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# TEXAS

PARKS & WILDLIFE

The OUTDOOR MAGAZINE of TEXAS

## THE State OF Rivers

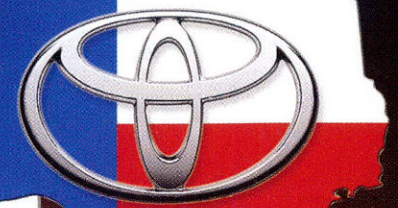
- ~ Larry McKinney Explains Why Rivers Matter
- ~ Gary Cartwright Tells the Tale of the Trinity
- ~ Bill Dawson Probes the Columbia Bottomlands
- ~ Wendee Holtcamp Looks at River Creatures
- ~ Joe Nick Patoski Floats the Glorious Guadalupe
- ~ John H. Ostdick Visits the Beginning of the Brazos
- ~ E. Dan Klepper Remembers the Rio Grande

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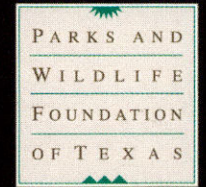


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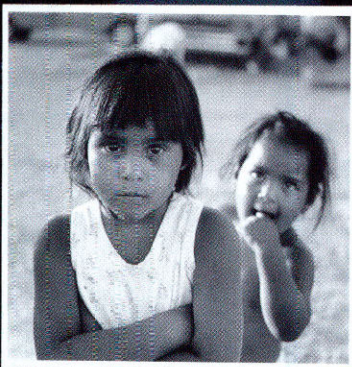


PHOTO © LAURENCE PARENT; INSET © JAMES EVANS

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JULY 2004

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[www.tpwd.state.tx.us](http://www.tpwd.state.tx.us)



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Photo © Wyman Meinzer

# TEXAS

The OUTDOOR MAGAZINE of TEXAS

JULY 2004, VOL. 62, NO. 7

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Texas Parks & Wildlife magazine is edited to inform readers, and to stimulate their enjoyment of the Texas outdoors. It reflects the many viewpoints of contributing readers, writers, photographers and illustrators. Only articles written by agency employees will always represent policies of Texas Parks and Wildlife Department.

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# In the Field

**GRADY ALLEN**, a former rancher and professional calf roper, has been a regular contributor to the magazine for more than 25 years.

**GARY CARTWRIGHT**, an author, screenwriter and journalist, has published eight books, including *Galveston, A History of the Island*.

**BILL DAWSON** is a Houston freelancer who was the environmental reporter for the Houston Chronicle.

**JAMES EVANS** of Marathon published his black-and-white photographs as a book, *Big Bend Pictures*, with the University of Texas Press in 2003.

**TOM HARVEY** is manager of the news and information branch of the Texas Parks and Wildlife Department.

**LARRY D. HODGE** is a contributing writer to *Texas Parks & Wildlife* magazine who specializes in freshwater fishing.

**WENDEE HOLT CAMP** has written for national environmental magazines and is working on her doctorate in evolutionary biology at Rice University.

**E. DAN KLEPPER** lives in Marathon and is a regular contributor to the magazine.

**KEVIN MAYES** is an aquatic biologist for the River Studies Program of the Texas Parks and Wildlife Department.

**LARRY MCKINNEY**, senior director for aquatic resources and coastal fisheries for TPWD, leads the department's study of instream flows for rivers and estuaries.

**WYMAN MEINZER's** photography has graced more than 250 magazine covers and 18 books. He lives in the north Texas ranching town of Benjamin.

**EARL NOTTINGHAM** has won numerous awards for outdoor photography. He has been staff photographer for TPWD since 1996.

**JOHN H. OSTDICK** is a Dallas writer and editor who specializes in travel writing.

**LAURENCE PARENT** is an Austin-based photographer who has published landscape photographs from 52 states and provinces.

**JOE NICK PATOSKI** has collaborated with photographer Laurence Parent for a book to be published in the fall of 2005 called *Texas Coast*.

**ERICH SCHLEGEL**, a staff photographer for *The Dallas Morning News*, has photographed six Olympic games, three Super Bowls and conflicts in Europe, Africa and Asia.

**LANCE VARNELL** is a Houston freelance photographer who specializes in shots of the Gulf Coast.

# AT ISSUE

FROM THE PEN OF ROBERT L. COOK

**Growing up in north-central Texas** on Lost Creek, which at best could be called an intermittent stream, I always wondered what it took to be a river. Lost Creek drains into Pecan Bayou, which in turn feeds into the Colorado River near Goldthwaite. The Colorado, one of the major rivers of Texas, supports the Highland Lakes, from Lake Buchanan to Austin's Town Lake, and hundreds of miles later, feeds into Matagorda Bay, one of the most productive estuary and bay systems in the world.

I have learned through the years that how we manage the land — even the watershed on our little ranch southeast of Abilene — really does impact the quantity and quality of water in places such as Marble Falls, Austin, Bastrop, LaGrange and Columbus. Throughout the state, private landowners now operate millions of acres of land under good wildlife habitat and range management plans on the watersheds of such rivers as the Brazos, the Trinity, the Colorado and the Guadalupe. Again and again we have seen the beneficial results of management plans on these waterways. I now understand how Lost Creek and similar watersheds play a critical role in the Colorado River system, which supplies fresh water for millions of Texans and for our fish and wildlife.

If my family — and private landowners like us — overgrazes our land or allow it to become infested with mesquite or cedar, which suck up huge quantities of ground water, the people in Austin may not have water to drink. Spring-fed creeks like Lost Creek and rivers like the Pecos and the San Saba will dry up, providing no water for people, fish, wildlife or agriculture. If, on the other hand, we provide abundant ground cover on our rangeland by implementing deferred-rotation grazing, and if we use prescribed fire to control undesirable brush species and stimulate the growth and production of native grasses and forbs, the rain that falls on the vast private lands of Texas will be slowly filtered through those plants and soak into the protected soil. That same water will appear again in our springs, creeks and rivers for the use and benefit of all Texans, and for our fish and wildlife. On the other hand, the bare, baked ground that results from continuous overgrazing will cause the rapid run-off of rainfall, soil erosion and the deposition of vast quantities of sediment into our rivers, lakes and bays, seriously undermining the quantity and quality of our water supply.

The state of Texas receives millions of acre-feet of fresh, pure rainwater annually. It comes to us free, clean, crystal-clear and ready for all of our uses and needs. Almost all of the land on which this water falls is held by private landowners. We must manage and conserve every drop when and where it hits the ground. Through good land and watershed management, Texas becomes a huge sponge, absorbing, conserving and returning this abundant supply of fresh water from the Caprock in the Texas Panhandle to the bays and estuaries of the Gulf Coast. We must act now to ensure an abundant supply of fresh water for future Texans. We can do it. Get involved: Be part of the solution.

*I now understand how Lost Creek and similar watersheds play a critical role in the Colorado River system, which supplies fresh water for millions of Texans and for our fish and wildlife.*



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*Texas Parks and Wildlife Department mission statement:*

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# MAIL CALL

PICKS, PANS AND PROBES FROM PREVIOUS ISSUES

## FOREWORD

**One morning recently a mother phoned me** for help. Where, she asked, could she find a map of Texas rivers? Every time she and her boy drive over a small stream, he wants to know where it comes from and where it goes. His imagination has been stirred by rivers.

I know how he feels. As I write this, I am sitting on the banks of the Colorado River at June Hill Pape Riverwalk in Bastrop. Cottonwoods and sycamores tower above this stretch of flood plain. Grapevines and trumpet vines, morning glory and Virginia creeper festoon the trunks and limbs of the trees: willow, ash, cherry laurel, hackberry, oaks and pecans. Birds are singing their morning chorus, and turtles paddle in the green depths.

This park helps you see what a rich and fertile and dangerous thing a river can be. I have reached it by descending a series of concrete stairs that begin near the highway, 30 or 40 feet above the river. It is hard to imagine, but according to park signs, the Colorado rose to the top of these stairs in the flood of 1991.

Sitting in the shade and listening to the rustle of cottonwood leaves, I can imagine what stirred the boy's curiosity. A river seems to be always coming from somewhere and going somewhere. Oceans inspire thoughts about eternity. Rivers inspire thoughts about time.

This magazine is the third in our series of July issues addressing the theme, "Texas, the state of water." The first, published in 2002, gave an overview of water in Texas, with stories on aquifers, springs, rivers and bays. Last year, we devoted the July issue to bays, and of course, we couldn't help also writing about rivers and their vital role in supplying fresh water to the nurseries of coastal wildlife. This year we're concentrating on rivers.

Joe Nick Patoski celebrates the recreational benefits of the Guadalupe River. Gary Cartwright explores the uses and abuses of the Trinity River. Bill Dawson describes the fecundity of river bottomlands. Wendee Holtcamp shows how some wildlife has adapted to the ebb and flow of rivers. John H. Ostdick writes of the unique problems of the western branches of the Brazos. E. Dan Klepper meditates on time and the river. And Larry McKinney, director of coastal fisheries for the Texas Parks and Wildlife Department, explains why we must do a better job of managing our rivers.

There's a good flow to the Colorado this May morning. When I look downstream, I think about the future. The rains have been generous. But someday we'll have a drought like the one that lasted several years in the early 1950s. Maybe when that next statewide drought hits, we'll be prepared because we'll know our rivers. We'll have the science completed and the policies in place to allocate the water for both people and wildlife. That's what "Texas, the state of rivers" is all about.

*Michael Benfield*  
EDITORIAL DIRECTOR

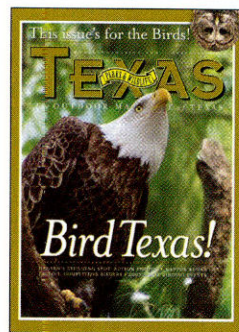
## LETTERS

I received my June issue today and I read with interest the article titled "The Pease River Fly-fishing Club" by Mr. Russell Graves. I am sorry to inform him, but I fly-fished that

river when I was a boy of 12 or 14. I grew up around Paducah, Texas, and fly-fished and bait-fished the holes in the Pease River from the Motley County line to the junction of the Middle Pease and the North Pease. At that time, most of the western part of the river was on the Matador Ranch. Several of us would ride horses up and down the river and fish the holes. I don't ever remember catching a bass, but we caught a lot of perch and catfish. There were places where there was quicksand and a lot of snakes.

The years were 1948, 1949 and 1950 when we adventured up and down that river.

ROBERT L. LAMB  
Iowa Park



**Texas Parks & Wildlife magazine won three "Maggie" awards from the Western Publishing Association, including Best Consumer Magazine (April 2003), Best Black-and-White Layout (February 2003) and Best Cover (September 2003).**



**RUSSELL GRAVES REPLIES:** *I wish I had known about you the first time we went fishing so I wouldn't have had such a tough time finding the good spots. Please forgive me for my lapse. However, would you accept entry into our exclusive club under the title of "president emeritus?"*

### SEEN A SNAKE DOCTOR?

I have just finished reading Greg Lasley and Robert Behrstock's fascinating "The Pageantry of Dragonflies" in the May issue of *Texas Parks &*

# MAIL CALL

*Wildlife*, and the article took me back at once to my boyhood on a farm in Cooke County. When I was fishing or otherwise living it up with my chums on the Elm Fork of the Trinity, or at one of the branches or stock tanks where we played our days away, I often took particular notice of the dragonflies. They were many, and their speed and agility could hold me enthralled for several minutes at a time — about as long as they ever stayed in one place. I have no idea to which species they belonged, but none of them was exceptionally colorful. Aside from their dodging and darting, when you had a hook in the water, one might suddenly swoop in and cling motionless for a while to your gently swaying line. One dragonfly might fly the length of the fishing hole, dipping down to the water every couple of feet. A grand sight.

We knew these insects were called “dragonflies,” but we seldom called them that. To us, they were “snake doctors.” We did not know why. It was a name we had inherited through folk speech. I wonder if any of your readers have ever heard or used this term.

L. D. CLARK  
Smithville

## JOIN THE TEXODES

Exceptional article on Odonates by Bob Behrstock with photographs by Greg Lasley. We invite those interested in further discussion on the dragonflies and damselflies of Texas to join the TexOdes online discussion group. The group can be accessed at <http://groups.yahoo.com/group/TexOdes/>.

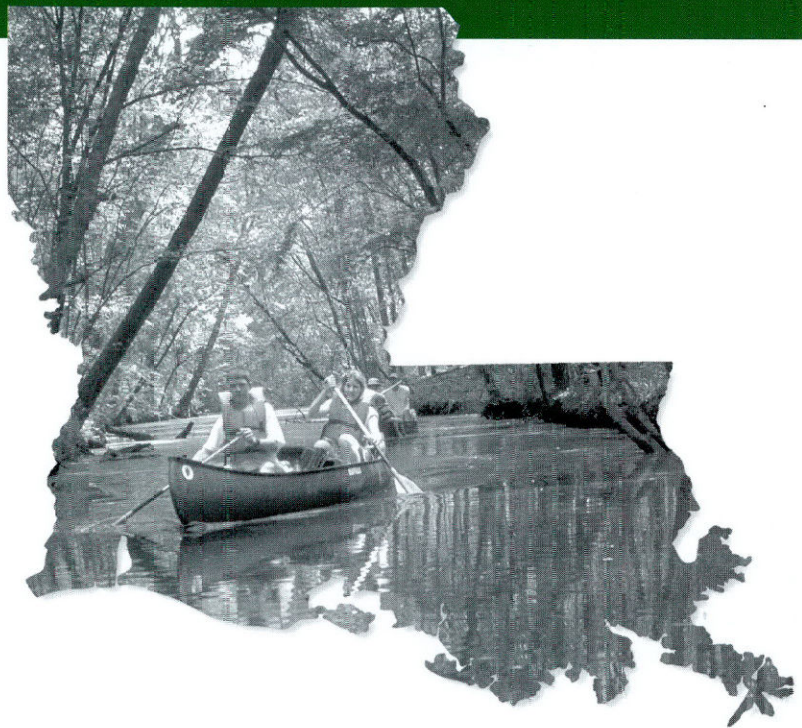
TONY GALLUCCI  
Hunt

## PICTURE PERFECT

I read Mail Call in the April 2004 issue, and was particularly interested in the letter about photographing the beautiful bluebonnets and coming upon the black widow spider. I was reminded of an outing two years ago with my brother.

I adored South Texas, and when we found a lovely spot with a low-lying Texas tree or two on the horizon, I flopped down in that lush field, eye to the camera and shot eight or 10 frames. I was in photography heaven. As I got


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up, my finger began stinging like crazy, and swelling up very fast. It was impossible to bear the pain, and we headed to a nearby garden shop for some ice. I was grateful for the comfort. In spite of that painful spider bite, I was delighted with our side trip, which took us to Kerrville where we visited the beautiful Cowboy Artists of America Museum.

I do love Texas!

AVIS J. TRIPLETT  
Charleston, WV

### MORE COLLARED DOVES

I would like to thank you for the article in the April 2004 issue about the Eurasian Collared Dove. A pair of these first started feeding under one of my bird feeders two summers ago, and we had no idea what they were. All of my bird books had been published before the middle of the 1980s and there were none of these doves shown. Last year at Christmas, my brother-in-law had a new *National Geographic* bird book, and the Eurasian collared doves were shown there. Now, with your article, we are all informed and up to date. I have also seen these doves several places on Merritt Island, Florida.

SERGE ENGLISH  
Callahan, FL

### THE WORD ON BIRDS

Your April 2004 "Birds, Birds and More Birds" issue was the best! Great photography and informative articles. It is great to see all the locations and viewing opportunities that are available throughout the state. I must comment that, with all the attention our feathered friends are attracting, I hope that folks will realize that the loss of habitat is the greatest threat facing not just birds but all wildlife. With the human population growing steadily and suburban encroachment expanding, measures must be taken and aggressively maintained to ensure that future generations will have the opportunity to view birds in their natural surroundings and not behind a glass display in a museum with an "extinct" sign next to it. As conscientious stewards of Texas, we must see to it that our remaining species do not meet this fate.

ERNEST MARTINEZ JR.  
Moore



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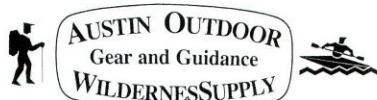
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# MAIL CALL

## LET THE EAGLE FLY

I was pleasantly surprised to see the "Parting Shot" photo of the American-bald eagle's nest near Llano in your June issue. I had been to the nest site only a few weeks earlier and did not see an eagle on the nest when I arrived that day. I was visiting with photographer Fred LaBounty and his wife who were at the site and had an opportunity to see your "parting shot" photo and many more the LaBountys had made of the eagles during this nesting season. As we were viewing the pictures, the two fledged eagles flew into the nest. Needless to say, it was an exciting time for this old birdwatcher, who had recorded his American bald eagle "lifer" on a fishing trip to Mexico in 1998.

In reading the "parting shot" commentary as to location of the nest, I thought a more precise location would be helpful for anyone wishing to visit the nest. It is located on Highway 29, eight miles east of Llano.

DON COWAN  
San Benito

## SPRINGS TO LIFE

I would love to share my story about the wonderful Hancock Springs free-flow pool in Lampasas. Natural springs have been drawing people to the Lampasas area since the Native Americans camped along the stream now known as Sulphur Creek. Hancock Pool is special because it is one of the few free-flow pools — fed by a constant flow of natural spring waters — in the state. It is refreshing and invigorating.

With the coming of the railroad in 1882, Hancock Springs gained wide fame as a health resort because the springs were thought to have healing medicinal value. It wasn't long before a group of stockholders built the Park Hotel Bathhouse, making Lampasas a resort destination in the Hill Country, advertised as the "Best Bathing Resort in Texas." Recently, the city of Lampasas restored the bathhouse, designating it an historical landmark. But for me, the main charm of Hancock Springs is still the cool, chlorine-free water in the free-flow pool that remains at 72 degrees year-round.

The Hancock pool itself was constructed in 1911 by the Texas Baptist

Association for bathing and baptisms. In the early 40s, it was popular with the Camp Hood soldiers trying to escape the summer heat.

I think it's a wonderful pool and it makes Lampasas a special place to come and "take the waters."

LEAH SNELL  
Lampasas

## Sound off for "Mail Call!"

### Let us hear from you!

Texas Parks & Wildlife magazine welcomes letters from our readers. Please include your name, address and daytime telephone number.


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# SCOUT

NEWS AND VIEWS IN THE TEXAS OUTDOORS

## Anglers Fund Their Resources

*New Freshwater Fishing Stamp Will Support Hatcheries.*

**Beginning this September**, Texas freshwater anglers will join hunters and saltwater anglers in supporting the resource they enjoy through purchase of a special stamp. The new \$5 freshwater fishing stamp is similar in purpose to the familiar turkey, waterfowl and saltwater stamps, and, in like fashion, the revenue it generates is dedicated to programs that directly benefit those who buy the stamp.

The high quality of freshwater fishing in Texas today can be attributed to management programs developed by the Texas Parks and Wildlife Department.

The introduction of Florida-strain largemouth bass was instrumental in creating the trophy bass fishery anglers enjoy today. Striped bass and hybrid striped bass stockings created increased angling opportunities in open waters of large reservoirs not typically used by bass. Rainbow trout and catfish stockings in urban ponds provide convenient fishing for urban communities. In recent years, stocking has rebuilt fisheries in reservoirs impacted by golden alga fish kills, helping local economies recover.

All this has been accomplished by a hatchery system struggling to meet the demands placed upon it. Even though the state once boasted 17 hatcheries, only five remain in operation. Only one, the Texas Freshwater Fisheries Center in Athens, has been added in the last 50 years. Despite renovations and expansions at several sites, TPWD hatcheries have never been able to produce enough fish to supply all stocking demands.

"In general, the structure of three of our hatcheries is reasonably good," says Todd Engeling, the TPWD hatchery program director. "However, we have a long list of needed repairs and improvements that have been deferred because of lack of funds. Replacement of the Jasper hatchery is our most immediate need. Without replacement, we will lose approximately 25

to 30 percent of our production. If we do not address other maintenance and repair issues, production at the A.E. Wood and Dundee hatcheries will be significantly compromised."

TPWD hatchery managers recently analyzed present and future needs and identified \$50 million in projects necessary to meet projected stocking needs in the next quarter century. Plans are underway to replace the Jasper State Fish Hatchery and make needed improvements at the other four: A.E. Wood in San Marcos, Dundee near Wichita Falls, Possum Kingdom

near Graham and Texas Freshwater Fisheries Center near Athens. Improvements will allow increased production with addition of minimal staff overall, significantly increasing efficiency.

As the population of the state doubles in the next 50 years, the demand for fish is expected to rise dramatically. The new \$5 freshwater fishing stamp required of anglers beginning in September 2004 follows the TPWD "user pay, user benefit" philosophy. Income from the stamp can, by law, be used for only two purposes: "(1) the repair, maintenance, renovation, or replacement

of freshwater fish hatcheries in this state; or (2) the purchase of game fish that are stocked into the public water of this state." The stamp is required of everyone who is not exempt from obtaining a fishing license. The stamp is currently scheduled to expire in 2014.

"Investing in the future of Texas fisheries resources is critical to meeting the needs and expectations of anglers in Texas," says Inland Fisheries Division Director Phil Durocher. "Although implementation of the proposed improvements will be expensive, the total cost represents a relatively small investment compared to the \$1.49 billion in retail sales generated by freshwater angling every year."

—Larry D. Hodge



The freshwater fishing stamp depicts a largemouth bass painted by Houston artist Mark Susinno. Collectors may purchase a print of the stamp from Collector's Covey by calling (800) 521-2403.

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# Rules for a River

*A Hill Country town becomes the first to create new local river access rules.*



**By developing river access plans, local and state officials can balance recreational use with environmental protection.**

↑ intent was to stop the four-wheeling activities that were taking place

**The first local community plan** to allow controlled motor vehicle access in a state-owned riverbed has been approved by the Texas Parks and Wildlife Department.

Since a new state law banning riverbed vehicle traffic went into effect Jan. 1, Mason County is the only local government to finalize such a plan, although several other communities are developing or considering similar plans. Senate Bill 155 in the last legislative session gave TPWD the authority to restrict riverbed vehicle traffic but included a provision to allow the state agency to approve local river access plans.

Known locally as the James River Crossing, the area covered by the Mason County plan is just off FM 2389 where it crosses the Llano River. The site is about 500 yards long by about 250 yards across. It includes a state-owned gravel island within the riverbed where the road crosses, and it has been a longtime access point for swimmers, kayakers, canoers and anglers, according to Mason County Attorney Shain Chapman.

"We just hated to see something like that taken away from the public when I don't think that was the intent behind the legislation," Chapman said. "I think the clear

on some points of the river, but not prohibiting folks from using the river in appropriate ways."

Chapman said TPWD game wardens came to him last year as a proactive step, saying they realized this area might cause a problem, and encouraged county officials to consider a local river-access plan.

The Mason County plan allows river enthusiasts access similar to what they had before, but with a few restrictions.

"They can't drive in the water at any time," Chapman said. "They can travel in their vehicles in the dry area of the gravel river bar covered by the plan, but there's a five mile-per-hour speed limit. We do have a restriction that allows no ATVs. We also prohibit any motorized vehicle traffic in that area between 10 p.m. and 4 a.m. Otherwise, we allow people to continue to camp, fish or whatever the case may be."

For several months, TPWD game wardens have been notifying people they encounter on or near rivers that the new law is now in effect. In many cases, wardens issue warnings the first time they encounter vehicles in riverbeds, but then issue citations for subsequent incidents. Game wardens report generally good compliance with the new law across the state, noting

that in the past three months they have issued 74 warnings and only eight citations statewide. Local sheriff's deputies and other peace officers are also enforcing the law. A first offense is a Class C misdemeanor, punishable by a fine of as much as \$500. Repeat offenders could face higher fines and jail time.

The new law pertains to any "navigable river or stream" in Texas except for the Canadian River and the Prairie Dog Town Fork of the Red River in the Panhandle.

The law prohibits motor vehicles from operating in "that portion of the bed, bottom, or bank of any navigable river or stream that lies at or below the gradient boundary of the river or stream." It defines navigable river or stream as "a river or stream that retains an average width of 30 or more feet from the mouth or confluence up."

A motor vehicle is defined as "any wheeled or tracked vehicle, machine, tractor, trailer or semi-trailer propelled or drawn by mechanical power and used to transport a person or thing."

The public continues to have the right to travel along navigable waterways as long as the restrictions on motor vehicle use are observed. The law says "a person may not restrict, obstruct, interfere with or limit public recreational use of a protected freshwater area." It also contains various exemptions for motor vehicle use in riverbeds by emergency and law enforcement personnel, utility workers, adjacent landowners and others.

The law grew out of Senate Bill 155, sponsored in the Texas Senate by Sen. Judith Zaffirini of Laredo. Rep. Robert Puente of San Antonio sponsored a companion bill in the Texas House of Representatives.

The law also directs TPWD to "facilitate the development of motor vehicle recreation sites that are not located in or on a protected freshwater area." The department administers the National Recreational Trails Fund in Texas, awarding grants to build or maintain trails for hiking, biking and similar uses. This is funded by a portion of federal gasoline taxes on non-highway recreational vehicles. By law, a certain percentage of funds are supposed to be used for

motor vehicle trails, but TPWD has historically received few grant applications to meet this need. The department is now actively seeking appropriate sites and grant proposals that provide alternatives for off-road vehicles away from rivers and other sensitive areas.

SB 155 did not clarify or change the legal definition of a navigable river or stream. This has long been a source of confusion and controversy in Texas, with river recreationists and private property

owners sometimes clashing about whether a particular area on or near a river is considered “navigable” according to the law. A key issue is where the “gradient boundary” at a river’s edge actually lies.

TPWD has created a new set of Web pages covering topics related to SB 155 <<http://www.tpwd.state.tx.us/texaswater/rivers/mvindex.phtml>>. There are links here to the entire text of the law and to various committee and research reports that led to it. These pages also include

local access plan guidelines and practical advice about navigable streams and river access. Questions about Local River Access Plans or other provisions of SB 155 may be directed to (512) 389-4725 or (800) 792-1112, extension 4725 or to [melissa.parker@tpwd.state.tx.us](mailto:melissa.parker@tpwd.state.tx.us). Anyone interested in grant funding to create motor vehicle trails may contact Andy Goldbloom at (512) 912-7128 or <[andy.goldbloom@tpwd.state.tx.us](mailto:andy.goldbloom@tpwd.state.tx.us)>.

—Tom Harvey

# A World of Water

*Texas faces the same water problems as the rest of the planet.*

**When it comes to water,** Texas is in the same boat as the rest of the world, facing a future filled with daunting challenges. No one suggests this state’s problems match the dire conditions blighting many developing nations. But here, as elsewhere, the basic dilemma is the same — how to provide adequate clean water and wastewater treatment for a growing human population while ensuring that ecosystems also get enough good-quality water to function.

That was a central theme of the Global Forum on Water held in March in Houston. The conference, cosponsored by FotoFest, a nonprofit arts and education organization, and Rice University, provided a kaleidoscopic look at the difficult, interlinking water issues that lie ahead.

The tone was set by Neal Lane, former science advisor to President Bill Clinton and now senior fellow at Rice’s James A. Baker Institute for Public Policy, named for the Houstonian who served as secretary of state under President George H.W. Bush.

A billion people worldwide lack good water, and 2.5 billion lack adequate sanitation, Lane said, and these problems are growing so rapidly, along with related state-nation conflicts, that some regard them as “nightmarish.” While unlikely, it’s possible that even Houston, “the flood capital of the U.S.,” could fully use existing supplies of water around 2025, he said.

Water woes could be one of humanity’s most solvable big problems, but scientific and technological advances alone won’t do the job, Lane said. “In the U.S. — charitably — water policy is fragmented.”

In an event brimming with statistics, perhaps the most striking were those representing the world’s yearly death toll due to inadequate water sanitation — 2 million to 5 million. Most are young children living in desperately poor circumstances.

Illustrating the complexity of such issues, however, one



↑ **By managing instream flows, we can maintain the biological soundness of the state’s rivers, lakes, bays and estuaries.**

speaker reported that researchers in Texas and other parts of the affluent United States are investigating links between unwanted byproducts of water decontamination processes and health problems such as birth defects and cancer. It will be a challenge to develop techniques that minimize both disease-causing pathogens in drinking water and the health risks posed by these chemical byproducts, said Shannon Marquez, an assistant professor of environmental sciences at the University of Texas School of Public Health in San Antonio.

Water quantity was as prominent in the conference discussions as water quality.

Sandra Postel, director of the Global Water Policy Project in Amherst, Mass., said people’s growing water demand is moving toward an intersection with the world’s renewable but

PHOTO BY EARL NOTTINGHAM



finite water supply. Outright wars over water are less likely than an increased occurrence of humanitarian crises, as limited water supplies are insufficiently shared, Postel said.

Water distribution, more than absolute scarcity, is the biggest supply-related problem, said Jerome Delli Priscoli, senior advisor at the U. S. Army Corp of Engineers' Institute for Water Resources. Accordingly, water could be a key tool in "preventive diplomacy," he said.

Edward Djerejian, director of the Baker Institute, said a study of the water-scarce, conflict-plagued Middle East recommended making water a tradable commodity, which might help reinforce habits of international cooperation.

But several conference speakers strongly criticized privatizing and trading water on humanitarian and environmental grounds.

"Water belongs to the earth," said Maude Barlow, volunteer national chairperson of the Council of Canadians, a prominent advocacy group. "It belongs to current and future generations as a human right." She noted that water is defined as a "good" under international trade agreements, which stipulate that its import or export cannot be blocked for environmental reasons.

Providing enough water for environmental purposes — the health of rivers and lakes and bays, the flourishing of fish and wildlife — was another frequent theme.

Citing evidence that nature is being shortchanged now, Postel asserts the water can be managed for both people's needs and nature's needs. The World Conservation Union estimates that 20 percent of fish species are in danger of extinction, she said, and rivers ranging from the Indus in Pakistan to the Yellow in China and the Rio Grande on Texas' southern border are periodically dry.

One conference panel focused on "Texas as a Microcosm" of worldwide water problems. A German speaker had observed earlier that an increasing majority of the world's population lives in

cities, and a member of the Texas panel echoed that point.

Mark Rose, general manager and CEO of the Lower Colorado River Authority through the 1990s, said there has been a dramatic shift in Texas' water battles. Thirty years ago, such skirmishes were mainly about plans to import water from other states for agriculture, he said, but today they are over moving water to urban areas.

Mary Kelly, senior attorney and program director in the Austin office of the advocacy group Environmental Defense, said that the state's most pressing water issues involve meeting environmental water needs, finding ways to manage groundwater supplies sustainably and dealing with the Rio Grande's problems.

Jim Blackburn, an environmental attorney in Houston, said Galveston Bay's environmental status has improved, but that without care, urban water recycling could deny sufficient flows to the wildlife-rich estuary in 10 to 20 years.

Amid such warnings, there were hopeful examples of how people can deal with seemingly intractable water problems. In the early 1990s, a water-supply crisis prompted San Diego to launch a multifaceted response, said Maureen Stapleton, general manager of the San Diego County Water Authority.

The elements include a 2003 agreement on the use of Colorado River water that includes protection for the Salton Sea, a crucial wildlife habitat; stepped-up efforts in water recycling, groundwater conservation and desalinization; promotion of technologies such as ultra-low-flush toilets and development of others; encouragement of native-plant landscaping; and a massive water education effort in schools.

Now other cities, such as Las Vegas, are studying San Diego's effort as a model, Stapleton said. With planning, courage and vision, she added, others can learn from it, too.

—Bill Dawson

## TEXAS READER

# Reading about Rivers

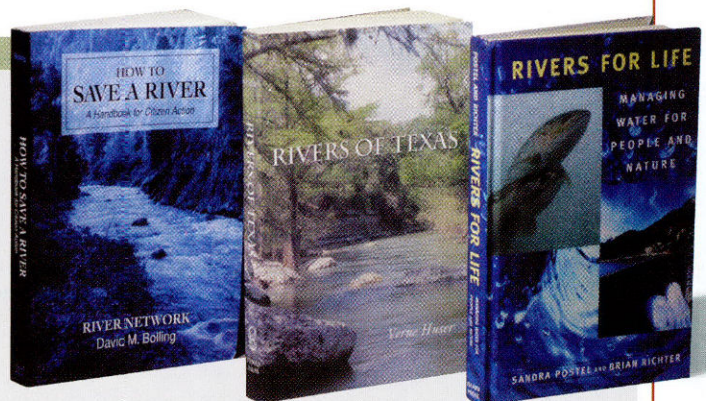
THE PLACES TO START READING ABOUT TEXAS RIVERS are John Graves' 1960 elegy, *Goodbye to a River*, and his series of essays for this magazine collected as *Texas Rivers* and now published by University of Texas Press. But then what?

Verne Huser's *Rivers of Texas*, first published in 2000 and recently re-issued in paperback (Texas A&M University Press, 264 pages, 60 black-and-white photographs, \$16.95, paper) offers a solid overview of Texas rivers and a passionate call for their protection. Huser, a retired English teacher and a long-time river guide, divides Texas rivers into four categories: the "border rivers" (Rio Grande, Sabine and Red River); "heartland" (Colorado, Brazos and Trinity); "regional specialties" (Neches, Nueces, Pecos and Canadian); and "Gulf rivers" (San Jacinto and Buffalo Bayou; San Antonio, Lavaca and Navidad, and Guadalupe). Some might argue that these categories don't reflect the ecological functions of rivers, but they do offer a convenient way of seeing the big picture. And, as John Graves so astutely reminds us, rivers have important cultural and political histories as well as ecological functions that demand our attention.

To understand how rivers work and how they might be helped, Island Press of Washington, D.C. has published two books of interest. *Rivers for Life, Managing Water for People and Nature* (253 pages, \$25 paper, \$50 cloth, <[www.islandpress.org](http://www.islandpress.org)>) is a balanced, informative analysis by Sandra Postel, director of the Global Water Policy Project in Amherst, Mass., and Brian Richter, director of the Freshwater Initiative of The Nature Conservancy. The key to understanding rivers, the authors write, is to understand how the historic shifts of low flows and floods have created river ecology. Managed flows need to mimic these highs and lows, they say. In addition to analyzing the public policy toolbox available for restoring and maintaining rivers, Postel and Richter provide case histories of river management and restoration and an extensive bibliography.

Island Press has also published *How to Save a River, A Handbook for Citizen Action* (286 pages, \$45 cloth) by David M. Bolling of the River Network, a national nonprofit organization founded in 1988 to help people save rivers. Published in 1994, the book is still available and timely. Bolling offers case histories of river restorations, practical advice on how to be an advocate for a river, a brief overview of the problems rivers face and a list of government and private resources. And he offers one important piece of advice for anyone who wants to be an advocate for a river: "First, fall in love." That's what John Graves did more than 40 years ago.

—Michael Berryhill



# Going with the Flow

*A new legislative study group ponders how to allocate water for wildlife.*

**Like blood vessels** in the human body, Texas rivers sustain people and wildlife all along their lengths and ultimately feed estuaries that serve as the foundation of coastal ecosystems.

But how does Texas know how much water should flow down a river and into an estuary? What scientific methods should be used to find the answer? And once that is determined, how should the state's finite water supplies be allocated to make sure there's enough to sustain healthy rivers and bays?

Those questions are at the heart of a landmark effort of the Texas Legislature, which last session established the Study Commission on Water for Environmental Flows. Members on the 15-member study commission were appointed by the governor, lieutenant governor and speaker of the house. The membership includes state senators and representatives from natural resource committees; board chairs of the state water agencies (Texas Commission on Environmental Quality, Texas Water Development Board, Texas Parks and Wildlife Commission), a university expert and representatives of river authorities and city water supply agencies.

The law that created the commission — Senate Bill 1639 — acknowledges the importance of healthy aquatic ecosystems, adding the following language to the Texas Water Code: "The waters of the state are held in trust for the public... Maintaining the biological soundness of the state's rivers, lakes, bays and estuaries is of great importance to the public's economic health and general well-being."

However, the bill prohibits the state from issuing new surface water right

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**This greater yellowlegs needs help from his fellow Texans to make sure there's enough water for a healthy ecosystem.**

permits for instream flows dedicated to environmental water needs for bays and estuaries. Its intent was to temporarily halt efforts by private conservation groups to appropriate water for San Antonio Bay, Galveston Bay, Caddo Lake and other water bodies. (See "The

Wildlife magazine.)

Instead, the commission will consider several policy options for meeting the needs of rivers and bays. The commission will make its recommendation to the legislature in a report due on Dec. 1. Legislative committees will then consid-

Guad Squad" in the July 2002 issue of *Texas Parks &*

er laws that specify how Texas will allocate water for environmental needs.

"We have reached a historic juncture in Texas water policy," says Larry McKinney, TPWD coastal fisheries director and an agency leader on water issues. "In the past, the legislature has mandated scientific studies regarding water for bays and estuaries. But with this commission, it is moving from scientific research into setting policy, deciding how to solve problems and provide

for the future."

This summer, the study commission will hold meetings at which the public can comment on the issues. For more information on the schedule of public hearings and the purpose of the commission, consult <[www.texaswater-matters.org/environment\\_commission.htm#5](http://www.texaswater-matters.org/environment_commission.htm#5)>.

—Tom Harvey



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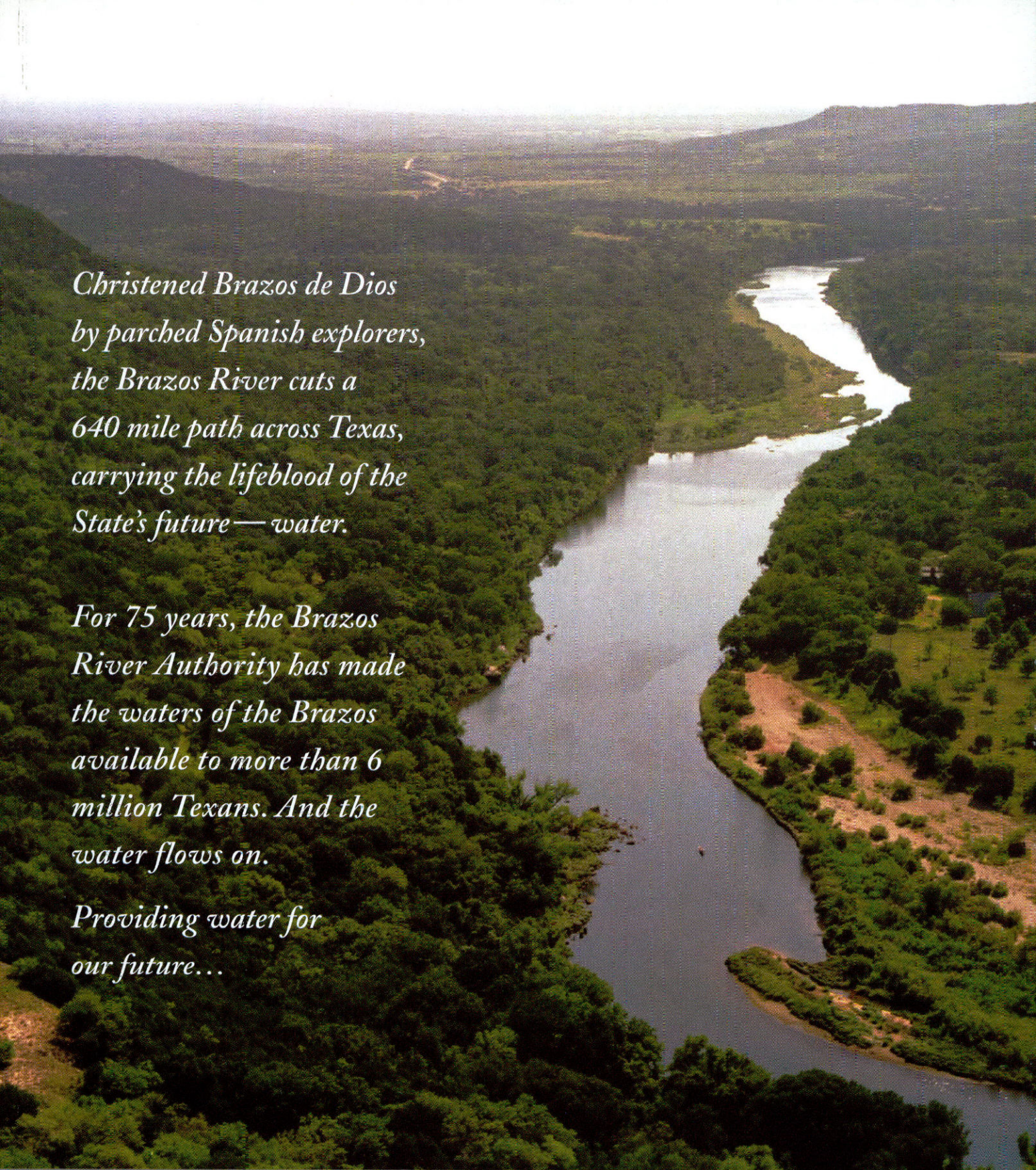
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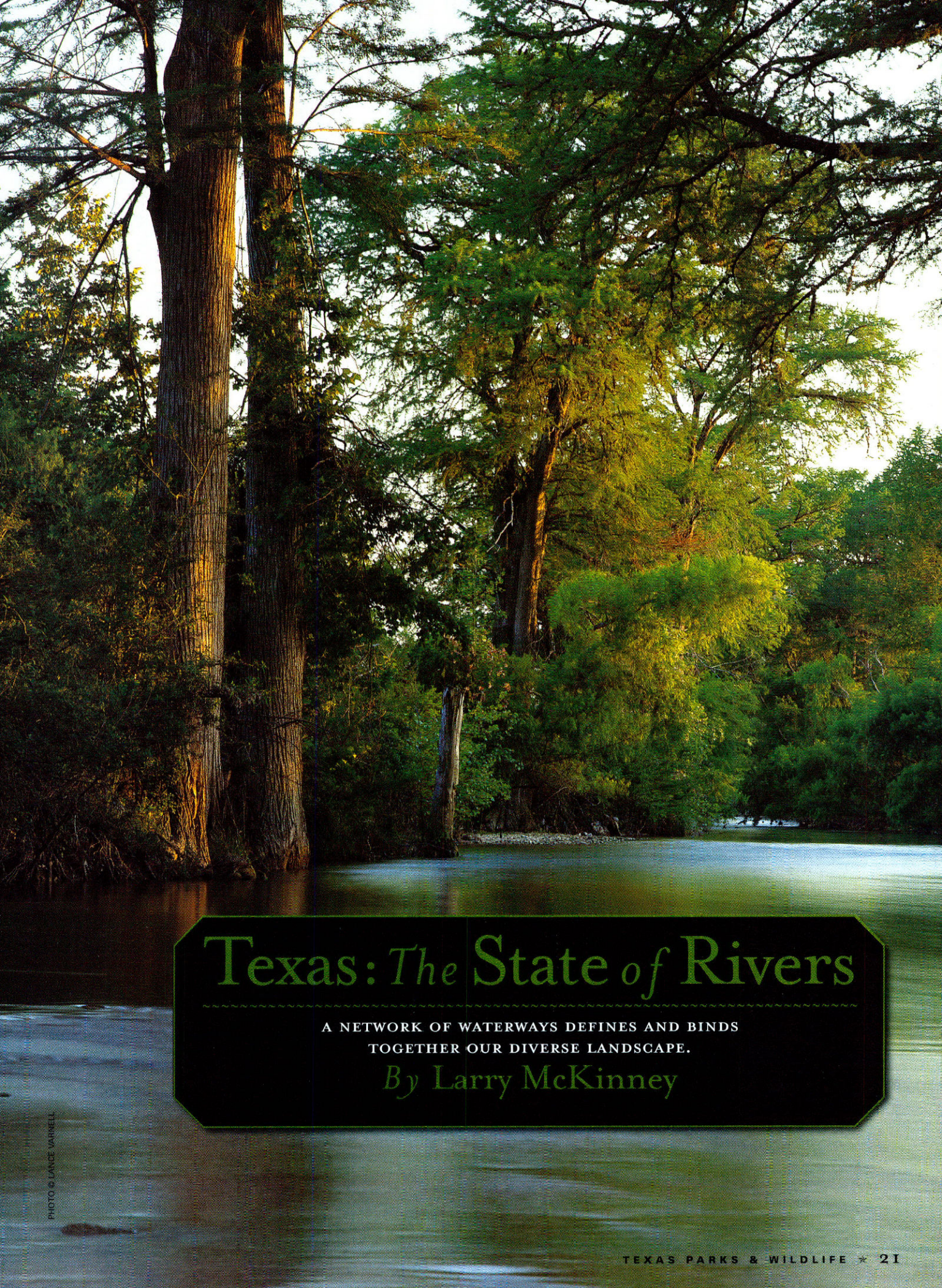
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# Texas: *The State of Rivers*

A NETWORK OF WATERWAYS DEFINES AND BINDS  
TOGETHER OUR DIVERSE LANDSCAPE.

*By Larry McKinney*

PHOTO © LANCE VARNELL

**M**y appreciation for, and love of, Texas rivers did not come naturally. It was an acquired taste that was realized only after many years. I was born and raised in West Texas near the small farming community of Coahoma. No rivers there. We had “draws” in which I spent my time playing and exploring — natural playgrounds

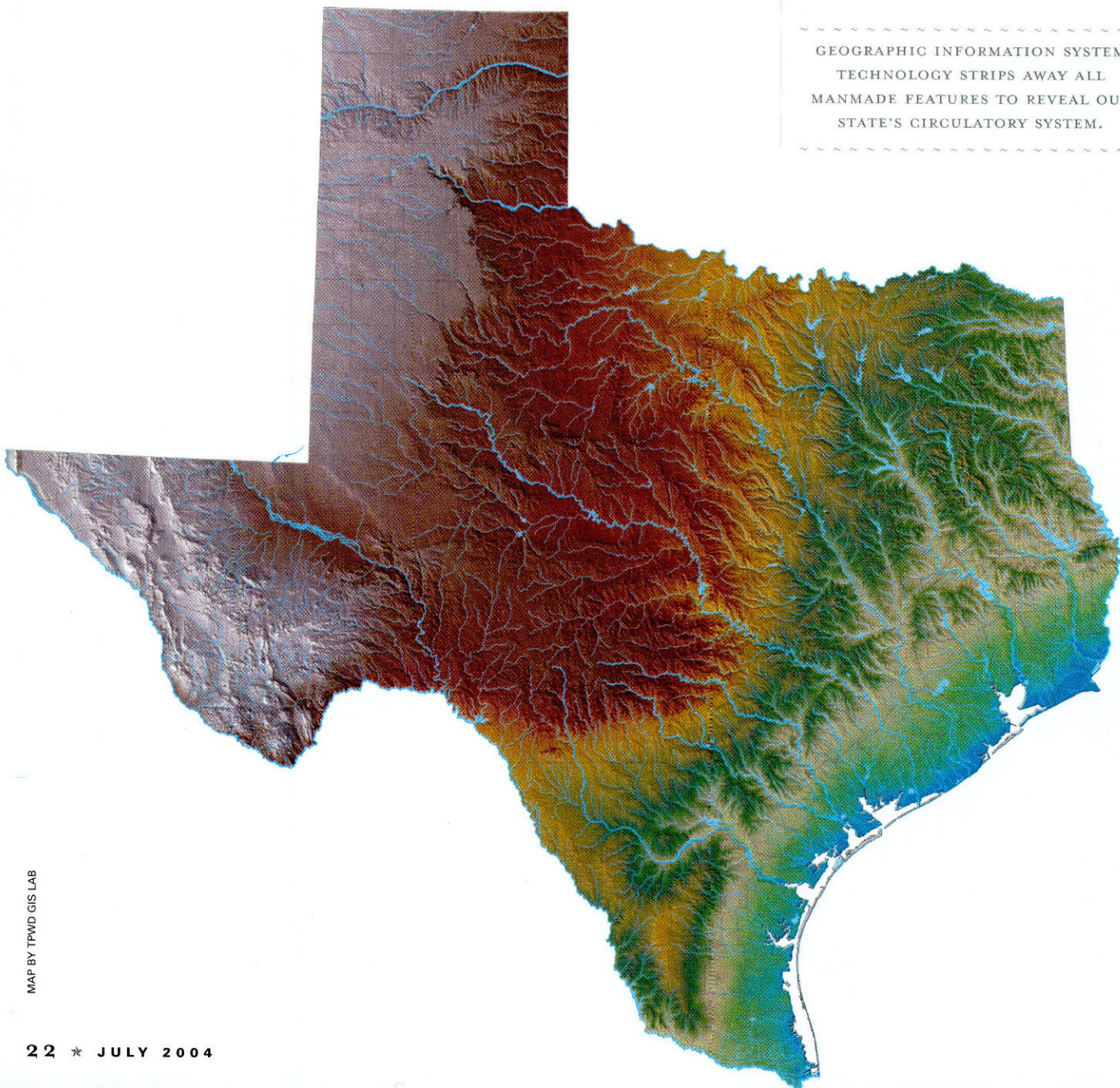
that no city park could equal. On the very rare occasion of a rain, during which we often received our entire annual rainfall in an hour or so, those pastoral draws became raging torrents. I remember them vividly. Cows, barns, entire trees and rafts of trees would tumble by in a boiling red-brown flood with all the intensity and sound of a runaway freight train. It was

frightening and yet fascinating.

Even today, as I stand on the bank of any river, that powerful childhood memory continues to tickle at the back of my mind. There are not many Texas rivers I have not waded, canoed or fallen into since Coahoma, but that background level of unease lingers. I do not pay it much more attention than that, as it is but a

small unease in a bigger, more powerful and reaffirming magic that I always feel on the margins of rivers such as the Devil's in West Texas, the Llano in Central Texas and the Neches in East Texas. I use the term “magic” with forethought, because I cannot honestly come up with a more descriptive word for how rivers affect me. I can understand them intellectually as com-

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MAP BY TPWD GIS LAB

plex, living entities — an easy concept for me to grasp because of my scientific training and study of them. But they are more than that, something in which scientific training begins to fail me — adding another small increment of unease. To this day, I cannot get on a river in my canoe or kayak without that barely perceptible feeling of unease rising to the surface. I guess it is because you have to give up some level of control to the river as it embraces you and your vessel — you join with it, not it with you.

That mass of water moving almost soundlessly past me generates a palpable sense of raw physical power. It is a presence that I can feel without actually touching the surface. Where does this water come from? Where is it going? What is hiding in the roiling depths beneath an otherwise calm surface? Answers to those questions are two-edged — metaphysical and physical. The metaphysical answer rests on individual experience and psyche, difficult to express or generalize but gut-level essential. The physical is more tangible and as important. Our health and economic well-being as individuals and communities depends upon the answers.

and dispersal of wildlife. Often these wooded or riparian strips are the only wildlife habitat in otherwise developed lands cleared for agriculture, housing or industry. The natural cycles of flood and drought are expressed as rivers expand explosively or shrink to a trickle, dictating the health of the lands in which they are embedded.

This dominance of rivers was not lost on the people originally inhabiting Texas, nor on those who later laid claim to it. Major Native American camps and the archeological sites that mark them today are invariably near a river, stream or important water feature. The margins of the San Marcos River have been continually occupied for 12,000 years. The springs and rivers of West Texas are littered with the artifacts of the past. These waterways were the highways that sped travel, promoted trade and sustained community. When Europeans came on the scene it was no different. Every major city in Texas is on a river or at the confluence of rivers. Texas rivers such as the Rio Grande, Pecos, Red, Colorado and San Jacinto reverberate with our history, for much of it was played out on their banks.

powerful. They drain much of the rolling plains and Llano Estacado in the Panhandle of Texas, bulking up with huge sediment loads as they charge towards the coast. The Brazos is so sediment-laden that it has filled its historic bay and empties directly into the Gulf of Mexico. The biggest cities of Texas were built with the sand and gravel of these rivers cast into concrete and mortar.

The Hill Country rivers of Central Texas are hidden gems that few outside of Texas (thank goodness) know: the Sabinal, Medina, Nueces, Frio, Llano and others like them run clear and cool through rocks and “blue holes” and grottos in a thousand hidden spots. Some, such as the Comal and San Marcos, are fed by springs from the Edwards Aquifer — the sole water source for San Antonio. These tributaries eventually feed the Guadalupe and San Antonio rivers and run to the coast and the estuaries that depend upon them for life-giving water.

It is hard to do justice to these remarkable resources. The best job has been done by John Graves, in his seminal work, *Goodbye to a River*, and in *Texas Rivers* with photographs by Wyman Meinzer. Verne Huser

~ TEXAS RIVERS REVERBERATE WITH OUR HISTORY ~

Except for the 15 major rivers and their larger tributaries, like the Guadalupe and its tributary the San Marcos, most of us are not aware of the extent to which these waterways encompass and define Texas. Using modern Geographic Information System technology, one can strip away map layers of roads, vegetation types and other natural and manmade features to reveal almost 200,000 miles of streams and rivers. It is a startling revelation to the uninitiated, and the universal response is that it looks like one of those human models in which the skin has been peeled away to show the circulatory system. It is an appropriate metaphor; both systems are vital to the health of the body they serve.

Texas is remarkable in biological diversity. It has 11 recognized and distinct biological provinces, defined by characteristic soils, vegetation and animal life. It is the network of rivers and streams that bind this diverse landscape together and integrate them one with the other. Our rivers and streams are a movable feast, carrying nutrients to one area and removing waste from another. They and their wooded margins are highways for the migration

Texas rivers are as diverse as the history they reflect. In pre-European Texas, rivers flowed unimpeded except by natural obstructions such as log jams and the like. Those seldom lasted for long, and the next sufficiently large flood often eliminated them. Lakes of any significant size were not a part of Texas historic natural setting, unless one looks back some 100 million years to the period of the great inland seas.

The Texas climate, along with its soil type, is what dictates riverine diversity. The high rainfalls of the northeast Pineywoods diminish in an orderly gradient, moving south and west, dwindling to nearly nothing in the Trans-Pecos. East Texas rivers, such as the Neches and Sabine are big and steady, what easterners recognize as rivers in the classic sense. Their margins were once lined with immense hardwood bottomland forests. More than 60 percent of these forests have been lost, and more is threatened as areas like the Big Thicket stand lonely sentinel to what once was and may never be again.

The Trinity marks the transition from forest to the rivers of the plains — the Brazos and Colorado, big, muddy and

in *Rivers of Texas* has profiled all the major rivers of Texas. These books are must-reads for all Texans concerned of their fate.

The fate of Texas rivers hangs in the balance, and, unless we come quickly to appreciate their value, we risk their loss. The problem is that most Texans have little understanding of what is at stake, what that loss can mean. On one river trip, I came upon several young men tossing full trash bags into the river from the back of their pickup truck. I was so stunned I could not think what to do, so I asked them as calmly as possible what they were doing. They responded in true innocence that they were getting rid of trash. I replied that this was no way to treat a river. Their parting rejoinder was puzzlement. “What’s the big deal?” they said. The river always takes care of it. When they come back, the trash is gone!

I hope this is a worst-case example of a general malady, but it is instructive nonetheless. There is an old truism: We all live downstream from someone. Many Texas cities, large and small, draw drinking water from rivers upstream of them. The water passes through showers, dish-





~ THE RIO GRANDE AND CANYON WALLS BEFORE DAWN ~

PHOTO © LAURENCE PARENT

washers and, yes, toilets, on through treatment plants that partially clean it up, and it goes back into the river, along with industrial discharges, urban and agricultural runoff. Downstream, that water is drawn into another city and the cycle repeats itself.

What allows this process to work is the healthy aquatic ecosystems of these rivers. With adequate water and abundant plants and trees and broad flood plains, rivers dilute the discharges and filter the water through plants and soil. Functioning ecosystems can cleanse the water as it passes downstream. The stretches of unaltered rivers between discharge and intake pipes process and assimilate these byproducts of civilization. So long as they remain healthy, they are a natural and cost-effective treatment. The key to that health is sufficient instream flows to support the aquatic communities. We simply cannot continue to remove water from rivers and expect them to continue to function.

It seems elementary, but rivers need water to exist. The consequences of not enough water are more than ecological

may be sending us a signal of possible trouble. In 2001 and 2002, the golden alga caused several major fish kills in these river basins, killing approximately 4.5 million fish in the Brazos River system and 2.3 million fish in the Colorado River system. Estimated losses to local economies from the 2001 winter fish kills exceeded \$18 million. Aside from toxic algae, the most common causes or stressors that affect assessed streams and rivers in Texas are high bacteria levels, elevated average concentrations of dissolved minerals and depressed dissolved oxygen concentrations. While some



to the river only somewhat abused. As the demands for water grow and its value increases, as our ability to move water between basins and markets develops, the holders of these permits will have great incentive to fully use "their" water. What then is the fate of the rivers on the margin? That is a question we must answer now, when options are still available. Sooner than we think, there will be none.

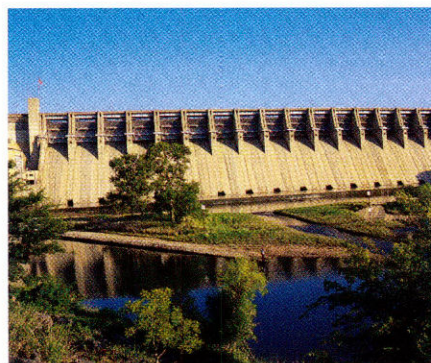
The good news for Texas is that options do exist right now. Also we know that we can be successful on a meaningful scale, if we make the commitment now. What we have done to address water quality concerns demonstrates what we can do on a statewide scale. We are not yet where we need to be. While approximately 80 percent of the assessed rivers and streams in Texas in 2002 fully supported their designated uses, some form of pollution impaired the remaining 20 percent. Contact recreation is the use most frequently affected. However, the Trinity River below Dallas is no longer referred to as the "Black River of Death" because of

~ ONE CAN NO LONGER COUNT ON CANOEING THE CANYONS OF THE BIG BEND ~

collapse; they can be life-threatening. Examples abound around the world where epidemics are fostered by poor water quality and pollution caused by human actions that reduce river flow.

There are rivers in Texas where we are close to this scenario, like the Rio Grande. Much has been written about it. It is drying up from both ends. One can no longer count on canoeing the canyons of the Big Bend; one hikes them — there is often not enough water to maintain anything other than intermittent pools. The mouth of the river periodically ceases to reach the sandy beach of Boca Chica to the sea. Drought, invasive aquatic plants and too great a demand for water are exhausting this river.

We have dammed every major river system in Texas and in many, drastically altered their natural cycles. We have diverted water from them and the estuaries they feed to support the economic development of the state and help diminish the threat of drought. All of this has been to the benefit of us all, but it has come at a price. It is a price that our rivers have been able to bear up to this point, but clearly, as the Rio Grande situation illustrates, we sit on the razor's edge. The golden alga blooms of the Colorado and especially the Brazos



of the stream and river water quality problems are naturally occurring, others are preventable. We cannot continue to take these valuable resources for granted, and we cannot sustain further abuse of them if we are to accommodate the additional 20 million Texans we anticipate during the next 50 years.

Like their calm surfaces that hide a roiling current, Texas rivers may be nearer to manifesting problems than we can see from looking at them. In some rivers, so much water has been permitted for withdrawal that if all of it were removed, the health of the waterways would be in peril. Fortunately, not all permitted water is used, and some water that is used returns

overwhelming quantities of untreated sewage. The Houston Ship Channel, once one of the worst polluted reaches in America, no longer catches fire — when a fish kill occurs there now, it's news. We can reverse wastewater and industrial pollution problems, and we have done so.

All that progress could be lost if we do not make sure enough water remains in our rivers to maintain healthy aquatic communities. If we wish to continue to fish, swim and boat in our rivers, even live next to them safely, we must reserve enough water to assure their health. The means to do so are numerous; we must find the political will to employ them.

That process has started, and the Texas Legislature has put a framework into place to figure out what will work best for Texas. It will not be easy. A limited quantity of water is available for cities, industry, agriculture and the environment. We must have water for all these needs to secure the future we all want for Texas. We all have a stake in it and a contribution to make, whether it is participating in this important process or conserving our most precious natural resource: water. The choice is ours. ✧

# Studying our Rivers

HOW MUCH WATER DO OUR RIVERS AND STREAMS NEED?  
TEXAS SCIENTISTS ARE LOOKING FOR THE ANSWERS.

By Kevin Mayes

**E**VERY DROP OF WATER counts, but why it counts depends upon your perspective. A water purveyor might see a drop of water slipping past a dam as lost for human consumption. But that same drop of water traveling downstream creates habitat for wildlife and supports myriad recreational opportunities — hunting, fishing, tourism, bird watching and paddle sports. Water that runs down a stream may rest in a quiet pool before moving down through an alternating chain of gliding runs and bumpy riffles, which are often the most productive and richest habitats in the river.

When water jumps the cottonwood- and willow-lined banks of a stream during a flood, it carries with it sediment and nutrients that nourish bottomlands and other streamside wetland areas. These riparian areas serve as natural sponges, soaking up pollutants and excess nutrients. They also

once the flows return. They are adapted to a natural cycle of dry and wet periods.

Drought is what worries river scientists the most. As the land parches, the need to irrigate crops and urban lawns intensifies; reservoir levels drop, and water purveyors become alarmed. Water diversions and reduced releases from storage reservoirs can prolong or exaggerate the effects of drought and aggravate impacts to fish and wildlife. With the population of Texas expected to nearly double in the next 50 years, from almost 21 million people in 2000 to about 40 million in 2050, the demand for water will certainly increase. The question is whether rivers and streams and the aquatic life they support can continue to recover from dry times and droughts in the face of ever-increasing water demand.

The challenge now is to find out how much water it takes to maintain healthy aquatic ecosystems. This is not an easy ques-

need to spawn. Some are specialists, using only certain habitats for all of their lives.

In 2001, recognizing the potential for serious conflicts between the need for water for human uses and for maintaining rivers and streams, the Texas Legislature directed the Texas Parks and Wildlife Department, the Texas Commission on Environmental Quality and the Texas Water Development Board to determine the flow conditions necessary for maintaining healthy streams and rivers in Texas. Those priority studies — termed instream flow studies — are to be completed by 2010. The three agencies jointly developed two documents that describe the priorities and the tools for conducting the studies. *The Programmatic Work Plan for Texas Instream Flow Studies (December 2002)* identifies timelines for six priority studies, outlines the roles of the state agencies and presents the scope of the studies along with the general methods used to conduct the

~ WE NEED TO KNOW HOW MUCH WATER IT TAKES TO MAINTAIN HEALTHY AQUATIC ECOSYSTEMS ~

contribute to the diversity of the river ecosystem — riparian areas are known for their tremendous productivity and richness of species. Hunters target these areas for waterfowl, turkey and deer, while birdwatchers come to see woodpeckers, kingfishers, shorebirds, vireos and warblers.

During dry times, each drop of water counts even more. As creeks and small springs run dry, streams and rivers turn to trickles and the competition for space, food and oxygen heats up. Because they are the highest part of the streambed, riffles tend to dry up first. Water barely covers the cobbles and pebbles and offers little habitat for some species that can't thrive anywhere else. Pools warm up and fish congregate at the tail of the riffle, waiting for the next meal to make a run for safer cover. Birds and other animals often find easy meals in isolated pools on the edge of the channel. In spite of these harsh conditions, stream organisms find havens and repopulate abandoned areas

because river ecosystems are complex and dynamic, being interconnected with groundwater, floodplains and estuaries, and characterized by interactions of hydrologic, physical, chemical and biological processes. For example, high flows move sediment, flush silt, build and reshape habitats and connect the river to the floodplain. Flowing water influences important water quality parameters such as temperature and oxygen levels. Land-use practices such as urbanization, agriculture and logging alter the quality and quantity of water by modifying watershed retention and runoff. Biological processes are also linked to hydrology. River biota have adapted their life histories to take advantage of the seasonal changes in flow, some timing their reproduction to high springtime flows and others migrating long distances upstream to complete their life cycle. Some fishes require different habitats at night, or change habitats as they mature or when they

studies. A supplementary document, the draft *Technical Overview (August 2003)*, provides an in-depth technical discussion of the proposed science and engineering methods and identifies the conservation of biodiversity as well as the maintenance of biological integrity as study goals. In 2003, as part of the peer review process, the Texas Instream Flow Program sought a review of these two documents by the National Academy of Sciences. The Academy's National Research Council assembled a multidisciplinary committee to perform the review, and it will be complete in October 2004.

The Texas Instream Flow Program can have an influential impact on the future of Texas' natural heritage by providing accurate and useful data and tools for water planning, permitting and the conservation of fish and wildlife. More information about the program and the NAS review is located on the Texas Instream Flow Program website at <[www.twdb.state.tx.us/instreamflows/](http://www.twdb.state.tx.us/instreamflows/)>. ☆

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~THE TRINITY RIVER~

# Contemplating the Trinity

PLAGUED WITH URBAN POLLUTION AND BLESSED WITH  
CLEANSING BOTTOMLANDS, THE TRINITY RIVER IS HOLDING ITS OWN.

*By Gary Cartwright*



PHOTO © LAURENCE PARENT

**W**hen self-professed Trinity River rat Cliff Johnson casually remarked to me that “any real Texan loves a river bottom,” I had to smile. Johnson, a former state representative from Palestine, owns 2,150 acres of pristine bottomland in the Middle Trinity Basin, but obviously he never lived in North Texas. When I was

growing up in Arlington in the 1940s, the Upper Trinity was a dirty joke. Our town dumped its sewage directly into the river. Our big-city neighbors, Fort Worth and Dallas, at least treated their sewage before sending it down river, though not so the fish could tell. In the 1960s, the U.S. Public Health Service described the 100 miles of river below Dallas as “septic.” As recently as the 1980s, sewage from Dallas was killing fish downstream in historic numbers. Alarmed by fish kills and what they called “black-water rises” — the welling-up from the river bottom of masses of oil, grease, copper, chlorine, pesticides and toxic industrial and agricultural wastes — citizens of Johnson’s district in Anderson and Freestone counties filed a lawsuit in 1985. The suit thwarted Dallas’ plan to dump tens of millions of gallons of raw sewage in the Trinity, and more than that, it called statewide

attention to this outrage.

Indignant Dallas officials denied their sewage harmed fish; the water commissioner noted cavalierly that the Trinity was never meant to be “a trout stream.” A guy from the Trinity River Authority had the gall to insist that the fish kill proved that the quality of the Trinity was getting better. “We wouldn’t have had a fish kill this year if we hadn’t made the improvements in water quality in 1970,” he declared, “because there wouldn’t have been any fish (left to kill).” Stung by such twisted logic, Cliff Johnson suggested that Dallas solve the problem by dumping its sewage in the Cotton Bowl, since the stadium was only used once or twice a year anyway. (Alas, further study revealed that Dallas would have needed 36 Cotton Bowls for the task.)

To this day, citizens of the Metroplex largely deal with the Trinity by ignoring it —

with a few happy exceptions. True, nobody writes poetry about this river, yet the Upper Trinity is far cleaner and more attractive than it used to be. Rivers are getting to be trendy. An 8-mile jogging and bike trail now connects Arlington’s River Legacy Park to Fort Worth and Grand Prairie. After all these years of indifference, the city of Dallas has officially discovered the Great Trinity Forest, a 7,000-acre swamp where for decades, old toilets, tires, truck axles and slabs of asphalt collected. The 7-mile-long section of river that slogs through downtown Dallas, a rerouted ditch constructed in the 1920s, may some day be transformed into a landscape of lakes, wetlands, nature trails and designer bridges; it’s part of the proposed \$1 billion Trinity Corridor Project.

For all its neglect and mismanagement, the Trinity is one of the great rivers of Texas. Half of the state’s population lives along its course. It’s the longest river totally within the state’s borders, 550 river miles, and it drains an incredible 17,969 square miles, from Cooke County on the northern border of Texas to Trinity Bay, where it becomes the main source of nourishment for Galveston Bay. The river’s curse is that it essentially begins and ends in the state’s two great urban areas, Dallas-Fort Worth and Houston. Between those gigantic blobs of commerce and trade, the Trinity flows through 300,000 acres of East Texas bottomland hardwood, one of the loveliest hardwood forests in Texas. Texas is vanishing, at least its natural parts. Our state led the nation during the last decade in loss of undeveloped land: every two minutes another acre of Texas farmland or open space becomes a subdivision or mall or road.

A group of landowners in the Middle Trinity Basin has banded together with the Texas Parks and Wildlife Department and other state agencies to arrest and reverse this hemorrhaging. In the summer of 2000, they organized the Middle Trinity River Basin Conservation Cooperative, dedicated to preventing fragmentation of habitat and maintaining natural travel corridors for wildlife, while simultaneously





~ THE TRINITY: NOBODY WRITES POETRY ABOUT THIS RIVER ~

PHOTO © WYMAN MEINZER







~ FOR ALL ITS NEGLECT AND MISMANAGEMENT, THE TRINITY IS ONE OF THE GREAT RIVERS OF TEXAS ~



~ ROBERT MCFARLANE'S WILDLIFE PROJECT HAS BECOME A BOLD ATTEMPT TO LANDSCAPE THE RIVER ~

attempting to restore the land to what it was a century ago. What started as a wildlife project has become a bold attempt to landscape the river itself. “There’s no point in trying to manage wildlife on my ranch unless owners of adjacent properties are on the same plan,” says Robert McFarlane, a Palestine cardiologist whose 7,200-acre hunting ranch and lodge near Tennessee Colony — called The Big Woods — is a major element of the co-op.

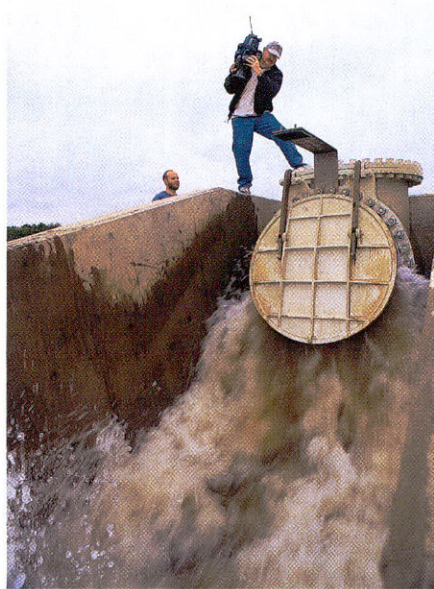
The neat thing about this co-op is that pipeline, energy and utility companies — the very corporations that whacked up and polluted the environment in the first place — are helping foot the bill, as required by law. “They are paying me to improve my land,” says McFarlane, whose government-

approved 435-acre mitigation bank will soon triple in acreage. Corporations needing “credits” for acres they develop or air they pollute come knocking on doors of landowners such as McFarlane and Cliff Johnson, eager to pay them to restore wetlands (which clean the water) or replant oak forests (which turn carbon waste into oxygen). For a one-time fee, landowners agree to create and maintain the mitigated project in perpetuity. Virtually useless for farming and ranching, land in the flood plain is cheap, a good buy for those who intend to use it for recreational purposes. The wastewater Dallas is so eager to be rid of can help refurbish bottomland hardwoods. “Every time someone in Dallas flushes his toilet,” one landowner jokes, “I get a new oak tree.”

And that’s just a start. Landowners are experiencing what TPWD biologist Carl Frentress calls “a paradigm shift in thinking how the land can produce commodities.”

“My Holy Grail is to make money off my land without having any cows,” McFarlane told me late one evening in the Big Wood Lodge. “I hate cows.” A 1970 graduate of Palestine High School, he graduated from Harvard Medical School and in 1986 returned to Palestine and started buying bottomland. McFarlane is a Falstaffian figure with a quick mind, a keen wit and a large appetite, one of those organic East Texas characters who seem to grow wild in dark, wet places. He loves listening to Vivaldi, reads Faulkner and writes wonderful essays on subjects such as “Squirrel Hunting Alone,” in which he reveals a running disagreement with his wife over whether Rembrandt’s paintings are special for the painter’s use of darkness, or, as his wife insists, for his use of light. “I think those who hunt have an inherent difficulty with optimism,” he says. His hunting lodge and guide service — the recreational end of this business — break even. But McFarlane believes there is big money to be made from such untapped resources as ground water, which is plentiful in this part of the state.

“Say I can sell it at a rechargeable rate at



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 HUGE PUMPS, LEFT, TRANSFER THE TRINITY’S WATER INTO WETLANDS THAT FILTER THE WATER AND SUPPORT A RANGE OF HABITAT, BELOW.  
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PHOTOS BY EARL NOTTINGHAM

\$100 an acre a year," McFarlane explained. "Seven hundred acres would produce \$70,000." He could pipe the water upstream and sell it to Dallas or, easier yet, pump it into the river and charge Houston to take it out. "A single-phase well [on his land] can pump 300-400 gallons a minute," he boasted. "It looks like a damn fire hydrant." Planting trees is almost as profitable. One acre of flood plain, he says, can sequester 600 tons of carbon waste. "So if the market for carbon waste is \$1.50 a ton, that's \$900," McFarlane calculates. "Pretty good return for land that cost \$400." He predicts that carbon sequestration alone will, over time, refurbish the Trinity flood plain from just south of Dallas all the way to the upper reaches of Lake Livingston.

The Middle Trinity Co-op has grown to nearly 150,000 acres, including 21,000

flows back to the Trinity, cleaner and purer than when the prison borrowed it. The Tarrant Regional Water District, which built the Richland-Chambers Reservoir at the north edge of the co-op, is making amends on a historical scale. Acknowledging that the reservoir destroyed bottomland hardwood habitat, the water district donated a 14,000-acre project known as the Richland Creek Wildlife Management Area. Each day, 15 million gallons of raw water is pumped from the Trinity River onto 250 acres of constructed wetlands. The wetlands filter and clean the water, which flows back into the Trinity. When the project is completed, it will have 2,000 acres of wetland and, hopefully, will be the model for all Texas waterways. "It's a grand recycling scheme," explains Jeffrey Gunnels, a wildlife biologist at Richland Creek. "This is the wave of the future."

noses and tusks. When the wind shifted, hundreds (maybe thousands) of mallards, teal, pintail and spoonbills swooped up, staining the gray sky. "They're bunching up, getting ready to fly back north," Wagner said. Water lines on trees nearest the river reach nine or ten feet. This is rough, nearly impenetrable land. Left alone, it will return to nature, but in the hands of mere humans, it can be stubborn. Cliff Johnson told me that he planted 500 sawtooth oaks and 500 bald cypresses, and not one of them survived. "They are native to the river bottom, just not *that* river bottom," he explained.

These deep woods guard our history and heritage in ways I'd never guessed. Bonnie and Clyde Road, a muddy trail designated by a street sign Doc McFarlane posted on a piece of his property, is supposed to lead to an old ferry landing that was an escape route for the infamous outlaws. Parker's Bluff on the section of river that runs through Big Lake is where Chief Quanah Parker and his Comanches crossed the river. It's also where the steamship *Ruthen* went down in the 19th century. Douglas Sumrall, a Palestine Exxon distributor who leases land on this part of the Trinity, told me that the *Ruthen* once hauled cotton bales from the Dallas area to the port at Anahuac. "You can still see the ruins, square nails and all," Sumrall said. From the end of the Civil War to as late as the 1970s, civic boosters in the Metroplex clung to the delusion that the Trinity might some day be made into a 370-mile ship channel connecting Dallas and Fort Worth to the Gulf of Mexico, creating an ersatz Port Metroplex rivaling the Port of Houston. That never happened, and never will, but that didn't stop them from constructing several locks along the river.

When the Trinity River Authority impounded Lake Livingston in 1969, it created 450 miles of shoreline and flooded 90,000 acres of hardwood bottomland. The dam also arrested the flooding and silt that would have nourished estuaries and hundreds of thousands of acres of Texas coastal wetlands. A remnant of the bottomland hardwood ecosystem remains 25 years later, protected by the creation of the Trinity River National Wildlife Refuge near Liberty.

Below Lake Livingston, the Lower Trinity becomes wild and unpredictable. In some places, it's surprisingly wide and deep, sheltered on both banks by dense forests of cottonwoods and elms. In other places, the cut banks I'd seen upstream vanish into a maze of passes, bayous, sloughs and incredibly beautiful and mysterious cypress swamps. On a boat trip with my friend Shannon Tompkins, a biologist and outdoors writer for the *Houston Chronicle*, I saw a part of this



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 RELEASES FROM THE RICHLAND  
 CHAMBERS RESERVOIR, ABOVE, TRAVEL  
 SOUTH THROUGH SAN JACINTO  
 COUNTY, RIGHT, AND ON TO THE GULF.  
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acres owned by the Texas Department of Criminal Justice (prison-system land) and almost 30,000 acres from three TPWD wildlife management areas. This turns out to be a win/win situation for both public and private landowners. Cliff Johnson, whose bottomland adjoins the Big Lake Bottom WMA, uses sewage water from the Beto Prison Unit just up the hill to create a 40-acre wetland that has become winter home to thousands of ducks. When Johnson drains the wetland in the summer to allow new vegetation to sprout, the water

Life in the Middle Trinity Basin is lazy and bucolic, a page from the Old South. Folks here still speak of the "Yankee aggression," and of great-grandfathers who lost arms and legs in the Civil War. Cliff Johnson, whose people settled near Palestine in 1857, told me: "There's a special feeling on that river bottom. It's got its own mystique, its own smell, its own sounds." I discovered this for myself one dark day in late February when I took a trip across the muddy terrain with TPWD biologist Matt Wagner, each of us jockeying a four-wheeler. Indeed, the forest swallows you up and puts you in another time. Parking near a wetland, we listened to the sound of silence, momentarily broken by the bark of a barred owl. A pack of feral hogs rustled through palmettos and beauty-berry plants, rooting for grubs with their

PHOTO © GRADY ALLEN



~ THE LOWER TRINITY BECOMES WILD AND UNPREDICTABLE ~

PHOTO © LANCE VARNELL



PHOTO © GRADY ALLEN

amazing swamp, one of the last of its kind in Texas. Somewhere south of Liberty, we exited the main body of the river and took an old barge canal that cut through the heart of this cypress wonderland. Fifty years ago the canal was used to transport timber and molten sulfur from the now long-abandoned Texas Gulf Sulfur mine to the ports of Galveston and Houston. You could still see the pilings of the loading docks, reaching like forgotten skeletons from the thick green water. A single long-leaf pine stood sentinel on a small rise to one side of the canal. Tompkins told me that 25 years ago that small hill was covered with long-leaf pines, some of them 150 years old. "Then one day they were gone," he said sadly. Most of the old growth was gone, too, cut down a century ago when there were two sawmills in the town of Wallisville.

Tompkins grew up in Baytown and had

lived near the river since he was in grade school. He knew every oxbow bend, slough and bypass. Like Doc McFarlane, Cliff Johnson and other river rats I'd met, Tompkins was a rare species, a college-educated swamp creature. If he had his way, Tompkins would spend every second outdoors. Yet he can quote Faulkner, Thoreau and any number of Greek philosophers and make it sound like casual conversation. When he is feeling depressed or stressed out, he comes to this isolated spot, shuts off the outboard motor and listens to the incomparable music of the swamp. It took me a while, but gradually I heard it too. A barred owl croaked his trademark hoo hoo hoo-aw. A gar splashed nearby. A brilliant yellow prothonotary warbler perched atop a piling, fluffed his feathers and whistled his reedy mating call. From somewhere deep in the forest of cypress, tupelo and

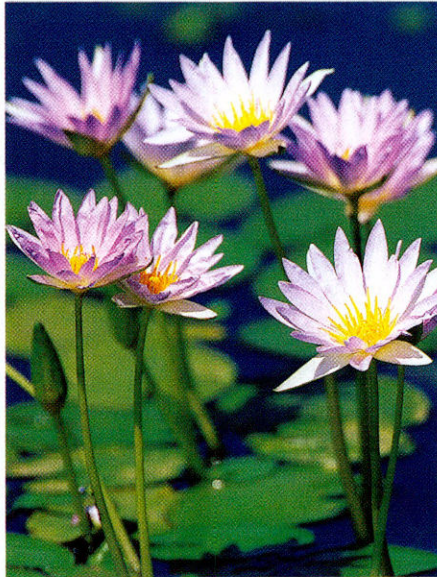
pignut hickory, we heard the squall of a wood duck and the staccato scream of a pileated woodpecker.

I could hear the swamp breathing, feel it pulsating with life. In places, the surface of the dark water boiled with clouds of tiny shad, a phenomenon that people here call "nervous water." Near an inlet, a black-crowned night heron stood poised to strike. What appeared at first to be two 8-foot logs moved in a curious way, then flicked enormous tails and revealed themselves as alligators. After a time, Tompkins took out his fishing rod and began casting into the swirling shadows near shore, hooking several nice bass, which he comforted with cooing sounds as he plucked the jigs from their jaws and returned them to the river. In a soft voice, he told me, "I bet I've caught every fish in this river twice."

Back in the river channel, we moved slow-



lined with the knees of long-dead cypress. The swamp was a shadow land of submerged stumps, tangled branches and fallen trees, forbidding and otherworldly. When hurricanes threatened Galveston in the early 1800s, Lafitte and his pirates hauled their ships along this bayou, seeking shelter in Lake Charlotte. Old-timers claim that one or two of Lafitte's ships remain buried on the lake bottom, under who knows how many feet of mud. When we reach the lake, it turns out to be so shallow that even our 16-foot aluminum boat can't cross it. Instead, we linger at the edge of a marsh where huge cypress rise like cathedrals from the shifting shadows. It was one of those



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THIS FANTASTIC SWAMP IS ONLY A  
TOKEN OF WHAT THE LOWER TRINITY  
WAS BEFORE MAN HAD HIS WAY.  
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ly, a deep peace settling over us. I watched as though in a dream as an anhinga plunged from the sky, vanished under water, then reappeared with a small fish flapping from its bill. Nests of red wasps, hundreds of them, hung from the ends of branches, low over the water. There were few snakes in this part of the river, Tompkins told me, explaining that "snakes are mobile sausages for feral hogs, gators and birds." In another few weeks, the river would be alive with mosquitoes and other insects, unbearably hot and humid, but on this spring day, conditions were perfect. Presently, Tompkins found what he was looking for: the bayou that leads to Lake Charlotte. The lake is one of several remote, nearly inaccessible natural bodies of water on this part of the river.

A squadron of great blue herons and great egrets, flying at eye level, escorted us deeper into the swamp. The banks here were

moments when you're praying before you know it. "Heraclitus said that you cannot step twice into the same river," Tompkins said in his quiet voice. I'd heard that quote before, only this time it made sense.

Late in the afternoon, we stop to investigate an Indian midden, one of dozens on this part of the river. This particular midden appears as a steep bank filled to a depth of four or five feet with clam shells, fish and alligator bones, shards of pottery and things I can't imagine. Hundreds of years ago this was a garbage dump for the nomadic Akokisa tribe. Though there was obviously an abundance of fish and fowl, life here must have been terribly difficult. Since there were no rocks to be found, the Akokisa fashioned arrowheads from gar scales. None of the pottery shards that we found had a trace of paint or decoration to enhance them. "Art is a manifestation of

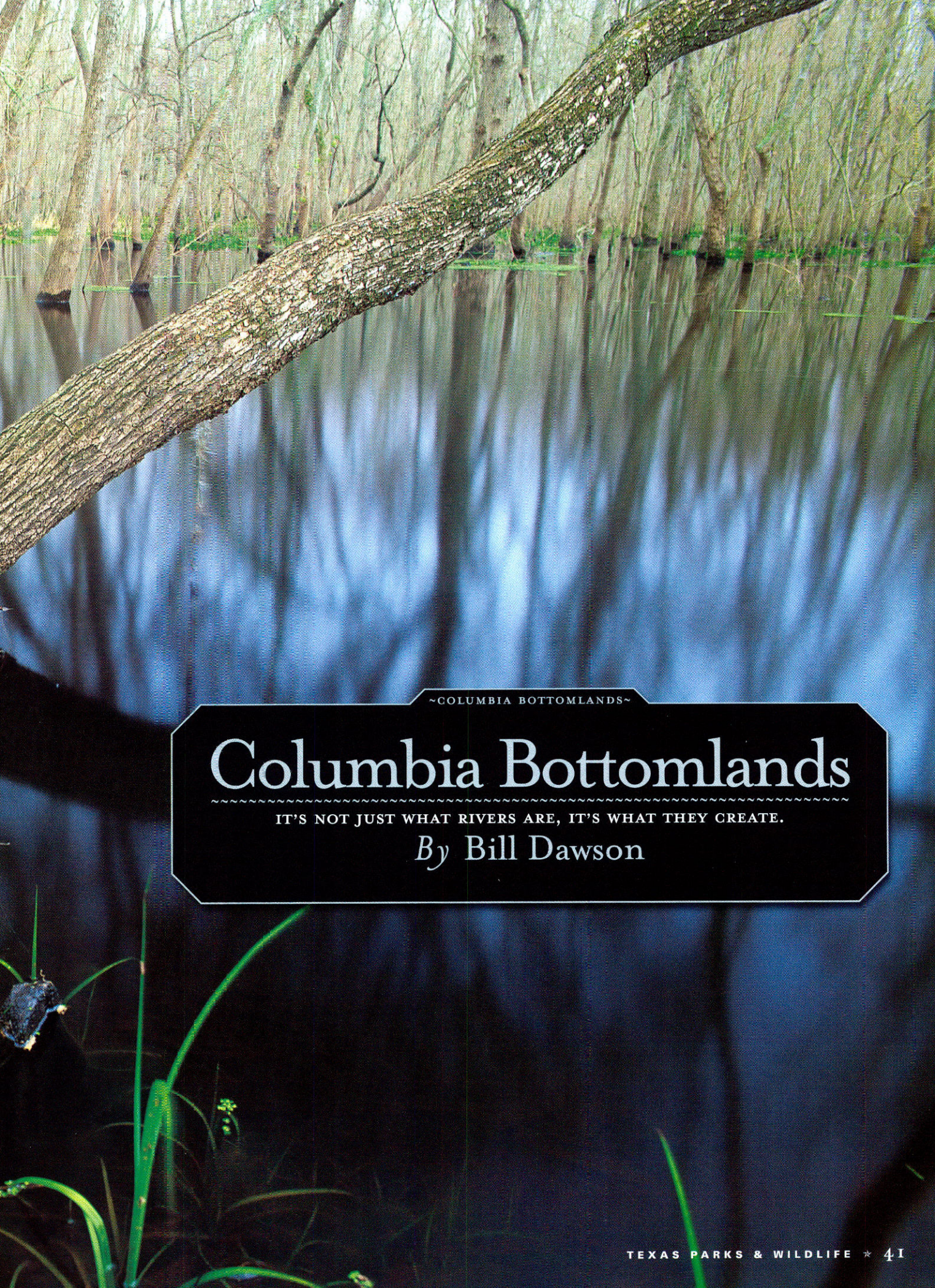
the thought process," Tompkins reminded me. "The Akokisa must have needed all their energy just to stay alive." In the 1750s, the Spanish constructed a mission and fort near Lake Charlotte, but the friars complained of biting insects, extreme heat and cold, and the thick, stinking water of the lake. The Spaniards had gone by 1771.

Heading back to the place we had put in early that morning, a ramp near where the Interstate 10 bridge crosses the Trinity east of Houston, I began to realize that this fantastic swamp was only a token of what the Lower Trinity was before man had his way. The last two ivory-billed woodpeckers on earth were shot near here in 1904, by a "naturalist" named Vernon Bailey. During a 10-year period in the 1880s, a hog farmer named Ab Carter killed all the bears in Liberty County — 182 of them — then shot his bear hound because the dog was no longer of any use. In the 1970s, Lake Charlotte was scheduled to be flooded out of existence, so that Liberty could become a seaport. It was spared only because someone discovered a nest of baby eagles. And the Wallisville Dam that was so controversial 20-something years ago? If environmentalists hadn't stopped it, the dam would have flooded 12,900 acres of marsh, cypress swamp and marine nursery and starved Galveston Bay of vital nutrients. Ironically, the dam was a key element of the grandiose dream of Port Metroplex. Somehow, the Trinity has survived it all.

An hour before dark, I made one final life-affirming discovery. Just a few hundred feet west of the I-10 bridge, there is a rookery that seems to belong on Caddo Lake or somewhere in the heart of Louisiana. Crossing a footbridge, you stand at the edge of a shimmering world of electric-green water plants, giant cypress, Spanish moss and so many snowy egrets, great blue herons and other nesting birds that the trees across the way appear to be doing a fan dance. The rumble of 18-wheelers on the bridge behind us gives way to a chorus of birds and bullfrogs. A small alligator rustles through a cluster of water hyacinths, watching us with patient eyes. "We seem to have dropped off the edge of Texas and landed in some Louisiana swamp," I tell Tompkins. He shakes his head and says, "Thousands of cars a day pass over the I-10 bridge, yet nobody notices what's down here. 'Rivers and the inhabitants of the watery element were made for wise men to contemplate and fools to pass by.' Izaak Walton wrote those words in the 1600s." Yes, I thought, Cliff Johnson got it right. Every real Texan could and should love a river bottom, or a swamp. But you have to leave the city to appreciate it. ☆







~COLUMBIA BOTTOMLANDS~

# Columbia Bottomlands

IT'S NOT JUST WHAT RIVERS ARE, IT'S WHAT THEY CREATE.

*By* Bill Dawson

A

*lthough it's late winter in Brazoria County, it feels like spring. The sunlight filtering through the moss-draped trees is warm, and the breeze is cool. A pleasant chill seeps through my hip boots whenever I wade across one of the clear-running sloughs that permeate this dense, ancient forest, which starts just a few miles from the Gulf of Mexico.*

On top of all that, there isn't a mosquito in sight. All in all, you couldn't ask for a better day for a hike in Austin's Woods — so named because Stephen F. Austin brought his initial band of Anglo settlers here in 1823. My aim is far more modest — to visit a very large, very old tree that was probably already growing when those first colonists arrived.

This is not just any big old tree, mind you. Unknown to science until 2000, it's the new champion live oak in all of Texas — officially designated as such last year by the Texas Forest Service. Agency experts bestowed the title after they carefully measured the oak, awarding points for its oblong trunk, its towering height, and the spread of its mighty crown. First, though, they had to slog through a breathtakingly beautiful, but decidedly jungle-like, area. It's a good thing I've got a couple of scientists who know this ground as my guides.

"These woods are just criss-crossed by these sloughs," says Andy Sipocz, a Texas

Parks and Wildlife Department wetlands expert. The shallow bodies of water we've been splashing through are the remnants of shifting river and bayou channels. "On the banks, or what were the banks, you get cherry laurels," he says. "In the sloughs themselves, the dominant tree is green ash, but you'll also find American elm. Marsh grasses sprout later in the year, forming a complete mat across the water."

When walking through the woods also means wading, it's easier to understand terminology such as "bottomland hardwoods" and "riparian wetlands" and "fluvial woodlands." Easier, also, to understand what scientists mean by "ecosystem" — in this case, a system called the Columbia Bottomlands. These bottomlands extend through four Texas counties — Brazoria, Matagorda, Fort Bend and Wharton — sharing a forested floodplain network of rivers and creeks and oxbows and ponds and marshes.

My other guide today is Mike Lange, a biol-

ogist with the U.S. Fish and Wildlife Service who discovered the champion oak in 2000. His agency was considering acquiring this swampy tract at the time. When that happened in 2001, the 1,271-acre property became a part of the neighboring San Bernard National Wildlife Refuge.

That acquisition was an important step, but just one among many in an unfolding conservation initiative in Austin's Woods. The partnership involves the U.S. Fish and Wildlife Service and TPWD, plus an array of other government and private entities. The principal aim is to protect some of Texas' dwindling coastal forests, whose crucial value for millions of migrating songbirds has only become well understood in recent years.

Since it's only mid-February, it's still a little early for the songbirds' annual arrival, Lange tells me. These neotropical migrants fly northward across the Gulf from their winter homes in Mexico and Central America, stopping for a rest and sustenance in the Columbia Bottomlands and other coastal woodlands before flying on to summer homes as far north as Canada. In the fall, they use the same Gulf Coast forests on their way south.

Just because the migrants haven't showed up yet doesn't mean there aren't plenty of resident and wintering birds here now. As we move into yet another watery zone, Lange identifies the call of a blue-gray gnatcatcher. A ruby-crowned kinglet, which winters here, chatters nearby. Lange points to raccoon tracks in the mud, just a couple of feet from a fresh crawfish hole. In the distance, a frog's call vibrates.

When we finally arrive, the champion live oak lives up to my expectations. I'd seen a photo of it with a tiny human figure in the crook of an impossibly big, bifurcating trunk. It seemed like a trick picture, a computer-generated version of those old Texas postcard images of cowboys astride jackrabbits. But here, in this quiet forest, amid other ancient live oaks, the new champion is a strikingly real vision, its craggy branches fanning outward and upward. "Majestic" can seem like a cliché in describing nature's splendor, but it seems absolutely right in this case.





~ THE NEW TEXAS CHAMPION LIVE OAK ~

PHOTO BY EARL NOTTINGHAM



~ A RICH VARIETY OF LIFE BURSTS FORTH ALL AROUND ~

As old and majestic as it is, though, it's not just the big live oak that impresses me about this walk — it's the rich variety of life bursting forth all around. Sipocz points out the mammoth trunk of a downed oak that lies next to our path. Covered with moss, it seems like a micro-ecosystem of its own. "These oaks take forever to rot," he says.

On our way out of the woods, we wade across the biggest, deepest slough yet, where sunlight reflects from the rusty shades of leaves, mud and twigs on the bottom. A red berry floats next to yellow oak leaves, and palmetto leaves jut from the glistening water everywhere.

A little farther on, a black willow is starting to leaf out. Lange points out a gar gliding past. Nearby, he spots a black-bellied whistling duck, a tropical species whose range is expanding northward. A great egret takes wing.

About 12 miles north of the champion oak, west of the town of West Columbia, is the first property protected under the Austin's Woods initiative after it got started in 1999 — a 657-acre tract of old-growth forest land called Dance Bayou. Here, scientists are cataloguing the scope of the Columbia Bottomlands' biological diversity.

Since its donation to the federal government in 1997, for instance, biologists have come to realize that Dance Bayou is one of the largest tracts of old-growth woodland left in the southern United States, Lange says.

Wylie C. Barrow, a Louisiana-based wildlife biologist for the U.S. Geological Survey, has studied birds on the property for eight years now. "The Columbia Bottoms is probably the biggest remaining patch of woods that goes down and meets the Gulf shore and sits right in the center of where consistently these [spring] flights make landfall," he says. In the fall, though there are not as many trans-Gulf flights, the Texas woods are "equally important," he adds.

David Rosen, a Houston-based biologist for the USFWS, has been documenting the profusion of plant life that is so essential to the area's bird-friendliness. So far, he has counted 335 flowering species alone on the Dance Bayou tract. That means it's "a very diverse, very rich" place botanically and suggests there are many more such species throughout the entire Columbia Bottomlands region.

"Bird diversity is tied to plant diversity," Rosen explains. "There are so many niches

available for prey species and the things that eat them." He laughingly confesses that when he was growing up in Brazoria County, hunting and fishing in its swampy woods, he never dreamed he'd be back someday, doing botanical research.

"The forest community is a product of all the types of soils and wetness," he says. "It's all coupled. There are so many small, unnamed tributaries and low places and swales that criss-cross that kind of habitat. They're all important in driving these systems."

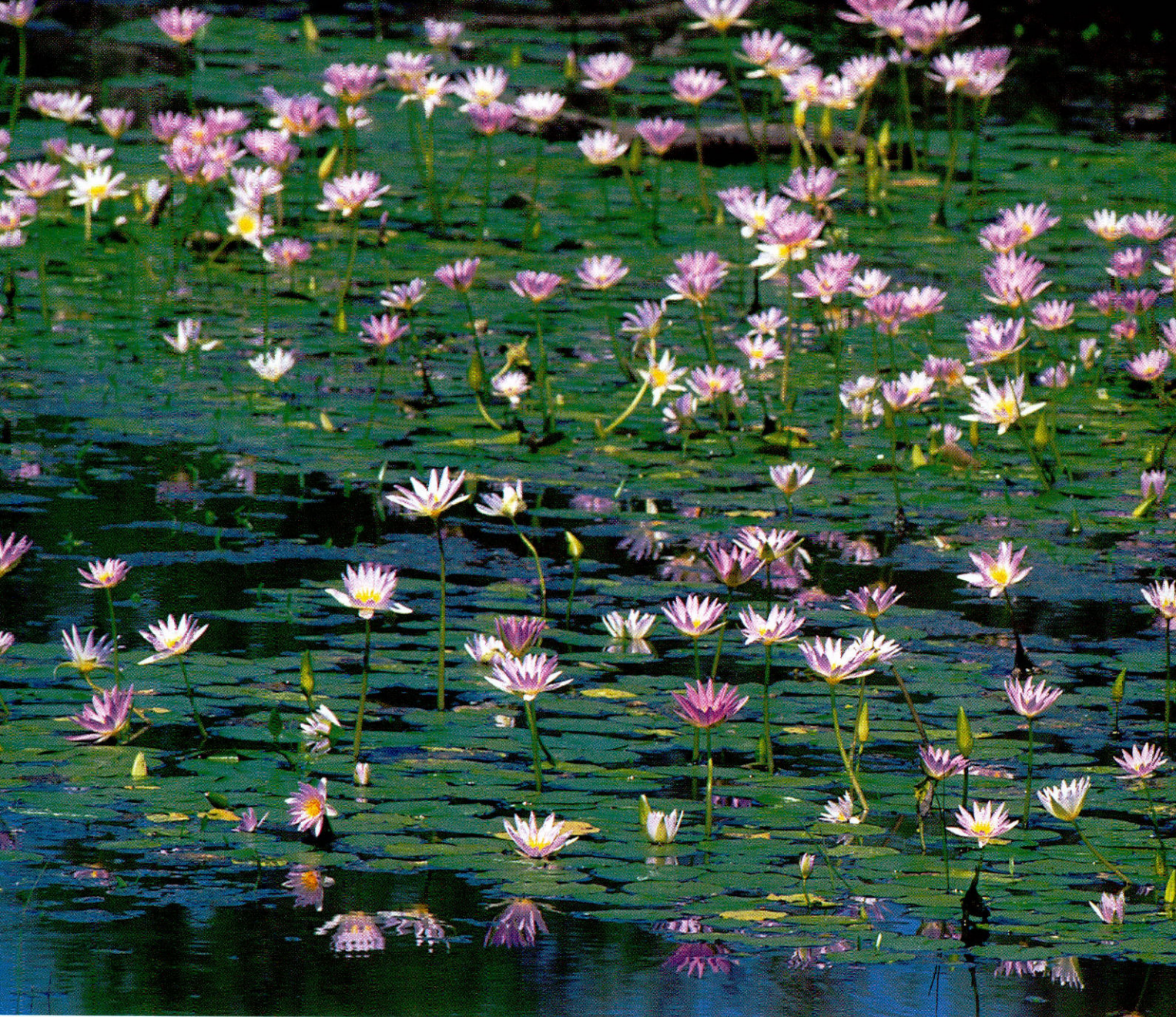
It's the same story throughout the Columbia Bottomlands region, which encompasses the flood plains of three rivers — the Brazos, San Bernard and Colorado — along with numerous tributaries and countless other water bodies, says Ron Bisbee, who retired in December 2003 after 25 years as manager of what is now called the Texas Mid-Coast National Wildlife Refuge Complex.

"This whole river system tends to mash together," he says. "The Brazos and San Bernard are not very far apart in a lot of places. The Brazos overflows into Oyster Creek in a flood, then Oyster Creek overflows into Bastrop Bayou, so Bastrop Bayou becomes a tributary of the Brazos in a high flood. These things all tend to



~ A PROFUSION OF PLANT LIFE IS ESSENTIAL TO THE AREA'S BIRD-FRIENDLINESS ~

PHOTO BY EARL NOTTINGHAM



get interconnected.”

That interconnection assumed new significance about 12 years ago, when Clemson University scientist Sidney Gauthreaux used Doppler weather radar to document how important the Columbia Bottomlands’ forest habitat is for dwindling populations of migratory birds. In earlier research, Gauthreaux had found that the number of cross-Gulf flights by migrating songbirds had declined by half from the 1960s to the late 1980s.

Knowing the forests were being cleared for various purposes, Bisbee, Lange and other USFWS officials saw in Gauthreaux’s findings an incentive to propose a conservation partnership to protect some of this habitat, by acquisition from donors and willing sellers and by other means.

The resulting federal proposal quickly ran into heated controversy, as some local residents and political leaders charged it was a federal land-grab. Others in the area rallied

to the support of the conservation drive. But the dispute eventually died down. When he was governor of Texas, George W. Bush sided with local leaders opposing federal land acquisitions in the Austin’s Woods area. But now that Bush is president, federal acquisitions are moving ahead. Now subsidized, the debate about how to conserve forests in the Columbia Bottomlands appears to have boosted public appreciation of their environmental values and the threats that forest-clearing poses.

A four-county task force, set up to study the issue when the controversy still raged, concluded that 237 bird species totaling 239 million individuals were “regularly using and depending on” the Austin’s Woods area. The task force also teamed with TPWD, Texas A&M University, the private Gulf Coast Bird Observatory and others for a habitat inventory. It concluded that forests of the Columbia Bottomlands region had declined by almost 17

percent from 1979 to 1995—from 305,914 to 254,269 acres. (W.B. Dewees, an early visitor, had recorded in 1838 that the region—about 40 miles wide and about 60 miles long, or more than 1.5 million acres—was “covered almost entirely in cane brake and forests.”)

The controversy “was a blessing in disguise in a lot of ways, because everybody in town now knows about the value of the system,” Bisbee says.

Projects to conserve parts of Austin’s Woods have been proceeding amicably for several years now, through a variety of methods and partnerships. The Lake Jackson-based Gulf Coast Bird Observatory has raised funds to buy several pieces of land now in federal hands. Other environmental groups have played various roles. Private citizens have donated property. Dow Chemical gave land for a Bottomlands Park to the city of Lake Jackson. The TPWD Stringfellow Wildlife Management Area, managed for old-growth



tecting up to 70,000 acres eventually.

The spirit of cooperation is on public display at the 1,093-acre Hudson Tract near Angleton, which was acquired by the USFWS in 2002 and opened for weekend bird-watching last October. The former landowner made a major donation. The Gulf Coast Bird Observatory contributed funds toward the remaining purchase price. The U.S. Department of Agriculture paid to restore a drained wetland. TPWD provided a grant to develop public-use trails and restore a cabin as an environmental education center. Local children have been planting trees.

Protecting some of what's left of Austin's Woods — an environmentally and historically important part of the state — has obviously become a shared enterprise. When I talk to Cecilia Riley, the executive director of the Gulf Coast Bird Observatory, about that work, she explains that it's also a project in which Texans are doing their part to help safeguard a widely-shared resource.

"We don't control what's happening to these birds in Mexico, or when they're over the Gulf, or when they're in their breeding grounds in the Northeast and Canada," she says. "But we can take care of what we have here to insure they have a safe migration." ☆

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 THE COLUMBIA BOTTOMLANDS IS A  
 VERY RICH, VERY DIVERSE PLACE.  
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species, is the main freshwater source for federal lands downstream, including the property with the champion live oak and the marshlands of the original San Bernard refuge, just to the southeast.

"We've really been working closely with Parks and Wildlife," Lange says. "We've worked together to add land to Stringfellow using mitigation funds. And they've been working with us to add lands to the refuge." All together, about 14,500 acres of forest land have been protected in the overall Austin's Woods initiative — 8,582 acres in federal ownership — as units of the San Bernard refuge, the rest owned by TPWD and others. The USFWS plan for the Austin's Woods partnership proposed pro-







~RIVER CREATURES~

# Lives of a River

MANY SMALL CREATURES HAVE EVOLVED  
IN HARMONY WITH RIVERS

By Wendee Holtcamp



**W**earing rubber waders to my hips, I'm smack dab in the middle of a riffle, trying to keep my balance against the knee-deep current of the San Marcos River. I plant one pole of a seine net firmly on the river bottom, as translucent green water gurgles over boulders and rocks that hide the river creatures we're trying to find. With me in the river are a trio

of Texas Parks and Wildlife Department aquatic biologists — Randy Moss, Kevin Mayes, and David Bowles — and my 7-year-old son, Sam.

Randy Moss, senior scientist with the River Studies Program of the Texas Parks and Wildlife Department, has a thick brown beard, an insightful way of describing things and a subtle sense of humor. "Kick the rocks as you walk downstream," Moss tells Sam. "That will make the fish swim toward the net." Sam obeys with wild abandon, his little legs doing their best to upturn rocks, and Moss follows behind him.

"Pick up the net!" Moss says, and Mayes and I swing up the two poles to create a sort of hammock. We peer in to see what little creatures we seined up. "Sunglasses!" Moss

says as he removes the wiry frames missing one lens. Various creepy, crawly invertebrates scuttle over the white mesh, along with a half dozen small, wriggling fishes — darters, shiners, chub and sunfish. We place the creatures in a plastic bucket and try again. This time, we catch more wriggling fishes and scuttling invertebrates, some exotic Asian clams, and a piece of gray plastic — the missing lens.

"Now we have a full set of glasses," Moss deadpans. We slosh through the water back to the riverbank, hauling our catch inside the folded-up seine.

To the casual observer a river might seem just a ribbon of water, maybe a place to throw a fishing line, or float down with your butt wedged through an inner tube. It's easy to take for granted the watery won-

derland beneath the surface, where fish, prawn, bug and mussel interact in an intricate web. Freshwater mussels with names such as fatmucket, deertoe and pistolgrip siphon water pollutants from the sediment. Invertebrates carry on private lives in and about the underwater rocks, and minnows dart around seeking invertebrates to devour. Frogs lay eggs at the stream's edge, bridging the gap between terrestrial and aquatic worlds.

Rivers boast as complex a geography as any land they run through, with deep, fast-flowing regions known as runs, slow flowing, deep pools and rocky riffle habitats. Many aquatic organisms breed and feed in the riffles, like the spot we are seining. As water flows over rocks, it draws oxygen into the river. Nooks and crannies in the rocks provide habitat and breeding substrate for riverine creatures and their eggs and larvae, particularly invertebrates that are, in turn, food for fish, frogs, salamanders, turtles, crayfish and even giant river prawn.

But build one large dam and several small, conveniently placed bridges across riffles, pump water out of the aquifer that feeds the spring, straighten out the natural river curves, introduce exotic species, and you've got a riverine feng shui disaster. Feng shui is the ancient Chinese art of enhancing one's living environment by improving harmony and energy flow. But nature got rivers right the first time, and now it's up to us to repair any damage already done.

"People see water in a river and they think it's OK," Moss says. "Because of rainfall, we'll always have streams and rivers with flowing water, but the question is whether they'll harbor the biological life they used to."

The sunglasses testify that, despite the San Marcos' relatively healthy aquatic ecosystem, no river system remains unaffected by the state's burgeoning population. Texas population is predicted to nearly double to 40 million people by 2050, and as the population grows, demands on rivers and their underlying aquifers will only increase. Citizens need





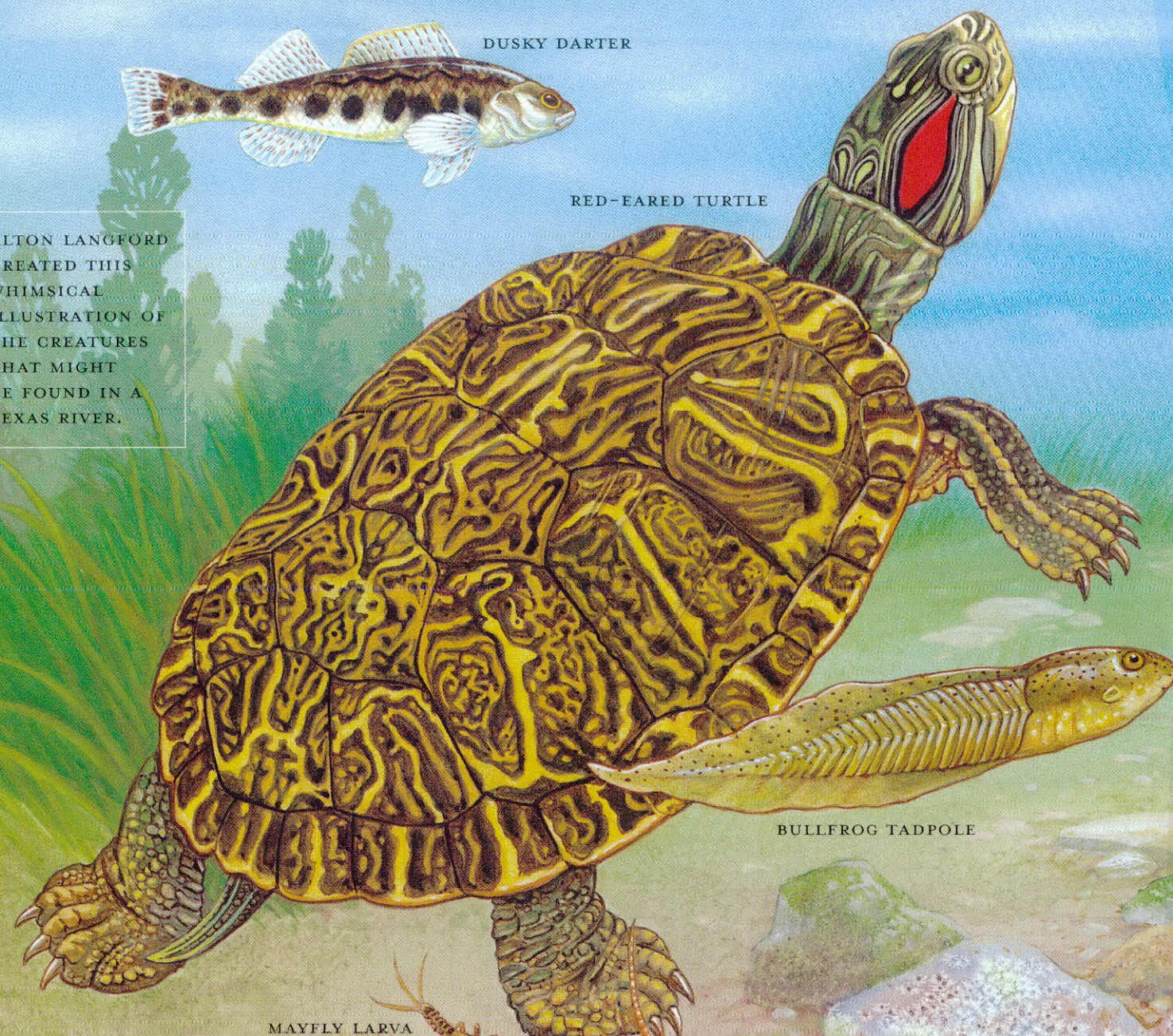
~ TPWD SCIENTISTS KEVIN MAYES, LEFT, AND RANDY MOSS OF THE RIVER STUDIES PROGRAM ~

PHOTO BY GARY NOTTINGHAM

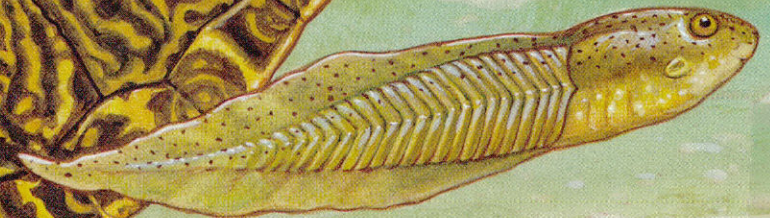
ALTON LANGFORD  
CREATED THIS  
WHIMSICAL  
ILLUSTRATION OF  
THE CREATURES  
THAT MIGHT  
BE FOUND IN A  
TEXAS RIVER.



DUSKY DARTER



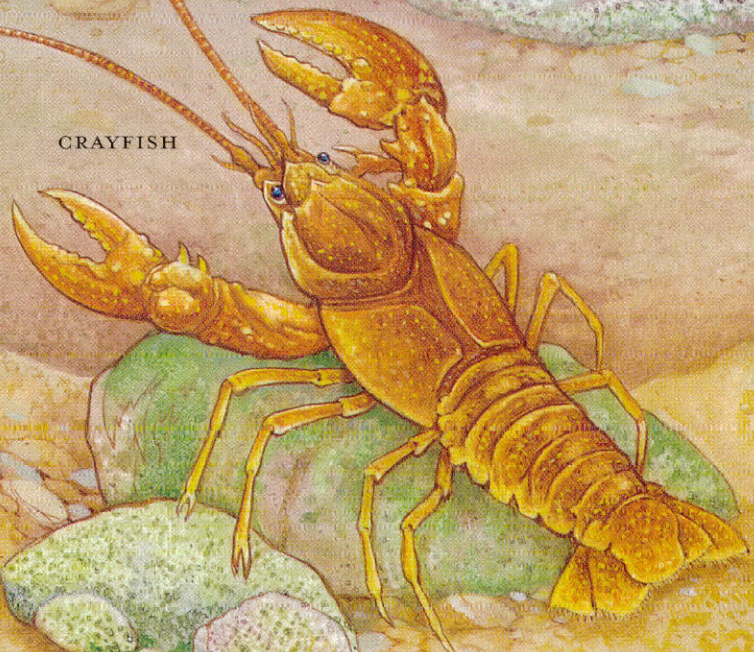
RED-EARED TURTLE



BULLFROG TADPOLE



MAYFLY LARVA



CRAYFISH



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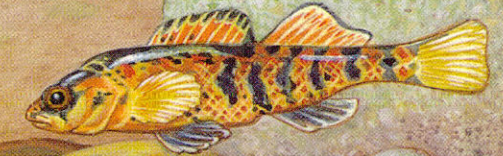
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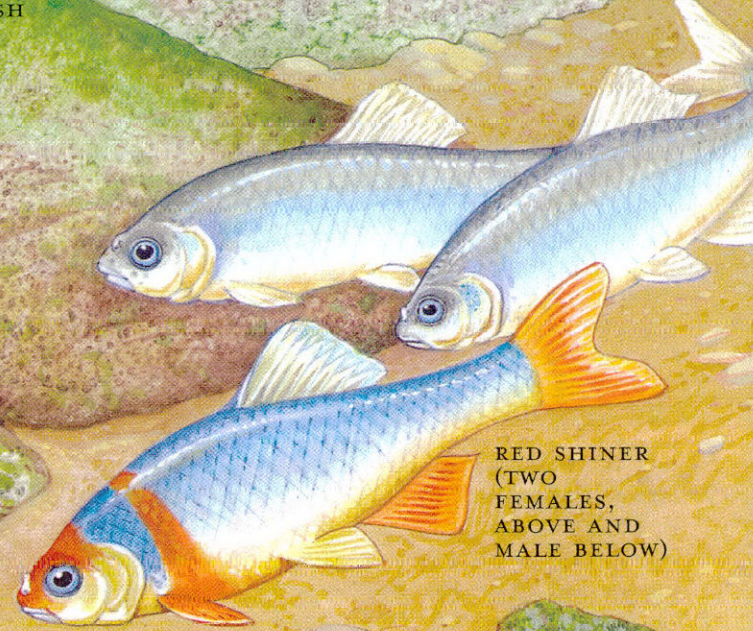
BULLFROG



LONGEAR SUNFISH



ORANGETHROAT DARTER



RED SHINER  
(TWO  
FEMALES,  
ABOVE AND  
MALE BELOW)



FATMUCKET MUSSEL



HELLGRAMMITE

ILLUSTRATION BY ALTON LANGFORD

Alton Langford

drinking water. Private business and economic interests want their share. Recreationists desire healthy streams for fishing and boating, and fish and wildlife require clean, abundant river water to survive and thrive.

The TPWD river studies staff recently studied how altered flows at the San Marcos springs, the second largest spring in Texas, might affect the river ecosystem. They found that maintaining normal, less-than-normal and above-normal spring flows allows the river to cleanse itself—to flood its banks and to shrink back. These natural fluctuations flush the river, transport sediment and maintain the river channel. The spring river system must be maintained in its naturally dynamic state for the creatures that have evolved with it to survive. If excessive aquifer pumping alters the natural duration and patterns of spring

explains. “They use them to push stones around to make a nest. They also use them in mating rituals. They rub their tubercles on the female’s belly and genitals.”

Mayes identifies the dusky and orange-throat darters we’ve netted. “It’s a patriotic fish,” I say, since its colors look red, white and blue to me. Mayes assures me the orangethroat’s colors are actually orange and green, not red and blue. He also explains that all darters have reduced air bladders so they can feed on river bottoms.

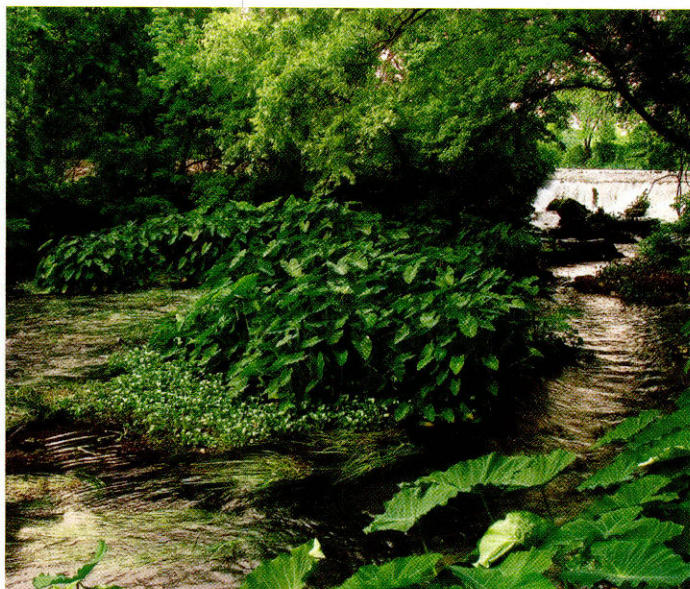
“Notice the males are more attractive than the females,” Moss pipes in, contrasting the drab females to the brightly colored males, “just like in humans. Really, the males are more desperate,” he says with a chuckle, explaining that many fish species are sexually dimorphic, with males more brightly colored to attract females.

Darters, chub, shiners and stonerollers

fish.

“It’s easy to explain why it’s declining throughout its range,” Moss says. “It used to be so common that it was used for food, and now most places it occurs it is a state endangered species or species of concern.” Blue sucker eggs stick on the rocks in riffle habitat, and their population decline often follows the disappearance of riffle habitat, as well as changed flow regimes caused by dams. Riffles face three simultaneous threats: damming of rivers inundates them, reduced water flow exposes them and they often become convenient spots to build bridges across rivers.

As we learn about river fish, David Bowles scours rocks for more invertebrates. He scoops up river water containing invertebrates into a white porcelain pan. After a few minutes, he brings them over to the bank and dumps them into the bucket.



flow, the river system changes and the river’s spring flora and fauna inevitably suffer.

Convincing the average citizen that spring flow dynamics, or the wild creatures that depend on them, are worth protecting often proves to be more difficult than studying them. “It’s a tough sell for us to convince the public that they should care,” Moss says. “People often have an attitude of, ‘Why should I care that we’re going to lose a minnow?’”

Sam is ecstatic over the minnows we caught. He removes fish from the net and plops them into the bucket. Kevin Mayes, a TPWD aquatic biologist, identifies the species. He shows us the various types of minnows — blacktail and red shiners, the torpedo-shaped speckled chub, as well as his favorite, a male stoneroller, a smallish fish with bumpy nuptial tubercles on its forehead. “They have hard heads,” Mayes

are truly river species, depending on flowing water, riffles and the natural structure of rivers to survive. “In an average river, about half the fish can do okay in a pool or lake, and half need flow,” Moss explains. These river-adapted species evolved so closely with natural river conditions that changes inevitably lead to their decline.

“Blue suckers are an extreme example in terms of needing flow,” Moss says. These large fish have a hydrodynamic shape like a jet plane, with fins like wings. Their strong musculature allows them to swim against the current. Blue suckers reside throughout the Mississippi River drainage in the eastern United States, and in Texas reside in the Colorado, Red, and Rio Grande Rivers. Mayes says that there are a few historic records of blue suckers in the San Marcos, Brazos, Nueces, Sabine and Neches Rivers, but TPWD River Studies biologists have never caught one in these

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 RIVERS BOAST AS COMPLEX A  
 GEOGRAPHY AS ANY LAND THEY RUN  
 THROUGH. CROOKS AND CRANNIES IN  
 THE ROCKS PROVIDE HABITAT.  
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Sam looks inside. “They are playing football! They are all tackling each other,” he says. The mayfly larvae and the centipede-like hellgrammites settle down on the bottom. Bowles shows us the mayfly larva’s aerodynamically rounded head, and raptorial front legs, adaptations for clinging onto rocks in fast flowing water. We also catch other bottom-dwelling creatures: the naucorid, with a flattened, penny-like body and piercing, sucking mouthparts and the tiny, caseless caddisfly larvae that attach to rocks and spin silk catch-nets to retrieve even tinier bits of food.

Bowles and other aquatic biologists mea-



~ WRIGGLING FISHES AND SCUTTling INVERTEBRATES BREED AND FEED IN THE SAN MARCOS ~



~ PECOS RIVER, NEAR PANDALE ~



sure invertebrate biodiversity as a quick way to assess a river's health. Some species, like mayfly larvae, are very sensitive to pollutants and low oxygen, so they won't be present if water quality is poor. Riffle regions often have the highest invertebrate biodiversity, while other river regions aren't so productive. He explains how small dams along a river can have a big impact on the river biota.

"Cape's dam backs water up into a little lake filled with soft sediment," Bowles says. "Hydrilla is the only thing that's there." Hydrilla is an alien plant that covers the surface of the impounded river region, preventing light from reaching the water below and choking out the native biota. The small impoundment causes a cascade of negative impacts. "These channel dams don't have any purpose anymore," Bowles says. "They were built for mill races in 1900s, and we don't have mills anymore." Bowles and others would like to see the old mill race dams removed to restore the San Marcos River to more natural conditions.

Dams, small and large, prevent migratory species from moving up- and downstream to spawning grounds. Dams in the Trinity, Angelina, Neches, San Jacinto and other East Texas rivers prevent endangered paddlefish from migrating upstream to spawning areas and are thought to have directly contributed to their decline. Likewise, here in the San Marcos, dams have likely led giant river prawn, or shrimp, into decline. River prawn are giant relatives of saltwater shrimp, have pinchers like lobsters, and live in freshwater rivers, but their eggs float downstream to coastal estuaries, where they develop and grow.

"If the eggs don't reach a certain salinity by a certain time, they die," Bowles explains. "They've estimated before all the dams it would take them four to five days to reach the estuary." Now, eggs of the shrimp that live near the spring die because the dams slow their downstream journey. "The individuals closest to the estuary maintain the population because the larvae of the ones that live upstream can't make it down to the estuary anymore." When the young prawns reach a certain size, they migrate upstream, where they again face challenges getting past the dams.

Texas rivers and the creatures that depend on flowing water face myriad threats — from dams and other changes, to natural flow regimes, to exotic species to pollutants. "The problems with Texas water come down to two things: quantity and quality," Bowles says. "Under these two broad categories are a myriad of problems that are often additive." The question

becomes: What water issue is most pressing for conserving aquatic biodiversity?

"If I had to single out one thing for [the] Edwards [plateau region], I would have to say water quantity," Bowles stresses, "because if you have a mild pollutant, fauna may be able to hang on, but if you don't have any water, nothing can tolerate that."

The following weekend, I'm streamside to a true desert oasis, the clear blue waters of the spring-fed Independence Creek, which meanders eight braided miles spilling into the Pecos River. The feng shui of this near-pristine creek is preternaturally sublime. Mist rises from the 70-degree creek and the rising orb of the sun reflects gold and rose hues onto the mesas. Clark Hubbs, hands wizened from the years, sits on a stool hunched over three porcelain trays full of little fishes. A handful of people flurry about the nucleus he forms — setting out fish traps, retrieving them, testing water quality.

Officially, the octogenarian Hubbs is regents professor emeritus of Zoology at the University of Texas at Austin. To his students and colleagues, Hubbs is the godfather of Texas fishes. He's collected fish from just about every stream in Texas and has published more than 300 scientific papers.

"Dump the water in that tray through this net," he tells me. I pick up a tray and dump the water and the fishes through the green aquarium net he holds. He peers at the pile of squirming fish and after a few seconds, calls out "seven hundred five," and dumps them into a bucket to be released back into the creek.

"You can tell how many fish are in there?" I ask, understanding why students call them his *Rainman* counts.

"I'm good at counting fish," he says with a grin.

Hubbs is here to sample minnows and other river fishes near the spring's headwaters and further downstream. Besides tallying total numbers, he identifies how many individuals of different species he finds at different locations. "I'm trying to find out which guys live in springs and which live in rivers," Hubbs says.

Hubbs' research comparing spring and downstream fish assemblages takes him regularly to the San Marcos River. Like the San Marcos, Independence Creek begins with a spring gushing 70-degree water from the earth and farther downstream, becomes less crystal-clear and with more variable temperatures — colder in the winter and warmer in the summer compared to the area near the spring. Certain fish

species have evolutionary adaptations for surviving under a constant spring environment versus the more variable downstream region, and they face different challenges.

Six Texas fishes have gone extinct since he first started collecting fish with his father, the late ichthyologist Carl Hubbs, in the 1930s, and several other fish are now federally listed. "When spring flow declines, spring fishes lose part of their range," Hubbs explains. "As many spring fishes are endangered, this can be important."

Reduced flow is no case of "crying wolf." Sixty-five of Texas' 281 historically important springs stopped flowing altogether in the past hundred years, including two of the largest. The once raging Rio Grande has turned to a trickle in portions because of excessive water removal. Though water often seems a free, infinite resource, clearly it is not. Like fossil fuel, spring and river water are finite, limited resources that citizens and business interests can use up faster than rainfall naturally replenishes it.

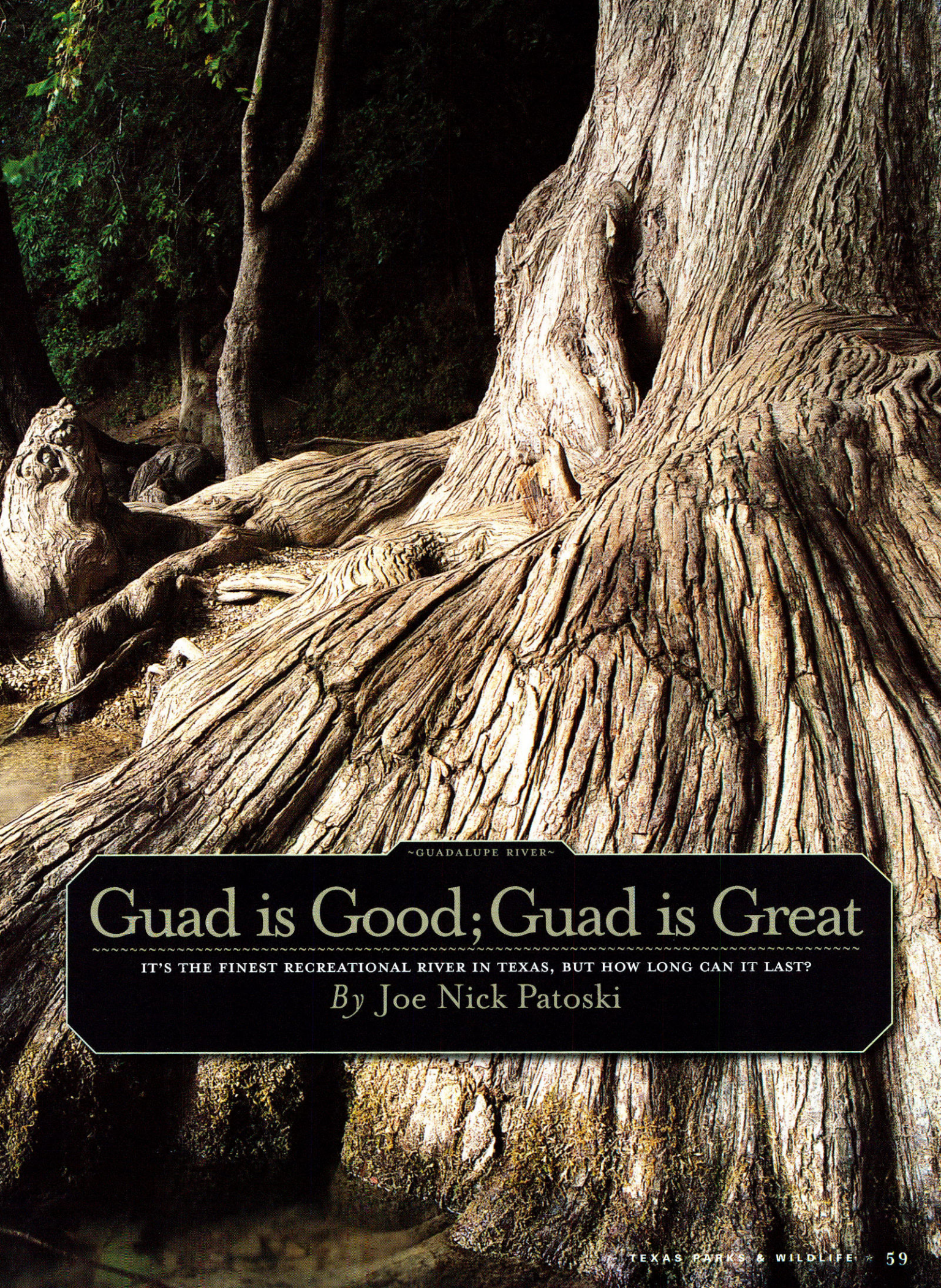
When I ask Hubbs what he considers the most important way to protect the fauna of Texas rivers in the next few decades, without hesitation he says, "Repeal that damn right-of-capture law." The statewide right of capture law says that landowners can pump as much groundwater as they want. And it is the groundwater that feeds the springs.

Hubbs' fleece sweatshirt is emblazoned with fish. I'm told he always wears some item of clothing with fish on it. When I ask if he likes to fish in the traditional sense, he answers, "Why catch four fish when you can catch 2,000?" You can't escape the feeling there's not much else he'd rather be doing than studying fish in the outdoors.

As I watch Hubbs and consider his deep love for fishes, I recollect that he was probably around my son's age when he started collecting fish. Sam started when he was three, and his enthusiasm for wild things hasn't waned, and I hope it never will. While the biologists and I sat around a table discussing the ups and downs of aquatic organisms in Texas rivers, Sam waits semi-patiently, periodically peppering the conversation with "I want to go catch fish!" and "Can we go out to the river now?"

It honors the passion of both old and young that we should protect, conserve, and restore the natural dynamics of our rivers — their natural feng shui, if you will — ensuring that the creatures that depend on them flourish well into the future. Doing this is not as easy as hanging a wind chime to soften the hard edge of a dam, but in the end the fishes will thank us. ☆



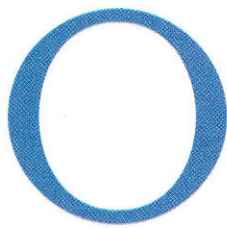


~GUADALUPE RIVER~

# Guad is Good; Guad is Great

IT'S THE FINEST RECREATIONAL RIVER IN TEXAS, BUT HOW LONG CAN IT LAST?

*By Joe Nick Patoski*



*One late afternoon in mid-February, the day after the first significant snowfall in 19 years, I launched a sit-on-top kayak from the low-water crossing near where I live onto my river, a tributary of the Guadalupe River. It was due for an inspection. It was early in the season for this kind of excursion, but I'd been feeling the tug for weeks.*

The calendar said winter, but spring was subtly stirring wherever I looked. A loud scree overhead identified the first pair of zone-tail hawks nesting in the top of a nearby cypress, none too happy with my presence. The first kingfisher flashed right in front of me, then skimmed above the water in full glide. A mockingbird hopped among the bare cypress branches, scouting for nest sites. A small turtle, its shell caked gray with mud, scooted atop a boulder to sun itself. A bass peeked out from under the base of the same boulder, submerged at the bottom of a deep hole.

With each dip of the paddle, I stirred up liquid diamonds that dazzled in the sunlight. The boat moved swiftly as I paddled through placid, deep pools, and scraped rock and fought currents. Where I could find them, I rode riffles and rapids, and

whenever necessary, I sloshed through shallows, dragging the boat behind me.

While surfing the little rapids, I'd occasionally get in a groove where I didn't have to paddle at all. Rather, I was suspended in the rapid, nose upstream, waves rushing downstream, motionless in the midst of perpetual motion, losing sense of time and even existence. In one of these trances, my meditative state was interrupted by a white-tailed doe stealthily sidling up to the water's edge about 100 yards upstream to take a drink. She spied me about the same time I spied her. She took another quick drink, stepped gingerly on several flat rocks in the water before bounding into a pool and scampering up to cross over to the other side. Two larger whitetails followed, going through the same routine. Look, drink, scan again, step,

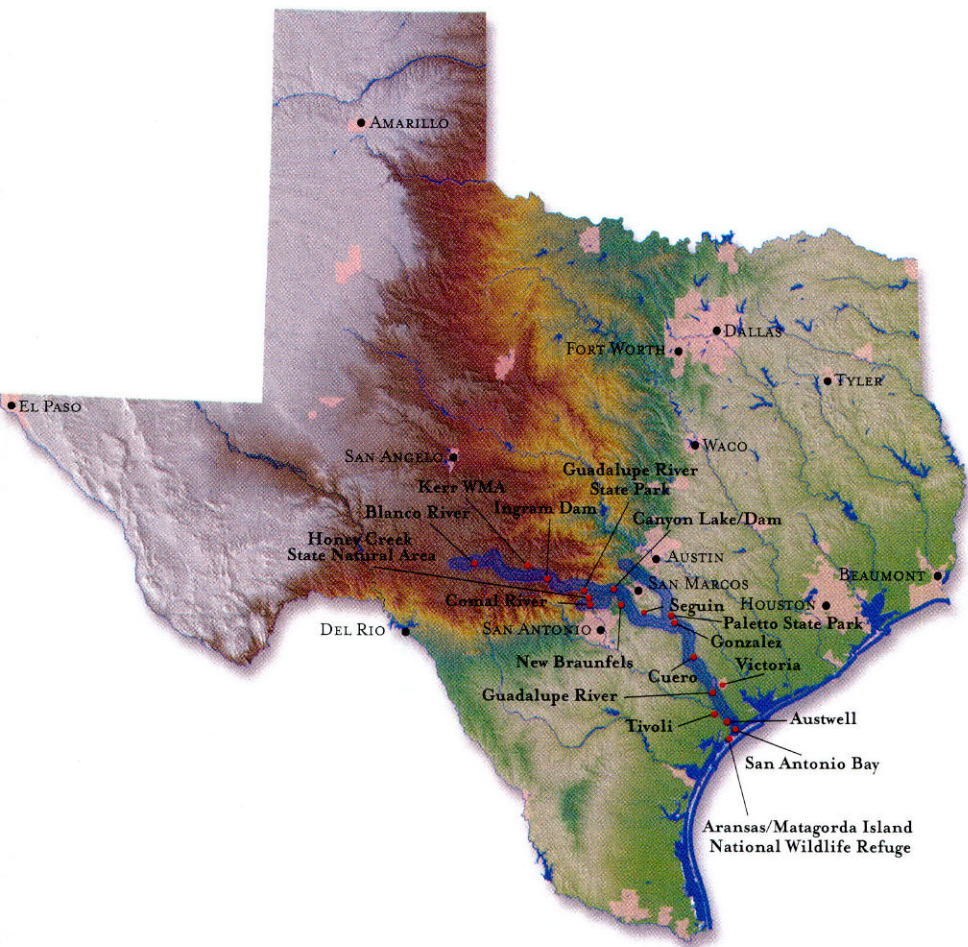
step, plunge, step, step across. Negotiating around a particularly large limestone hazard, I glanced back to spot a great blue heron, the giant bird-queen of the river, moving upstream, flapping her pterodactyl-like wings just enough to keep her sizeable trunk above the surface of river.

None of the rapids were so much as class II-worthy. But on a mid-winter's day in Central Texas, I was more than satisfied. I couldn't imagine a better place to be on this earth. That thought stuck with me all the way back to the house even though my butt was numb and I couldn't feel my toes.

### *A River of Pleasure*

Of the 15 major rivers in Texas, the Guadalupe is the Texas-most river, springing to life in the Hill Country, that sweet spot where east and west, north and south, coast and desert, tropics and prairie all converge, and diversity thrives and flourishes. The Guadalupe runs exceptionally cool, swift and clear until it reaches the fertile rolling plains, where it widens and muddies and roils through hardwood bottomlands and past the historic towns of Seguin, Gonzales, Cuero and Victoria before reaching the coastal prairie and its delta in San Antonio Bay.

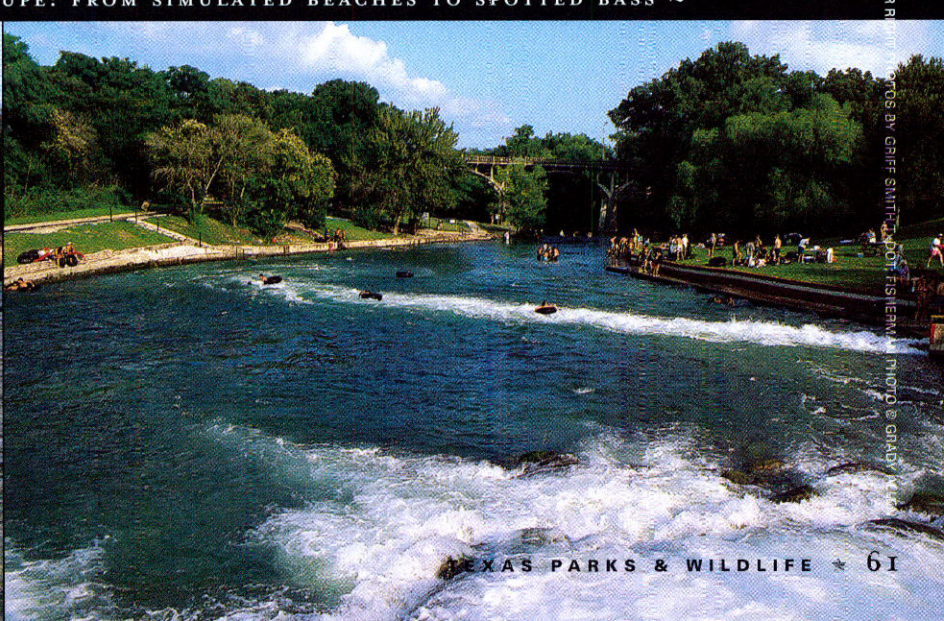
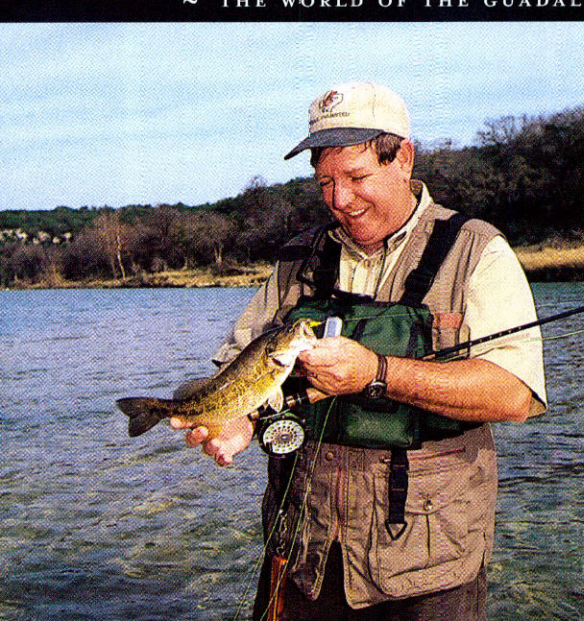
The Guadalupe is the home of the state fish of Texas, the Guadalupe bass. It is the only river in the state that sustains a year-round trout population. Marked with dramatic stretches of limestone cliffs and tall bald cypresses on the upper half, and distinguished with water that begins gin-clear, evolves into an ethereal green-turquoise and ends an earth brown, it's the prettiest river in Texas. Fed by the state's two biggest springs—the Comal and San Marcos—and supporting abundant wildlife and several endangered species, the Guadalupe has attracted



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 ENJOYING THE GUADALUPE: FROM SCHLITTERBAHN ON THE BANKS OF THE COMAL, OPPOSITE TOP, TO NEW BRAUNFELS' TUBE CHUTE, LOWER RIGHT, TO CATCHING THE STATE FISH, A GUADALUPE BASS, LOWER LEFT.  
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~ THE WORLD OF THE GUADALUPE: FROM SIMULATED BEACHES TO SPOTTED BASS ~



TOP AND LOWER RIGHT PHOTOS BY GRIFF SMITH; MIDDLE PHOTO BY GRADY



visitors for more than 12,000 years and today is probably enjoyed by more people than any other river in the Southwest.

But the water of this beautiful river is under pressure from growing urban demand. Whether the river will endure for another 50 years, much less 300, is not certain. For all its attributes and benefits — and in part because of them — the Guadalupe may be Texas' most troubled river. Coveted by thirsty cities, tenaciously held on to by farmers and ranchers, exploited for new, competing uses as the population of Central Texas booms, the Guadalupe has a forbidding future, and that is a shame when you consider how many Texans take pleasure in it.

Back at the house, I estimated how many other people might have been on the Guadalupe and its main tributaries, the Blanco, San Marcos, and Comal rivers, that same February day. I figured at least several thousand. Fewer than 10 miles south of my little play spot, a flock of sailboats breezed across Canyon Lake, the sole significant lake on the Guadalupe, while several hundred people walked the dam over the course of the afternoon.

Downstream, several hundred more men, women, and children were spread out along the banks, tying flies to their lines, scanning the surface and casting into the fast-moving,

chilly waters for elusive trout. A little farther down, a handful of hard-headed kayakers played in the waves around Hueco Springs and Slumber Falls, the most reliable whitewater in Texas. Up and down its length, even in winter, the river is a boon to recreationists. Canoeists and kayakers were paddling it, scuba divers were plying its transparent depths at Canyon Lake, duck hunters were sitting expectantly in blinds on its delta and birdwatchers were searching its forests and marshes.

Once the waters warm in the spring, the thousands enjoying the Guadalupe and its tributaries swell into millions. Each day, thousands of people head to Schlitterbahn on the banks of the Comal in New Braunfels and pay more than \$25 to play in America's top-rated water park. On any hot day, some of the best river-swimming on earth is in the Guadalupe basin. The curious idyll of "toob-ing," as it is referred to around New Braunfels, Gruene and San Marcos, where the pastime is most popular, attracts tens of thousands of aficionados on Easter, Memorial Day and Fourth of July weekends. The Tube Chute in Prince Solms Park in New Braunfels is a water flume that's been a tourist attraction for many decades. All told, no other river in Texas is so heavily used for recreation. Plain and simple, the Guadalupe is fun.

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A DAY ON THE RIVER: GRUENE RAPIDS,  
ABOVE LEFT, SLUMBER FALLS, TOP,  
GLUTTER FALLS, ABOVE, A LAZY  
SUMMER FLOAT, OPPOSITE.  
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## *A Hill Country Playground*

I have driven the length of the Guadalupe River in stages, exploring its multiple delights, tracing its geography. The river insinuates itself into the rocky oak-and-cedar scrub landscape of western Kerr County very subtly. There are no specific headwaters, no gushing artesian spring. Dry washes and gullies gradually collect enough moisture from small springs to hold water in pools that stretch longer and longer until a steady, shallow stream trickles over a hard limestone bed and then tumbles out of the craggy hills towards the sea, more than 200 miles away.

At Boneyard Draw, on Farm-to-Market 1340, a sheer 60-foot limestone bluff in the distance marks a bend in the drainage, the first hint of canyons to come. A wooden sign identifies a "parking bird-viewing area" on the perimeter of Stuever's Ranch. Just below the crossing is the turnoff to the Kerr Wildlife Management Area, where the Texas Parks and Wildlife Department has been



~ PLAIN AND SIMPLE, THE GUADALUPE RIVER IS FUN ~







~ THE COOL, CLEAR SAN MARCOS RIVER SUSTAINS THE GUADALUPE ~

PHOTO © ERIC SCHULFEL

testing cedar (Ashe juniper) eradication, brush-clearing and other water-saving land management strategies. In addition to being a center of whitetailed deer research, this WMA holds one of the great concentrations of wild turkeys in the state.

Less than a mile down the road, I detour down a county road, towards Cherry Springs Ranch, Guadalupe Bluffs Ranch, and the Price's Joy Spring Ranch Bed & Breakfast. At a low-water crossing, I find the river, sparkling in the sun, the palest of greens with a slight tinge of blue, scooting over the hard rock bed.

A mile farther, the river is moving full-tilt and roaring to life, with a deeper blue tint, a ribbon of sustenance snaking along a narrow alley guarded by soaring cypress trees and flanked by high bluffs, some rising up 100 feet above the water surface. Turkey buzzards politely wait on a fence post while I pass before resuming clean-up duty on a mangled piece of road kill.

A slide leading directly into the water on the banks of Mo Ranch Camp marks the beginning of the "camp run," consisting of Camp Waldemar and Camp Stewart on the North Fork, and Camp Mystic, Heart O' the Hills Camp and Camp Arrowhead on the South Fork. Crider's rodeo arena and dance patio is also on the south fork. There are not too many places in this world where a couple can two-step under the summer stars to the sounds

of western swing fiddles and the steady rush of the river.

The Guadalupe widens, narrows, and spills from limestone shelf to limestone shelf as it moves past patios, swings and ornate rockwork of dream ranches owned by CEOs, corporations and churches. In one field by the river, scale replicas of Stonehenge and two 13-foot-high Easter Island statues have been erected.

The North Fork and South Fork join just below the Hunt Store, a community gathering spot for vacationers, hunters, fishermen, swimmers and visitors for more than 80 years. Several generations of the wealthiest, most influential Texans have spent the summers of their youth on this part of the river, learning the basics of life and being exposed to a wilder, more untamed version of the natural world than exists near the cities they come from. Small wonder riverfront property here has been the most coveted real estate in the Hill Country for decades.

Anyone can glean a semblance of that experience by passing a night at an old-fashioned resort such as the Waltonia Lodges on the Guadalupe River, or jumping in and cooling off at Schumacher's Crossing, the first significant swimming hole with easy public access on the river.

The bluffs fade farther into the background from the river as it flows between Hunt and Ingram. Ingram Dam creates

large enough pools to support a bass boat or a one-man sailboat and offers younger river rats the pleasure of dam sliding.

Parks become more plentiful farther downstream: Louise Hays Park on the south bank through most of Kerrville and Kerrville-Schreiner Park east of town. In both parks, people are disc throwing, fishing and hanging out. The river gains stature but loses a little bit of its curb appeal as it flows past Kerrville, Center Point and Comfort, the bluffs considerably diminished, most of the cypress logged out long ago.

The magic returns just below Comfort and Interstate 10, as the Guadalupe narrows, snakes and curves through a verdant valley, parts of which have been cultivated by German farmers from the same families for more than 150 years. To stumble upon the hamlets of Welfare and Waring practically hiding under giant oak motts is like discovering a lost fairyland.

Though the entire 89-mile length of the Upper Guadalupe qualifies as a wilderness river experience — save for the dam in Ingram and all the low-water crossings — the 39-mile middle section between Seidensticker Crossing below Waring to the privately owned Bergheim Campgrounds at FM 3351 conveys the sensation of being somewhere Out There, with more heifers on the banks than humans, more fish in the water than folks.

~ GUADALUPE BALANCING ACT: DAM SLIDING IN INGRAM ~



PHOTO BY EARL NOTTINGHAM



~ THE GUADALUPE OFFERS THE MOST RELIABLE WHITE WATER IN TEXAS ~

Below Bergheim and Edge Falls, the 1,939-acre Guadalupe River State Park and the adjacent Honey Creek State Natural Area offer public access to four miles of unspoiled riverfront, more than any park on the Guadalupe and situated a mere 30 miles north of downtown San Antonio. The park attracts hikers and mountain bikers, as well as toobers, swimmers, and paddlers. Every Saturday at 9 a.m., Honey Creek opens its gates for a walking tour of the ecologically fragile environment, which encompasses several native species of plants and animals, including the endangered golden-cheeked warbler.

I keep looking for the right superlative to describe the upper Guadalupe's blend of wilderness and playground, and one remark sticks in my mind. At Kerr WMA I stumbled upon Anthony Glorioso, a fresh-faced, curly-headed college student from Poughkeepsie, New York, who was working as a field assistant on a study of wild turkeys by radiotelemetry. Glorioso had never been to this part of the world before, he said.

Asked about his first impressions, he lit up. "It's like Africa!" he exclaimed.

The New Yorker got it. The Guadalupe is that special.

## Canyon Lake

The most intense recreational use of the river is along the 40 miles of streambed from Highway 281 through Canyon Lake — one of the finest inland spots in Texas for sailing and windsurfing — and below Canyon Lake to Gruene and New Braunfels. In New Braunfels, the Comal — at three miles in length often called the country's shortest river — joins the Guadalupe, providing additional flow from Comal Springs. The crowds come for the natural beauty, the dependable flow, and, in summer, relief from the heat. Even in the middle of August, the water temperature remains brisk, rarely climbing over 70 degrees.

The 8,200-acre Canyon Lake was created by the construction of an earthen dam in the mid-1960s. Through managed releases, the dam tempers the wild swings between drought and flood that define the typical stream flow of Texas waterways; the Guad has water when other rivers may not. Since the release is from the bottom of the dam, chilled water is the norm and a boon to the stocking of trout. And since Guadalupe River Trout Unlimited reached a settlement with the Guadalupe-Blanco River Authority,

the flow is supplemented through the hottest, driest months of the year.

In July 2002, Canyon Dam was put to the test by weeklong storms that dumped close to 30 inches of rain into the watershed. The dam functioned precisely as its engineers intended. When the water level in the lake reached near the top of the dam, overflow went over the spillway for the first time ever. The torrent from the spillway carved a dramatic gorge out of the countryside, accomplishing several thousand years of erosion in a matter of days. The result — a dramatic red-dirt gorge pocked with springs, pools and pouroffs — is being studied by geologists. But sometime in the near future, parts of the gorge will likely become another recreational opportunity.

I'm disturbed to learn that recreational users have not been given a seat at the table in regional water planning, although permit amendments have been approved to draw more than twice as much out of Canyon Lake as has been historically allowed. While it is common knowledge that recreation is the major economic engine for Canyon Lake, the Lower Guadalupe, the village of Gruene, and the town of New Braunfels,

PHOTO BY BILL HEAVES/TADDOT



~ THE TEXAS WATER SAFARI: 260 MILES — FROM SAN MARCOS TO SEADRIFT — IN 100 HOURS ~

no research has been done to calculate the total economic impact of having a bountiful, flowing Guadalupe.

## Lower Guad

Recreational opportunities do not stop at Interstate 35. Despite all the focus on the Upper Guadalupe, the river offers plenty of diversions and opportunities after exiting the Hill Country. Between New Braunfels and Seguin, the river widens into Lake McQueeney, a wider-than-normal part of the river. Still, it holds enough water to attract boaters, swimmers, and water-skiers, including the Ski Bees, the first water-ski gang I ever wanted to join.

Twenty miles north of Lake McQueeney is the starting point of the Texas Water Safari, which bills itself as the "World's Toughest Boat Race." Last summer I stood on the banks of San Marcos Springs, the second-largest spring in Texas and the headwaters of the San Marcos River, and watched a couple hundred crazies go through last-minute preparations before beginning the 260-mile test of physical and mental endurance. Staged every June since 1963, the race from San Marcos to Seadrift follows the San Marcos River to Gonzales, where it joins the Guadalupe, and down to the coast. While the Safari is technically a race, the challenge for most entrants is to finish the course in 100

hours, which earns racers a pin.

I heard racers' tales of Hallucination Alley, a side effect of sleep deprivation that has been experienced by most of the contestants who've done the race. I met Julie Basham and Ann Best, two 40-year-olds attempting the race for the first time, and Julie's dad, or his ashes in an urn, at least. "Before he died, he said he wanted to watch me finish," Basham explained. She was going to spread his ashes at the finish, if they made it that far (they did). John Bugge introduced me to his 9-year-old granddaughter, Jessica, who became the youngest paddler to complete the race. Ian Adamson, a 38-year-old professional adventure racer and four-time Eco-Challenge champion from Sydney, Australia, put the safari in perspective: "To me, this is the best boat race I've ever run, starting in a clear, freshwater spring and a tight channel and winding up in swamps with alligators and the coast." Talking to them made me want to do the race, too.

But there are more leisurely ways to enjoy the pleasures of the lower Guadalupe that don't require a hundred hours of paddling. The "Guadalupe Loop" is a birding route sponsored by the towns of Victoria, Cuero and Gonzales that includes sites along the river. Situated between Luling and Gonzales, Palmetto State Park offers a birding trail that meanders through a lost swamp rife with palmetto palms. In winter, the park is

home to large roosting flocks of caracaras. The Athey Nature Preserve and the adjacent Riverside Park in Victoria is one of the hotspots on the Loop, offering birds such as the river's specialty, the green kingfisher.

Near the confluence of the Guadalupe and San Antonio Bay, the tidal marshes and riparian woodland of Guadalupe Delta below Victoria are a whole other world, where heat, moisture and fertile soil conspire to cook up a piquant stew of marine and terrestrial life. Birders flock here to spot anhinga, American bittern, glossy ibis, Ross's goose, bald eagle, Virginia rail, Couch's kingbird, golden-crowned kinglet, winter wren and late neotropicals.

The Guadalupe feeds them all.

## Sustaining the Guad

Yes, the Guad is great, but for how much longer? In 2002, the nonprofit environmental group American Rivers designated the Guadalupe one of the top 10 most endangered rivers in the United States because of demands placed on it from growing Central Texas cities.

Perhaps more than any other Texas river, the Guadalupe faces a diminishment of its flow in the coming years. The thirsty city of San Antonio is looking to the Guadalupe for more water. One plan under close consideration and considerable discussion

involves taking water from near the mouth of the Guadalupe at the town of Tivoli and piping it 120 miles back to San Antonio. The project is estimated to cost from \$683 million to \$785 million, or more, depending on design. The flow of the Guadalupe is also potentially affected by pumping in unregulated parts of rapidly growing Comal and Hays counties, which are part of the Guadalupe basin. This explosive development includes more than 20 golf courses built in the last 20 years, each consuming from 500,000 to 1 million gallons a day.

The Guad is beset by a combustible mix of historic laws, traditions and a rapidly growing number of users and uses for the river whose collective demand could soon outstrip the existing supply. The "rule of capture" is still the building block of Texas water law. Under it, groundwater belongs to the owner of the property above it, and plans are in place for excessively pumping underground reservoirs that provide the Guadalupe its sustenance. Surface water, such as the river and its tributaries, belongs to the people of the state, and is managed under the Prior Appropriation Doctrine which says, "First in time, first in right." Surface water, too, is being coveted as a resource that can be moved and sold to the highest bidder.

The problem is that the real price of water, in terms of its effect on wildlife and recreation, have yet to be calculated. Thirty-five miles away from the mouth of the Guadalupe as the black-bellied whistling duck flies, I ran into Tom Stehn, the whooping crane coordinator of Aransas/Matagorda Island National Wildlife Refuge. Stehn had been a speaker at the eighth annual A Celebration of Whooping Cranes and Other Birds in Port Aransas, the town's end-of-winter birding and ecotourism festival. When I found him, he had finished hearing Norman Johns, the water research scientist for the National Wildlife Federation, lecture about freshwater inflow, a major unresolved issue in Texas water planning.

Without fresh water from the Guadalupe, the health of shrimp, oysters, fish and other marine life in San Antonio Bay and other nearby bays will be at risk, Johns explained. His PowerPoint presentation layered current water usage and projected water usage in 2050 onto historic data from the great drought of the 1950s. The numbers suggest the likelihood that in the next drought of record, the population of blue crab, the main food source for whooping cranes, will crash, jeopardizing the most successful recovery of an endangered species in Texas.

Stehn joined the long line of witnesses telling me how remarkable the Guadalupe is. After all, what other river nourishes 198

whoopers during the winter so they can fly up to near the Arctic Circle for the summer? Without the Guadalupe, thousands of visitors wouldn't be coming to the refuge to try to spot the tallest bird in North America.

The final stop on my tour of the Guadalupe River was at Austwell, a sleepy little community on the western bank of Hynes Bay, the northwestern thumb of San Antonio Bay, where the Guadalupe meets the sea.

"You carry it in. You carry it out," reads the hand-painted sign by water's edge. A single lighted dock juts out into the water. Two men lean on a rail, their fishing lines dipping down.

Wind is a constant, bending the sea oats and cattails northward and stirring up mud in the shallows to add a brown earth tone to

the pallet of rich green slate and pale blue hues streaking the expansive bay. Ducks settle contently in salt marshes, shielded from the wind. A redbud blooms near a stack of crab traps, and a Texas lantana is showing all colors, the first clear signs of spring's arrival. Austwell is quiet and silent and like some of the stretches of the Upper Guadalupe, refreshingly remote and disconnected.

I start to approach the two fishermen on the dock, but think better of it.

Maybe they're in the same zone of solitude I was farther upstream that late February afternoon. If they're not, maybe if they're left alone long enough, they will get there. I walk away, leaving them be, shaking my head in amazement that the Guadalupe is the reason they are there. My river is a special river indeed. ✧

~ THE GUADALUPE NOURISHES OUR WINTERING WHOOPING CRANES ~

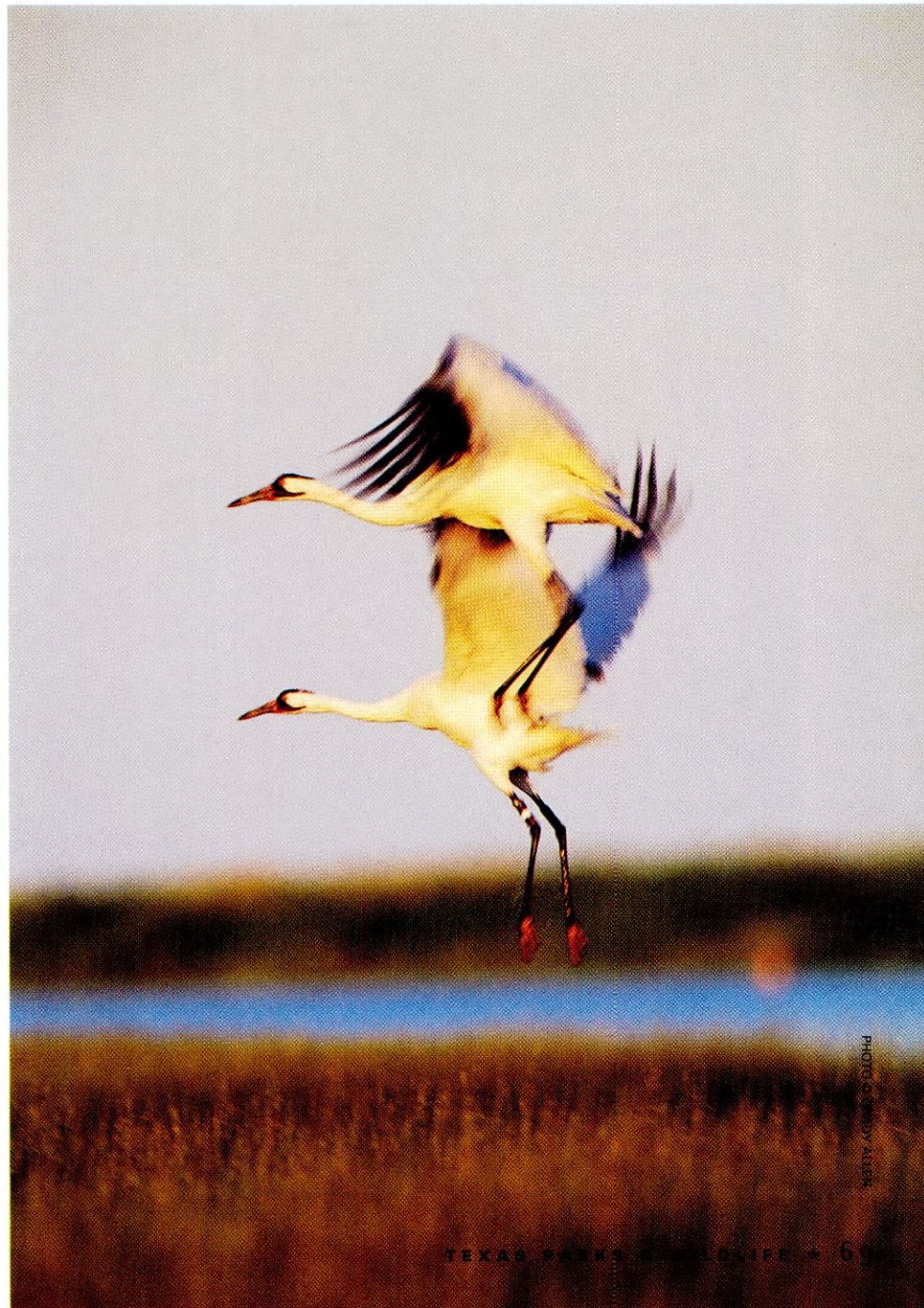


PHOTO © JIMMY ALLEN



~THE BRAZOS~

# A Natural River

THE UPPER REACHES OF THE BRAZOS RIVER  
ARE FEELING THE PRESSURE OF CHANGE.

By John H. Ostdick



**T**he enormous Brazos River system stretches 840 miles long from its trace beginnings in northeastern New Mexico to its sediment-gorged mouth at the Gulf of Mexico, two miles south of Freeport. Like many of Texas' major rivers, the Brazos barely resembles its frontier origins. Dams on its main stream and tributaries repeatedly stop its flow,

creating reservoirs that provide water and recreation near Fort Worth and Dallas: Possum Kingdom, Whitney, Granbury, Hubbard Creek, Palo Pinto and Waco. In 1957, the building of the De Cordova Bend Dam on the Brazos spawned one of the great books on the environment, *Goodbye to a River* by John Graves. For 3 weeks, Graves paddled a stretch of the Brazos that would disappear into a reservoir and contemplated the price of that development, mourning the gradual loss of a natural world.

Most of the Brazos is forever changed by that series of dams, but in the parched High Plains and shortgrass prairies of Northwest Texas, one last long piece of the natural river has survived, two spindly little forks that begin the river: the Double Mountain Fork and the Salt Fork. For almost 150 miles, they snake through the multi-colored cliffs of the escarpment, past red-dirt farms and mesquite-infested ranches, through sand



THE SOUTHERN EDGE OF THE LLANO ESTACADO NEAR POST, ABOVE; DOUBLE MOUNTAIN LOOMS OVER ITS RIVER, TOP RIGHT; MISTS RISE OVER THE SALT FORK OF THE BRAZOS, LOWER RIGHT.



channels and rocky chutes, past wide vistas. In this arid, flat, sparsely populated country, every drop of water matters, even the naturally salty water of the Salt Fork.

Generally ignored in the state's great dam rush of the closing half of the last century, the forks remained mostly impervious to modern water demands. But that is slowly changing, and biologists worry about what that portends for their future.

### *The Damming Effect*

If you read much about rivers, you find that most of the experts believe the days of dam building are over, but in dry country, thoughts of a dam are seldom far away. The uppermost dam on the Brazos River is the John T. Montford, which creates Lake Alan Henry, in Garza County about 65 miles from Lubbock. It is also the Brazos system's newest dam, completed in 1993. Standing on top of it, you can look down at the reddish brown trickle that is the Double





~ RARE VIEWS OF THE UPPER BRAZOS ~



PHOTOS © WYMAN MENZER



HELL'S GATE IN POSSUM KINGDOM LAKE ~

Mountain Fork leaving the reservoir, and while it might not look like much, it is liquid gold. How to mine that liquid gold without drastically changing the region's aquatics is one of the biggest challenges here.

Even a reservoir won't help if it doesn't rain, and in the best of years it doesn't rain that much in the Upper Brazos. After last year's second-lowest level of rainfall on record, Lubbock mayor Marc McDougal issued a formal proclamation calling residents to pray and fast for rain to replenish local reservoirs. One day, a yet-to-be-built pipeline will annually pump about 23 million gallons of Alan Henry water uphill to Lubbock.

Runoff in a 400-square-mile watershed feeds Alan Henry. When full, the lake's 3,600-foot-long dam confines about 40 billion gallons of water within its rock-edged shorelines. More than 41,000 visitors passed through its recreation permit office in 2003. Largemouth bass, stocked after the reservoir

out. "A thriving species became almost non-existent," Wilde notes. "You have all this water just a short distance downstream, and it means nothing to these stream fish."

The White River Municipal Water District has a long-held state reservoir permit on the North Fork of the Double Mountain Fork in Garza County but has yet to apply for the necessary federal permits. Its existing state permit expires in 2008. Such an impoundment would capture runoff that would otherwise feed the forks.

### *A Salty Problem*

Both of the upper forks of the Brazos, particularly the Salt, absorb large amounts of its namesake from the saline soils, salty springs and oilfield residues in the Rolling Plains. On the snaking Salt, east of the town of Post, gusts of wind lift the bracing smell of salt off the river's surface. Saline residue clings to the jagged riverbank.

correcting the salt infiltration are attained, the remedy might not arrive without its perils.

"If we freshened that river up, we would see major changes in the fish community," says Randy Moss, senior scientist at the Texas Parks and Wildlife Department's River Studies Program in San Marcos. Moss, who has done extensive testing on the Upper Brazos, reports water in the Salt Fork can be saltier than seawater (about 33 or 34 parts per thousand). "We've done sampling in late summer as high as 40 parts per thousand," he says. "Pupfish thrive in the salty water. If for human purposes, we decided to reduce the salinity, I would expect that species to decline."

The salt pollution that makes the river so problematic to treat for human consumption also has another unique recreational impact downstream. The heavy salt load coming into Possum Kingdom is one of the



filled, prove the most popular catch in the reservoir. The recreational revenue (in addition to flood control and water storage) of reservoirs lures rural development boards into dreaming of dams, even though the logistics are daunting.

Research shows that dam construction affects downstream fisheries by altering temperature regimes, flow rates, substrate, water quality and nutrient availability. Dams can have upstream effects as well.

"Looking down the river valley from the Alan Henry dam, there isn't any river there," notes Gene Wilde, a Texas Tech University associate professor of fisheries science. "It's a powerful statement on the impoundment's effects on the aquatic resources of the river basin." In 1995, Wilde started extensive sampling about 5 to 8 miles above the new reservoir and continued for several years.

Wilde expected sharpnose and smalleye shiners, two species of minnows found exclusively in the Brazos, to die off because of the reservoir; his sampling quickly bore that

State and federal agencies have long studied the natural salt sources here. Ralph Wurbs, a Texas A&M professor who developed a water rights analysis package being used in all 23 Texas river basins, considers it a major concern.

"The high salt concentrations coming down from the Salt Fork and some of the salty creeks in the watershed pose some challenges in the Possum Kingdom and Granbury reservoirs," Wurbs explains. One plan to remedy it called for building three brine impoundments on small creeks in the primary salt source areas feeding the Salt Fork. Impetus for the project waned, however, when Congress authorized construction but required non-federal participation.

"We would dearly love to get a handle on the salt pollution problem but that's a bigger problem than any single agency can handle," says David Wheelock, principal engineer for the Brazos River Authority.

Even if the funding and mechanism for

HELL'S GATE IN POSSUM KINGDOM, OPPOSITE; THE NORTH FORK OF THE DOUBLE MOUNTAIN FORK IS DAMMED NEAR LUBBOCK, ABOVE LEFT; AND CLEAR FORK, ABOVE RIGHT

reasons it is as clear as it is and such an attraction to scuba divers.

### *Hope for Salvation*

Several Spanish legends explain how Los Brazos de Dios, "the arms of God," received its name; they all deal with the river providing sustenance or rescue. A coalition of a dozen communities and counties in the parched and economically strapped region around Stonewall County believe the Double Mountain Fork holds the key to their salvation as well.

The coalition has funded a campaign to build a Double Mountain Reservoir on one



PHOTO © WYMAN WENZEL

~ ROCK ART APPEARS ALONG A TRIBUTARY OF THE SALT FORK ~

of two sites south of Aspermont, a weather-beaten smattering of modern brown-brick municipal buildings and closed storefronts that line State Highway 380. It has spent \$120,000 for two studies, the first to determine if there is sufficient water to develop a reservoir, and the second looking at what kind of downstream impact such a project might have on Possum Kingdom, which owns the water rights involved. Further studies and analysis are pending.

"We're looking at both the water need and a possible reservoir's boost to recreational values and increased land values here," says Stanley Trammell, owner of Stonewall Electric and the president of the Aspermont economic development corporation seeking reservoir approval. "We think it has the potential to be a real boon for our area. Right now, some of our involved communities, like Nolan County and Sweetwater, are really struggling for water."

The Stonewall County effort is still in its infancy. If all goes well, a reservoir might emerge in 15 to 20 years.

Texas Tech University's Wilde cautions that another such reservoir may irrevocably change the Brazos fish species still under siege. He says that some of the fish, including the two endemic shiners, are probably broadcast spawners; they move upstream and spawn into the current. The eggs are semi-buoyant; in the absence of current, they settle to the bottom and are lost under sediment.

"The dams will prompt more local fish populations to die," he says. "When that happens, there will be no chance for reestablishing those species."

History shows once species are lost to an environment, others can be affected in unpredictable ways. Balancing the importance of saving two species of shiny minnows against human-related water-quality issues is but one of the complex issues of managing rivers within the state.

## Water as a Commodity

Shortly after the confluence of the two forks, the Brazos enters the state's Cross Timbers and Prairies region. The topography becomes more rugged, and the geologic formations and soils more varied. Here, the river is at its biggest in the Upper Basin. Mesquite and salt cedar dot its banks.

Seymour, the county seat of Baylor County

(population 3,929 in 2002), is an unlikely place for a grand experiment, but a location just south of town may prove just that for the Brazos River Authority and Mesa Water, a consortium of Panhandle landowners formed in 1999 by businessman Boone Pickens.

The purpose of Mesa Water is to pump groundwater from the Ogallala aquifer and sell it. Under the "rule of capture," Texas law gives landowners the right to produce



~~~~~  
 PETROGLYPHS INCISED INTO THE  
 CANYON WALLS BORDERING THE UPPER  
 REACHES OF THE BRAZOS, OPPOSITE;  
 SUNSET ON LAKE WHITNEY, ABOVE.  
 ~~~~~

groundwater from beneath their property. Pickens and about 175 Panhandle landowners want to pump as much as 150,000 acre-feet of water per year and deliver it to any municipality willing to buy it.

In October, the river authority signed an agreement to explore the feasibility of Mesa's delivering its water into the Brazos basin by pipeline from the Panhandle. In theory, the groundwater would be added to the Brazos River and transported downstream. Mesa would pay the river authority for the right; the authority would use that revenue to fund new projects within the basin, such as new delivery infrastructure

and wastewater treatment.

The general manager of the Brazos River Authority is Phil Ford, a retired U.S. Air Force lieutenant general who pledged to run his agency as a business when he was hired in March 2001. With the state population expected to double by the year 2050, Ford explains that his agency is exploring ways to meet the projected water demands. "One of the things we've come to grips with is that we need more infrastructure to be able to move water at will, even in the Upper Basin," he says. "If we can use the Brazos River as a transportation center to move water, then we would be smart to do so."

Although TPWD scientist Moss understands the cost-effectiveness of using state-owned riverbed to transport water, such proposals leave him a little queasy about its impact on river's biology, and a little skeptical in general. "Everything upstream of Possum Kingdom is characterized as pretty salty water," he says. "It's surprising to me that someone would think about taking fairly high-quality water out of the ground, mixing it with salty water, and transporting it downstream for consumption purposes."

Pickens says his group is poised to install the needed infrastructure within five years. "Our water is just sitting there until somebody indicates they want it," Pickens explains during a working weekend at his Mesa Vista Ranch in Roberts County. "We can get it to San Antonio, Dallas-Fort Worth, or wherever, quicker than

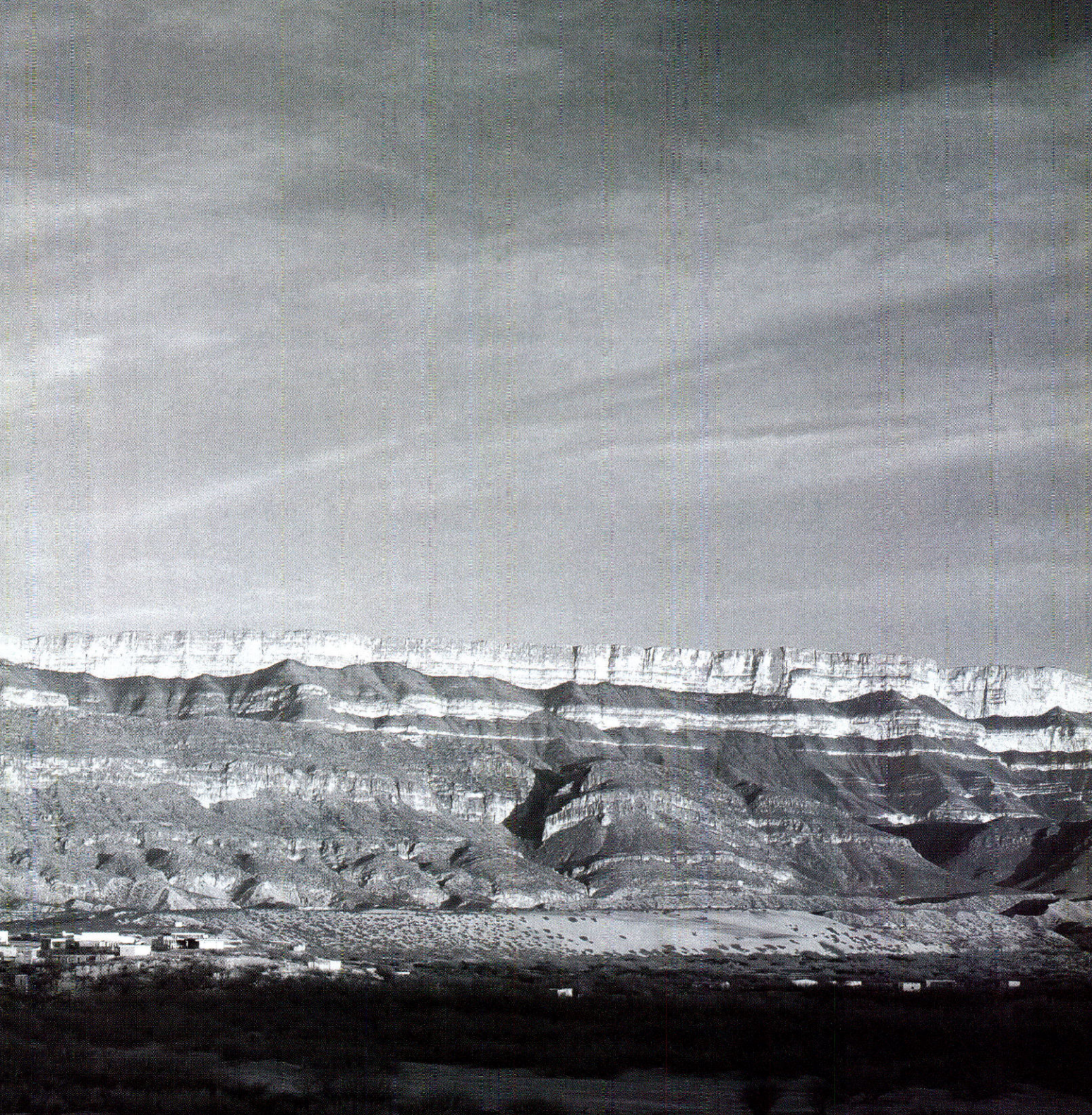
anybody else can. We've done the studies, and the reports are on the appropriate desks statewide. We're ready to go, if we can just get somebody to dance."

All's quiet so far. Demand will determine when, if and where that dance will take place. Whatever happens next, scientists such as Moss and Wilde hope that some thought will be given to preserving the natural river that still remains.

"Texas faces some real difficult decisions with respect to population growth and water distribution," observes Wilde. "It's also a state, as wealthy as it is, that does not give much thought to environmental issues. I'm a fish person, so obviously I have a different sensitivity to these issues than most people, but it would be just a real tragedy not to make the necessary accommodations to the biology. I don't think we have to have one or the other."★

PHOTO © GRADY ALLEN





~THE RIO GRANDE~

# Time and the River

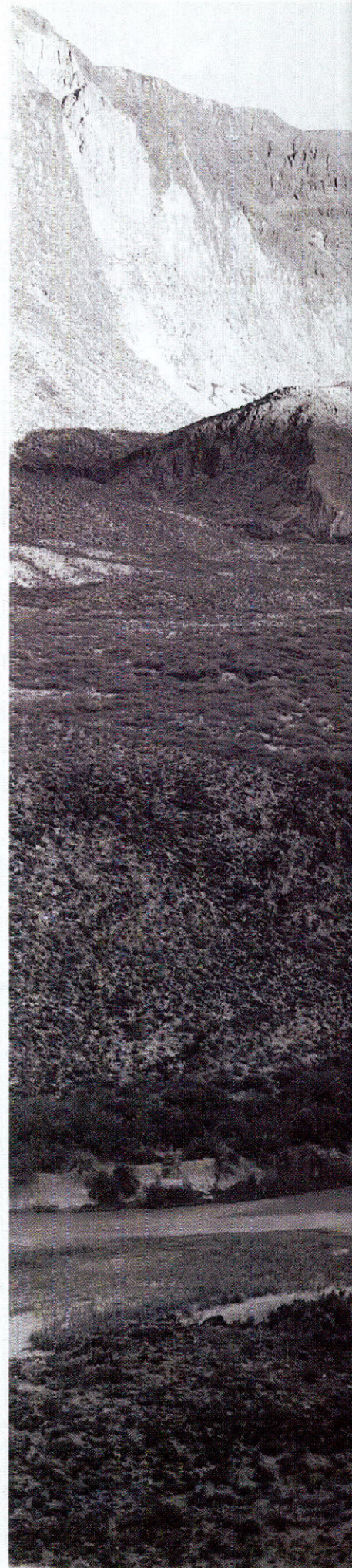
THE DEEP CANYONS OF THE RIO GRANDE REMIND  
US HOW OUR LIVES ARE WRITTEN IN WATER.

*By E. Dan Klepper*

**A** spring afternoon in 1974 has “hotted” up, withering and pallid from the Mexican sun as if August, not April, had just begun. I am sweating in a friendly cantina on the streets of la Villa de Boquillas del

Carmen and sucking on a tiny bitter lime. My eyes are watering and I am hoping the acrid juice of the lime will offset the fiery slivers of serrano pepper slicing into my fresh-made taco and my tongue and lips and the farthest reaches of my throat. My friends — my lifelong pals, as I believed at the time — M and K and N and J and all those names that seem to repeat themselves throughout my life yet with new faces and, thankfully, with a few of the same old ones, are laughing. So is the bartender, who hands me a beer and some salt. This seems to quell the heat briefly until another bite triggers the burning sensation and the merriment all over again. The taco is deliciously spicy and the laughter contagious, causing pure suffering and joy at once. A record player sits on the bar, a little box designed for a child, and is plugged in to the light socket that hangs from the ceiling. The bartender positions a 45 on the turntable, then drops the needle onto the rotating vinyl, and suddenly, the Rolling Stones are scratching their way out of the tiny speaker. Through fresh tears and winced eyes, I can see my friends dancing herky-jerky amid their easy laughter. There is M, a riot in his deadpan wit and pop sensibility. There goes K, outfitted to the teeth with a sure-fire solution for every possible circumstance. And here is N, redheaded and beautiful and ready to embrace everything the world has to offer.

Memory shades here and then shines again later as memory often does. I’m not sure how long we stayed at the cantina but I recall we eventually made our way down to the

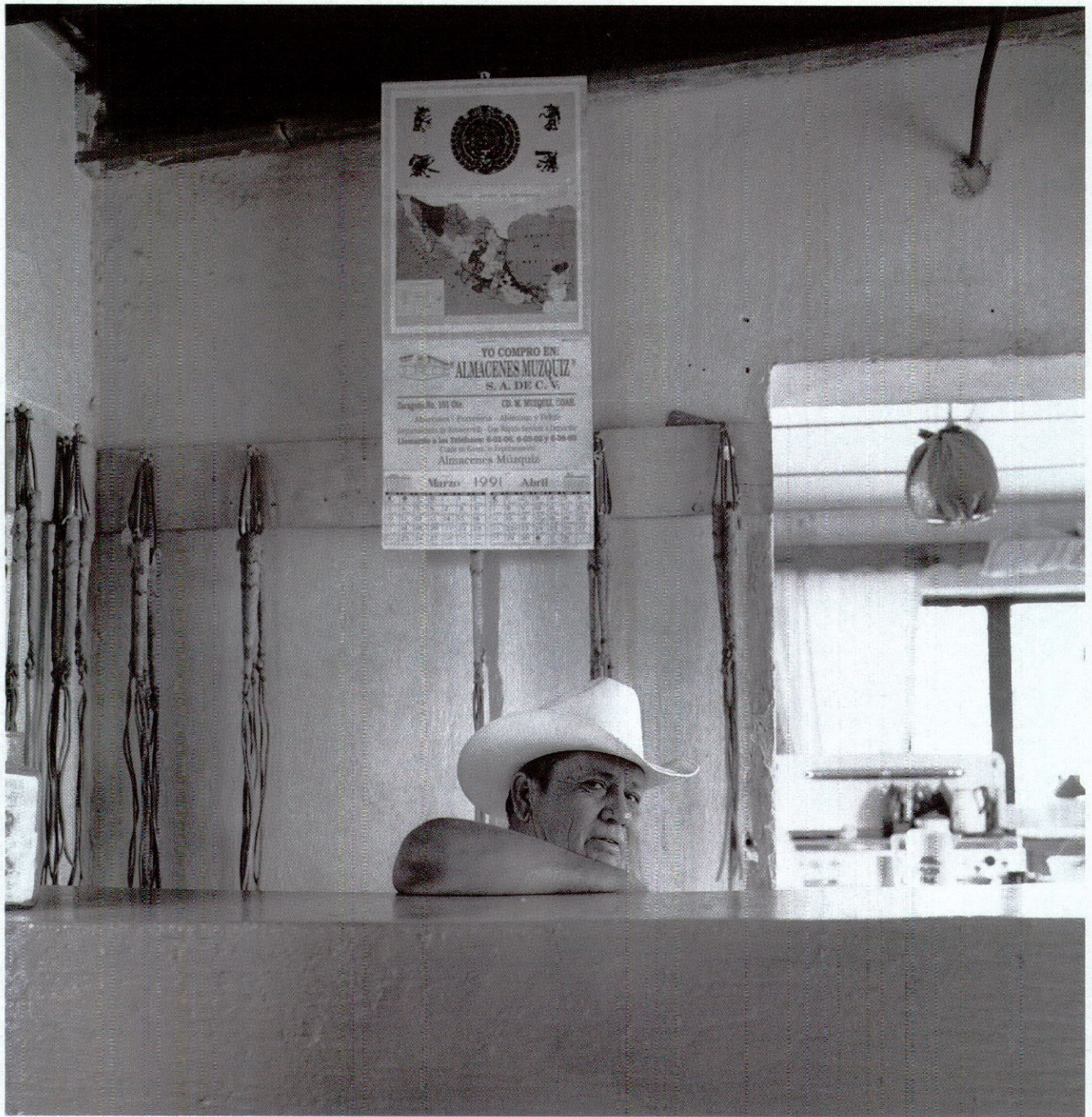






~ "NOT ENOUGH WATER!" IS THE BATTLE CRY OF A RIVER-DEPENDENT CIVILIZATION ~

PHOTO © JAMES EVANS



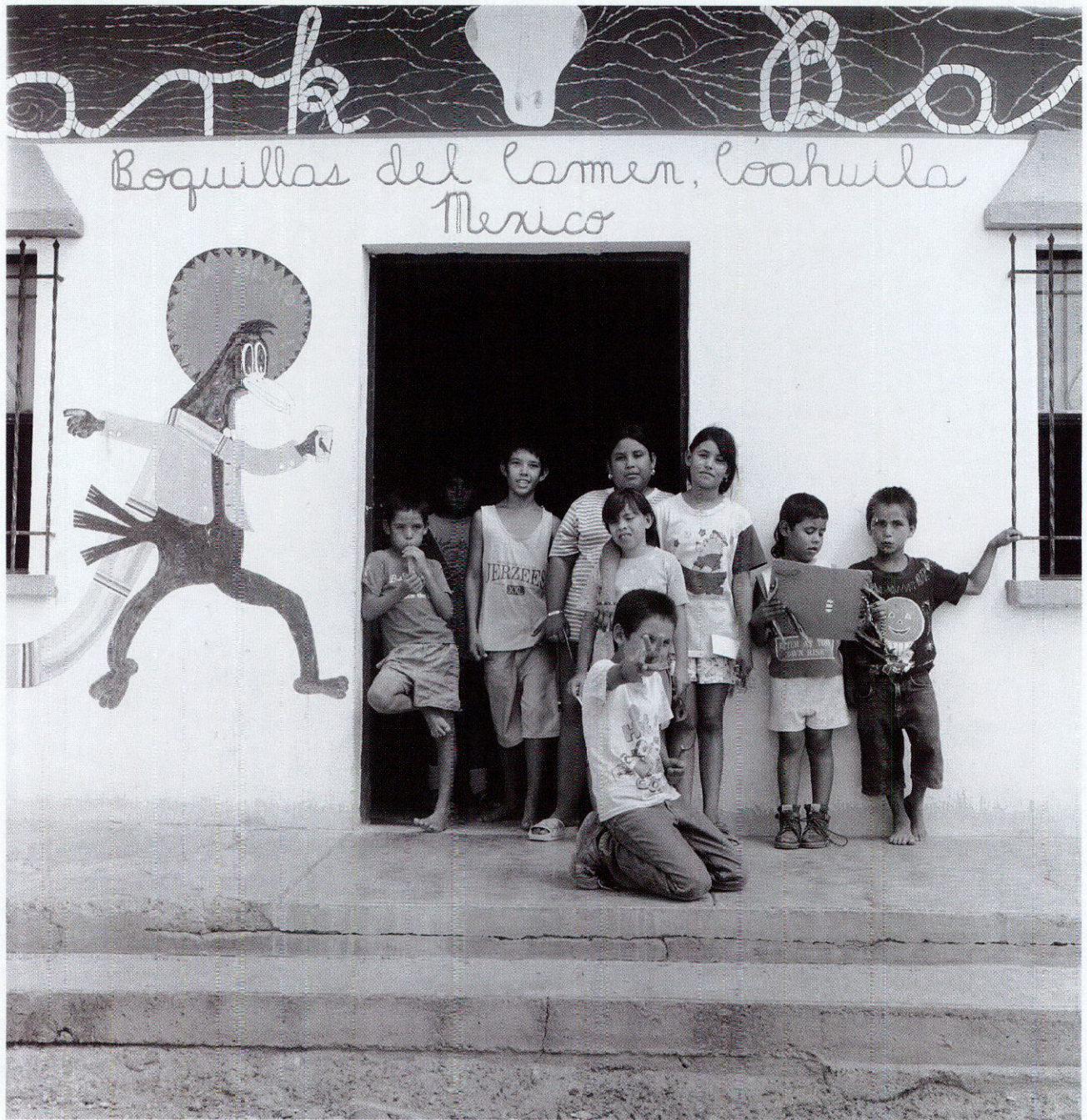
~ THE RELAXED AND STEADY SLOWING OF TIME IN THE BOQUILLAS CANTINA ~

banks of the Rio Grande in order to swim back to the United States side. My companions and I had crossed to Boquillas del Carmen earlier in the day from Big Bend National Park, where we had been camped for the week. The informal border crossings up and down this West Texas stretch of the river were still open and casual at the time. Citizens of both countries were free to come and go at will as they had done for more than a century.

Ours had been a foolish crossing, as the river was swollen with rain. But we did it anyway, anxious for the relaxed and steady slowing of time in the Boquillas cantina. And, after all, the high flow of river water may not have been such an unusual sight. The river always seemed to be full of water at the time, at least with enough water for everyone who needed it — for the wildlife, the

river rafters, the cities lining the border, and farmers and their crops along both sides of the banks.

Sunburned and at ease, my companions and I sit above the bank and rest before forging the river and hiking back to camp. We spend the time joking, enjoying the late afternoon sun and eyeing the currents for an easier return across. I remember gazing downriver, admiring the light as it enhanced the bright limestone along the river's edge and threw the opposing slabs of bank into shadow. As the river carves its way into the mouth of Boquillas Canyon, the bank walls tilt and slope in an alarming gesture and then disappear into the canyon depths. I recall a sense of exhilaration, a mixture of awe and dread, as if the canyon's traverse represented my future, unsettling and unknown.



~ AMERICAN ASSISTANCE, JUST 100 FEET AWAY, MIGHT AS WELL HAVE BEEN 100 MILES AWAY ~

Argentine writer Jorge Luis Borges defined time as a river that carried him along. "...[B]ut I am the river," he revealed, for "time is the substance from which I am made." It has been 30 years since that Boquillas afternoon and on another, more recent, lazy day, I was reminded of it as I maneuvered a canoe slowly past the banks of Boquillas del Carmen. The village had flourished under the generosity of American tourism in the intervening years. But after 9/11, all informal border crossings were shut down. With the crossing off-limits, tourist dollars had vanished and the villagers had resumed suffering the isolation of their geography and the neglect of their government. American assistance, just 100 feet away, might as well have been 100 miles away. Had I beached my canoe along the Boquillas

banks, eaten another taco at the cantina and returned the same way to the United States side, I would have been breaking the law.

But my companions and I hadn't come to the river to cross it to Boquillas del Carmen this time. We had come, instead, to follow the waterway into Boquillas Canyon. Gazing downriver, I anticipated the moment when I would finally see beyond the canyon's mouth. The tilts and slopes hadn't changed, it seemed, nor the fiery light glancing off the walls. The buildings of Boquillas del Carmen, however, appeared transitory and fragile, as if a great wind or a sudden rise in river levels could simply make them all disappear. But the water would have to rise dramatically these days. Water in the Rio Grande is scarce, and whatever else I anticipated in my three-day journey through the



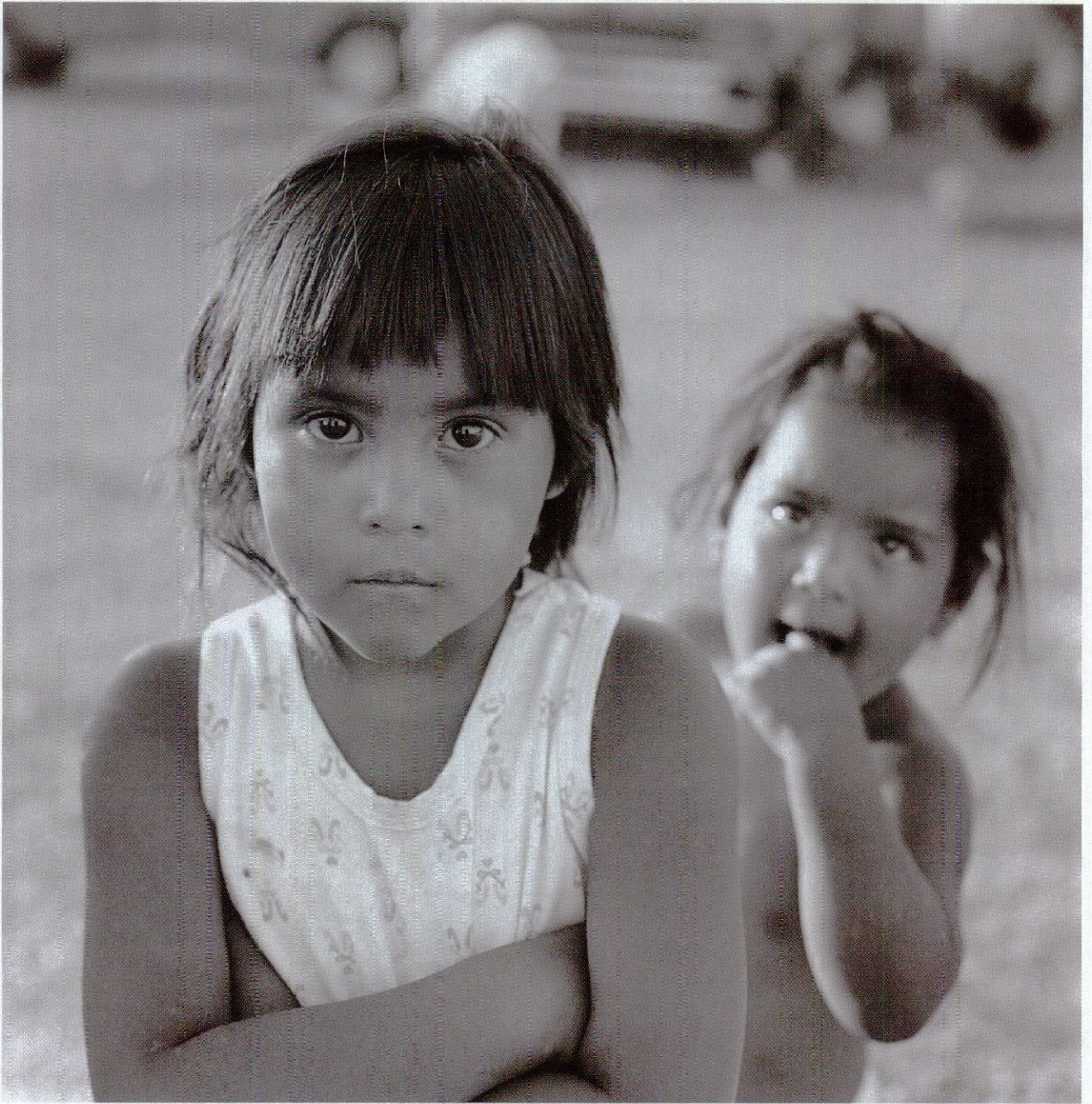
~ THERE ARE LIMITS TO ALL THINGS, IT SEEMS, INCLUDING A RIVER'S GENEROSITY ~

canyon, low water was certain. "Not enough water!" is the battle cry of a river-dependent civilization all along the border's edge, each side accusing the other of creating the river's shortages and contributing to its degradation.

As my canoe cleared a mat of reeds below Boquillas del Carmen, I was surprised by the sight of a man taking a bath. He stood up to his chest in steaming water. The water was hot here on the Mexican side, bubbling up from some volcanic remnant to create the Boquillas Hot Springs. A woman waited with a towel just above the man. She was perched on an old, half-built rock wall and laughed when she saw my expression. The man waved at me with a soapy hand.

I was relieved to finally enter the mouth of the canyon and float

out of reach of the trinket vendors and beyond earshot of the Mexican goat herder's chatter and the hikers taking snapshots from the end of the canyon lookout trail. Each new moment in the canyon seemed a slip in time as my companions and I discovered aspects of a geography that had evolved on a much grander scale than we, in our tiny boats, would ever witness. The walls of Boquillas Canyon revealed an elementary drama of waterworks both tender and brutal and undirected by anything man-made. Water had wept, scumbled, cemented, ground and ravaged the rock layers of this remote and desolate place for eons, carving the canyon into the centerpiece of a breathtaking landscape. The next three days of exploring the river's monumental limestone towers and hidden slot canyons brought real



~ IT WAS A REALM THAT REMAINED UNAFFECTED BY OUR PRESENCE ~

satisfaction to our wanderlust. It was a realm that remained unaffected by our presence, or by our absence. The forces that have been at work, literally moving mountains incrementally over time, seemed well beyond the scope of human interference. It was difficult to imagine anything mankind could do to compromise the natural evolution of this place.

But once I passed beyond the canyon's rough and inaccessible walls then out the other side, I found myself paddling alongside the choking thickets of non-native river cane and water-hogging salt cedar and through open pastureland, overgrazed and eroding away; all of it brought on by the hand of man.

I floated past a horse grazing listlessly along the banks. She had been fitted with a bell because of her advanced age and the

propensity for the rest of the herd to follow her lead, letting the horseman know where his herd had wandered. As the bell mare shook flies from her mane, I could see the thick leather strap buckled around her neck and hear the copper bell's toneless clamor. The mare seemed to bear her burden with a limited tolerance as if the bell were a weight affixed to her resignation. She appeared encumbered, not only by the strap and the heavy bell but by its implications that marked her old and gray and predictable and mortal. There are limits to all things it seems, including a filly's youth or a river's generosity or a country's shortfalls or even perhaps its privileges. And then I remembered a moment just six months back when the river had all but disappeared.



~ THE INFORMAL BORDER CROSSINGS WERE STILL OPEN AND CASUAL ~

The water supply, the river has proven, is finite. In early May of 2003, Big Bend National Park officials released photographs documenting exposed gravel beds across the river's floor where water once flowed. Areas of static, pooling water and drying flats of mud were reported for segments of the river along a full two-thirds of the total 118 miles of river defining the national park's southern border. The river had experienced low flow conditions for a number of drought-stricken years, but this sudden zero flow status attested to the added pressure of water diversion by humans for urban consumption, irrigation and industrial needs.

Late May rains ultimately restored the watercourse to low flow conditions at best. But the alleviation of an immediate danger by nature is not necessarily a long-term solution for humans.

We tend to interpret the arbitrary ebb and flow of nature as expressions of turmoil and security – the water flow is restored, so we can continue to use as much water as we need; the floodwaters have receded, so we can fill in more wetlands for development; the hurricane has passed, so we can rebuild our beachfront homes; the wildfires have been extinguished, and now life may go on as it has gone on before. Yet these natural cycles, and their disturbing aberrations, are not designed to terrify or reassure us. They are simply the ways that nature, like the river, moves forward through time, with or without us. We can decide to work within the parameters of the natural world, of which we are an integral part, or to continue the hubris of our manifest destiny over nature. The free will to choose is our blessing in life



~ NATURE, LIKE THE RIVER, MOVES FORWARD THROUGH TIME ~

and one that is accompanied by the responsibilities of stewardship in a world dense with its need and lacking in the freedom of choice. The decision is not an option but an imperative and will determine the river's survival and, ultimately, our own.

M and K and N and I sit above the riverbank of Boquillas del Carmen and goof lazily for the rest of that memorable afternoon. It is as if time stands still for us simply because the moment is so full of our own celebration that it becomes ours to command. We are at that age when the young believe in anything, including the illusion that everything will last and that the generosity of this fresh world will never temper. A thunderstorm boils up from some unanticipated concoction while we carry on. The anvil bruises the sky and sends a chilled wind and sharp

drops of rain that drive us to shelter against the old rock wall, a remnant of some half-forged idea to house the hot springs bath that simmers just below us along the river's edge. The pelting rain runs in sheets, icy and unpleasant, but subsides just as we reach our limits for suffering it. One of us shivers, and we all look down to the steaming riverbank and dive en masse into the springs. The Boquillas children come to watch us as we huddle neck-deep, pestering us to buy their tiny packs of Chiclets. We soak until the sun has almost set, unwitting and optimistic, protected from the cold river current in our cups of eroded rock and thermal brew, as the mortality of our youth flows by us, undetected and into the future. ★

# SIGHTS AND SOUNDS



THE FRONT LINE OF NEWS AND VIEWS



## T E L E V I S I O N

LOOK FOR THESE STORIES  
IN THE COMING WEEKS:

### June 27 - July 4:

Conserving water with wildscapes; learning at wildlife management areas; the Texas tortoise; great blue heron calls; Cooper Lake State Park.

### July 4 - July 11:

River access rules; the Caddoan Indian culture; Casa Navarro; West Texas sand dunes; grassland prairies.

### July 11 - July 18:

Panhandle water at risk; a gaggle of gobblers; family hunting traditions; animal sound secrets; finding nature in the city.

### July 18 - July 25:

Big Bend; quail in the snow; protecting and enjoying a desert spring; in line at the boat ramp; Fredericksburg's Admiral; Washington-on-the-Brazos.

### July 25 - August 1:

Galveston Island State Park; hardwoods and rivers in harmony; Caddo Lake; a truly Texas boat maker; squawk of the hawk.



See the two sides to Galveston Island State Park. Watch the week of July 25 - August 1.

## "TEXAS PARKS & WILDLIFE"

Winner of 12 Emmy Awards, our television series is broadcast throughout Texas on local PBS affiliates. In stereo where available.

**AMARILLO:** KACV, Ch. 2 / Sun. noon

**AUSTIN:** KLRU, Ch. 18 / Sun. 10 a.m. / Mon. 12:30 p.m. KLRU-TOO, Cable Ch. 20 / Tues. 11 p.m.

**BRYAN-COLLEGE STATION:** KAMU, Ch. 15 / Thurs. 7 p.m. / Sun. 5 p.m., 10:30 p.m.

**CORPUS CHRISTI:** KEDT, Ch. 16 / Sun. 11 a.m. / Fri. 11:30 p.m.

**DALLAS-FORT WORTH:** KERA, Ch. 13 / Sat. 8:30 a.m.

Also serving Abilene, Denton, Longview, Marshall, San Angelo, Texarkana, Tyler, Wichita Falls, Sherman

**EL PASO:** KCOS, Ch. 13 / Sat. 2:30 p.m.

(rotates with other programs; check listings)

**HARLINGEN:** KMBH, Ch. 60 / Sun. 5 p.m.

Also serving McAllen, Mission, Brownsville

**HOUSTON:** KUHT, Ch. 8 / Sat. 2:30 p.m. / Fri. 1 p.m.

Also serving Beaumont/Port Arthur, Galveston, Texas City, Victoria

**KILLEEN:** KNCT, Ch. 46 / Sun. 5 p.m.

Also serving Temple

**LUBBOCK:** KTXT, Ch. 5 / Sun. 5:30 p.m.

**ODESSA-MIDLAND:** KOCV, Ch. 36 / Sat. 5 p.m.

**SAN ANTONIO & LAREDO:** KLRN, Ch. 9 / Friday noon, Sunday 1:30 p.m.

**WACO:** KWBU, Ch. 34 / Sat. 3 p.m.

Check local listings. Times and dates are subject to change, especially during PBS membership drives.

## R A D I O

### "PASSPORT TO TEXAS"

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**ABILENE:** KACU-FM 89.7 / 7:04 a.m., 1:43 p.m., 6 p.m.; KWKC-AM 1340 / 6:30 a.m.

**ALPINE:** KSRU-AM 1670 / 9 p.m.

**AMARILLO:** KACV-FM 89.9 / 3:50 p.m.

**ATLANTA:** KPYN-AM 900 / 7:30 a.m.

**AUSTIN:** KVET-AM 1300 / between 5 a.m. and 7 a.m. Sat.; ESPN Radio KWNX-AM 1260 and KQQA-AM 1530 9:20 a.m. Sun.

**BEAUMONT:** KLVI-AM 560 / 5:20 a.m.

**BIG SPRING:** KBST-AM 1490 / 10:55 a.m.

**BONHAM:** KFYN-AM 1420 / 10:10 a.m. KFYZ-FM 98.3 / 10:10 a.m.

**BRADY:** KNEL-AM 1490 / 7:20 a.m.; KNEL-FM 95.3 / 7:20 a.m.

**BRIDGEPORT:** KBOC-FM 98.3 / 11:45 a.m.

**BRYAN:** KZNE-AM 1150 / 5:40 p.m.

**CANTON:** KVCI-AM 1510 / 8:20 a.m.

**CANYON:** KWTS-FM 91.1 / noon, 4 p.m., 7 p.m.

**CARTHAGE:** KGAS-AM 1590 / 6:40 a.m.; KGAS-FM 104.3 / 6:30 a.m.

**CENTER:** KDET-AM 930 / 5:20 p.m.; KQSI-FM 92.5 / 5:20 p.m.

**COLUMBUS:** KULM-FM 98.3 / 5:20 a.m.

**COMANCHE:** KCOM-AM 1550 / 6:30 a.m.

**COMMERCE:** KETR-FM 88.9 / 10:15 a.m.

**CORPUS CHRISTI:** KEDT-FM 90.3 / 5:33 p.m.; KFTX-FM 97.5 / 5:30 a.m.;



KVRT-FM 90.7 / 5:33 p.m.; KLUX-FM 89.5 / throughout the day

**CROCKETT:** KIVY-AM 1290 / 8:15 a.m., KIVY-FM 92.7 / 8:15 a.m.

**DENTON:** KNTU-FM 88.1 / 10:58 a.m., 3:58 p.m., 11:59 p.m.

**DIMMITT:** KDHN-AM 1470 / 12:29 p.m.

**EAGLE PASS:** KINL-FM 92.7 / 3:30 p.m.

**EASTLAND:** KEAS-AM 1590 / 5:50 a.m., 5:50 p.m. KATX-FM 97.7 / 5:50 a.m., 5:50 p.m.

**EDNA:** KGUL-FM 96.1 / 7:10 a.m.

**EL CAMPO:** KULP-AM 1390 / 2 p.m.

**FAIRFIELD:** KNES-FM 99.1 / 6:47 a.m.

**FLORESVILLE:** KULB-FM 89.7 / 1:30 p.m.

**FORT STOCKTON:** KFST-AM 860 / 12:55 p.m., KFST-FM 94.3 / 12:55 p.m.

**GAINESVILLE:** KGAF-AM 1580 / 10 a.m.

**GRANBURY:** KPIR-AM 1420 / 4:20 p.m.

**GREENVILLE:** KGVF-AM 1400 / 8:10 a.m.

**HARLINGEN:** KNBH-FM 88.9 / 4:58 p.m.; KHID-FM 88.1 / 4:58 p.m.

**HENDERSON:** KZQX-FM 104.7 / 10:20 a.m., 4:20 p.m.

**HEREFORD:** KPAN-AM 860 / 2:50 p.m.; KPAN-FM 106.3 / 2:50 p.m.

**HILLSBORO:** KHBR-AM 1560 / 9:30 a.m.

**HOUSTON:** KILT-AM 610 / between 4 a.m. and 7 a.m. Thur.-Sun.

**HUNTSVILLE:** KSHU-FM 90.5 / 12:05 p.m., 5:05 p.m.

**JACKSONVILLE:** KEBE-AM 1400 / 7:15 a.m.

**JUNCTION:** KMBL-AM 1450 / 6:40 a.m., 3:30 p.m., KOOK-FM 93.5 / 6:40 a.m., 3:30 p.m.

**KERRVILLE:** KRNH-FM 92.3 / 5:31 a.m., 12:57 p.m., 7:35 p.m.; KMBL-AM 1450 / 5:49 a.m., 12:49 p.m., 5:49 p.m.; KERV-AM 1230 / 5:49 a.m., 12:49 p.m., 5:49 p.m.; KRVL-FM 94.3 / 5:49 a.m., 12:49 p.m., 5:49 p.m.

**LA GRANGE:** KBUK-FM 104.9 / 12:30 p.m.; KVLG-AM 1570 / 12:30 p.m.

**LAMPASAS:** KCYL-FM 102 / 7:10 a.m.; KCYA-AM 1450 / 7:10 a.m.

**LAREDO:** KHOY-FM 88.1 / 2 p.m.

**LEVELLAND:** KLVT-AM 1230 / 12:05 p.m.

**LUBBOCK:** KJTV-AM 950 / 6:45 a.m.

**LUFKIN:** KUEZ-FM 100.1 / 10:40 a.m.; KYBI-FM 101.9 / 10:30 a.m.

**MADISONVILLE:** KMVL-AM 1220 / 7:45 a.m.; KMVL-FM 100.5 / 7:45 a.m.

**MARSHALL:** KCUL-FM 92.3 / 6:12 a.m.; KMHT-FM 103.9 / 6:35 a.m.; KMHT-AM 1450 / 6:35 a.m.

**MESQUITE:** KEOM-FM 88.5 / 5:30 a.m., 2:30 p.m., 8:30 p.m. Mon.-Thu.; 5:30 a.m., 2:30 p.m. Fri.)

**MEXIA:** KROX-AM 1590 / 3:15 p.m.; KYCX-FM 104.9 / 3:15 p.m.

**MINEOLA:** KMOO-FM 99.9 / 5:10 p.m.

**MONAHANS:** KLBO-AM 1330 / 6 a.m., noon, 3 p.m.

**NACOGDOCHES:** KSAU-FM 90.1 / 2:45 p.m.

**NEW BRAUNFELS:** KGNB-AM 1420 / 6:52 a.m.

**ODESSA:** KCRS-AM 550 / 6:05 a.m., 5:50 p.m., KOCV-FM 91.3 / 7:37 a.m.

**PECOS:** KIUN-AM 1400 / 10:30 a.m.

**PLAINVIEW:** KVOP-AM 1090 / 7:49 a.m.

**PLEASANTON:** KBUC-FM 95.7 / noon Sat.

**ROCKDALE:** KRXT-FM 98.5 / 5:05 a.m., 5:50 a.m., 8:50 p.m.

**SAN ANTONIO:** KSTX-FM 89.1 / 9:04 p.m.

**SEGUIN:** KWED-AM 1580 / 7:55 a.m.

**SONORA:** KHOS-FM 92.1 / 10:13 a.m.; KYXX-FM 94.3 / 2:15 p.m.

**STEPHENVILLE:** KSTV-FM 93.1 / between 5 a.m. and 7 a.m.

**SULPHUR SPRINGS:** KSST-AM 1230 / 2:50 a.m., 11:50 a.m.

**SWEETWATER:** KXOX-FM 96.7 / 7:20 a.m.; KXOX-AM 1240 / 7:20 a.m.

**TEMPLE:** KTEM-AM 1400 / 10:20 a.m.

**TEXARKANA:** KTXK-FM 91.5 / 8 p.m.

**VICTORIA:** KTXN-FM 98.7 / 6:50 a.m.; KZAM-FM 104.7 / 7:10 a.m.

**WICHITA FALLS:** KWFS-AM 1290 / 6:15 a.m., 7:45 a.m.

**AUSTIN AMERICAN-STATESMAN'S INSIDE LINE:** (512) 416-5700 category 6287 (NATR)

**BEDFORD:** K-Meadow, Meadow Creek Elementary / noon

**VIRTUAL RADIO eTUNZ:** <www.etunz.net> / :20 every hour.

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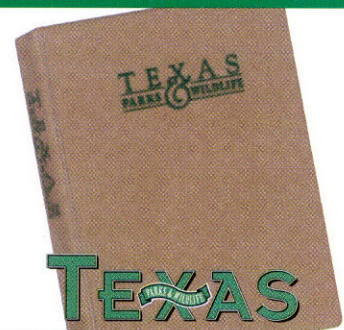
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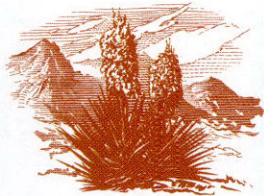
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# GETAWAYS

FROM BIG BEND TO THE BIG THICKET AND THE RED TO THE RIO GRANDE



## BIG BEND COUNTRY

**JULY:** Desert Garden Tours, Barton Warnock Environmental Education Center, Terlingua, call for dates, available for groups of six or more, reservations required, (432) 424-3327

**JULY:** Summer Amphitheater Program, Davis Mountains SP, Fort Davis, every Wednesday through Saturday evening, (432) 426-3337

**JULY:** Bouldering Tours, Hueco Tanks SHS, El Paso, every Wednesday through Sunday, reservations required, (915) 849-6684

**JULY:** Hiking Tours, Hueco Tanks SHS, El Paso, every Wednesday through Sunday, reservations required, (915) 849-6684

**JULY:** Pictograph Tours, Hueco Tanks SHS, El Paso, every Wednesday through Sunday, reservations required, (915) 849-6684

**JULY:** Texas Camel Treks, Monahans Sandhills SP, Monahans, Call for dates, (866) 6CAMELS

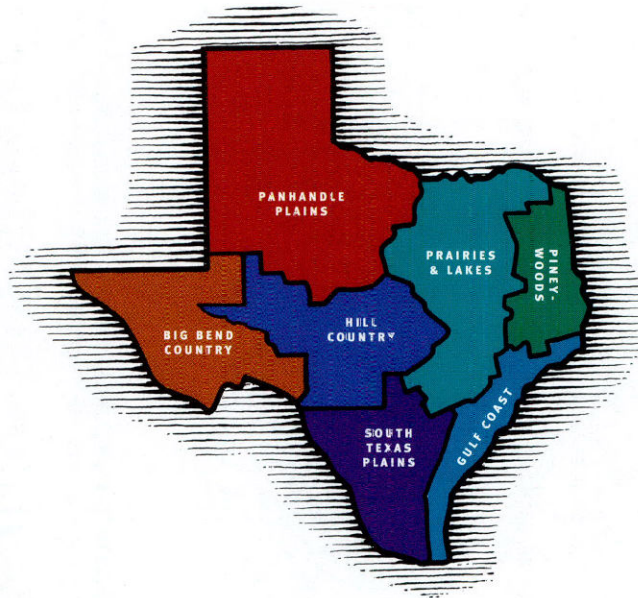
**JULY:** Fate Bell Cave Dwelling Tour, Seminole Canyon SP&HS, Comstock, every Wednesday through Sunday, (432) 292-4464

**JULY:** White Shaman Tour, Seminole Canyon SP&HS, Comstock, every Saturday, (432) 292-4464

**JULY 2, 31:** Full Moon in the Dunes, Monahans Sandhills SP, Monahans, (866) 6CAMELS

**JULY 3:** Madrid Falls Tour, Big Bend Ranch SP, Presidio, reservations required, (432) 229-3416

**JULY 3-4, 17-18:** Guided



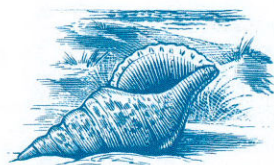
For more detailed information on outdoor getaways across the state, visit [www.tpwd.state.tx.us](http://www.tpwd.state.tx.us) and click on "TPWD Events" in the center light blue area entitled "In the Parks."

Tours, Franklin Mountains SP, El Paso, (915) 566-6441

**JULY 10:** Stories of Spirits, Magoffin Home SHS, El Paso, reservations encouraged, (915) 533-5147

**JULY 18:** Bird Identification Tours, Hueco Tanks SHS, El Paso, reservations required, (915) 849-6684

**JULY 24:** Fresno Canyon Tour, Big Bend Ranch SP, Presidio, reservations required, (432) 229-3416



## GULF COAST

**JULY:** Weekend Nature Programs, Brazos Bend SP, Needville, every Saturday and Sunday, (979) 553-5101

**JULY:** Hatchery Tours, Coastal Conservation Association/American Electric Power Marine Development Center SFH,

Corpus Christi, every Monday through Saturday except holidays, reservations required, (361) 939-7784

**JULY:** Exploring Sea Life, Galveston Island SP, Galveston, every Saturday, (409) 737-1222

**JULY:** Aquarium and Hatchery Tours, Sea Center Texas, Lake Jackson, every Tuesday through Sunday, hatchery tours by reservation only, (979) 292-0100

**JULY:** Marsh Airboat Tours, Sea Rim SP, Sabine Pass, every Wednesday through Sunday, (409) 971-2559

**JULY 2:** Comanche Moon Hayride, Fennessey Ranch, Bayside, reservations required, (361) 529-6600

**JULY 3, 17:** Summer Night Hike, Sea Rim SP, Sabine Pass, reservations required, (409) 971-2559

**JULY 3, 10, 16, 17, 24, 31:** Story Time, Sea Center Texas, Lake Jackson, (979) 292-0100

**JULY 10:** Miss Ima's Birthday Tea Party, Varner-Hogg Plantation SHS, West Columbia, (979) 345-4656

**JULY 10, 24:** Beachcombing and Shelling Tour, Matagorda Island SP&WMA, Port O'Connor, reservations required, (361) 983-2215

**JULY 11:** History Tour, Matagorda Island SP&WMA, Port O'Connor, reservations required, (361) 983-2215

**JULY 12:** Music at the Mansion, Fulton Mansion SHS, Fulton, (361) 729-0386

**JULY 17:** Nighttime Alligator Count, J.D. Murphree WMA, Port Arthur, reservations required, (409) 736 2551 Ext. 25

**JULY 23:** Nighttime Wildlife Tour, Matagorda Island SP&WMA, Port O'Connor, reservations required, (361) 983-2215



## HILL COUNTRY

**JULY:** Gorman Falls Tour, Colorado Bend SP, Bend, every Saturday and Sunday, (325) 628-3240

**JULY:** Walking Wild Cave Tour, Colorado Bend SP, Bend, every Saturday and Sunday, reservations recommended, (325) 628-3240

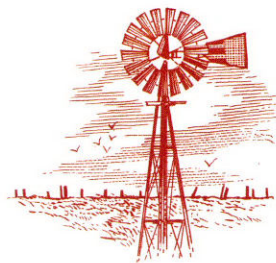
**JULY:** Summer Bat Flight Tours, Devil's Sinkhole SNA, Rock Springs, every Wednesday through Sunday evening, reservations required, (830) 683-BATS

**JULY:** Texas Buffalo Soldiers Month, Fort McKavett SHS, Fort McKavett, (325) 396-2358

**JULY:** Saturday Evening Interpretive Programs, Guadalupe River SP, Spring Branch, Saturdays, (830) 438-2656

**JULY:** Saturday Morning Interpretive Walk, Honey Creek SNA, Spring Branch, every

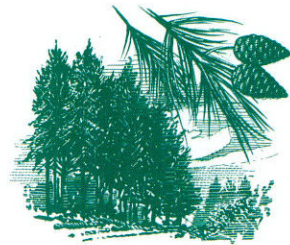
Saturday, (830) 438-2656  
**JULY:** Stumpy Hollow Nature Hike, Inks Lake SP, Burnet, every Saturday, (512) 793-2223  
**JULY:** Wild Cave Tour, Longhorn Cavern SP, Burnet, every Saturday, reservations required, (877) 441-2283  
**JULY 1:** Devil's Waterhole Canoe Tour, Inks Lake SP, Burnet, reservations required, (512) 793-2223  
**JULY 2:** Range and Wildlife Seminar, Kerr WMA, Hunt, reservations required, (830) 238-4483  
**JULY 2-5:** July 4th Guided Tours, Fort McKavett SHS, Fort McKavett, (325) 396-2358  
**JULY 3:** Crawling Wild Cave Tour, Colorado Bend SP, Bend, reservations recommended, (325) 628-3240  
**JULY 3-4:** Island Assault 1944 Living History Program, Admiral Nimitz SHS-National Museum of the Pacific War, Fredericksburg, (830) 997-4379  
**JULY 3, 24:** Wild Cave Tour, Kickapoo Cavern SP, Brackettville, reservations required, (830) 563-2342  
**JULY 4:** Independence Day Parade and Program, Admiral Nimitz SHS-National Museum of the Pacific War, Fredericksburg, (830) 997-4379  
**JULY 10, 11:** Guided Hikes, Bright Leaf SNA, Austin, (512) 459-7269  
**JULY 10, 24:** Simple Sounds Concert in the Cave, Longhorn Cavern SP, Burnet, reservations required, (877) 441-2283  
**JULY 17:** Bluegrass in the Park, Inks Lake SP, Burnet, (512) 793-2223  
**JULY 17:** 2nd Annual Catfish Kid Fish, Landmark Inn SHS, Castroville, (830) 931-2133



## PANHANDLE PLAINS

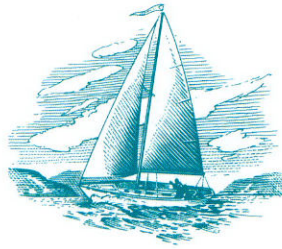
**JULY 3:** Dutch Oven Cooking, Caprock Canyons SP & Trailway, Quitaque, reservations required, (806) 455-1492  
**JULY 3:** Petroglyph Tour, San Angelo SP, San Angelo, (325) 949-4757

**JULY 3, 17:** Campfire Tails, Abilene SP, Tuscola, (325) 572-3204  
**JULY 10:** Night Noises, Palo Duro Canyon SP, Canyon, (806) 488-2227  
**JULY 12, 26:** Fire in the Canyon, Palo Duro Canyon SP, Canyon, (806) 488-2227  
**JULY 17:** Geocaching, Caprock Canyons SP & Trailway, Quitaque, (806) 455-1492  
**JULY 17:** Sun Fun and Star Walk, Copper Breaks SP, Quanah, (940) 839-4331  
**JULY 17:** Campfire Program-The Language of the Fan, Fort Richardson SP&HS & Lost Creek Reservoir State Trailway, Jacksboro, (940) 567-3506  
**JULY 17, 31:** Snakes of Palo Duro Canyon, Palo Duro Canyon SP, Canyon, (806) 488-2227  
**JULY 24:** Canyon Critters, Palo Duro Canyon SP, Canyon, (806) 488-2227  
**JULY 24-31:** Summer Art Exhibition, Copper Breaks SP, Quanah, (940) 839-4331



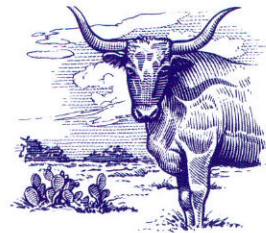
## PINEYWOODS

**JULY:** Walk on the Wild Side, Martin Dies, Jr. SP, Jasper, every Sunday, (409) 384-5231  
**JULY 2, 16:** Nature Slide Program, Village Creek SP, Lumberton, reservations required, (409) 755-7322  
**JULY 3:** Snakes Alive, Tyler SP, Tyler, (903) 597-5338  
**JULY 4, 31:** Nature Hike, Tyler SP, Tyler, (903) 597-5338  
**JULY 10:** Steam Engine Shop Tours, Texas State Railroad SP, Rusk, (800) 442-8951  
**JULY 10, 24:** Guided Nature Trail Hike, Village Creek SP, Lumberton, reservations required (409) 755-7322  
**JULY 17:** Floating the Forks, Martin Dies, Jr. SP, Jasper, reservations required, (409) 384-5231  
**JULY 17:** Raccoons, Tyler SP, Tyler, (903) 597-5338



## PRAIRIES & LAKES

**JULY:** Yegua and Nails Creek Canoe Tours, Lake Somerville SP & Trailway/Birch Creek Unit, Somerville, every Thursday and Saturday, reservations required, (979) 535-7763  
**JULY:** Yegua and Nails Creek Canoe Tours, Lake Somerville SP & Trailway/Nails Creek Unit, Ledbetter, every Thursday and Saturday, reservations required, (979) 535-7763  
**JULY:** Group History Tours, Monument Hill & Kreische Brewery SHS, LaGrange, available to groups of 10 by reservation, (979) 968-5658  
**JULY:** Kreische Brewery Tours, Monument Hill & Kreische Brewery SHS, LaGrange, every Saturday and Sunday, weather permitting, (979) 968-5658  
**JULY 3, 10:** Our Fuzzy and Furry Friends, Cedar Hill SP, Cedar Hill, (972) 291-5940  
**JULY 3:** Sandcastle Building Contest, Cooper Lake SP/South Sulphur Unit, Sulphur Springs, (903) 395-3100  
**JULY 3:** Cowboy Campfire, Music and Poetry, Lake Mineral Wells SP & Trailway, Mineral Wells, (940) 328-1171  
**JULY 3:** Campfire Programs, Ray Roberts Lake SP/Isle du Bois Unit, Pilot Point, (940) 686-2148  
**JULY 3, 31:** Reptiles, Our Scaly Skinned Friends, Cedar Hill SP, Cedar Hill, (972) 291-5940  
**JULY 3-4, 11, 17-18, 24-25, 31:** Tours, Fanthorp Inn SHS, Anderson, (936) 873-2633  
**JULY 4:** 6th Annual H-E-B Fireworks on the Brazos, Washington-on-the-Brazos SHS, Washington, (936) 878-2214  
**JULY 4, 11:** Kreische House Tours, Monument Hill & Kreische Brewery SHS, LaGrange, also available to groups of 10 or more by reservation on other dates, (979) 968-5658  
**JULY 10:** Kid's Wilderness Survival, Cedar Hill SP, Cedar Hill, reservations required, (972) 291-5940  
**JULY 10:** Guided Nature Hike, Cooper Lake SP/Doctors Creek Unit, Cooper, (903) 395-3100  
**JULY 10:** Stagecoach Days, Fanthorp Inn SHS, Anderson, (936) 873-2633  
**JULY 10:** Kid's Wilderness Survival, Lake Mineral Wells SP & Trailway, Mineral Wells, reservations required, (940) 328-1171  
**JULY 17:** Venomous Snakes, Cooper Lake SP/South Sulphur Unit, Sulphur Springs, (903) 395-3100  
**JULY 17:** Night Sounds, Lake Mineral Wells SP & Trailway, Mineral Wells, (940) 328-1171  
**JULY 17:** Stargazing Party, Ray Roberts Lake SP/Isle du Bois Unit, Pilot Point, (940) 686-2148  
**JULY 19:** Steel Sports Mineral Wells Adventure Challenge, Lake Mineral Wells SP & Trailway, Mineral Wells, (903) 871-8466  
**JULY 24:** Get to Know the Trees, Cedar Hill SP, Cedar Hill, (972) 291-5940  
**JULY 24:** Poisonous Plants, Cooper Lake SP/Doctors Creek Unit, Cooper, (903) 395-3100



## SOUTH TEXAS PLAINS

**JULY 17:** Animal Signs, Government Canyon SNA, San Antonio, reservations required, (210) 688-2208

|            |                          |
|------------|--------------------------|
| <b>SP</b>  | State Park               |
| <b>SHS</b> | State Historical Site    |
| <b>SNA</b> | State Natural Area       |
| <b>WMA</b> | Wildlife Management Area |
| <b>SFH</b> | State Fish Hatchery      |

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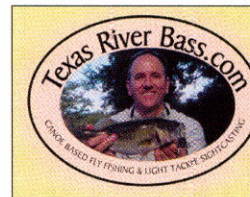
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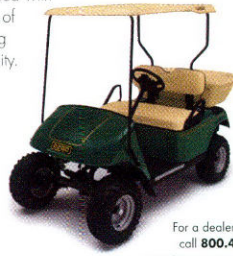


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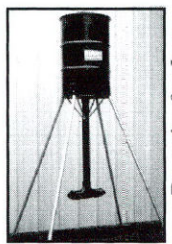
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**On the prowl:** This young bobcat seems to be focusing on its reflection as it crouches to take an early morning drink. The scene unfolds on a South Texas ranch, where photographer Larry Ditto had staked out this pond in anticipation of just such a visitor.

PHOTO © LARRY DITTO



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