pegged across the province, called



“Nuevo Santander,” after Escandón’s Spanish birthplace. Special note was made of vast grasslands and fertile vegas then existing along the Rio Grande, well upstream from the river’s steamy, thicketed delta.

Within two years, nearly 3,000 eager settlers were provisioned and escorted by columns into the new province. By 1755, six villas were established along the Rio Grande as core areas for expansive ranching enterprises. First came the Mexican communities of Camargo, Reynosa, Revilla and Mier, followed across the river by Laredo and the now-abandoned colony of Dolores Viejo.

Stock raising prospered from the start. Herds vastly increased across the freely grazed Rio Grande range. Just seven

years after its founding, Revilla’s 62 families ran nearly 50,000 head of sheep, goats, longhorn cattle, horses and donkeys. By 1757, Escandón’s *primitivos*, the earliest and best-established pioneer family heads, were deeded tracts of land called *porción* tracts. Staked out on horseback by feeding a 150-foot lariat along the cardinal directions, *porciones* generally were two-league (8,856-acre) elongated plots that provided at least one mile of river frontage and extended some 16 miles inland.

In time, management of large land holdings, loose herds and growing families spurred development of villas beyond the central Rio Grande communities. Indian depredations, especially worsened by Comanche raids after the 1790s, as well as a withering climate, figured prominently into the design and



National Heritage Corridor Legislation Proposed

This spring, legislation will be presented to the U.S. Congress to designate the border area encompassing Los Caminos del Río as a National Heritage Corridor. If passed, Los Caminos would become the fourth officially recognized such heritage corridor in the United States. Already designated corridors are located in Illinois, Rhode Island and Pennsylvania.

Heritage corridor designation would bring long-overdue recognition to Los Caminos del Río as an area of national significance that possesses unique cultural and natural resources worthy of preservation. The designation also could facilitate technical assistance by the National Park Service to the wildlife corridor project that already is sponsored by local groups and the U. S. Fish and Wildlife Service.

layout of these ranching outposts.

To retard fire arrows and a blazing sun, flat *terrado* roofs were topped with earth fill and a layer of *chipichil*, a lime concrete usually batched from Rio Grande peagravel and fossil oyster shells. Thick walls of *sillar*, heavy blocks of caliche, or of quarried sandstone, tapered upward from massive, out-cropped foundations. Windowless except for *troneiras*, or loopholes from which to fire at attackers, and standing tall on prominent sites with their parapeted walls, the fortified homesteads of Escandón's determined *primitivos* evolved into a distinctive architectural style.

More than a dozen of these unique compounds were lost in an unprecedented 1953 Rio Grande flood that suddenly filled the newly completed Falcon Reservoir. As this *creciente grande* surged downriver at almost 600,000 cubic feet per second, the heirs of ancient homesteads and time-honored ways of life barely had time to snatch their family memoirs. In days, not the predicted years, the lake nearly brimmed. Some 4,500 bewildered evacuees reluctantly took up residence in new communities laid out on the seared gravel plains cut

by Highway 83. Zapata, Falcón, Lopeño and Ramireño today carry on the names of lost villas.

Two impressive places are left to remind Los Caminos del Río travelers of the Spanish settlement and ranching heritage drowned under Falcon Reservoir. Old Revilla, now called Guerrero Viejo, is found half-submerged on Mexican shores of the once-beautiful Rio Salado. It was the cultural capital of the river region, onetime home to some 13,000 residents grown proud and prosperous from borderland ranching and trade. Old Guerrero was known for its fine boarding school, its elegant, three-story hotel, an ancient church and streets bedecked with hand carved sandstone facades.

Now, bass boats troll over the plaza and anglers cast for bass in shadowy waters flooding the church sanctuary.

Teams of binational conservation agencies, including the World Monuments Fund, are pondering ways to assist Los Caminos del Río in their plea to better protect the ghost city and interpret its dignified past.

Meanwhile, old-timey San Ygnacio is alive and well on the Texas bank of Falcon's riverlike headwaters. From its 1871 church plaza, seven blocks of architectural history step back along streets that narrow and seem to converge at the village's cornerstone, the walled Treviño Fort.

The fort is prized as the best of its type in the region. Started around 1830 as a one-room outpost by the wealthy Guerrero rancher Don Jesús Treviño, a defensible compound evolved as additional rooms were linked inside the 90-by-130-foot periphery of a nine-foot wall. The privately owned landmark features roof parapets with loopholes and roof drains of carved sandstone that may have doubled as protection for shoot-



Hopeful that someday their historic Treviño Fort at San Ygnacio will be restored for the public are the heirs of its Spanish Colonial founders, Dr. R.G. Sanchez, front, his brother, Saul, left, and nephews Hector Ramirez, center, and Michael Southerland, right.

ers. Its hewn mesquite doors swing on wooden pivots lined with leather and they still lock with original hand-forged, curved iron hasps. Inside cool, high-ceilinged rooms, central *vigas* (rafters) are inscribed with dates from the 1850s. One beam is carved with the words, *En Paz y Libertad Obremos* (In Peace and Liberty We Work). A carved sundial (*cuadrante*) tops the fort's north wall. It was placed there on a starry night in 1852 by Don Blas Uribe, whose widowed mother bravely pioneered in the area a decade before Treviño Fort was built as refuge from Indian attacks.

Although Treviño Fort and other historic structures were studied extensively during the 1980s as a proposed historic park district, plans for San Ygnacio were shelved as Texas Parks and Wildlife joined with a Los Caminos team effort to acquire and resurrect a spectacular historical district at Roma, 40 miles downstream.

Originally part of ranchlands divided up as *porciones* from nearby Mier, the site of Roma's elevated bluff attracted permanent settlers in the 1830s. A trading community blossomed here after the 1848 Treaty of Guadalupe Hidalgo resolved boundary disputes between Texas and Mexico. By this time, steamboats regularly plied the Rio Grande as far as Roma.

During the Civil War, smuggled Texas cotton found its way to the Confederacy via Roma and down the Rio Grande aboard Mexican-flagged steamers. Long mule trains of contraband shuffled back and forth across the river under cover of darkness. The fast money of wartime black marketing ensured Roma's preeminence during the "Golden Age of Border Trade" in the late 1800s. Even after rails connected Laredo in the 1880s, its warehouses stayed piled with goods traded to and from New Orleans, the Eastern Seaboard and the ports of Europe.

Roma's rise to wealth and stature is proclaimed by the grand edifices of its plaza-centered historical district. Blended with older vernacular structures are numbers of elegant, well-pro-

portioned homes and mercantile buildings constructed by the town's principal 19th century architect, Heinrich (*Don Enrique*) Portscheller.

The German-born Portscheller, who ducked out of the Prussian army in Europe and landed in Mexico only to be impressed by Maximilian's forces, somehow managed to arrive at Roma in 1883, superbly equipped with building skills needed to memorialize its heyday.

Using molded bricks to achieve special interior and exterior features, Portscheller's commissions stand out as a blend of both classical European and functional architectural styles from the borderlands and Mexican interior. His brickwork patterned fancy dentils and corbels, pilasters and arches. But more organic traditions lay at the heart of Portscheller's structures. Beyond the trappings was the practical: layered roofs for coolness, steeply elevated barquetas (sidewalks) that kept moisture from softening walls.

"Roma is one of only about 35 National Historic Districts in Texas," said Dr. Mario Sanchez. "It is a living catalog of the building technologies that evolved along the Lower Rio Grande."

Three of Portscheller's finest buildings, including the 1884 M. Guerra Store with its second-floor New Orleans-style balcony railing, are part of a nine-building conservation plan at the forefront of the Los Caminos del Río Project. Acquisition of these antique properties was helped last year by The Conservation Fund of Alexandria, Virginia, which will pass along the deeds to an appropriate nonprofit management entity when restoration is complete.

"The Los Caminos Partners were



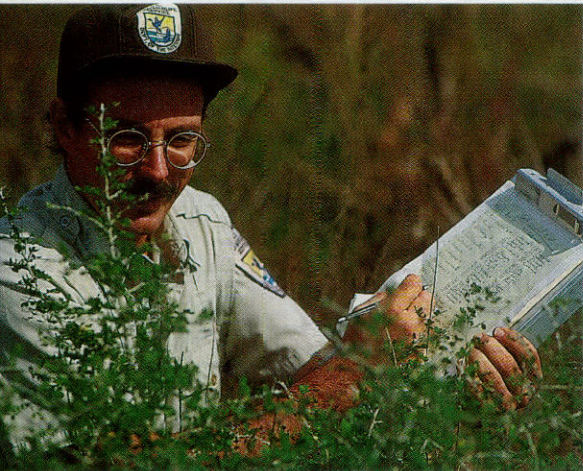
The magnificently detailed brickwork of 19th century borderlands architect Enrique Portscheller crowns Roma's 1884 M. Guerra Store, centerpiece of the former steamboat town's restoration for Los Caminos del Río.

lucky in finally having to deal with only 28 heirs in purchasing the properties," said Bill Dolman. "One of the biggest obstacles to the development of historical sites and wildlife habitat in the borderlands is the huge number of claimants that arise from Spanish grants that have been subdivided across family generations."

The multimillion-dollar program first aims to secure the buildings from further deterioration. Then, following a period for historical research, archeological investigations and careful restoration, the structures will be reopened for historically compatible roles.

"For years the department has pursued the idea of a project like this for the Lower Rio Grande," explained Dolman. "Fortunately, plans for Roma and Los Caminos coincided. Without

Plant ecologist Chris Best hunkers down in thornbrush revegetated on former croplands as part of efforts by the U. S. Fish and Wildlife Service to link up gaps in the Wildlife Corridor for key terrestrial species like the endangered ocelot (right). Half of the 130,000 acres pegged for the valleywide refuge will require revegetation with native plant species.



the partnerships that have resulted, Roma would have been too much for us to tackle alone.”

“It’s the showpiece of Los Caminos del Río,” said Bonnie Waninger, stationed at Roma for the National Park Service Rivers and Trails Conservation Assistance Program. “What’s good for Roma will be good for the whole river region, and vice-versa.”

The military heritage theme of Los Caminos mostly wraps around the toe-end of the corridor in the Brownsville-Matamoros area. Although soldier forts and battlefields extend upriver to Laredo and beyond, Texas’s southernmost tip attracted most of the action.

Today, the eight-pointed earthworks of Fort Texas (later Fort Brown) serve only to berm the contours of a golf course just downstream from Brownsville’s jammed International Bridge. But in spring 1846 its dirt bastions and parapets arose as an unmistakable threat to the walled city-fortress of Matamoros. Faced off in a boundary dispute that opened the

Mexican-American War, General Zachary Taylor’s outnumbered Fort Texas troops endured a six-day assault while his other forces used bayonets and artillery to rout the Mexican army from the nearby Palo Alto and Resaca de la Palma battlefields.

Hitched to the fame of Lower Rio Grande military service are the names of U.S. Presidents Zachary Taylor and Ulysses S. Grant. Taylor’s adversary at Palo Alto, General Mariano Arista, later headed a troubled Mexican government. Grant’s later nemesis, Robert E. Lee, served at Fort Ringgold in Rio Grande City before taking over the Confederacy.

The forts of the borderlands remained on guard until after World War II when they were decommissioned and taken over as public school or college campuses. Class bells instead of bugles resound at Fort Ringgold, but its quadrangle remains intact as Texas’s best-preserved pre-Civil War fort.

A century of soldiering along the Lower Rio Grande leaves a trail of mixed memories. Even when former servicemen from the 1940s revisit, their recollections fall back on discomforts also shared by their 19th century predecessors in the dust and heat of the borderlands.

“There is nothing in the vegetable world of the Rio Grande but what is not armed with weapons of defense and offense,” wrote Lieutenant William McClintock after an arduous 1840s patrol.

In 1994, cat-clawed shrubbery yanks

threads from the government uniform Chris Best wears. But he still likes to hunker down with spiky native plants. As the Fish & Wildlife Service’s refuge plant ecologist, Best is in charge of revegetating brushless gaps to help connect the pieces of the Wildlife Corridor.

Like a Johnny Appleseed who leaves thickets growing down his trail, Best resprouts up to 50 native woody plant species on farm tracts purchased for conversion to refuge habitat. His annual plantings of up to five million seeds and 100,000 nursery-grown seedlings are carefully blended in varieties matched to each of the valleywide refuge locales. Some 4,000 acres have been transformed so far, most of it with the help of local farmers who agree to phase out crop production over a period of years in return for helping to reintroduce native brush on their former lands. Best guesses that half of the lands pegged for the refuge may require some level of revegetation.

In the midst of a 1,000-acre former cotton field near La Joya, Best stops to admire the rapid comeback of some ragged-looking native species. He leans to measure the growth of a tepahuae, then a young Texas ebony and next, little honey mesquites and sandpaper-leaved anacuas.

Mossy draperies soften the thorny brush of the Lower Rio Grande Valley Wildlife Corridor. Together, the habitat preservation and historical site restoration efforts of the overlapping Wildlife Corridor and Los Caminos projects make up one of the most extensive heritage projects yet undertaken in Texas.

“When we get plants in the ground at the right time and under the right moisture conditions, their initial growth rate can be as much as 10 to 15 feet per year,” Best explained. “In a few years, a low canopy begins to spread out, reattracting wildlife. In turn, the birds and animals carry in other native seeds and soon habitat diversity is restored. Then birds nest and animals start to breed and again, wildlife diversity gets a new foothold.”

More than 500 native plant species are being tallied in the Lower Rio Grande region, a third of them woody varieties, and most are thorn-bearing. They have developed adaptive strategies for what has been ranked as one of the world’s most difficult climates, where combined summertime heat, humidity and evaporation compare with the Indus Valley and the Red Sea.

Commonly, plants have thick and succulent leaves, usually with waxy, hairy or roughly textured coatings for maximum retention of moisture. They are drought-deciduous, capable of throwing off biomass in dry conditions,

or producing leaves in a hurry when it rains. With or without foliage, some plants maintain photosynthesis through their bark. Thorns keep browsers at bay and moisture from escaping munched leaves and limbs.

Some of the rarest plant species in the Valley, especially thornless varieties, probably were chomped to the brink by livestock.

“From the very beginning, you’ve got to remember that Spanish colonists set loose enormous herds of sheep, goats and cattle,” Best said. “In this county, when the original grasslands were overgrazed and then hit by droughts, only the brush came back. Brush can dominate a landscape in a generation, even as few as 20 years. Then, when the tastiest morsels of brush are browsed out, you’ve got mostly thorny species left over.”

He pauses in the scraggly field to show off a revegetation success story: an infant, knee-high Texas baby bonnet, a barbless, soft and pale-green shrub. If spared from an animal’s appetite, Best said it can grow to fan out a dense, 15-

foot-high understory—just right for some nesting birds, or even to shade a panting ocelot.

In 1991, the population of Texas baby bonnets for the two-million-acre Rio Grande delta area was only three locations. Best got their seeds. Now more than 1,500 up-and-coming Texas baby bonnets are rooted at 15 revegetated Wildlife Corridor tracts.

The fields once sluiced by the Old River Pumphouse roll past the windshield as Best heads back to his greenhouse at Santa Ana Refuge. He muses about his baby bonnets: “Look what almost happened to just one species that didn’t come into the world with thorns. No one has any idea how many species may have existed along the Lower Rio Grande 250 years ago, before any land disturbance,” he said. “The habitat, the wildlife, the history...the best we can do now is try to bring enough of it all back to really understand.” ★

Freelance writer/photographer Bob Parvin of Austin has researched the Lower Rio Grande region since the early 1970s.



OUTDOOR DATEBOOK

APRIL

April: * April folk weekends and wildflower walks each weekend in April, Washington-on-the-Brazos State Historical Park at Washington, 409-878-2214

April: * Bird banding observation each Tuesday, Thursday and Saturday, Davis Mountains State Park at Fort Davis, 915-426-3337

April: * Houston toad tour each Wednesday and Saturday in April, Bastrop State Park at Bastrop, 512-321-2101

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

April 1-30: Wildflower celebration sponsored by DeWitt County Wildflower Association, Cuero, 512-275-5622 or 512-275-2112

April 2: * Native prairie tour and bird walk, Cedar Hill State Park at Joe Pool Reservoir, 214-291-3900

April 2: * Mountain bike ride, Dinosaur Valley State Park at Glen Rose, 817-897-4588

April 2: * Desert bird banding, Black Gap WMA in Brewster County, 915-376-2216

April 2: * Shorebird banding tour, Richland Creek WMA in Freestone County, 903-928-2251

April 2: * Bus tour, Fort Leaton State Historical Park at Presidio, 915-229-3615

April 2: * Bird walk and wildflower identification, Cedar Hill State Park at Joe Pool Reservoir, 214-291-3900

April 2-3: Free wildflower show sponsored by Highland Lakes Birding and Wildflower Society, LCRA Headquarters at Buchanan Dam, 512-793-2044

April 2-May 1: Statewide Rio Grande turkey hunting season

April 2, 9, 16, 23: * Muzzleloading beginner's course, McKinney Falls State Park in Austin, 512-243-1643

April 2, 9, 16, 23, 30: * Nature tour, Pedernales Falls State Park in Blanco County, 210-868-7304

* 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 REI in Austin.

April 2, 9, 16, 23, 30: * Nature tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

April 2, 9, 16, 23, 30: * Birdwatching and ecosystem tour, Caddo Lake State Park and WMA, 903-884-3833

April 3: * "Fat Tire Fandango," Fairfield Lake State Park near Fairfield, 903-389-2216

April 3: * Easter egg hunt, Fort Griffin State Historical Park near Albany, 915-762-3592

April 3, 10, 17, 24: * Birdwatching tour, Pedernales Falls State Park in Blanco County, 210-868-7304

April 6, 13, 20, 27: * "Dance With the Chickens," Gene Howe WMA near Canadian, 806-323-8642

April 7, 14, 21, 22, 23: * Bat flight observation at Green Cave, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

April 7, 14, 23: * Cavern tour, Kickapoo Cavern State Natural Area, 210-563-2342

April 8: * Marine life tour, U.T. Coastal Studies Lab on South Padre Island, 210-350-4490

April 8-17: Wildflower celebration, Eagle Lake, 409-234-2780

April 9: * Bird house project, Cedar Hill State Park at Joe Pool Reservoir, 214-291-3900

April 9: * Wildflower tour, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

April 9: * "Slithers and Such," Richland Creek WMA near Fairfield, 903-389-2216

April 9: * Birding and hatchery tour, GCCA-CPL Marine Development Center at Corpus Christi, 512-939-7784

April 9: * Migratory waterfowl viewing, Fort Parker State Park near Mexia, 817-562-5751

April 9: * Bat flight observation and cave program, Devil's Sinkhole State Natural Area near Brackettville, 210-563-2342

April 9, 21: * Bird banding observation, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

April 9, 23: * Boat tour of coastal marsh, Sea Rim State Park near Sabine Pass, 409-971-2559

April 9, 23: * Nature and ecosystem boating tour, Caddo Lake WMA, 903-679-3743

April 10: * Horseback tour, Hill Country State Natural Area in Bandera County, 210-796-3984

April 10, 17: * "Plodding the Pease," Matador WMA near Paducah, 806-492-3405

April 10: * Spring birding bike ride, Matagorda Island State Park and WMA, 512-983-2215

April 12: * Electrofishing demonstration, Eisenhower State Park on Lake Texoma, 903-465-1956

April 13: * Artifact photography, Lubbock Lake Landmark State Historical Park at Lubbock, 806-765-0737

April 13, 27: * "Discover South Texas Wilderness Areas," Bentsen-Rio Grande Valley State Park, 210-585-1107 or 210-585-0902

April 14: * Fishery survey and sampling demonstration, Bonham State Park at Bonham, 903-583-5022

April 16: * Birdwatching and hatchery tour, A.E. Wood State Fish Hatchery at San Marcos, 512-353-0572

April 16: * Bluebird Festival sponsored by Wills Point Wilderness Society, Wills Point, 903-873-3252

April 16: * Sebastopol Historical Festival, Max Starke Park in Seguin, 210-379-4833

April 16: * Earth Day celebration, Eisenhower State Park at Lake Texoma, 903-465-1956

April 16, 17: * Desert bird seminar, Black Gap WMA in Brewster County, 915-376-2216

April 16: * Migrant songbird tour, Candy Cain Abshier WMA at Smith Point, 409-736-2540

April 16: * Birdwatching tour, Guadalupe Delta WMA near Victoria, 512-576-0022

April 16: * Heritage Days Festival, Varner-Hogg Plantation State Historical Park at West Columbia, 409-345-4656

April 16: * Interpretive tour, Penn Farm Agricultural History Center, Cedar Hill State Park at Joe Pool Reservoir, 214-291-3900

April 16: * Bus tour of Big Bend Ranch, Barton Warnock Environmental Center, 915-424-3327

April 17: * Photography tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

April 17, 23: * Spring bird walking tour, Matagorda Island State Park and WMA, 512-983-2215

April 17: * Birdwatching, Honey Creek State Natural Area near Bulverde, 210-438-2656

April 20: * Earth Day activities, Fairfield Lake State Park near Fairfield, 903-389-4514

April 20: * Grand opening of Village Creek State Park, Lumberton, 409-755-7322

April 17: * Golden-cheeked warbler birding tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

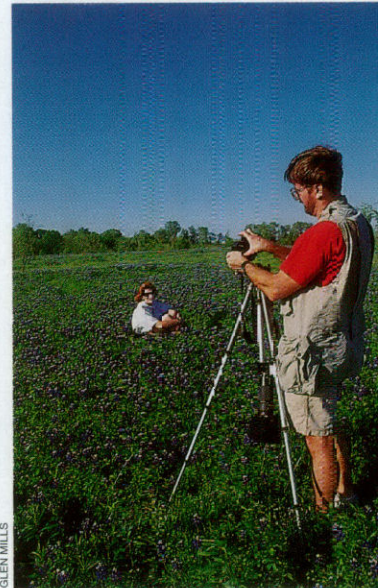
April 22-24: Wildflower Trails of Avinger, Hughes Springs and Linden, 903-756-5491 or 903-756-3106

April 22-24: * Desert survival workshop, Big Bend Ranch State Natural Area, 915-424-3327

April 22-24: * Arbor Daze, Euless, 817-685-1426

April 23: * Earth Day activities, Honey Creek State Natural Area near Bulverde, 210-438-2656

April 23: * Birdwatching tour, Mad Island WMA in Matagorda County, 512-576-0022



GLENN MILLS

Conservation Passport holders can enjoy wildflower walks each weekend in April at Washington-on-the-Brazos State Historical Park, above.

April 23: * Earth Day nature photography show and contest, Palmetto State Park near Gonzales, 210-672-3266

April 23: * Cleanup project, San Jacinto Historical Complex, LaPorte, 713-479-2437

April 23: * Nature Walk, Pat Meyers WMA near Paris, 903-884-3833

April 23: * Birding walk, Lake Brownwood State Park near Brownwood, 915-764-5222

April 23-24: * March for Parks Fun Run, Fossil Rim Wildlife Center near Glen Rose, 817-897-2960

April 23-24: * Safari '94, Austin Nature Center at Zilker Park in Austin, 512-327-2540 or 512-345-0795

April 23-24: * Fort Griffin Frontiers Days reenactment, Fort Griffin State Historical Park near Albany, 915-762-3592

April 24: * Nature walk, Caddo Grasslands WMA near Bonham, 903-884-3833

April 27: * Birdwatching, Las Palomas WMA in the Lower Rio Grande Valley, 210-385-8982

April 30: * Sphagnum peat bog tour, Gus Engelng WMA in Anderson County, 903-928-2251

April 30: * Native flora tour, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

April 30: * Wildflower tour, Dinosaur Valley State Park near Glen Rose, 817-897-4588

April 30: * Nature tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

April 30: * Birdwatching, Jasper State Fish Hatchery, Martin Dies, Jr., State Park and Sam Rayburn Dam, 409-334-9963 or 409-384-2227

April 30: * Birdwatching tour, Peach Point WMA near Bay City, 512-576-0022

April 30: * Mountain bike ride, Matagorda Island State Park, 512-983-2215

April 30: * Birding tour, Kerr WMA near Hunt, 210-238-4483

April 30: * Nature and birdwatching tour, Lake Tawakoni State Park, 903-425-2332

M A Y

May: * Bird banding observation each Tuesday, Thursday and Saturday, Davis Mountains State Park at Fort Davis, 915-426-3337

May 1, 7, 14, 21, 28: * Painted bunting tour, McKinney Falls State Park at Austin, 512-243-1643

May 1, 8, 15, 22, 29: * Birdwatching tour, Pedernales Falls State Park in Blanco County, 210-868-7304

May 5, 14, 27: * Bird banding observation, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

May 5, 12, 19: * Bat flight observation at Green Cave, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

May 7: "Save Our American Raptors" program by Doris Mager, the "Eagle Lady," Fort Richardson State Historical Park near Jacksboro, 817-567-3506

May 7: * Bird walk and native plant tour, Cedar Hill State Park at Joe Pool Reservoir, 214-291-3900

May 7: "East Texas Get Hooked on Fishing—Not Drugs" fishing tournament for kids, Shirley Creek Marina on Sam Rayburn Reservoir, 409-564-7521

May 7: * Photography tour, Dinosaur Valley State Park near Glen Rose, 817-897-4588

May 7: * Black-capped vireo workshop, Black Gap WMA in Brewster County, 915-376-2216

May 7: * Birding walk, Somerville WMA at Lake Somerville, 409-279-2048 or 903-566-1626

May 7: * "Call of the Wild," Fairfield Lake State Park at Fairfield, 903-389-2216

May 7: * Aquatic ecology tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

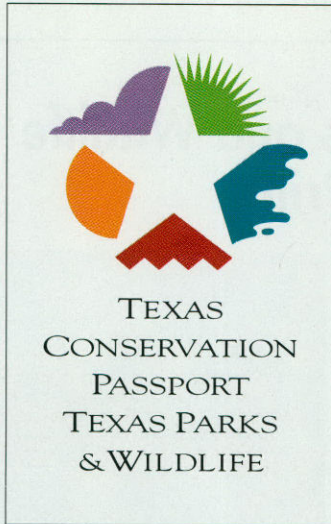
May 7: * Bus tour, Fort Leaton State Historical Park at Presidio, 915-229-3613

May 7: Special Olympics Motorcycle Tour, Caprock Canyons State Park at Quitaque, 806-455-1492

May 7, 14, 21, 28: * Nature tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

May 7, 14, 21, 28: * Nature tour, Pedernales Falls State Park in Blanco County, 210-868-7304

May 7, 14, 21, 28: * Birdwatching and ecosys-



SM

tem tour, Caddo Lake State Park and WMA, 903-884-3833

May 7, 21: * Plant identification and birding tour, Lake Mineral Wells State Park at Mineral Wells, 817-328-1171

May 7, 21: * Boat tour of coastal marsh, Sea Rim State Park near Sabine Pass, 409-971-2559

May 8: * Warbler weekend, Gene Howe WMA near Canadian, 806-323-8642

May 8: * Horseback tour, Hill Country State Natural Area in Bandera County, 210-796-3984

May 11, 25: * "Discover South Texas Wilderness Areas," Bentsen-Rio Grande State Park, 210-585-1107 or 210-5850902

May 12, 19: * Primitive cavern tour, Kickapoo Cavern State Natural Area near Uvalde, 210-563-2342

May 14: * Birding and hatchery tour, GCCA-CPL Marine Development Center at Corpus Christi, 512-939-7784

May 14: * "Wings on the Wind," Fairfield Lake State Park at Fairfield, 903-389-2216

May 14: * Desert birding, Black Gap WMA in Brewster County, 915-376-2216

May 14: * Wildflower walk, Eisenhower State Park at Lake Texoma, 903-465-1956

May 14: * "Stroke and Float," Angelina-Neches WMA at B. A. Steinhagen Lake, 409-383-4343

May 14: * Aquatic ecology tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

May 14: * Mountain bike ride, Choke Canyon State Park North Shore Unit near Three Rivers, 512-786-3868

May 14, 28: * Nature/ecosystem boating tour, Caddo Lake WMA, 903-679-3743

May 15: * Historical tour, Matagorda Island WMA, 512-983-2215

May 15: * Birdwatching tour, Honey Creek State Natural Area near Bulverde, 210-438-2656

Note: Events scheduled for the last half of May will be listed in the May issue.

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TELEVISION SCHEDULE

Watch for our companion television series, "Texas Parks & Wildlife," on your local PBS affiliate. All times p.m. unless otherwise noted.

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CITY/STATION	DAY	TIME
Amarillo KACV, Ch. 2	Sunday	4:00
Austin KLRU, Ch. 18	Saturday	5:00
College Station KAMU, Ch. 15	Tuesday	7:30
Corpus Christi KEDT, Ch. 16	Thursday Friday	7:30 10:30
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	Saturday	4:30
<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>		

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

Look for these stories in the coming weeks

MARCH 27—APRIL 3: The Texas shrimp industry, a canoe rendezvous at Huntsville State Park, and botanist Barton Warnock.

APRIL 3—10: Disappearing East Texas hardwood forests, rock climbing, and rafting through Santa Elena Canyon on the Rio Grande.

APRIL 10—17: Forgotten borderlands along the Rio Grande in far West Texas, the redfish rebound, and the changing role of zoos.

APRIL 17—24: Recycled petroleum rigs become offshore reefs, Project WILD, and alligator farming.

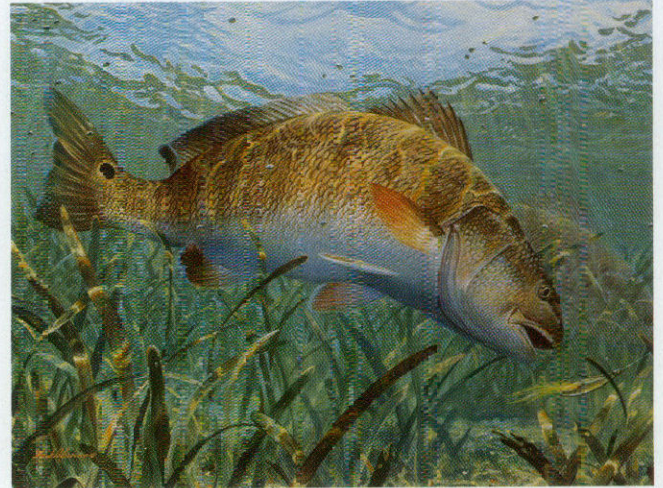
APRIL 24—MAY 1: Recycling, fire ants, and migrating geese.

1994 Texas Parks and Wildlife Stamp Prints



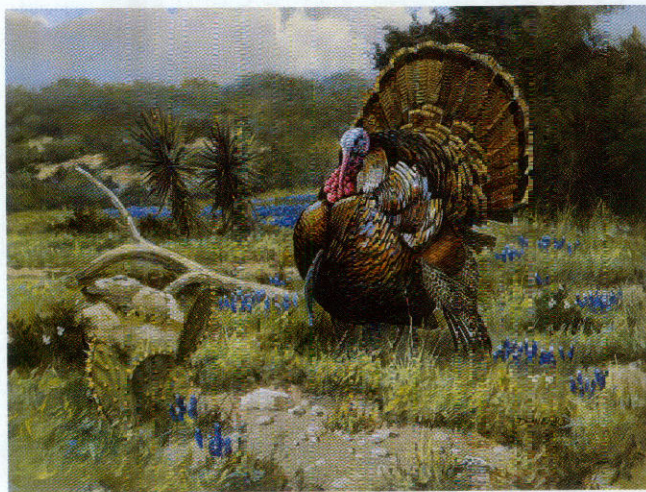
1994 Waterfowl Stamp Print
(Shoveler)
by Ken Carlson

Signed and numbered edition limited to wholesale orders received by June 30, 1994, but in no event will the edition size be less than 5650. Image size 6 1/2" x 9". Each \$142 with stamp. Delivery fall 1994.



1994 Saltwater Stamp Print
(Redfish)
by Mark Susinno

Signed and numbered edition limited to wholesale orders received by May 31, 1994, but in no event will the edition size be less than 2100. Image size 6 1/2" x 9". Each \$142 with stamp. Delivery summer 1994.



1994 Turkey Stamp Print
(Rio Grande)
by David Drinkard

Signed and numbered edition limited to wholesale orders received by June 30, 1994, but in no event will the edition size be less than 1050. Image size 6 1/2" x 9". Each \$140 with stamp. Delivery fall 1994.



1994 Nongame Stamp Print
(Great Horned Owl)
by Pamela Davis King

Signed and numbered edition limited to wholesale orders received by May 31, 1994, but in no event will the regular edition be less than 475 and the medallion edition less than 55. Image size 6 1/2" x 9". Each \$140 with stamp.

Gold plated Medallion Edition, \$260 with medallion and stamp. Delivery summer 1994.

See accompanying list of print dealers or contact your local print dealer.

1994 Texas Parks and Wildlife Stamp Print dealers

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512-458-6343 800-34-DUCKS

Hunt & Co. 26 Doors Shopping Center

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512-458-5687

Corpus Christi

First Light Gallery Sunrise Mall

5858 South Padre Island Drive 78412
512-985-6055

Dallas

Collectors Covey

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800-521-2403

Friendswood

Friendswood Frame and Gallery

150 South Friendswood Drive 77546
713-482-2202

Galveston

Don Rouse's Wildlife Gallery

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409-763-1391

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713-781-7772

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1666 West Sam Houston Pkwy. N. 77043
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The Kipling Company

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713-528-2719

The-Millers-Wildlife Unlimited

The Antique Center of Texas
1001 W. Loop N.- 7200 Old Katy Rd 77055
713-871-8900

Spencer's

3772 Richmond Avenue 77027
713-871-8900 800-742-7766

The Sporting Life

P.O. Box 5275 (Kingwood) 77325
713-965-0582

Story Sloane's Wildlife Art Gallery

9075 Katy Freeway 77024
713-465-0404

San Antonio

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2218 Breezewood 78209
210-828-6491 800-453-8991

Spring

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Tyler

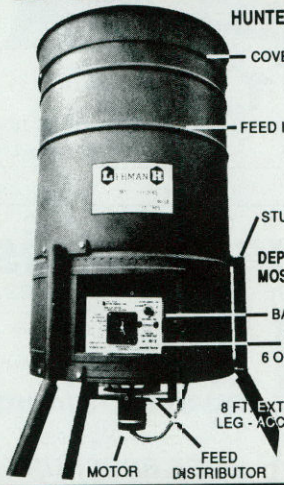
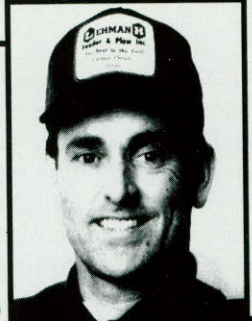
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Continued from page 17

To make reservations for May 16 or beyond, call the central number, 512-389-8900 (This is not a toll-free call). For reservations before May 16, call the individual park. The parks will not accept telephone or mail reservations for May 16 or later.

Two exceptions to the centralized system are the Texas State Railroad at Palestine/Rusk and Indian Lodge at Davis Mountains State Park. To reserve rides on the railroad, call toll-free 1-800-442-8951. Indian Lodge reservations still are made directly by calling 915-426-3254.

Officials said the new system will make reserving facilities easier and provide more options for park visitors.

Higher Park Fees Now In Effect

Increased charges for a variety of facilities and services in the Texas State Park System went into effect February 1.

Officials said the new fee schedule is part of the new Entrepreneurial Business System, which is designed to eventually make the parks self-sufficient instead of depending on revenues from the state's general fund.

In most cases, entry and campsite fees are now \$1 to \$3 higher, and fees will be charged for some activities that were free before. In most parks, a two-level fee system offering lower fees during weekdays will be changed to the single higher fee. Also, slightly higher fees will be charged for "premium" campsites and other facilities that are consistently in higher demand. Another feature is discounted weekly rates for some campsites and differing seasonal rates.

The new fees will have no effect on privileges due holders of \$25 Texas Conservation Passports, but some TCP events may see slightly higher fees, officials said.

Revenues generated by the increased fees will be spent directly on park operations, and money brought into a park through the entrepreneurial setup can be spent for operations or improvements in that particular park.

For a free brochure listing the facilities and the new fee schedule, write the department at 4200 Smith School Road, Austin, Texas 78744, or call toll-free 1-800-792-1112.

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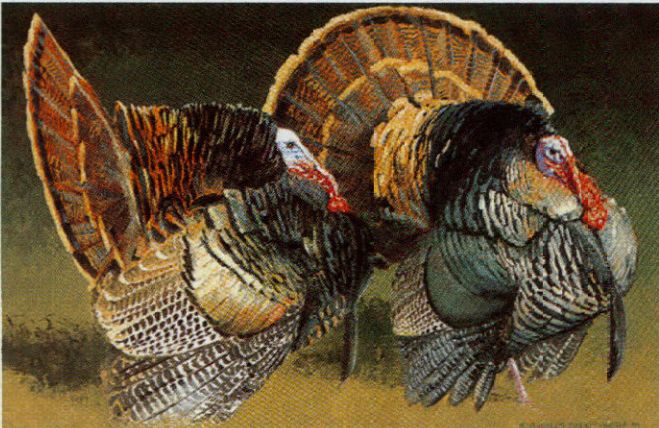
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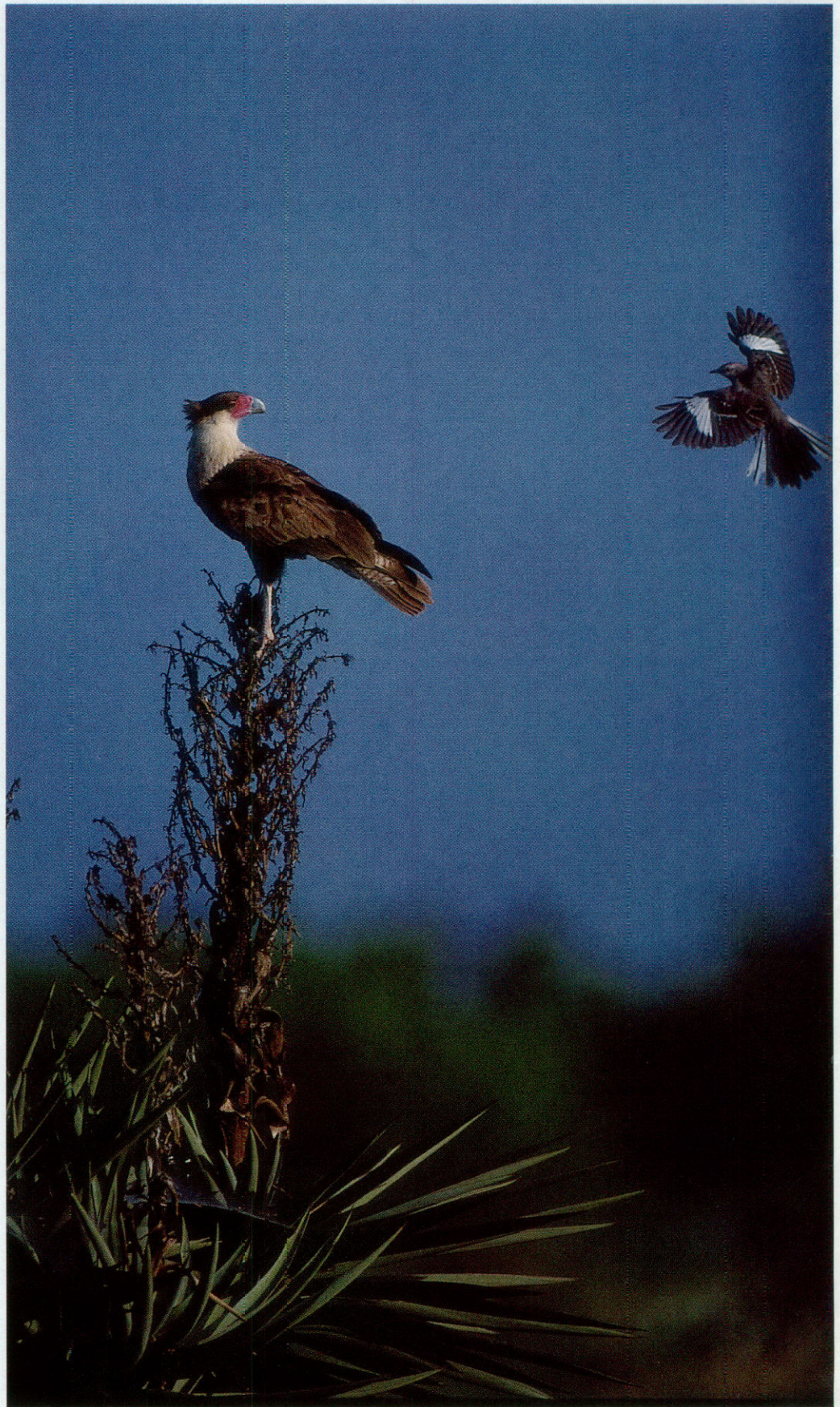
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PARTING SHOT

As a biologist and manager of the U.S. Fish & Wildlife Service's wildlife corridor project in the Lower Rio Grande Valley, Larry Ditto of McAllen has plenty of opportunities to view and photograph that region's rich variety of wildlife. Here he captures an Audubon's caracara perched atop a yucca stem, seemingly unruffled by an aggressive mockingbird that probably considers the caracara an unwelcome intruder into its resting territory.



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Dakota Superiorities	More power	More towing ³	More room in back	More safety features	Dodge provides the only choice of warranties, our Owner's Choice Protection Plan, offering longest powertrain protection. ²
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