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FEBRUARY 1996





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Want more information? Call
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*1995 Automotive Performance, Execution, and Layout Study, based on 27,859 responses. **We calculated resale using avg. trade-in values for full-size '94 models vs. MSRPs, published in '95 Jan.-Sept. N.A.D.A. Official Used Car Guide® monthly editions.

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F E B R U A R Y 1 9 9 6

14 GIBBONS CREEK REVISITED The most spectacular bass fishing frenzy in U.S. history accompanied the opening of Gibbons Creek Reservoir in 1985. Has it lived up to its promise? What does the future hold? Here's a look at Gibbons Creek's evolution over the past decade. *by Larry Bozka*

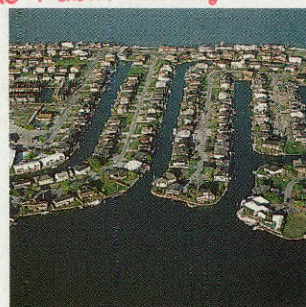
20 A GROWING CONCERN Texas has population growth rivaling some Third World countries, and the resulting environmental degradation and resource depletion can threaten the health and survival of human beings and other species. One expert says that population growth, intensified by a consumptive and wasteful lifestyle, is the single biggest factor in the decline of wildlife in Texas and the nation. *by Kristi G. Streiffert*

28 ANIMAL TRACKS Footprints not only help you identify animals and learn about their movements; they also make interesting shots for the creative photographer.

36 TEXAS'S "OTHER" CACTI The familiar prickly pear is just one facet of Texas's cactus treasures. The "other" cacti can be found throughout the state. They come in an amazing variety of sizes and shapes, and their colorful springtime blossoms make it worth the effort it can take to find them. *by Arturo Longoria*

44 PURE AND SIMPLE Beaumont city officials solved their wastewater problems by building an artificial wetland. A number of natural phenomena interact to purify the water. And in addition to benefiting Beaumont taxpayers, the new freshwater marsh has provided additional wildlife habitat and recreational opportunities. *by Phyllis Staff*

48 FREQUENCY FLYERS Volunteers joined TPWD biologists at Village Creek State Park in Southeast Texas last summer to search for the southeastern myotis bat. Their efforts in capturing and tracking the bats should shed some light on the status of these secretive flying mammals. *by Mike Dixon*



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© PAUL REZENDES



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© MERLIN D. TUTTLE, BAT CONSERVATION INTERNATIONAL

DEPARTMENTS

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<i>by Ezra Ward</i> |
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COVERS

Front Fishing from a float tube using a fly rod is a sporting way to go after largemouth bass at Gibbons Creek Reservoir. Read about the lake's auspicious opening and what's happened to the fishing since then on page 14. Photo © David J. Sams. Nikon F4 camera, Nikkor 500mm f4 lens, f4 at 1/250 second, Fuji 100 film.

Inside back A Texas horned lizard makes tracks across a South Texas sand dune. This is one of many animal species that have been impacted by human population growth. See story on page 20. Photo © Wyman Meinzer, Canon F1 camera, Canon 20-35mm lens, f22 at 1/30 second, Fuji Velvia 50 film.

Back One of Texas's rarest flowering cacti is the black lace cactus, which is on both the state and federal endangered species list. See story on the state's lesser-known cacti on page 36. Photo © Paul M. Montgomery. Nikon F camera, Nikkor 55mm micro lens, f22 at 1/15 second, Kodachrome 64 film.

AT ISSUE

Sometime this year a federal appeals court and the Texas Supreme Court will render decisions that will have great impact on the environment in Texas and on all of our lives for years to come. At stake is whether the vast underground reservoir known as the Edwards Aquifer will be managed by the federal government through the U.S. Fish and Wildlife Service or by a state-level authority created by the Texas Legislature in 1993. In either outcome, the historic practice of unrestrained pumping from the aquifer will end.

This circumstance is brought about primarily by a single factor—population growth. Today the sheer numbers of people needing water each day strain not only subterranean resources such as the Edwards but our surface water capacity as well. This condition not only threatens our future but also that of all the living things that share the lands and waters of Texas with us. And there are more of us on the way. Texas now is the fastest growing state in the nation and, with 18.4 million persons, second only to California in total population. Texas' population has increased by 8.2 percent since the beginning of the decade, with about 60 percent of that due to our birth rate and the remaining 40 percent roughly divided between immigration from other states and nations. Thus, pressure on our water resources will continue to mount.

In anticipation of this looming crisis, officials from three state agencies, Texas Parks and Wildlife, the Texas Natural Resources Conservation Commission and the Texas Water Development Board, along with the leadership of a diverse selection of interest groups, began in 1990 to formulate a strategy to help ensure that all water needs will be addressed. With funding from a Chevron Corporation grant, the support of three successive governors and Parks and Wildlife Commission Chairman Emeritus Perry R. Bass, participants have worked quietly but intensely for five years to develop a "consensus water plan" for Texas. As Kristi Streiffert writes in this issue, the effort comes not a moment too soon. For the first time in the history of our state, there is the promise of guaranteed water to meet the demands of development and the environment.

In the days ahead, the nation's first consensus water plan will be presented to the leadership of Texas in the culmination of a long, difficult process created by a dedicated group of people determined to find a better way. As a result of their efforts, I believe we are on the threshold of a new and promising era in water planning for both people and wildlife. We really do not have a choice. The stakes are that high. But in the process we will prove that, where water is concerned, Texans can take care of Texas.

—ANDREW SANSOM, Executive Director

In March



© ROBERT W. PARVIN

- The dynamic and largely unseen ecosystem of Texas beaches.
- How volunteers are making a difference at state parks.
- Village Creek State Park in the heart of the Big Thicket.
- A new program offering outdoor adventures across Texas.

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TEXAS PARKS & WILDLIFE

*To manage and conserve the
natural and cultural resources of
Texas for the use and enjoyment
of future generations.*

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December Cover

I believe the unidentified ruins pictured on the front cover of your December issue are the old Torrey Ranch (1875-1881). I got this information from Mondel Rogers's book "Old Ranches of the Texas Plains." There is a painting of the ruins on page 27 and a description of the ranch on page 106.

Truitt Bishop
Ogelsby

Back Cover

I have not even opened the December issue, but find myself appalled and dismayed. The back cover shows a man with a high-powered rifle and scope, obviously in the process of shooting at one of our beautiful wild animals. Regardless of your rationale for printing such a picture, I find it in less than good taste for a magazine with a name such as yours. Send Bubba and the good old boys to *Field and Stream*. A publication for parks and their inhabitants is not a suitable place for such a picture.

I have no argument with the need to hunt some species to maintain the herd. I understand the humane reasons for hunting seasons. But I thought I was subscribing to a magazine which, although not rejecting the need to hunt some species, at least did so with regret, as they had an appreciation for the animal as a fellow resident of the planet, not just an object of sport. Please try to maintain a little distance from the "sport" magazines.

David W. Dunckel
Big Spring

Terrifying Experience

Last fall I had a terrifying experience with a "tame" white-tailed deer. I consider myself knowledgeable about animals and nature, and still I almost lost my life. I'm writing out

of concern for the families with children who are moving to the Hill Country. Children are especially vulnerable because of their fascination with deer, and I would hate for one of them to lose their life in their own backyard.

This particular deer was a six-point buck that was a frequent caller to our property. People fed him often and someone put an orange collar on him. We called him "Cedar." I knew that bucks become aggressive during the rutting season, but I thought that aggression was directed only toward other bucks.

How wrong I was. I was outside one morning at 6:45 and there he was. I reached out to pat his head and said, "Good morning, Cedar." He attacked. I struggled with the deer for about 40 minutes. No one heard my screams, not even my husband who was asleep inside the house. When I was near the point of exhaustion the deer suddenly backed into a persimmon tree. Thinking he was being attacked from behind he raised his head and I dashed for the house. I was bloody, bruised, had a lump on my head and a deep laceration on the palm of my hand.

The deer could have killed me if his antlers had struck a vital organ. I was able to hold the antlers for 40 minutes, but a child wouldn't have had a chance. People need to understand that it is dangerous to "tame" deer, and they should never let their children wander alone.

Sybil Lightfoot
Spring Branch

Two Questions

I have two questions.

Why are senior citizens having to buy a fishing license?

Why am I sending TPW magazine payments to Marion, Ohio?

I will await an answer before lashing out.

Troy R. Frizzell
Clute

As we've explained before, Kable Fulfillment Services of Ohio handles circulation fulfillment. Some 40 companies, most of them in Texas, were given the opportunity to bid on handling our circulation. Kable Fulfillment of Ohio was the low bidder, and none of the Texas companies submitted a bid.

Regarding licenses, for the past several years, the department has been working with the state leadership to move the source of funding away from general revenue to a "user pay" situation. In the case of residents over 65, there already was a requirement for them to possess a discount hunting license, and they also were required to purchase a red drum tag. With more of the population approaching age 65, it was realized that a problem in the user-pay system was developing. It is generally understood that those reaching retirement age have more time to fish and enjoy other outdoor activities. House Bill 1785 passed in the last session of the Texas Legislature allowed the Parks and Wildlife Commission to establish a fee for a discount fishing license for anyone reaching 65 years of age after September 1, 1995. It protects those who gained the exemption age before the effective date.

By charging a larger group of users for using a resource such as fishing, there will be greater equity in cost per user and the department will be able to continue to improve fishing for everyone.

Not Renewing

I have been a subscriber for many years, but I am not renewing any more. I have read your reasons for having the renewals handled by folks in Ohio, but it's not good enough reasons for me. I am not sending any more of my Texas money to Ohio. Besides, I can see the ads creeping in more and more. Next thing, it'll be like *Texas Monthly*—156 pages of ads and 10 pages of actual reading material.

Mrs. A. E. Valentino
Dickinson

Texas Parks & Wildlife magazine welcomes letters to the editor. Please include your name, address and daytime telephone number. Our address is 3000 South IH 35, Suite 120, Austin, Texas 78704. Our fax number is 512-707-1913. If you'd like to contact us by e-mail write to: magazine@tpwd.state.tx.us. We reserve the right to edit letters for length and clarity.

Be sure to visit the Texas Parks and Wildlife Department's home page on the Internet at: <http://www.tpwd.state.tx.us>

FEBRUARY

Feb: GORMAN FALLS TOUR each Saturday and Sunday, Colorado Bend State Park at Bend, 915-628-3240

Feb.: HISTORICAL TOUR each Saturday, Stephen F. Austin State Historical Park at San Felipe, 409-885-3613

Feb.: LOWER EDWARDS PLATEAU ECOSYSTEM TOUR each Saturday, Honey Creek State Natural Area near Bulverde, 210-438-2656

Feb.: WILD CAVE TOURS each Saturday and Sunday, Colorado Bend State Park at Bend, 915-628-3240

Feb : BIRDWATCHING FIELD TRIPS to Bentsen-Rio Grande Valley State Park, Falcon State Park, Las Palomas WMA and other sites on 22 days during February, call 210-585-1107 for details

Feb. 2: * INTRACOASTAL WATERWAY BIRDING TOUR, Matagorda Island State Park & WMA, 512-983-2215

Feb. 2-3: "CRANEFEST," Big Spring State Park at Big Spring, call Big Spring Chamber of Commerce, 915-263-7641 or the park at 915-263-4931

Feb. 3: BIRDHOUSE DAY, Martin Dies, Jr., State Park near Jasper, 409-384-5231

Feb. 3: BEACHCOMBING AND SHELLING TOUR, Matagorda Island State Park, 512-983-2215

Feb. 3: ANNUAL TEXAS BIRDHOUSE DAY, Kerrville-Schreiner State Park at Kerrville, 210-257-5392

Feb. 3: BIRDHOUSE DAY, Eisenhower State Park at Lake Texoma, 903-465-1956

Feb. 3: BIRDHOUSE DAY, LBJ State Park near Stonewall, 915-533-5147

Feb. 3: 5TH ANNUAL BIRDHOUSE DAY, Fairfield Lake State Park near Fairfield, 903-389-4514

Feb. 3: PREDATORS, White Oak Creek WMA near Mount Pleasant, 903-884-3833

Feb. 3: * "PUTTING THE DUCKS TO BED," Gus Engeling WMA in Anderson County, 903-928-2251



© JOE MAC HUDSPETH

Put the ducks to bed at the Engeling Wildlife Management Area on February 3.

Feb. 3, 10, 17, 24: BALD EAGLE BOAT TOUR, Fairfield Lake State Park near Fairfield, 903-389-4514

Feb. 3, 10, 17, 24: HISTORICAL CENTER TOUR, Penn Farm Agricultural History Center at Cedar Hill State Park, 214-291-3900

Feb. 3, 10, 17: BIRDING, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

LBJ State Historical Park near Stonewall will be the site of a quilt show on March 2-3.



BILL BEAVES

Feb. 3, 10, 17, 24: HISTORY TOUR of the "Cradle of Liberty," Stephen F. Austin State Historical Park at San Felipe, 409-885-3613

Feb. 4: LATE SOUTH TEXAS ANTLERLESS-ONLY WHITE-TAILED DEER SEASONS CLOSE

Feb. 5, 10, 15, 21, 27: NATIVE PLANT FIELD TRIP, Bentsen-Rio Grande Valley State Park, 210-585-1107

Feb. 9-11: SPORTSMAN'S EXTRAVAGANZA, Tyler, 903-566-1615

Feb. 10: WINTER WATERFOWL BOAT TOUR, Fort Parker State Park near Mexia, 817-562-5751

Feb. 10: ROCK ART TOUR, Hueco Tanks State Historical Park near El Paso, 915-857-1135

Feb. 10: NATURE HIKE, River Legacy Parks, Arlington, 817-265-7721

Feb. 10: STAGECOACH RIDES, Fanthorp Inn State Historical Park at Anderson, 409-873-2633

Feb. 10: WINTER BIRDING, Caddo Grasslands WMA near Bonham, 903-884-3833

Feb. 10: * "DUCKS AT DARK," Ray Roberts Lake WMA near Denton 817-591-9115

Feb. 10: * HISTORY TOUR, Matagorda Island State Park & WMA, 512-983-2215

Feb. 10-11: ORIENTEERING, Tyler State Park at Tyler, 512-389-8900

Feb. 10, 24: GUIDED NATURE WALKS, Cedar Hill State Park near Cedar Hill, 214-291-3900

Feb. 11: GUIDED HORSEBACK TOUR, Hill Country State Natural Area near Bandera, reservations required through Running R Ranch, 210-796-3984

Feb. 11: SANDHILL CRANE HUNTING SEASON CLOSES IN ALL ZONES

Feb. 14: VALENTINE'S DAY DINNER, Indian Lodge at Davis Mountains State Park, 915-426-3254

Feb. 17-18: SOAP MAKING, Landmark Inn State Historical Park at Castroville, 210-931-2133

Feb. 18: BIRD IDENTIFICATION TOUR, Hueco Tanks State Historical Park near El Paso, 915-857-1135

Feb. 23-25: * DESERT HIKING with lodging at Saucedo Lodge, Big Bend Ranch State Park, 915-229-3416

Feb. 24: BIRDING, Longhorn Cavern State Park near Burnet, 512-756-4680

Feb. 24: BIRDING BY FEEDERS, Caddo Lake State Park & WMA, 903-884-3833

Feb. 25: * WHOOPING CRANE TOUR, Matagorda Island State Park & WMA, 512-983-2215

MARCH

March: BUS AND HIKING TOURS at times requested, Big Bend Ranch State Park, 915-371-2548

March: * PHANTOM SPRINGS BIRD TOUR AND DESERT WETLANDS WALK each Saturday, Balmorhea State Park at Balmorhea, 915-375-2370

March 2: "CALL OF THE WILD" PREDATOR CALLING, Eisenhower State Park at Lake Texoma, 903-465-1956

March 2: TEXAS INDEPENDENCE DAY BARBECUE, Indian Lodge at Davis Mountains State Park, 915-426-3254

March 2-3: TEXAS INDEPENDENCE DAY CELEBRATION, Washington-on-the-Brazos State Park at Washington, 409-872461

March 2-3: QUILT SHOW, LBJ State Park at Stonewall, 210-644-2252

March 2, 23: * BIRD TOUR, Choke Canyon State Park Calliham Unit near Three Rivers, 512-786-3868

March 2, 7, 21, 23: * PRIMITIVE CAVERN TOUR, Kickapoo Cavern State Natural Area near Brackettville, 210-563-2342

March 2, 9, 16, 23, 30: * PHANTOM SPRINGS BIRD TOUR AND DESERT WETLANDS WALK, Balmorhea State Park at Balmorhea, 915-375-2370

March 2, 16, 30: LOWER EDWARDS PLATEAU ECOSYSTEM TOUR, Honey Creek State Natural Area near Bulverde, 210-438-2656

March 3: BUS TOUR of Big Bend Ranch State Park, departing from Fort Leaton State Historical Park at Presidio, 512-389-8900

March 6, 20: * NATURE TOURS, Bentsen-Rio Grande

Valley State Park and Las Palomas WMA, 210-585-1107

March 8-10: * ROCK ART TOUR, Big Bend Ranch State Park, 915-229-3416

March 8: * FERAL HOG AND JAVELINA SEMINAR, Chaparral WMA near Artesia Wells, 210-676-3413

March 8-15: TIMBER FRAMING CLASS, Nacogdoches, 409-564-9465

March 9: GUIDED NATURE HIKES, River Legacy Parks, Arlington, 817-860-6752

March 9: ROCK ART TOUR, Hueco Tanks State Historical Park near El Paso, 915-857-1135

March 9, 23: NATIVE AMERICAN ECOLOGY, Kerrville-Schreiner State Park at Kerrville, 210-257-5392

March 9, 23: ETHNOBOTANY WALK, Honey Creek State Natural Area near Bulverde, 210-438-2656

March 10: GUIDED HORSEBACK TOUR, Hill Country State Natural Area near Bandera, reservations through Running R Ranch, 210-796-3984

March 14: "100 YEARS AFTER," history tour, Big Spring State Park at Big Spring, 915-263-4931

March 15: PRIVATE BUS TOUR of Big Bend Ranch State Park, departing from Lajitas, 915-424-3234



© PAUL M. MONTGOMERY

Join a wildflower observation tour at Bentsen-Rio Grande Valley State Park on March 15.

March 15: WILDFLOWER OBSERVATION TOUR, Bentsen-Rio Grande Valley State Park, 210-585-1107

March 15-17: SPRING MIGRATION BIRDING, Big Bend Ranch State Park, 915-371-2356

March 16: OLD-FASHIONED BARN RAISING for pavilion adjacent to TPWD regional fisheries office on FM 848 in Tyler, 903-566-1615

March 16: HERITAGE DAY, Meridian State Park near Meridian, 817-435-2536

March 16: FLINTKNAPPING, Caddoan Mounds State Historical Park near Alto, 409-858-3218

March 16: FLINTKNAPPING, Guadalupe River State Park near Bulverde, 210-438-2656

March 16: "TOADS II: THE TEXAS HORNED LIZARD," Guadalupe River State Park near Bulverde, 210-438-2656

March 16: BUS TOUR of Big Bend Ranch State Park, departing from Warnock Center at Lajitas, 512-389-8900

March 16: BIRD WALK, Lake Brownwood State Park

near Brownwood, 915-784-5223

March 16: "BIRDS AT YOUR FEEDER" White Oak Creek WMA near Mount Pleasant, 903-884-3833

March 16: BIRDING TOUR, Caddo Lake State Park, 903-884-3833

March 16, 24: * BEACHCOMBING AND SHELLING TOUR, Matagorda Island State Park, 512-983-2215

March 16, 30: NATIVE AMERICAN HISTORY, Kerrville-Schreiner State Park at Kerrville, 210-257-5392

March 16, 30: MOUNTAIN BIKE TRAIL RIDE, Bonham State Park at Bonham, 903-583-5022

March 17: BIRD IDENTIFICATION TOUR, Hueco Tanks State Historical Park near El Paso, 915-857-1135

March 17: ST. PATRICK'S DAY BUFFET, Indian Lodge at Davis Mountains State Park, 915-426-3254

March 22-24: * DESERT SURVIVAL WORKSHOP, Big Bend Ranch State Park, 915-229-3416

March 22, 29: SPECIAL FRIDAY DOGWOOD RAIL EXCURSIONS, Texas State Railroad at Rusk/Palestine, 1-800-442-8951

March 23: "ENDANGERED SPECIES OF CENTRAL TEXAS," Guadalupe River State Park near Bulverde, 210-438-2656

March 23: WALKING BIRD TOUR, San Angelo State Park at O.C. Fisher Reservoir, 915-949-4757 or 915-947-2687

March 23: "HUNTERS OF THE NIGHT," Caddo Lake State Park, 903-884-3833

March 23: * BIRDWATCHING ON THE RIO GRANDE, Las Palomas WMA Ocotillo Unit, 915-837-2051

March 23: WESTERN DAYS BBQ COOKOFF, Fort Parker State Park near Mexia, 817-562-5751

March 23, 30: SPECIAL EVENING DOGWOOD TRAIL EXCURSIONS, Texas State Railroad at Rusk/Palestine, 903-683-2561

March 24: ANNOUNCEMENT PARTY, Magoffin Home State Historical Park at El Paso, 915-533-5147

March 30: SPRING TRAIL RIDE, San Angelo State Park at O.C. Fisher Reservoir, 915-949-4757 or 915-947-2687

March 30: BIRDING TOUR, Las Palomas WMA in the Lower Rio Grande Valley, 210-383-8982

March 30: CAMPFIRE SING-ALONG AND HAYRIDE, Mother Neff State Park near Moody, 817-853-2389

March 30: BIRDWATCHING, Cooper Lake WMA near Sulphur Springs, 903-884-3833

March 30: MOON WATCH AND STARGAZING, Caddo Lake State Park, 903-884-3833

March 30: "PIG AND A POKE," feral hog program, Martin Dies, Jr. State Park near Jasper, 409-384-5231

March 30: * MIGRANT SONGBIRD TOUR, Candy Abshier WMA at Smith Point, 409-736-2551

March 30: "TRASH BASH," San Jacinto State Historical Park at Houston, 713-479-2431

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

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<i>Also serving McAllen, Mission</i>	
HOUSTON KUHT, Ch. 8	Monday 7:30
<i>Also serving Beaumont/Port Arthur, Galveston, Texas City, Victoria</i>	
KILLEEN KNCT, Ch. 46	Sunday 4:00
<i>Also serving Temple</i>	
LUBBOCK KTXT, Ch. 5	Saturday 7:00
ODESSA KOCV, Ch. 36	Saturday 7:30
<i>Also serving Midland</i>	
SAN ANTONIO KLRN, Ch. 9	Thursday 12:00
<i>Also serving Laredo</i>	
WACO KCTF, Ch. 34	Saturday 2:30

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

Look for these stories in the coming weeks

JANUARY 28—FEBRUARY 4: A 260-mile canoe race to the Gulf of Mexico; rock climbing; quail hunting.

FEBRUARY 4—11: Game wardens; a restored Spanish mission; a family shrimping enterprise in the Gulf of Mexico.

FEBRUARY 11-18: Canoeing and kayaking for the physically disabled; the San Jacinto Monument; a day in Texas.

FEBRUARY 18-25: Preserving and restoring native prairies; flash floods; wintering whooping cranes at the Aransas National Wildlife Refuge.

This series is made possible in part by a grant from



The Los Ébanos Ferry

This historic crossing on the Rio Grande is the site of the only remaining hand-operated ferry between Texas and Mexico.

Along the banks of the Rio Grande, in the town of Los Ébanos, is the port for the only hand-pulled ferry that remains between the United States and Mexico. Crossings at this point on the river have been recorded since the 18th century, and the Los Ébanos ferry continues to draw travelers because of its usefulness and history.

Located in Hidalgo County about 18 miles east of Rio Grande City, Los Ébanos was named by settlers for a grove of ebony trees that grew along the river bank on the U.S.

side. Only two ebonies of that original grove remain, and one has been mentioned by the Texas Forest Service in its book *Famous Trees of Texas* because it has served as anchor for the ferry, with a one-inch steel cable wrapped around its trunk since 1950.

That cable, which stretches from bank to bank, serves as a guide for the ferry and prevents it from being swept downstream. Depending on the strength of the river current, it takes two to five men pulling a thick rope to drive the ferry back and forth between Los Ébanos and Diaz Ordaz (formerly San Miguel), Tamaulipas, Mexico.

The original ferry was built chiefly of wood and could carry only two cars and their passengers, along with several pedestrians. The ferry now is mostly steel and can hold up to three cars and their passengers, along with pedestrians who sit on a bench during the ride.

The crossing takes an average of five minutes, but the wait to board the ferry can be long. It has remained popular because it is the only official crossing for several miles in

either direction along the river. Approximately 250 people cross daily, paying \$1 per car and 25 cents per person.

The late E.B. "Beto" Reyna of Mission, a prominent farmer and county commissioner who owned the land on the U.S. side, established the ferry in 1950. His partner was a Mexican citizen who controlled the land on the other side. Reyna first was given permission by the Eisenhower administration to establish Los Ébanos as an official point of entry. He opened the ferry in hopes of someday replacing it with a permanent bridge. The bridge, however, never gained the necessary financial support from both countries, thus the hand-pulled ferry remains.

But the history of this crossing point does not begin with the ferry's establishment in 1950. According to Rio Grande Valley historian Margaret McAllen, the first recorded crossing was in the 1740s when Spanish explorer José de Escandón led a group of colonists across the river.

Other memorable crossings were made later. During the Mexican-American War,

Men along the right side of the ferry, some wearing orange caps, work to pull the ferry from Texas to Mexico.



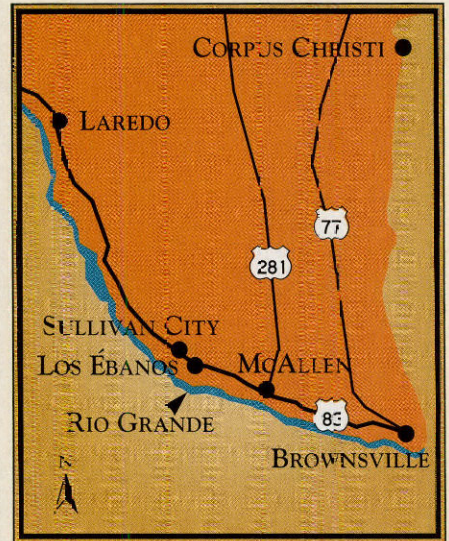
© DAVID J. SAMS

General Zachary Taylor led U.S. Army troops across the Rio Grande to invade Mexico in 1846. Then, on December 28, 1862, armed Mexican troops made their way across the river at Los Ébanos, and attacked a Confederate wagon train. They captured the wagon train after killing three teamsters. In 1874, a group of Texas Rangers followed some men they mistakenly suspected of stealing 500 head of cattle from the King Ranch across the border at Los Ébanos into Mexico. The prohibition era of the 1920s and 30s also made Los Ébanos a popular crossing point; about six boat loads of liquor were imported to the United States nightly, giving it the nickname “smugglers’ crossing.”

When the ferry began operating in 1950, the United States Border Patrol began operating there as well, hoping to crack down on the smuggling that had been taking place for years.

The ferry still is owned by the Reyna family. Honored in 1975 by the Texas Historical Commission with a historical marker, the ferry continues to operate year around except when the current is too strong or the water is too high. To reach the ferry take U.S. Highway 83 west from McAllen to Sullivan City. Los Ébanos is located three miles south of Sullivan City.

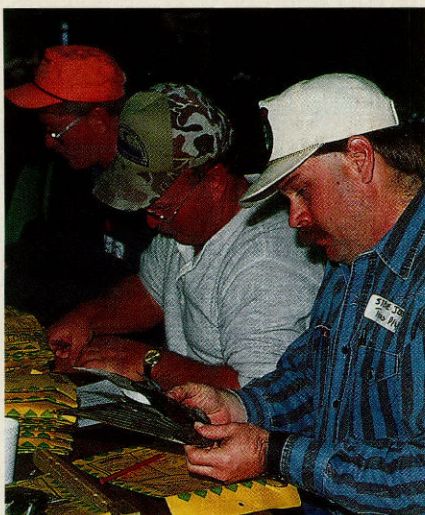
BY LAUREN WALLACE



WOODS & WATERS

Feather Detectives

Waterfowl biologists gather valuable data on their feathered constituents by sitting down to an old-fashioned “wing bee.”



Biologists from Central Flyway states examine duck wings to help determine overall harvest of the season just closed.

You’ve heard of spelling bees, honey bees and even killer bees but how about a wing bee? A wing bee is an annual event in which resource professionals from various state and federal conservation agencies examine duck wings and goose tail feathers donated by hunters. The information derived from the wing bee enables biologists to determine the types (species), sex and age of waterfowl harvested during the hunting season, thereby improving knowledge and management of migratory waterfowl. Wing bees are held annually in each of the four waterfowl flyways: Atlantic, Mississippi, Central and Pacific. Last year, Leroy Reinecke, Brian Sullivan and I traveled to Emporia, Kansas to represent the Texas Parks and Wildlife Department in the Central Flyway wing bee.

The 30 to 40 bee participants are divided into several groups. Each group has an experienced “chief checker” who oversees the aging and sexing of each duck wing and goose tail feather fan to ensure that the data is accurately recorded.

The chief checker showed us how the sex of mallard wings could be determined by looking at the white bar above the brightly colored speculum. In females the bar extends

into the longer adjacent tertial feathers near the body; in male mallards it does not. In male blue-winged teal there are few or no black markings in the white bar immediately below the chalky, blue-colored wing patch; in females there are several markings. This should provide a good tip for accurately sexing bluewings, which have rather drab coloration during the early September teal season. Although both sexes of teal may be taken, many hunters keep personal records of their harvest, and this information might aid their record keeping. Geese can be aged by examining the tail feathers. Feathers that are notched or badly frayed indicate the bird was a yearling.

National harvest estimates are derived from two federal surveys: the Harvest Questionnaire Survey and the Parts Collection Survey. Hunters selected to participate in the Harvest Questionnaire Survey are asked to record the number of ducks, coots and geese they harvest during the hunting season. Hunters selected for the Parts Collection Survey are asked to save a wing from each duck and the tail fan feathers from each goose they harvest. Each duck wing and all goose tail feathers are enclosed in separate envelopes with the information on harvest location, time

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Biologists were ankle-deep in feathers at last year's "wing bee."

and date, and sent to the wing bee site.

Results from the surveys are combined to provide overall harvest information. For example, suppose the Harvest Questionnaire Survey indicates the Texas duck harvest is 1 million birds. Now suppose the wings sent in by hunters from Texas in the Parts Survey are comprised of 50 percent mallards, 25 percent green-winged teal, 15 percent pintails and 10 percent widgeons. By using both surveys, biologists can estimate the annual harvest of 500,000 mallards, 250,000 green-winged teal, 150,000 pintails and 100,000 widgeons.

Age ratios, or the number of juveniles to adults, provide an index of annual production and habitat quality. In years with good habitat conditions the number of juvenile wings received at the wing bee often is greater than the number of adult wings. In 1993, a wet year, the age ratio of mottled ducks in the harvest was 1.4 young birds per adult bird. Similarly, the age ratio of snow geese in the harvest was one young bird per adult. These ratios indicate that waterfowl breeding habitat was in good shape that year.

In poor years the number of juvenile wings may be equal to or fewer than adult wings. For example, 1990 was a dry year on the Texas Gulf Coast, and the age ratio of mottled ducks in the harvest was 50-50 for young and adult birds. Similarly, most goose

hunters remember 1992-93 when there was little reproduction by snow geese due to poor conditions on the breeding grounds. That hunting season the age ratio in the harvest was 0.2 young birds per adult. These low ratios indicate waterfowl breeding conditions were in bad shape that year.

Sex ratios also provide important information with which to assess harvest regulations. Hunter often "select" the more brightly colored males (drakes) such as mallards. Data from the wing bee indicates that male mallards outnumber female mallards six to one in the harvest. Conversely, in species in which the male and female are similar in appearance, such as gadwalls, the harvest ratio is about 2.5 males per female.

The Texas duck harvest is dominated by green-winged teal (25 percent of the Texas harvest), mallard (15 percent), gadwall (13 percent) and widgeon (10 percent), which mirrors the overall flyway harvest. On average, there are 225,000 waterfowl hunters in the Central Flyway, of which 75,000, or 30 percent, are from Texas. Given the importance of Texas as a wintering area for millions of ducks and geese and the number of hunters in the state, it is not surprising that Texas waterfowl hunters contribute a third of the duck wings and a fourth of the goose tails to the Central Flyway wing bee.

During the three-day wing bee, we assist-

ed with aging and sexing more than 16,600 duck wings and 7,400 goose tails, and our clothes were covered in goose down and duck feathers. We had the opportunity to meet other biologists and learn about waterfowl and wildlife management in other states. Also, we brought back enough wings of the various species to construct several wing identification boards that will be used as educational tools at events such as the annual Texas Wildlife Expo and at hunter check stations.

Texas waterfowl hunters play a major role in the conservation of the waterfowl resource through the purchase of waterfowl stamps, membership in conservation organizations and by participating in federal and state harvest surveys. The next time you are asked to participate in a harvest survey, please report the requested information. You will be helping to further our knowledge and management of waterfowl. Moreover, rest assured that come February, TPWD personnel will be representing you by "wingin' it" at the wing bee.

BY M. TODD MERENDINO

OGT Raises Maximum Reward

The Operation Game Thief (OGT) Committee has raised the maximum reward for callers who report fish and wildlife law violations from \$300 to \$1,000 and has taken other steps to support conservation law enforcement and enhance public awareness of OGT.

OGT, which allows callers to remain anonymous, operates a toll-free, 24-hour phone hotline (800-792-GAME) and offers rewards to callers whose information leads to the conviction of fish and wildlife law violators. It also provides benefits to families of game wardens killed in the line of duty.

The OGT Committee authorized new, higher rewards for six callers who had request-

ed rewards during 1995. The new reward structure raised total rewards for these callers from \$700 to \$2,050.

The information provided by the six callers helped convict 10 violators for 18 criminal violations that included taking deer without landowner consent, hunting from a public road, killing deer in closed season, hunting hogs with an illegal firearm on a management area, and illegal possession of an alligator in closed season, with resulting fines totaling \$5,140.

Since its inception in 1981, Operation Game Thief has been an unquestioned suc-

cess in Texas. More than 17,600 calls from concerned citizens have resulted in more than 6,000 criminal cases filed against fish and wildlife law violators. About 98 percent of these cases have resulted in convictions for which courts assessed more than \$778,780 in fines. As a result, OGT has approved more than \$100,000 in rewards for callers

The committee also established new membership levels that include base membership (\$25), conservation member (\$100), landowner member (\$500), and life member (\$1,000). OGT also is developing new, major sponsorship opportunities for corpo-

rations, foundations or individuals which will be structured as Conservation Partnerships.

Many people may not realize that Operation Game Thief, although a program of TPWD, is a 501(c)(3) charitable organization that is totally dependent on private donations. All donations to OGT are tax-deductible.

For more information on supporting OGT, write to Operation Game Thief, TPWD, 4200 Smith School Road, Austin, TX 78744 or call Jack King at 512-389-4630. To report violations, call the OGT hotline at 800-792-GAME.

S T A T E O F N A T U R E

If Looks Could Kill

Despite their menacing appearance, scorpions are secretive and non-aggressive toward humans. Some scorpion species pack a potentially fatal sting, but fortunately they are not found in Texas.

In the northern hemisphere, if you look near the horizon of the summer sky, you can see the constellation Scorpius. The scorpion earned this place in the heavens through an ancient Greek myth. According to one version of the story, the great hunter Orion boasted of being powerful enough to kill all the animals of the world. The Goddess of Earth, Gaea, got wind of the boast and was saddened and afraid. She sent a giant scorpion to sting Orion. Orion fought with valor but was no contender for the monster, and the scorpion finally delivered a deadly sting.

Orion and Scorpius were honored with positions in the sky but were placed at oppo-



© WYMAN MEINZER

The striped scorpion has delivered many a painful sting to Texans.

site ends so they would never fight again. Look for the pair of stars that forms the tip of the tail of Scorpius; the brighter of the two is called *Shaula* by Arabians, which means "the sting."

The sting, of course, is what has earned the scorpion its fearsome reputation through the years, and it's true that the sting from certain species can be extremely painful and even fatal. The venom attacks the nervous system, causing drowsiness, numbness and tingling, itchy throat and mouth, muscle

twitching, nausea and vomiting and eventually circulatory failure.

The good news is that of the more than 1,500 scorpion species of the world, only about 25 are considered fatally dangerous, and none lives in Texas. According to David Sisson, assistant professor of biology and geology at West Texas A & M University, at least 18 species roam the Lone Star State, and every region is home to at least one. The most common in Texas, *Centruroides vittatus* or striped scorpion, can be found across the state from

the East Texas Pineywoods, down the Gulf coast all the way out west to Big Bend. West Texas has the largest concentration and widest variety of scorpions with 16 of the 18 species dwelling in this hot, desert-like climate.

Sisson searches for scorpions at night using a black light, which causes their exoskeleton to glow in the dark. "It's a great advantage because we can study them during their routine moving around, looking for food and mating." Scorpions prefer warm climates but adopt a nocturnal lifestyle because they do not like intense heat. However, the notion that they detest the heat so much that they will commit suicide when surrounded by a ring of fire is simply a cruel myth. The poor scorpion, when encircled by fire, will flail about trying to escape like any animal, and its tail will curl up over its back, giving the false impression it is stinging itself.

Another myth described in some movies and books is that the scorpion is aggressive and will attack humans, often by hanging in

a chain, tail-to-pincer, from the ceiling waiting for an unwary victim. The truth is that scorpions sting only to protect themselves and don't aggressively seek out humans to sting. Most stings result from accidental contact and can be avoided with a little common sense. Children under five years of age are especially at risk of serious reactions to a sting, so their play areas should be monitored carefully. Sandboxes are a favorite and often neglected area where certain species of scorpions may burrow because the temperature is cooler during the day.

Others, like the striped scorpion, don't burrow but will take refuge anywhere that is protected and shady: under rocks, sticks or anything left on the ground. Since they also can squeeze through tiny openings and may enter homes, remove wood and rock piles from around the premises, but be careful hauling wood, stones or bricks from piles. Wearing a pair of leather gloves is a practical precaution.

The ancient Assyrians, who were plagued

by scorpions, are credited with inventing boots specifically designed to prevent scorpion stings while walking. Wearing boots is still a good idea when hiking—that is, of course, if you remember to empty them out every morning. It's also a good idea to shake out bedding and clothing while camping or in areas known to harbor scorpions. I learned this lesson the hard way. After tossing my jeans on the floor one night and then slipping into them the next morning, I was rudely awakened by a series of stings on my leg before I could jump out of the jeans.

My stings were painful, but not nearly as bad as I thought they would be. This exaggerated fear of scorpion stings is common, according to Sisson. "Scorpions should be respected and understood, but they shouldn't be feared," he said. He compares the sting of a Texas scorpion to that of a wasp but adds that each sting and individual's reaction may vary. Generally the affected area will hurt and may swell and turn red. Applying an ice pack to the area and taking an aspirin

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will help the symptoms in most cases. If a victim is hypersensitive to stings or the symptoms worsen—difficulty in breathing for instance—he should be taken for medical treatment immediately.

Even though scorpions are present in abundance throughout Texas, you may rarely encounter one. Not only are they nocturnal, but they also are solitary animals, meeting other scorpions only by accident. The only time they seek each other is to mate. Once the male and female do find one another, they begin what looks like a choreographed courtship dance. They lock pincers, and often curl their tails up and touch stingers then move together sideways and back and forth in a random pattern. The purpose for this dance, which may last hours or even days, is so that the male can feel for a fine-grained surface on which to deposit his spermatophore, a sac that contains sperm.

Once deposited, the spermatophore sticks to the ground, and the male guides the female over it. She positions herself so that her reproductive opening is over the sac and then hooks it with her organ and takes the sperm into her body to fertilize the eggs. After their courtship dance, the smaller male usually makes a hurried retreat. This is wise, since females have been known to devour their mates on the spot.

The females' gestation period is surprisingly long, lasting anywhere from 2½ months to a year and a half. After the young are born, they scurry onto the mother's back and stay there up to two weeks, subsisting on yolk that is carried in the mother's midsection. When they first are born, the offspring are very light in color, but exposure to the air gradually darkens them. This odd sight, the mother covered with tiny look-alikes, once led to the false assumption that the young were eating their parent.

After the youngsters molt, or shed their skin, they leave their mother and begin to hunt for food on their own. Although they have two eyes on top of their head and two to five on each side, they have poor vision. As nocturnal hunters, scorpions instead use their sense of touch and hearing to search for prey. They are aided by chemical recep-

tor organs that trace the ground as they crawl and hairs—or setae—on their legs that are very sensitive to movement. "They have sense organs in their legs and feet that they use like a seismograph to hunt," explained Sisson. "Prey generate sound waves in the soil that travel at different speeds. The receptors measure these vibrations and can tell how far away and in which direction the prey is located."

Some large scorpions have been reported to eat small reptiles and all species will eat other scorpions, but large insects and spiders are the scorpions' primary meals. Once they find their dinner, scorpions grab their prey and crush it with their pincers, then swing their tails up and sting it. Scorpions also may become the meal themselves if they are not careful. Despite their sting some animals, including armadillos, skunks, opossums, bats and certain birds, find scorpions quite tasty.

As members of the Arachnid family, scorpions are cousins to spiders although they don't look much alike. Like spiders, scorpions have four pairs of legs, but their bodies and tails are elongated and segmented. They more closely resemble lobsters, with their large pincers and long tail, except the scorpion's tail is pointed with a stinger.

The striped scorpion common in Texas is brown and reaches about 2½ inches in length. Oddly, size and sting potency are not related, with some of the most venomous varieties being the smallest. The African fat-tailed scorpion, for instance, is one of the most deadly and is relatively small, while the same continent is home to the large emperor scorpion, which is passive and rather docile.

Hearty and adaptable, scorpions can live several months without water and longer without food. In addition, they can tolerate a wide range of temperatures. In North America they prefer the warm climates of Mexico, the Southwest and the Gulf of Mexico regions, but they also live in more temperate climates and have been found as far north as Canada.

Perhaps this adaptability accounts for their long existence on earth. The earliest scorpions were aquatic animals that arose

from brackish water and emerged on land as amphibians between 375 and 400 million years ago. Since then the scorpion's shape and form has changed very little, leading some scientists to call them "living fossils."

In the end, whether you fear and loathe scorpions or not, it is difficult not to admire their long reign on the planet. "They are successful, having been here 400 million years," Sisson pointed out. "They have an interesting natural history and a place in the community. If any animal has a right to be around, it's the scorpion."

BY MELISSA MAUPIN

"Barn-Raising" Project To Benefit Ecology

Wood craftsmen from around the world will participate in an old-fashioned "barn-raising" in Tyler on March 15 to build a pavilion for the East Texas Ecological Education Center. The project is made possible by a cooperative agreement among the Texas Parks and Wildlife Department, National Park Service's National Center for Preservation Technology and the Timber Framers Guild of North America.

Students of a trades class will design the pavilion and begin construction during the week prior to the "barn-raising," according to guild officials. Timber framing is a method of wood construction that relies on finely-crafted wooden joints in massive beams to hold the building together. This craft has been virtually lost through the years, replaced by conventional carpentry methods using small-dimension lumber and nails.

The facility, located on an 82-acre tract that is part of the TPWD's regional office property on Tyler's east side, will provide a place where students and adults can learn more about East Texas ecology and enjoy native flora and fauna in a natural setting.

For further information call the Timber Framers' Guild, 360-733-4001 or fax 360-733-4002.

How A.C. Long's pleasure palace
became Terry Preston's
last picture show.

By EZRA WARD

GORDON RICKE

Nobody had been inside the old Three Corners Theatre building for years until bank president A.C. Long bought, renovated and reopened it under the name Three Corners Theater. It had always bothered him that the "Theatre" spelling constantly provoked disagreements between the town's simple folk and their more educated neighbors—arguments that always seemed, to A.C.'s mind, to end with a put-down of those who felt it should be "Theater." Three Corners was in the country and, by God, ought to spell things the way rural people would, A.C. believed.

The local amateur acting group, Three Corners Thespians, was, of course, elated to have a place to perform downtown. The auditorium at the high school on the edge of town was nice, but it seated far more people than the Thespians could ever attract, which always left them feeling inadequate and underappreciated after every event. And nearly everyone looked forward to having a local cinema so they could watch an occasional movie, even an old one, without having to drive an hour or more to a nearby city.

But A.C. didn't fix up the theater to help the Thespians, or to provide convenience for local residents, or even to improve Three Corners' original "downtown," though he supported such efforts. No, the truth was that A.C. Long went to all that trouble and expense simply to find a job for Jimmy Thompson, the young man whose supposed death was the subject of a rumor A.C. once inadvertently had helped spread. The false report had caused Jimmy's father, Catfish Thompson of Amarillo, A.C.'s lifelong friend, several hours of needless grief; and to A.C., that caused an entry on the deficit side of his ledger so enormous he would spend the rest of his life trying to balance it.

A.C. figured running the theater on Friday and Saturday nights was the only job in Three Corners

that Jimmy Thompson, a hopeless drunk, might be able to perform; plus, it would keep him out of the honky-tonk, where he was constantly getting into trouble. Jimmy could clean up the theater in the mornings, when he was briefly sober. The Thespians would run their own events. Jimmy wouldn't even have to sell food and drink—that would be done by the local women's service sorority, the Delta Sigmas, who planned to use the operation to raise funds for local causes. Ticket purchases were to be made with an open-cashbox, honor system. All Jimmy would have to do would be to lock up the cashbox after the movie began and change reels in the middle; and such was his obligation to Catfish that A.C. planned on doing these tasks himself if he had to.

Opening night came one Friday in February, which A.C. figured would be good, because hunting and football seasons were over and it was too cold to fish. A.C. had obtained "Gone with the Wind" and promoted it with a full-page ad in Thursday's Three Corners *Tattler*. Sure enough, every seat was taken. As the movie began, however, not a soul in attendance would have guessed that the event would be remembered in later years not as the Three Corners Theater's grand reopening, but as the most embarrassing moment in Terry Preston's life.

The movie classic was to be the mood-setter in an evening carefully planned by Terry. It would be followed by a romantic drive in his pickup to a spot above the dam favored by young lovers and culminate with his asking Kitty Ammerman for her hand in marriage. As he sat with his right arm around Kitty, watching the adventures of Rhett Butler and Scarlett O'Hara, Terry rested his left hand on the bulge in his pocket caused by the box holding the engagement ring he had bought.

So anxious was he that everything come off just perfectly, the shy, reclusive carpenter scarcely noticed the movie. Well into the film, he excused himself to use the restroom—not because of need, but because he wanted to take the box out so that, for the hundredth time, he could make sure the ring was still there. Satisfied, he set the box on the shelf beneath the mirror in the men's room, while he combed his sandy hair and wispy mustache, then undid his blue jeans so he could tuck his starched white dress shirt. When someone knocked at the door, he snatched up the ring box

and stuffed it back into his pocket and hurriedly refastened his belt. But he forgot to close the stiff zipper on the front of his brand-new blue jeans.

Back in the darkened theater, Terry found his row and began the sideways shuffle from the aisle toward his seat in the center, brushing against the seat backs in front of him as he tried to avoid stepping on those seated in his row. Peggy Detwiler and a group of her friends sat in the row just in front of his and Terry lifted his hands so as not to brush the pretty high school cheerleader's long, blonde ponytail, which hung over the back of her seat. Kitty saw him approaching just then and smiled warmly.

Suddenly, Terry's progress toward Kitty was impeded somehow. But, his gaze locked on hers, he hardly noticed. He tried stepping sideways again, but again he was stopped; and, though he still smiled toward Kitty, his ears recorded a feminine gasp from the row in front of him.

He turned to look for what was happening, but could see nothing in the darkness. He tried to move more sharply toward his seat: once, twice, but each time he was held back and each movement seemed to coincide with a cry from in front of him. On the third such try, Terry realized with horror that every time he jerked toward his seat, Peggy Detwiler's head was snapped in the same direction. As the dread knowledge settled in that the two were somehow connected, Peggy Detwiler began to scream.

At first, no one else seemed aware of anything. Peggy's screams blended with those coming from the sound track as, on the screen, Rhett and Scarlett Terry began to call out for him to sit down. Confused by his inability to comply and unable in his desperation to concoct any other plan, Terry struggled repeatedly toward his seat.

Peggy's shrieks grew in intensity as her head jumped back and forth like a ball attached to a paddle by a rubber band. More people behind Terry shouted at him. A few of those around him and the helpless cheerleader at last knew something was wrong, but couldn't figure out what.

Some didn't care: a very large, very angry man behind Terry ordered him to sit, then put a beefy hand on his shoulder and shoved him downward. Terry meekly obliged, sitting on the floor between the seats, an action which, unfortunately, yanked poor Peggy Detwiler's head completely over the

seat back so that her terror-stricken, glassy eyes gaped upside down at those seated behind her. The girl sobbed piteously.

By this time, the commotion had engulfed the theater and prompted several patrons to go in search of Jimmy Thompson. He came in then with a huge flashlight, a bright beacon stabbing through the darkness, searching for the source of the uproar, seeking out Terry Preston, who tried at the last moment to crawl beneath the seats behind him to escape certain, onrushing humiliation.

He failed. The searing beam found him. And Jimmy Thompson's drunken guffaw drew all attention and ensured that none in the theater would

fail to hear his words, which seemed to Terry Preston surely would crush him forever: "Look at that! Peggy Detwiler's ponytail is caught on Terry Preston's fly!"

Giggles rippled across the theater. A woman produced a pair of scissors from her purse, the hair was cut free and Terry fled wordlessly. Kitty called to him, but her voice was drowned out by waves of laughter. On the screen, the movie continued, but no one watched.

Kitty found Terry later, hiding in his home with all of the lights turned out. "Everything's ruined!" he blubbered. "I was going to ask you to marry me!"

She put her arms around him and smiled into

his eyes, which were blurred by tears. "And so now you're not going to ask?" she said.

And so he did ask; and she accepted. And Terry Preston, who had traveled from the depth of utter shame and despair to the pinnacle of happiness and fulfillment in the space of half an hour, discovered just what a roller coaster ride life can be.

But he never again set foot in the Three Corners Theater.

If you have an outdoor story you'd like to share with Ezra Ward, jot it down and send it to his attention at Texas Parks & Wildlife magazine, 3000 South Interstate 35, Suite 120, Austin, Texas 78704.

O U T D O O R B O O K S

Tracking & the Art of Seeing: How to Read Animal Tracks & Sign

By Paul Rezendes. 1992. 320 pages. Camden House Publishing, Inc., Ferry Roads, Charlotte, Vermont 05445. Hardcover, \$29.95. Softcover, \$19.95.

Discovery is a rewarding aspect of any outdoor experience for people of all ages. Take tracking, for example. Deciphering animal tracks and other signs to discover what species has been there before you brings a closeness with nature that is missing in many modern lives.

Tracking & the Art of Seeing: How to Read Animal Tracks and Signs offers tips for identifying the tracks and signs of everything from rodents to deer to carnivores. Author Paul Rezendes, a professional tracker, photographer and wildlife consultant, tells readers not only how to identify animal tracks and sign, but why he believes it is important. "The more intimate we become with other lives, the more aware we are of how those lives connect with and affect our own," he writes.

Tracking & the Art of Seeing is divided into nine groups of mammals: rodents, the rab-

bit family, the weasel family, Virginia opossum, raccoon, the dog family, the cat family, the bear family and hoofed animals. Within each of these categories the author describes the animals' range and natural history as well as the tracks and other signs such as scat, scent posts, scrapes, dens and middens.

Rezendes provides a wealth of information for wildlife detectives. A rough, chewed-up branch and leaves with frayed, squared-off ends might mean a deer has been in the area, since deer have incisors only on the bottom jaw and cannot cut through branches cleanly. A branch completely stripped of bark might be the work of a beaver. Pick up an acorn and examine it, and you might be able to tell the species that fed on it. Mice chew on the shell until they make a hole from which to extract the meat. Gray squirrels peel off the shell in strips. Porcupines cut into the acorn, leaving it ragged.

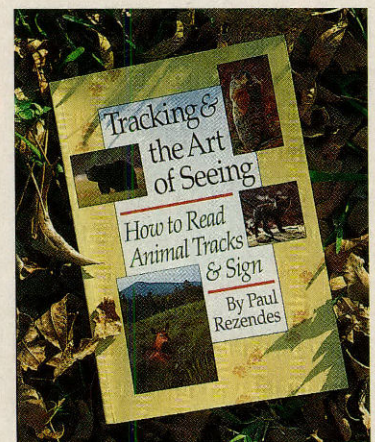
The book contains a wealth of photos showing the animals, their habitat and various signs, as well as photos of the tracks on different surfaces such as mud, sand, clay or snow. Rezendes also includes a photo of the paws of many species, giving the reader an idea of what the track should look like. Illustrations of the trail pattern of each species shows the animal's gait and stride.

Anyone interested in learning more about

animal tracks will enjoy the photo essay beginning on page 28 of this issue. Rezendes offers photography tips for anyone interested in compiling their own track and sign photo library.

"Ultimately," writes Rezendes, "tracking an animal makes us sensitive to it—a bond is formed, an intimacy develops. We begin to realize that what is happening to the animals and to the planet is actually happening to us. We all are one. Tracking and reading sign help us to learn not only about the animals that walk in the forest—what they are doing and where they are going—but also about ourselves. For me, this interconnection is survival knowledge and the true value of tracking an animal."

MARY-LOVE BIGONY

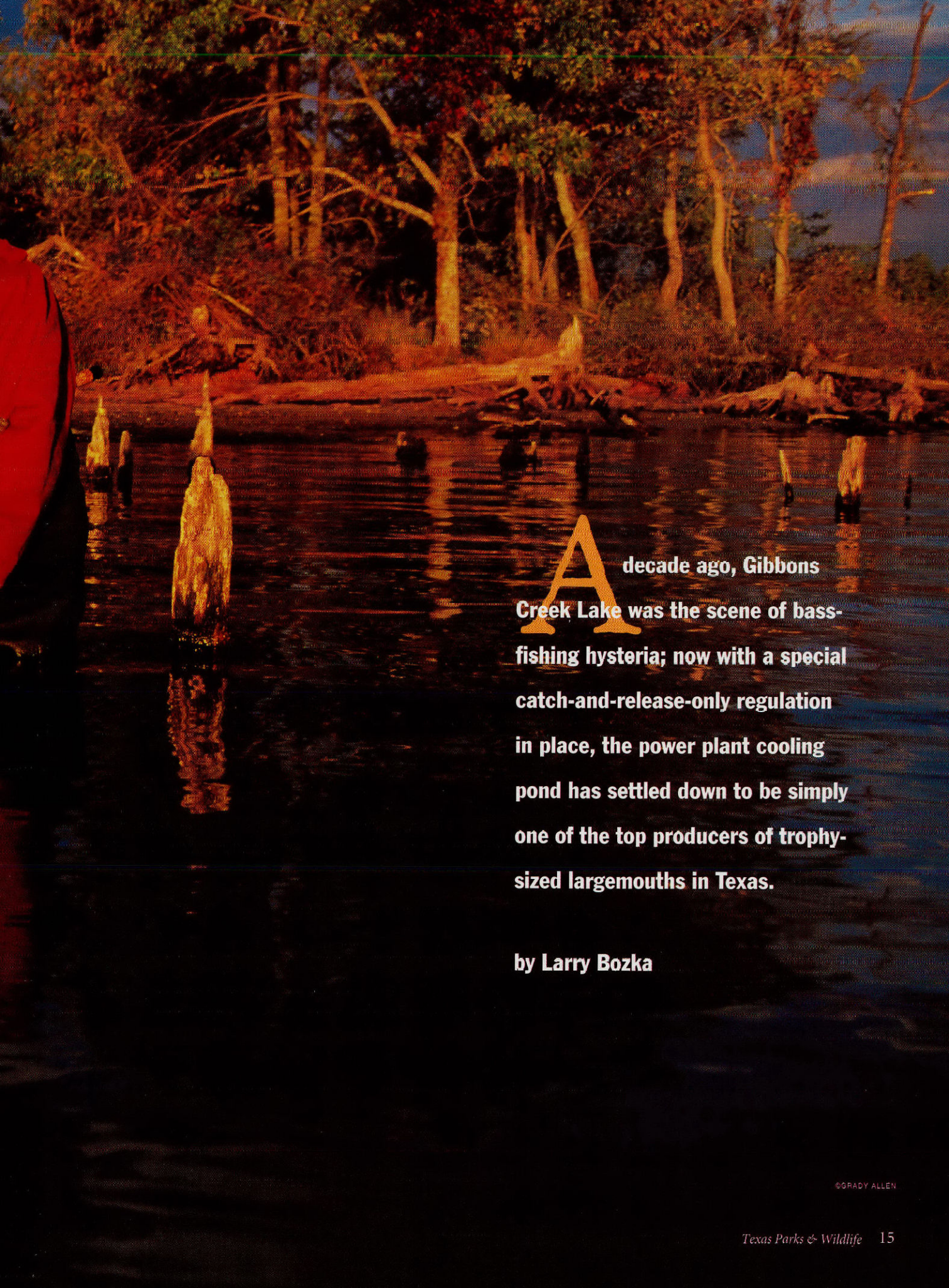


BILL REAVES



Gibbons Creek

revisited



A decade ago, Gibbons Creek Lake was the scene of bass-fishing hysteria; now with a special catch-and-release-only regulation in place, the power plant cooling pond has settled down to be simply one of the top producers of trophy-sized largemouths in Texas.

by Larry Bozka



© DAVID J. SAMS

Even hefty largemouth bass like the six-pounder shown here must be released at Gibbons Creek Reservoir, where a catch-and-release-only regulation has been in place since September 1993.

Gibbons Creek Reservoir opened in March 1985 with all the subtlety of a nuclear test. Anglers who had been allowed access to this 2,500-acre Grimes County cooling pond prior to the official debut had leaked reports of incredible fishing, five- to seven-pound bass that would pounce on artificial lures without hesitation. The ensuing build-up ultimately resulted in the most spectacular bass fishing frenzy in the nation's history.

The Texas Municipal Power Agency (TMPA), owner of the power plant and lake, had established a telephone reservation system, hoping to avoid opening-day traffic snarls. More than 550,000 telephone calls were made to the TMPA line during the first six hours of the first day, February 27, effectively shutting down phone lines from Bryan/College

Station to Houston. Calls out of Houston were routed through Kansas City. Telephone company officials said this six-hour blitz of attempted calls was the second-highest one-day total on record, following only the 700,000 attempted calls to a television network survey after the Reagan-Carter debate in October 1980.

The telephone lines continued to sizzle, with 100,000 callers dialing the TMPA number on the second day and about 90,000 on the third day. Finally, after the frazzled telephone system had been fried by 800,000 attempted calls in a four-day span, TMPA officials raised the white flag and instituted a mail reservation system. This, too, proved overwhelming, with an average of 1,800 pieces of mail arriving at the plant's mailroom every day. After about a year this requirement was dropped, due either to sheer exhaustion or because fishing pressure declined to a manageable level.

Those anglers who got in among the initial rush were not disappointed. Certainly, no caliber of fishing could have matched the pre-opening hype, but few bassers went home disappointed. With time, however, Gibbons Creek settled down and assumed status as yet another of many quality Texas lakes that can provide outstanding largemouth bass action when conditions allow.

Situated on several small feeder creeks just east of College Station off State Highway 30, the lake serves as a cooling pond for a coal-fired electric generating station. Overall, the water stays turbid. It's not among the easiest lakes around to master. Still, those who persevere here have a realistic shot at a *bona fide* trophy bass.

"It's kind of an odd lake," said Texas Parks and Wildlife Department district fisheries supervisor Mark Webb. "It's relatively small, and it's fairly hot due to

the power plant generator. The vegetation, primarily hydrilla, has come and gone, and the habitat has changed with time. But the main thing,” he emphasized, “is that the lake’s largemouth bass fishing has changed along with angler preferences and angler use. Bass fishing has been the major driving force all along.”

Today, that driving force has completely evolved. Gibbons Creek opened under a 15- to 21-inch slot limit in order to prevent the bass population from being overharvested. In September 1993, TPWD took the big step of making Gibbons Creek a catch-and-release-only lake for largemouth bass. This change long had been supported by a select constituency of Texas bass anglers who hit the water with one goal in mind—catching a trophy largemouth bass in excess of 10 pounds. Today, Gibbons Creek is one of only two major fisheries in the state governed by catch-and-release-only bass management. (The other is Purtis Creek State Park Lake.) It was a major and somewhat controversial move, but the decision has proved to be a sound one. The trophy concept is catching on.

According to figures acquired through the TMPA regional office in 1991-92, prior to the new no-keep regulation, a total of 12,826 boats entered the facility. In '92-'93 that figure dropped to 10,813 and, in '93-'94, fell even further, to 10,065. However, as of September 30, 1995, the number had bounced back to 11,194. The slow but steady increase in visitation almost certainly will continue as the state’s serious trophy seekers return to catch not a limit of fish, but a single bass.

One very, very big bass.

Some biologists contend that power plant reservoir bass tend to peak at around 13 pounds. The lake already has produced seven fish in excess of that mark, but only a few ounces above it. Nevertheless, when Troy Johnson caught a 16-pound, 2½-ounce lunker from the

waters near the discharge on January 26, 1989, Gibbons’ potential as a record-breaker became undeniable. Bolstered by the new regulations, the lake’s fishery now has a serious chance to prove itself. Were it not for restrictive limits, even during the opening years, it never would have happened.

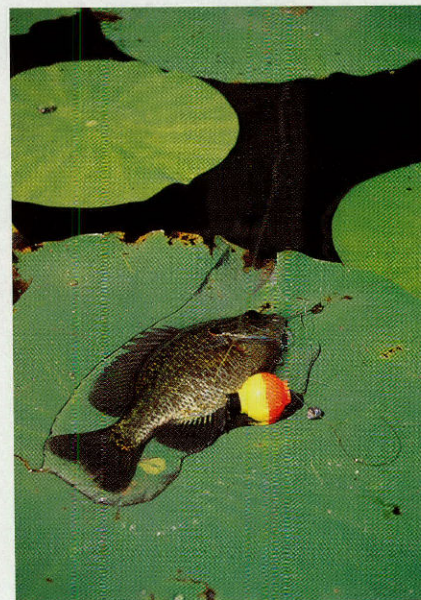
“Although it’s impossible to gauge the exact number, a large percentage of Gibbons Creek bass have been caught before, especially the larger fish,” said Webb. “Previously, many of those bigger bass would not have been returned to the lake and allowed to grow to true trophy proportions.”

Roughly 70 miles to the southwest of Gibbons Creek is Fayette County Lake, another small but potent power plant cooling pond that’s a favorite of bass fishermen from Houston to San Antonio. “Fayette has the advantage of a tremendous amount of vegetation,” noted Webb. “That vegetation makes the lake relatively easy to fish, while at the same time protecting the fish to a great degree. However,” he continued, “you don’t see the larger size bass coming out of Fayette. Many, if not most of the over-21-inch bass caught out of Fayette County have been retained.” The lake’s 14- to 21-inch slot limit was increased to a 14-24, effective September 1, 1994, in an effort to grow more 21-inch-plus bass.

Although it existed to a lesser degree, the retention factor played a role in implementation of the current catch-and-release-only bass regulation on Gibbons Creek. All the same, it wasn’t the sole factor for the decision.

“Basically, two things were going on at Gibbons Creek prior to its going to catch-and-release,” Webb explained. “The lake wound up with a 14- to 21-inch slot limit, and at that point anglers not only harvested big bass over the 21-inch mark, but also a substantial number of fish under 14 inches. Even though we had tremendous reproduction and excellent recruitment of eight- to 10-inch bass, the number of fish between 10 and

Although it is illegal to retain largemouth bass at Gibbons Creek, you still can keep a legal limit of crappie, catfish and sunfish such as the redear sunfish shown below.



© GRADY ALLEN



© LARRY BOZKA

An outstanding forage base and the no-kill regulation apparently are combining to produce more trophy-sized largemouths at Gibbons Creek. The lake record is a 16.17-pounder caught in 1989.



© DAVID J. SAMS

The traffic jams seen during Gibbons Creek's early days have subsided, but boat ramps often are jammed with bass boats during the prime early-spring fishing period from January through March.

14 inches plummeted. We were losing them before they could hit the slot.

"When we came in with catch-and-release," he continued, "it served to counter both dilemmas. The new regulation protected the small fish and allowed them to become bigger and more desirable to bass fishermen. And, ultimately, it set the foundation for a large boost in the number of trophy-class fish. As it is," he pointed out, "we're already starting to see more fish in the 13-pound-plus range. The lake has a tremendous amount of forage in it, primarily threadfin shad, and there's every indication that the bass will do nothing but get bigger."

The 16.17-pound lake record largemouth caught by Johnson in 1989 cemented Gibbons Creek's potential as a record-breaker. "I think there's a strong likelihood that Johnson's record will fall within the next two years," said Webb. "I also think there's a good possibility that the lake holds a bass that's pushing or in excess of the current Texas state record (13.18 pounds). You never really know for sure," he said, "but there are certainly some very large fish out there, and they're getting larger all the time."

The lake weigh station and boat ramp are operated by the TMPA. "Even though

retention of bass is illegal, except for the 13-pound-plus fish which can be placed in the ShareLunker program, you still have the opportunity to take a bass, put it on certified scales at the station and get not only the accolades but also the measurements and photos needed by a taxidermist to create an acrylic replica that'll last a lifetime," said Webb.

Lovers of fresh fillets should note that catch-and-release bass regulations still leave plenty of room for an angler to take home a batch of fat crappie from creek-bend brushpiles or perhaps a hefty stringer of channel catfish.

The Gibbons Creek bass spawn begins a bit earlier than the norm, due to the hot water generated by the power plant. Early in the spawn, at the beginning of February, the hot-water discharge area is as crowded as a suburban shopping mall. But later, when the fish move out over bottom humps and points, the task at hand becomes a bit more demanding.

"The fish follow a pretty predictable pattern throughout the spawn," said veteran Gibbons Creek fishing guide Jim Butler, a 53-year-old pro basser who has been guiding parties on the lake for the past nine years and has been fishing it since it opened. "Starting with the spawn, a lot of the big bass are going to be shallow, in two feet or less of water around the shorelines and the feeder creeks. In March, they hang around the shorelines of the main lake," he continued, adding that soft plastic lizards or jerk baits are prime choices for duping the finicky bank huggers. "You can't see fish on nests, like you can on Lake Fork," Butler added. "You have to learn the spawning areas, and fish them slowly."

The Gibbons Creek bass spawn runs all the way through March and into the first part of April. "From mid-March through May, there will be lots of shallow hydrilla that you can fish with topwaters and spinnerbaits," Butler said. "At that time of year, we have very few trips on which we don't catch at least one seven-pound fish."



© LARRY BOZKA

The often-murky waters of Gibbons Creek support very little aquatic vegetation, so bass anglers have to be aware of other fish-holding structure such as timber, creek channels and tank dams.

Typically, the post-spawn month of June is a very tough period in which to catch big bass. Not so on Gibbons Creek. In fact, it's prime time.

"There have been more 10-pounders caught out of the lake in June than any other month," Butler noted. "Because they're so hard to see, relatively few very big bass are caught during the spring. By June they're positioned on deep-water structure, and you can locate them out on the humps, ridges, points and tank dams. But you have to have a depthfinder, and you have to know how to use it."

The lure pattern turns to deep-diving crankbaits or Carolina-rigged plastic worms. According to the guide, color patterns are much less important than the presentation of the bait. "The crankbaits seem to produce most of the big fish," said Butler. "Nowadays, more and more bass anglers are becoming adept at fishing deep-water structure in the 10- to 15-foot range. And it's those people who tend to do the best at catching big bass in this lake."

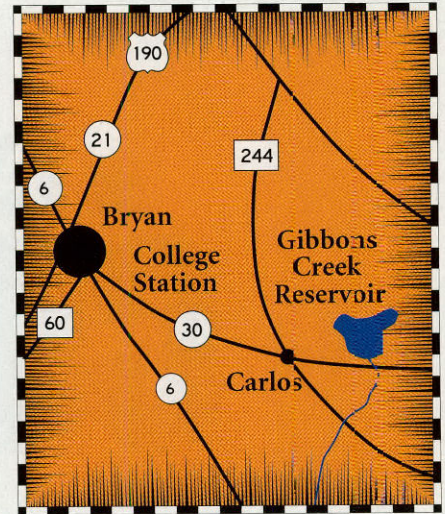
From July through September, Gibbons Creek bass action generally falls into a lull. However, catfish action at that time of the year can be excellent. So can minnow fishing for deep-water crappie and

worm-dunking for tilapia. What late-summer bass action can be had would likely be best at night, and that's out of the question since the lake is closed at night. It's also closed on Wednesdays. For specifics on opening and closing hours as well as holiday closings and ramp entry fees, call the TMPA at 409-873-2424.

"Right now, I think the lake has a better bass fishery than it did when it opened," said Butler. The first three months after the opening were really good for bass up to five pounds, and maybe even a few eight-pounders. But now, in the year following the enactment of the catch-and-release regulation, we've seen numerous fives to sevens along with more 10-pound-plus fish than we've seen in any year since the lake opened."

Bass fishing on this unique south-central Texas impoundment is currently heating up with the advent of the spawn. Serious applicants should not delay. The legendary '85 bass rush is long over. But it could be, quite possibly, that the trophy bass rush on Gibbons Creek Reservoir is just now starting. ☆

Larry Bozka is a freelance writer and photographer living in Seabrook.



The coal-fired power plant shown in the background of the photo below keeps Gibbons Creek's water fairly warm, causing largemouth bass to spawn earlier than they do in non-heated lakes. The action usually heats up around February 1, according to the experts.

© GRADY ALLEN



A GROWING CONCERN

EXPANDING HUMAN POPULATIONS IN TEXAS ARE PUTTING THE SQUEEZE ON WILDLIFE. THE SURVIVAL OF MANY SPECIES DEPENDS ON HOW MUCH WE ARE WILLING TO INVEST IN THEIR FUTURE.

BY KRISTI G. STREIFFERT



More people mean more demands on the nation's petro-chemical industry, above, to refine gasoline and produce materials for consumer goods.



An aerial view of the Lower Rio Grande Valley shows how the native brush that provided wildlife habitat has been destroyed to make room for croplands.

© ROBERT W. PARVIN

During the decade of the 1980s Austin's human population grew by 46 percent. Is it coincidence that during the same decade two Texas songbirds were added to the federal endangered species list? A look at the distribution ranges of these birds will tell us not to be surprised at their recent decline. The Austin area is, or was, a major portion of the golden-cheeked warbler's and black-capped vireo's habitat.

And a look at growth statistics will

show us that the problem is not just Austin's. Texas has population growth rivaling some Third World countries. This is a complicated topic, tangled with terms such as "crude birth rate," "population change rate" and "demographic transition."

The subject of population growth becomes even more snarled when discussing developed regions because we must incorporate the "consumption" overpopulation factor. Consumption overpopulation occurs when a relatively small number of people use resources at such a high rate and without sufficient controls that the resulting environmental degradation and resource depletion threatens the health and sur-

vival of human beings and other species.

For example, the average resident of an industrial country consumes three times as much fresh water and 10 times as much energy as someone in a less developed country. "In Texas," said Jare Lyons, formerly National Audubon Society's population project manager, "we produce four pounds of trash per day, while across the border in Mexico it's only one pound per person per day."

Whatever definitions we use, it is clear that the web of wild expanses, parks and protected areas that harbor Texas's wildlife are not exempt from the problems caused by population growth.

Years ago, when the black-capped vireo and golden-cheeked warbler

returned from winters in the south, they found nesting habitat aplenty in the steep ravines and juniper hills west of Austin. But as the human population expanded into their territory, the birds returned to find increasingly fragmented, disrupted habitat. Their numbers declined, so much so that today we fear for their survival.

And as development expanded, 20 percent of the caves in Travis County were destroyed or filled in. Dark-dwelling creatures such as the Tooth Cave spider and others now struggle to carry on. Seven area invertebrates have been added to the federal endangered species list.

Struggling too, are rare shrubs, flowers, salamanders, and perhaps even other species biologists have not yet monitored.

Other areas of Texas also face Austin's quandary. The treasure called Texas is a crystal of myriad faces and the power of population growth, if allowed to, can darken every facet.

"The San Antonio area has grown by leaps and bounds," said Sam Hamilton, former Texas state administrator for the U.S. Fish & Wildlife Service, "and the Edwards Aquifer has been its sole source of drinking water. This growth, combined with agricultural and industrial use, has caused the aquifer to decline and the spring systems that support rare species to be threatened."

The spring systems of the Edwards Aquifer are a subterranean Swiss cheese of conduits and passageways. As the water quantity and quality declines, species such as the fountain darter, Texas blind salamander and Texas wild rice are hit hard.

Consumption of the water is not the only problem. San Antonio's growth in the north and northwest has covered some of the recharge areas for the aquifers with concrete and asphalt. Now water runs off into streams headed for the Gulf (picking up nonpoint source pollution as it goes), instead of refilling the aquifer.

Although the people and leadership of San Antonio are aware of the issue,

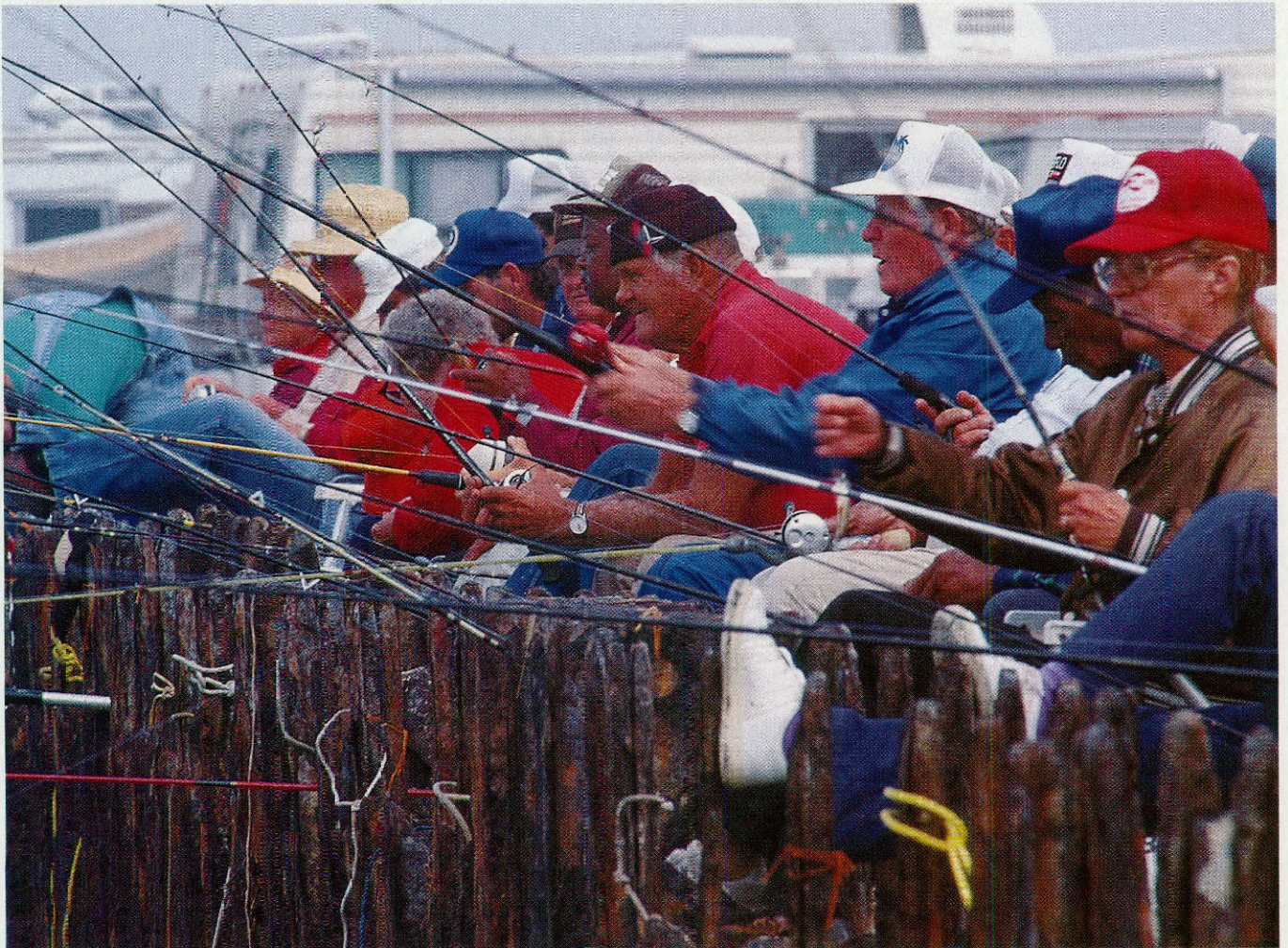


© ROBERT W. PARVIN

Pricey homes west of Austin have replaced much habitat favored by many wildlife species, big and small, endangered and still holding their own.



A condo development along the Texas coast cuts through fragile vegetation that holds dunes in place, which in turn protect bays and the mainland from storm surge.



Popular recreational spots along the coast such as Rollover Pass have felt the crush of people looking to the outdoors to escape the pressures of urban life.

timely rains tend to dampen any efforts to face the problem. Controversy inundated a recent effort to finally confront the impending water shortage and voters eventually trashed the plan that many felt did not look far enough into the future.

"There have been some attempts to conserve water, but on a national scale they are not yet very significant," said Hamilton. "And there's been no aggressive attempt to get alternate water sources."

A third area of Texas that has been growing rapidly is the Lower Rio Grande Valley.

"This area owes its boom times to free-trade frenzy," said Rose Farmer, a manager of the Sabal Palm Sanctuary near Brownsville. "I've watched this growth for the several years I've been here; the wildlife habitat is going very fast."

"From Rio Grande City to Brownsville, the Valley is filling with development due to the growth in binational industry," said Larry Ditto, refuge manager for the U.S. Fish and Wildlife Service. "The associated commerce, large warehouses and villages are springing up everywhere, occupying formerly prime agricultural land and cutting into wildlife habitat."

Some scientists believe wildlife and plant diversity along the Rio Grande in South Texas is greater than in any other area in the U.S. The slender thread of life along the river harbors endangered piping plovers, peregrine falcons, ocelots and jaguarundis. Since 1980, a team of citizens and scientists has been striving to create a 107,500-acre, 200-mile-long Rio Grande Valley Wildlife Corridor. This brave attempt to save vestiges of some of the most important habitat and wildlife in the United States now is being hampered by population growth.

"The population is growing with no planning and many times without adequate sewage treatment and solid waste disposal," Ditto said. He tells of at least eight new international bridges being proposed at various locations within the

© GRADY ALLEN



Why did the geese cross the road? To get to their wintering grounds. Texas provides winter habitat for much of the world's snow goose population.



Not much wildlife habitat is left on this piece of the Lower Rio Grande Valley that has been cleared for crops.



Colonias along the Rio Grande are notorious for their lack of planning and their inadequate water and waste facilities.

wildlife corridor project area. The construction of each bridge destroys at least 50 acres of wildlife habitat and in some cases the bridges themselves prevent the necessary movement of wildlife from one habitat to another.

Land use planning will be key to addressing the problems of the Lower Rio Grande Valley. "If we could pull everybody together, we could plan greenways, make provisions for agriculture, and maybe discover that those bridges aren't needed," said Ditto.

Urban areas are not the only places in Texas affected by population growth. The hardwood forests of Texas provide humans and wildlife some of the most productive habitat in the state. But recent economic pressures, brought about by a growing consumer population, are threatening to eliminate these valuable forests.

"The past five years have seen an enormous growth in the hardwood pulp industry," said TPWD biologist Jim Neal. Neal is the special representative for East Texas and is assigned to find ways to stop the hardwood forests' destruction.

"Most of this pulp, produced from trees only 35 to 40 years old, is used to produce glossy, high-quality paper—especially cartons for 12-packs of beer. We are trying to find ways to encourage landowners to let the timber age for 65-80 years, and sell it for furniture, flooring and cabinets," said Neal.

Older East Texas forests are dominated by a dozen different species of oaks, and include maples, elms, ashes and hickories. These trees harbor a diverse wildlife composition including 50 types of reptiles, 30 kinds of amphibians, 100 species of fish, 275 species of birds and perhaps 50 mammals.

"The problems I'm working on are tied directly to population pressure and consumers' demand for the type of products that are produced by younger forests. The answer is twofold: we need to try to look at ways to limit population, and look at alternative sources for

what the consumers want,” said Neal.

Said Jane Lyons: “We need to be smarter about how we use things, asking ourselves ‘do we mine the present at the expense of the future?’”

The dilemma of population growth is formidable, agreed Larry McKinney, Director of TPWD’s Resource Protection Division.

“Where wildlife and people come head to head,” he said, “we have altered landscape. And what attracted people in the first place ends up being destroyed. Roads and other impervious cover, invader species like fire ants, weeds displacing native plants, and springs drying up—all this affects the wildlife and the quality of life for the people living in these places.”

Sam Hamilton echoes these thoughts. “The demand for housing, transportation systems and food production is using hundreds of thousands of acres of wildlife habitat. The decline of every endangered species is probably in some way related to population growth and the resulting habitat degradation,” he said.

In spite of the gloomy assessment, the experts seem unanimous on solutions.

“Strong master plans are the key,” said Hamilton. “We need to inventory and identify sensitive areas and direct growth away from them. The tendency is to push out into the areas that are most sensitive, but there are relatively safe areas in the Austin and San Antonio area to develop.”

“That is what the Austin region’s Balcones Canyonlands Conservation Plan (BCCP) is all about,” said McKinney. “Conservation on a large scale, with an ecosystem approach. Economics and wildlife can coexist, although it is going to cost us more.”

This habitat conservation plan, directed at endangered species such as the black-capped vireo, is the result of four years of collaboration by environmentalists, developers, government agencies and others. The BCCP would be a national model for other growing areas faced with endangered species issues. The

© ROBERT W. PARVIN



Ranch Road 2222 carries a ever-increasing number of people to an ever-increasing number of homes and businesses in the hills west of Austin.

Making the Consumption CONNECTION

“Population growth, intensified by a consumptive and wasteful lifestyle, is the single biggest factor in the decline of wildlife in this state and the nation,” says Sam Hamilton.

Here are some ways to kick the consumption habit:

Haunt second-hand stores.



Your blender is smoking? Don't buy a new one. Find a repair shop. Same with other kitchen appliances and radios, television sets, etc.



Recycle, but don't stop with recycling. Reuse. Reduce.



Analyze your unrecycled trash. How can you eliminate 25 percent? Or more?



Get involved in creating a master plan for your community. Don't let houses, schools and businesses consume the sensitive habitat in your area. Encourage your city to offer incentives for lower water and energy consumption.



Carpool or use public transportation.



Conserve water: replace old showerheads with low-flow models and install new water conserving toilets.



Conserve energy: replace burned-out lights with long-lasting, energy-efficient bulbs.



Make a list of 10 things to do other than shop; post it on your refrigerator or in your car.

Are you thinking, “The way our economy functions, if no one buys stuff, no one works?” Indeed, the shift from high to low consumption, if achieved on a large scale, will require many workers to change jobs and all industry and business to completely restructure operations.

But what is the alternative? Might it be better to learn to live simply and to teach our kids to do so, than to watch our grandchildren struggle to survive in a world that has no room for wildlife and only an unhealthy, ecologically imbalanced place for people?

purpose of the plan is to ensure the continued existence of endangered and threatened species while still allowing public and private land development. One of the aims of the BCCP is to design a system of preserves that consists of large tracts of land rather than small isolated units. Its supporters say the plan not only would benefit the region's wildlife, but the presence of so much open space near a large urban area would contribute to the quality of life, to the quality of local streams and aquifers, would provide educational and recreational opportunities and would enhance property values.

Two-thirds of the preserve system, 19,000 acres, has already been assembled. Recent setbacks, like a failed Travis County bond election, have not discouraged local officials and private business representatives from continuing to work to design alternative approaches in completing the regional preserve system.

Someone once told me that if you travel by air and don't look out the window, you're not getting your money's worth. Texas seems so still and silent from above. The earthy hues of soil and vegetation are calming to the eye. As the hills rise and the rivers drop, the landscape seems to breathe.

The bird's eye view displays a spider web of roads punctuating each vista. Every so often, rivers are delayed by sparkling reservoirs. As we come in for a landing, the slim county roads are replaced by traffic-laden freeways. Mile after mile of peaked roofs pass below. Here is a landfill, here is a bridge, here is a shopping mall.

From above, it's easy to see that human-induced changes have far-reaching, inevitable consequences. The results of past change show us that in the future we must use wisdom, care and restraint. Earth and water can benefit us all—human, plant, or animal. “The key,” as former Secretary of the Interior Stewart L. Udall once said, “is wise stewardship.” *Former Texan Kristi Streiffert now lives in Coulee Dam, Washington.*

ANIMAL TRACKS



© WYMAN MEINZER

Even something as small as a beetle can leave tracks on a sandy surface such as this.



© STEPHEN G. MAKA

A snapping turtle's tail also leaves a track.



© PAUL REZENDES

A raccoon's front (top) and rear (bottom) tracks show five toes and a C-shaped palm pad.



© GREGORY K. SCOTT

A porcupine has been down this snowy trail recently.

© WYMAN MEINZER



This muddy surface recorded the tracks of a coyote, a raccoon and an opossum.



© ANGIE BERCHIELLI

Frog tracks are seen frequently near water.

© WYMAN MEINZER



This interesting pattern is a collection of sandhill crane tracks.



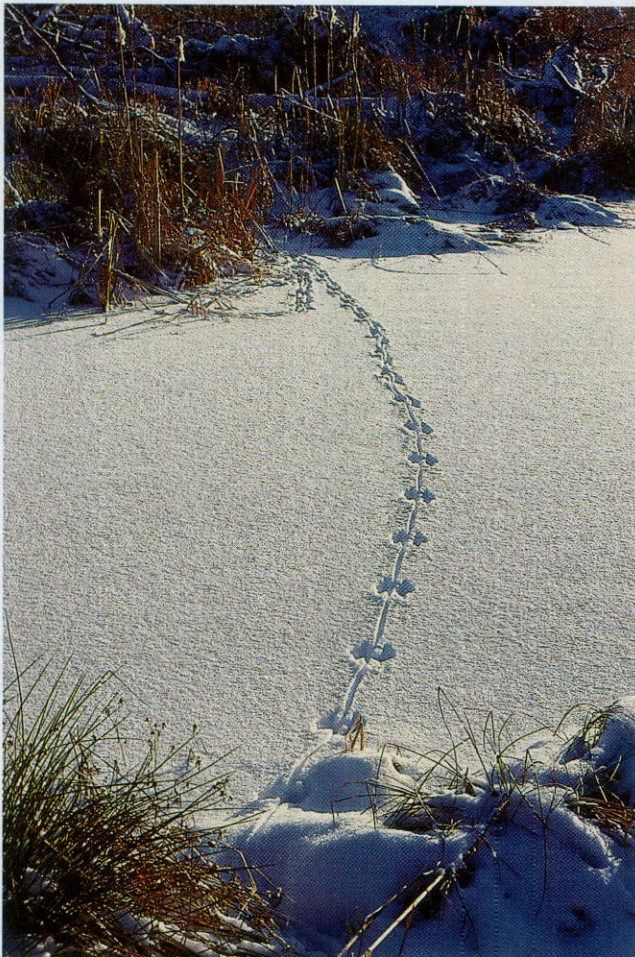
© PAUL REZENDES

The webbed foot of a Canada goose made this track.



© WYMAN MEINZER

A lumbering tortoise leaves tracks in its wake.



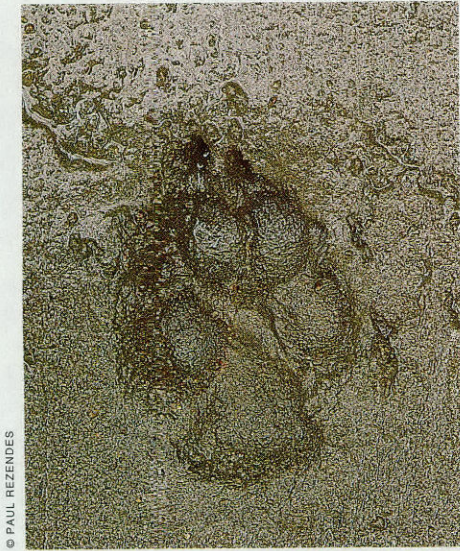
© GREGORY K. SCOTT



© GREGORY K. SCOTT

Muskrat tracks show four toes on the front and the back. Tail drag also is part of the track.

This running muskrat left a slightly different trail pattern from the one above.



© PAUL REZENDES

All canines walk on their toes, not on the full foot. The red wolf's track, above, is somewhat oval-shaped like the coyote's.



© GRADY ALLEN

Sand captured these tracks of a loping coyote.



© PAUL REZENDES

Coyote tracks show the front foot making a deeper impression than the hind foot.



© PAUL REZENDES

A strutting turkey left these tracks from its feet and its dragging feathers.



© PAUL REZENDES

The white-tailed deer's track shows a heart-shaped cloven hoof with two appendages called dewclaws just above the hoof, as seen here.



© WYMAN WEINER

White-tailed deer leave an alternating walking pattern, with the hind track superimposed on the front track.



© ANGIE BERCHIELLI

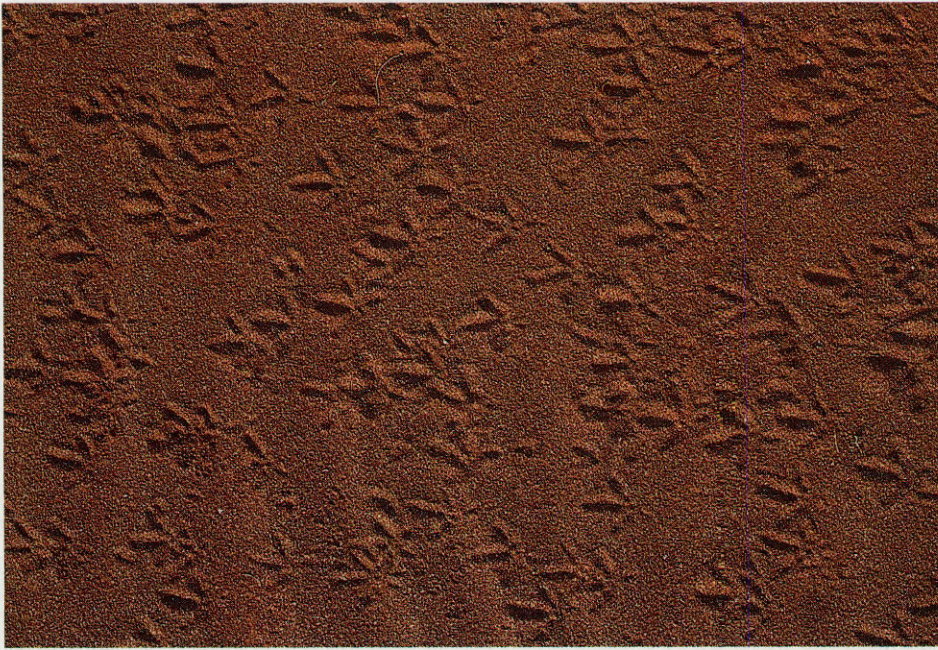
The turkey leaves a distinctive three-toed track.

© GRADY ALLEN



These tracks show where an eagle swooped down to capture a rabbit.

© WYMAN MEINZER



Scaled quail tracks pepper the sandy soil.

This track shows the long toes of the great blue heron.

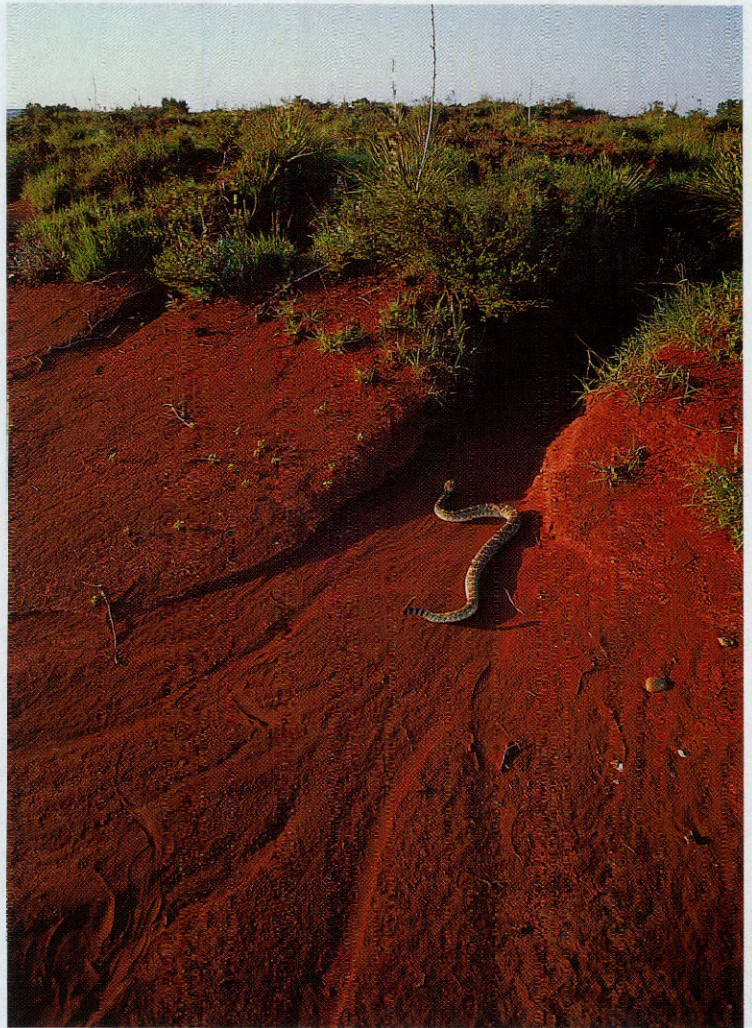


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© WYMAN MEINZER

This track reveals that a roadrunner has passed this way.



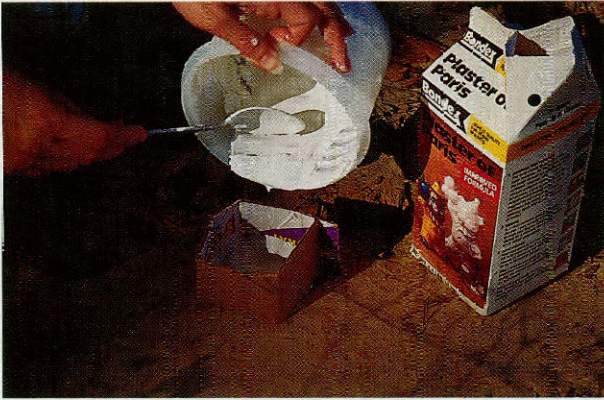
© WYMAN MEINZER

An animal doesn't have to have feet to leave evidence of its presence, as this western diamondback rattler shows.



© PAUL REZENDES

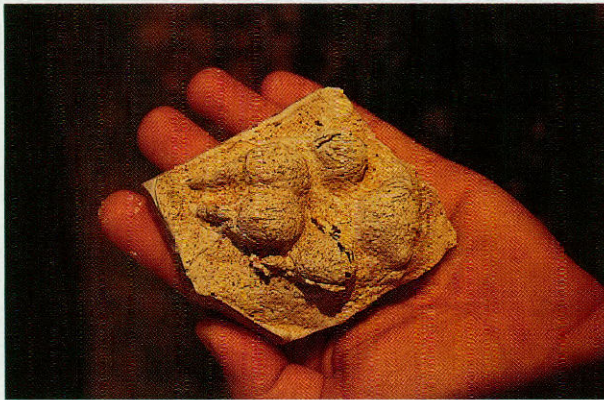
Tracks of a gray fox and a wood duck mingle in the mud.



You may want to recreate an original cast of a track you have found. To preserve the track, you'll need some plaster of paris and a strip of cardboard.



Make a form from the cardboard strip by notching the ends and putting the ends together to form a collar around the track. Next, mix some plaster of paris, following the instructions on the package. Pour the plaster mix into the cardboard collar and let it harden 10 to 15 minutes.



When the plaster is dry, remove it and brush away any dirt to reveal the imprint of the track. Label the back of the cast with the date and location to make a study aid for improving your tracking skills.



PHOTOS © MICHAEL JAMES

TEXAS' Other CACTI

ARTICLE BY ARTURO LONGORIA,
PHOTOS BY PAUL M. MONTGOMERY



YOU MIGHT HAVE TO LEAVE THE ROADWAY AND SEARCH THE BACKCOUNTRY TO SEE THE COLORFUL BLOSSOMS OF SOME OF OUR STATE'S MORE SECRETIVE CACTUS SPECIES.

A Texas panorama without cactus seems incomplete. But the flat padded prickly pear that usually springs to mind when visualizing Trans-Pecos deserts and South Texas chaparrals represents only one of many cactus species that embellish the region. From the thimble-size mulato of the Big Bend to the creeping lady finger of the Rio Grande Valley, Texas's other cacti might best be thought of as the state's most alluring floral treasures.

Members of the cactus family, called Cactaceae, range from Texas's northern boundary at the Red River to the Rio Grande along the Mexican border, and from the Pineywoods in the east to the Hueco

Bright red-orange flowers of the claret cup cactus bloom at Enchanted Rock State Natural Area, above left. The guapilla, right, looks like a cactus but belongs to a different family.





The spiny star cactus, left, is a common cactus of the Rolling Plains. The peyote cactus, below, could be overlooked easily.



Mountains near El Paso. Pervasive and persistent, cacti have withstood the abrupt climatic changes that have swept across the state's landscape. Few plant species can match their springtime blooms or their ability to survive in hostile environments.

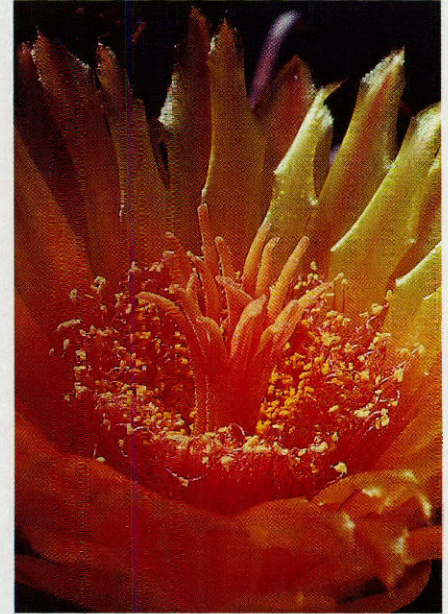
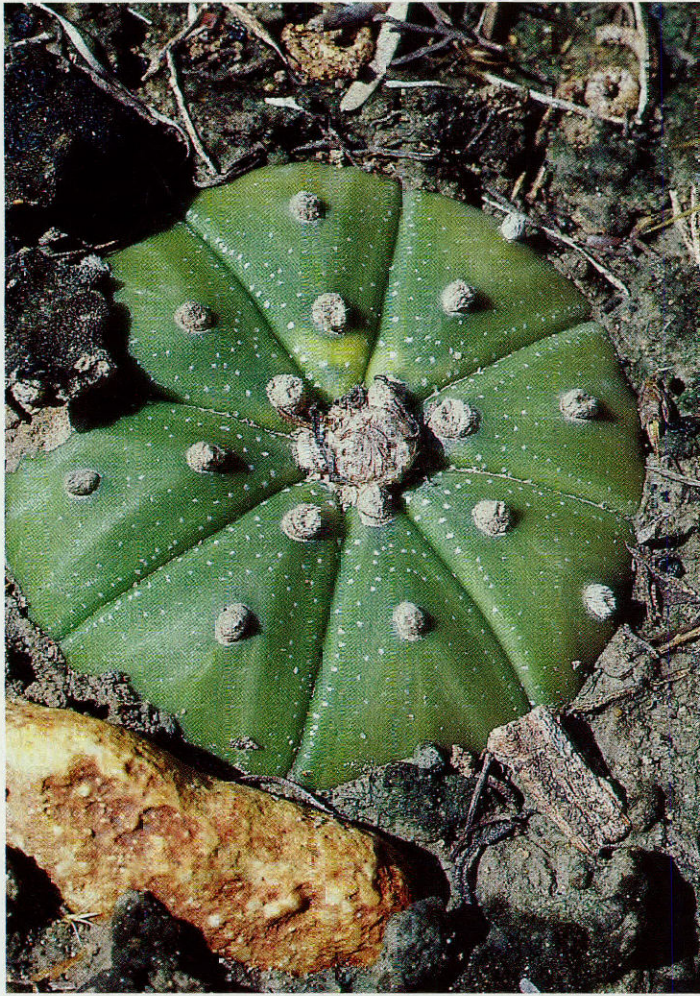
Yet unlike the flamboyant clumps of prickly pear or nopal that line fencerows and crowd the prairies, Texas's other cacti tend to live secretly. Some species, such as the dainty pencil cactus or sacasá, found between Laredo and Mission, prefer the shade beneath shrubs and trees. And cacti such as the Texas night-bloom-

ing cereus of the Trans-Pecos, or the pitahaya found along the state's southern coastline, bloom only at night. Of course, cacti that have adapted to harsh conditions by using another plant as a sun screen or by blooming during low evaporation periods have enhanced their own chances of survival.

Still, secrecy can be carried only so far. When it comes time for plants to transfer pollen from one flower to another, Texas's other cacti show their true colors, a departure from a life-form whose "attitude" seems unfriendly and reclusive at best.

In the springtime, these hermits of the plant kingdom become genuine prima donnas. The beauty of rocky hillsides between Del Rio and the Big Bend studded with the carmine blossoms of claret-cup cactus, or mesquite-pocketed South Texas savannas blanketed with the pitaya's royal-pink flowers easily match the splendor of any meadow laced with bluebonnets and daisies.

Texas's other cacti display a collage of colors ranging from the yellow-gold nipple cactus of Central Texas to the deep maroon-brown devil's claw barrel of the Texas/New Mexico border.



Overcollecting has made the sea urchin cactus, left, one of the rarer in the state. The scuticwest barrel cactus, above, sports a golden-yellow bloom.

Texas harbors 11 to 16 genera, or groups, of cacti, which are divided further into about 200 species and subspecies. Perhaps the genera and species numbers are somewhat arbitrary since plant taxonomists—those who study the orderly grouping of plants—may be second only to historians when it comes to disagreement. The number of genera and species, therefore, tends to swell or shrivel as cacti get lumped into large groups or divided into smaller units, depending on the swing of the academic pendulum.

But for those who simply want to revel

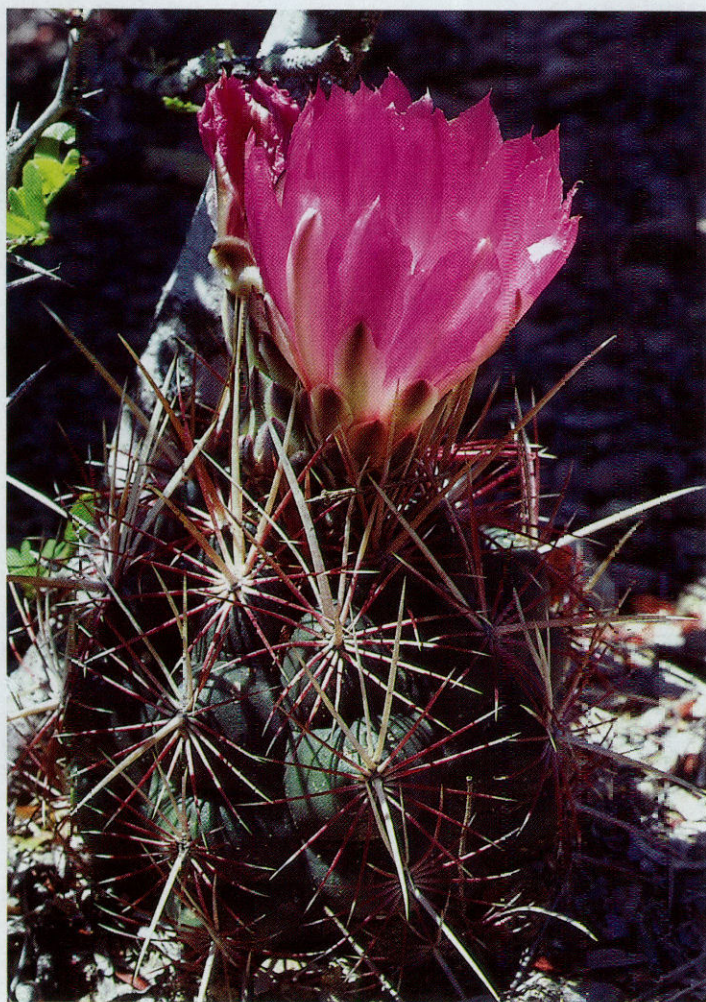
in nature's wonders, the taxonomist's debate seems moot. Cacti, after all, got along just fine before man came along; even though man has insisted on not only naming and classifying cacti but giving them reputations as well. Some species have even acquired dual personalities, since a particular plant might be both hated and revered.

The horse crippler or viznaga of the Rio Grande Valley, for example, strikes fear in the hearts of most trail-riding *vaqueros*. Yet, it also can bring thoughts of celebration. This squat succulent with spines vicious enough to injure a

horse or cow also makes a rich candy for many Mexican feasts.

Desert Christmas cactus, or *tasajillo*, likewise enjoys a love-hate reputation. Common throughout Texas, *tasajillo* provides an excellent perimeter fence, or a deterrent against burglars when planted under windows. The *tasajillo*'s long, sharp spines have a sheath that remains embedded in its victim, and will make any Peeping Tom think twice before venturing too close to the house again.

Many of Texas's most interesting cacti are found in a region that parallels the



The glory of Texas cactus, left, is restricted to a small area of South Texas. Desert rodents often eat the fruit of pitayas, above.

Rio Grande from the southern counties of Hidalgo and Starr up to Big Bend, where they then extend into the Guadalupe Mountains along the Texas/New Mexico border. A few species, however, are limited to single counties.

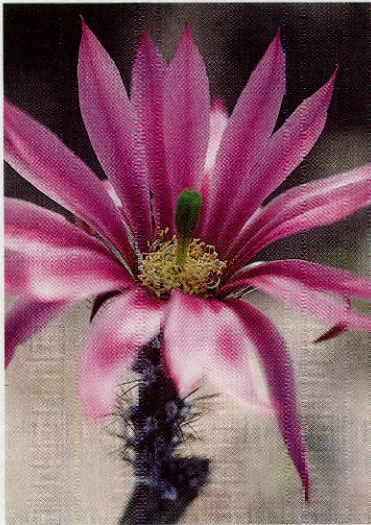
Members of the genus *Mammillaria* (including the genus *Cryphantha*)—the name deriving from the nipple-shaped tubercles that protrude from each plant—range throughout South and West Texas. These same cacti usually have spines that act as shading mechanisms for the plants. These downturned spines also collect dew, causing the water droplets to trick-

le near the base of the plant to be used by the root system. Generally, *Mammillarias* grow no larger than a baseball, and some species grow in clumps, with each individual cactus no bigger than a small marble.

Numerous barrel cacti—*Echinocactus*, *Anastrocactus*, *Ferocactus*, *Astrophytum*, *Thelocactus*, and *Neolloydia*—also grow in West and South Texas, and employ the same protective devices as *Mammillaria*. One of the most intriguing, the glory of Texas, which produces brilliant fuchsia flowers, confines its range to just two counties: Brewster in

West Texas and Starr in South Texas. Another barrel cacti, the Lower Rio Grande Valley barrel that can grow a foot tall and 10 inches thick, clings to the South Texas border from Brownsville to Eagle Pass. The various “fishhook” and “hedgehog” cacti are restricted to the arid lands along the Rio Grande from around La Joya in Hidalgo County west to El Paso County.

One of the strangest species of cacti, the living rock cactus, grows between the towns of Langtry in Southwest Texas and Presidio in the Big Bend. The living rock doesn't even look like a cactus, instead



Often hidden among taller shrubs, the pencil cactus, left, is easily overlooked. Tiny white flowers adorn the nipple cactus below.



resembling a flower-shaped rock. And speaking of flowers, the living rock blooms in the fall instead of the spring.

Peyote cactus grows in South and West Texas, and has been used in Native American religious ceremonies for centuries. The plants contain powerful chemicals called alkaloids that, when ingested, affect the nervous system, causing hallucinations. It is illegal to possess this species without the proper permits.

Although not as well-rounded a food source as the prickly pear, many of Texas's other cacti produce edible fruit. The "strawberries" from the genera

Echinocereus and *Acanthocereus* make a tasty addition to salads, or can be eaten fresh in the field if you first remove the spines. Also, the pin cushion's little "chilies" and the fruits of all barrel cacti taste sweet, ranging from a cherry-like flavor to a more-or-less strawberry tang.

Wildlife also utilize many types of cactus other than prickly pear for shelter and food. Candle cholla, tasajillo, cane cholla and tree cholla—all belonging to the same genus as the prickly pear—provide nesting cover for small birds. Coincidentally, the loggerhead shrike—sometimes called the butcherbird—often

impales its prey on tasajillo spines. And wood rats line the openings of their burrows with tasajillo thorns to discourage predators. Wild turkeys also seek out the tasajillo's bright red fruit, as do white-tailed deer that sometimes consume the plant's green stems, called joints.

Small desert rodents often eat the fruit of pitayas, pin-cushion cactus and barrel cactus. And many birds, such as cactus wrens and mockingbirds, consume cacti fruit when available.

Unfortunately, a number of Texas's other cacti have been pushed near extinction by commercial collectors, and sev-



Cliff brake ferns surround this claret cup cactus. Both species adapt easily to harsh, dry habitats such as Enchanted Rock.

TIPS FOR IDENTIFYING TEXAS CACTI

Learning to recognize the different types of cacti—whether confining observations to the large groups of genera or taking it a step further and memorizing the species—broadens one's appreciation of nature and enhances outdoor skills. Cactus observation can be coupled with an afternoon of bird watching, or simply can be part of hiking through the desert, the Hill Country or the brushlands.

The cacti of Texas comprise a diverse grouping of plants, some of which attain great sizes, while others never grow much bigger than a marble or thicker than a pencil. In the brushlands of South Texas, spotting members of the genera *Mammillaria*, *Wilcoxia* and *Echinocereus* demands a sharp eye because they may be hidden under other plants; which, of course, makes it all the more fun.

South and West Texas have a vari-



The Chisos agave is not a cactus but a member of the lily family.

ety of plants that resemble cactus, but belong to other plant families. The century plants, agave or maguey, may look like cactus, but they belong to the family *Amaryllidaceae*. The guapilla has

been mistaken for either a small century plant or a cactus. It is neither, instead belonging to the family *Bromeliaceae*. The dark green, thorn-ridden and leafless plant called junco or all-thorn often is misidentified as a cactus. However, it belongs to the family *Capparidaceae*. Likewise, the thorny, gray shrub called lotebush or clepe, though sometimes appearing leafless, is not a cactus, but instead a member of the family *Rhamnaceae*.

The excellent field guide, *Cacti of Texas and Neighboring States* by Del Weniger, published by The University of Texas Press, provides the amateur and professional alike a quick and easy reference for identifying Texas cacti. A more academic source of information, and one that covers the entire United States, is Dr. Lyman Benson's *Cacti of the United States and Canada*.



The hand spined cob cory cactus, left, is infrequent throughout its range. The living rock cactus, above, is Texas's only cactus that can be found blooming in December.

eral species are listed as endangered or threatened. Despite their ability to endure the harsh conditions of the desert and brushlands, most of Texas's other cacti make poor choices for cultivation.

"Most folks don't know how to treat (cacti)," noted Dr. Robert Lonard, professor of biology at The University of Texas–Pan American and the author of several guides to the trees, shrubs and grasses of South Texas. He explained that too often people over-water cacti and keep them in areas with insufficient light. Succulents, which include all cacti, have evolved unique methods of con-

serving moisture and dealing with high temperatures. Because they have adapted to dry conditions, they cannot tolerate a waterlogged environment. And unlike most plants that take in carbon dioxide throughout the daylight hours, and then convert it into simple sugars via photosynthesis, cacti employ a method called crassulacean acid metabolism that fixes carbon within the plant at night. This allows cacti to keep their pores, called stomata, closed during daylight, thus reducing water loss. But because carbon from carbon dioxide has been stored in the plant overnight,

photosynthesis—which taps the sun's energy and therefore can occur only in daylight—goes on uninterrupted.

No wonder Texas's other cacti hold a special place in the hearts of those who wander the backlands. When the rainless springs and scorching summers come, as they often do, and the terrain lies void of sunflowers and firewheels, hope nevertheless comes in yellows, golds and reds, emerging from solitary petals protruding from spiny stems. ★ *Arturo Longoria is a freelance writer, photographer and college instructor living in McAllen.*

Pure & Simple



How Beaumont city officials created a wastewater treatment facility using nature's own purification plant—a freshwater marsh.

By *PHYLLIS STAFF, PH.D.*

Cormorants, great egrets, blue herons and cinnamon teal dot the landscape. Miles of trails beckon joggers, hikers and horseback riders. There is so much to see and do at Cattail Marsh, the casual visitor might never recognize it for what it is: a tertiary water purification facility, transforming Beaumont's treated sewage into clean water that seeps into Hildebrandt Bayou.

In 1985, the U.S. Environmental Protection Agency announced its 1990 parameters for the City of Beaumont's wastewater discharge permit. Water utilities engineers in Beaumont knew their treated effluent could not meet such stringent standards. They considered three alternatives. They could pipe treated water to the Neches River, a distance of more than six miles, at a cost of \$20 million. They could expand their current water treatment plant at a cost of \$40 million. Or, as a third alternative, they could build an artificial wetland at an

estimated cost of \$18 million. They chose the third option, and Cattail Marsh was the result.

Recently, S.A. Webb, Beaumont's director of public utilities, led visitors to the facility on a tour of the eight mini-marshes that comprise Cattail Marsh and the original marsh adjacent to them. Nearing the first of eight man-made cells or mini-marshes that purify Beaumont's wastewater, Webb explained how artificial wetlands work.

"This is an ancient technology used by nature for millions of years as a water cleaner. In fact, if you look along the banks of any river or lake, you'll see the same thing happening today. The boggy areas along banks are cleaning the standing water before it empties into the river or lake. It's a natural cleaning process."

The effectiveness of the purifying process depends on interactions of a number of natural phenomena. Wind, rain, birds and animals agitate the water, causing atmospheric gases to dissolve in it. Then the reedy marsh plants, a variety of rushes planted in most of the cells, absorb the gases through their stems as nourishment. In a curious reversal of the way many of our more familiar plants operate, oxygen in the rushes moves from stems downward to plant roots. Oxygen leaks through those roots back into the water, creating an oxygen-rich, life-sustaining liquid.

Other types of plants such as duckweed, floating in tiny leaflets on the water's surface, and coontail, just below, capture ammonia and ammonia by-products.

They sequester the chemicals for the duration of their life. When they die, the chemicals escape and are assimilated by other plants. The plants' cellulose skeletons, accumulating on the bottom, serve as a culture medium for bacteria that aid in the removal of ammonia, nitrogen, phosphates and various metals.

Effective functioning of the marsh depends on ambient temperature as well as plant life. Hot, still summer months bring problems. Most vexing is a reduction in the level of dissolved oxygen in the water. Small motor boats, called Go Devils®, with large propellers like giant kitchen mixers, increase the absorption of gases by agitating the water. However, at times the problem becomes so great that agitation is insufficient.

Dry weather also can slow the process. When there is no rain, even for as little as two weeks, water movement slows both within and between cells. Motionless waters serve as breeding grounds for mosquitoes and contribute to unpleasant odors.

Water is the beneficiary as well as the backbone of all these processes. Before it flows into Cattail Marsh, wastewater is pretreated by clarification. Then it flows through a trickling filter, a treatment device utilizing biological sludge that actually removes many contaminants. From the treatment plant, it flows downhill into the first of the marsh cells.

Gravity moves the water through the entire marsh system including the eight cells of Cattail Marsh, through old Willow Marsh and to its final destination,



© S.A. WEBB

Eight mini-marshes comprise Cattail Marsh, the artificial wetlands system that purifies Beaumont's wastewater.



Hildebrandt Bayou. During construction, workers were careful to build each cell slightly lower than the preceding cell, so that water leaving Cattail Marsh is about four feet lower than water entering it. A thick bed of clay contains the water and supports both Cattail Marsh, about 650 acres, and adjacent Willow Marsh, about 250 acres.

The visitors' tour followed the water's journey, beginning at cell one on the northern edge of the facility where water enters the artificial wetlands. Birds congregate densely in this area of the facility, and they were present in abundance that morning.

The first cell functions primarily to oxygenate rather than purify the water, so nothing was planted there. Its open water attracts birds that feed on small fish such as sunfish. "The birds brought in most fish," said Webb. "But we stocked the cells with gambusia, a minnow-sized

fish that thrives on mosquito larvae." A purple gallinule eyed the tourists warily as they moved toward the next cell, densely planted with bulrushes.

"California bulrushes do the heavy work in most cells," said Webb. In the year since Cattail Marsh was completed, they have developed into thick clumps that will serve as nurseries for eggs and baby birds if water levels remain constant. However, maintaining a constant water level is not as easy as it might appear. Under normal weather conditions, ranging from arid, windless days to heavy downpours, between 130 and 220 million gallons of water flow through the system each day. Such extreme fluctuations can cause serious problems for birds nesting in the rushes. Rising waters may drown their eggs, while falling levels hamper incubation.

"It's something we're learning to deal with as we go. We know very little about

how marshes really work, so every day we face unexpected challenges. But every problem teaches us something new," said Webb as we continued southward.

Open water in the next cell marked areas where the water reached depths of about eight feet. Because rushes and other marsh-loving plants cannot reach the bottom to take root at such depths, they are clear of plant life. Webb moved quickly past the open water to the next cell.

Here clumps of cattails stood withered and brown. "We'd like to get rid of our cattails," noted Webb. "They were introduced by the birds, and they're not particularly beneficial to the wetlands. Besides, they are extremely messy plants. They produce so much debris that cells must be cleaned more often than they would without them. When rushes and other marsh-loving plants grow too thick, they cannot perform their jobs as

Gravity moves
the water
through the eight
cells, each of
which is slightly
lower than the
one before it.



© S.A. WEBB

well. Then we have to drain the cell and cut the old plants off just above the soil line. The remaining roots will produce vigorous new growth that provides more oxygen to the water.”

He hopes that harvesting plant materials will have to be done only about once every 10 years. The process is not difficult, but it is time-consuming. And, although the system can operate with one or more cells out of commission, the purification process may not be as effective if other conditions, such as temperature, are less than optimal.

Because the final cells augment cleaning power rather than adding new functions, Webb moved quickly through them and into old Willow Marsh. Although completely drained during the 1930s, it is now fully restored by water from Cattail Marsh. Willow Marsh is thick with palmettos and trees, so it serves as habitat for birds not normally seen in the more open Cattail Marsh. Wood

storks and white ibises can be seen around the unpaved trail.

When it previously functioned as a natural marsh, Willow Marsh was wet only nine months of the year, drying up during the summers. During the dry period, native vegetation inundated by marsh waters for nine months would regrow. To duplicate this natural cycle, parts of Willow Marsh are drained each summer to allow native grasses to regenerate.

Learning how to promote the marsh vegetation regrowth is only one of the problems associated with attempting to use an unfamiliar technology. Just getting the permits to build and operate the facility posed monumental difficulties.

When planners decided to build an artificial wetland in 1985, they discovered that discharge permits had to be obtained from 13 state and federal agencies before construction could begin. It took seven years to obtain those permits. It appeared that every agency with even a remote

interest in the area wanted in on the act. They dispensed piles of paper and mountains of regulations.

“Difficult? No, it’s not just difficult to get clearance from that many agencies. It’s almost impossible!” said Webb. But, because state and federal bureaucracies were keenly interested in how this facility, the first of its kind in Texas, would work, they helped guide him through the maze. “I think we’ve made it a little easier for the next wetlands project. But still, getting so many permits never will be easy, even now that Cattail Marsh is working well.”

“Working well” understates the successes of this facility. By any of three measures, the project must be declared a remarkable accomplishment. First, the water leaving Cattail Marsh is consistently cleaner than required by the 1990 EPA standards. It is, in fact, cleaner than Beaumont’s municipal water supply.

Second, the project, although esti-



Could an Artificial Wetland Work in Your Town?

mated to cost about \$18 million, was completed for only \$12.5 million. In addition, land purchases totaled about \$1 million.

Third, the cost of daily operation and maintenance is negligible. Because there are no moving parts or pumps, there can be no mechanical breakdowns. Routine inspections consist of monitoring flow structures, which are wooden barricades that regulate the amount of water going into each exit pipe, water levels and plant materials.

In addition to providing direct benefits to Beaumont taxpayers, the facility has augmented ecotourism and recreational opportunities in the area. The number of species of birds seen in both Cattail and Willow Marshes is astonishing. Visitors counted at least 40 separate species and subspecies on the day of our tour. Wildlife photographers and birders undoubtedly will spot even more.

Recreational opportunities are plentiful. In adjacent Tyrell Park, horses are available for riding. Bicycles are also welcomed. Eight miles of levee trails are used by runners, hikers and riders. Additional trails wind through the old marsh as well.

Cattail Marsh has provided a solution to wastewater purification that simultaneously satisfies the needs of people, wildlife and the environment. With so many benefits to offer, it truly deserves to be called remarkable. ★

Dr. Phyllis Staff is a psychologist and freelance writer living in Midlothian.

The answer depends on the size of your city and the acreage available to it. In planning Cattail Marsh, officials determined the number of acres needed for the facility on the basis of the amount of ammonia and other pollutants to be removed. Acreage needed will increase as the population to be served increases. In giant cities, the land requirements may be too great to make artificial wetlands feasible.

In addition, the interaction of factors that make such a facility work is not yet well understood. Hours of sunlight, wind speed, temperature, water depth, plantings and other factors interact and influence operations in an unpredictable fashion.

Finally, many state and federal agencies must be consulted before discharge permits can be obtained. Getting permits simultaneously from a dozen or more agencies requires both tenacity and patience.

If your city planners have sufficient resources and patience, artificial wetlands offer certain unique benefits. The plants that make the system work thrive in many areas of the country, making the tech-

nology available to most regions. And operation and maintenance costs generally are well below those of conventional treatment systems.

Many types of pollutants can be removed within a single system. Purified wastewater can be used for agricultural or industrial purposes or discharged into streams or rivers.

An artificial wetland does not require the presence of a natural marsh or boggy area. Phoenix and Albuquerque are using variations of Cattail Marsh, but their purified water is allowed to evaporate rather than being returned to a river or stream.

Artificial wetlands can be a boon for areas with significant potential for flooding, because cells can be designed to hold water from runoff or floods. The extra four feet of storage area above normal cells levels in Cattail Marsh were able to contain some of the runoff from Beaumont's heavy rains of October 1994.

To learn more about artificial wetlands, contact Beaumont's Office of Water Utilities at 409-866-0023.

Visiting Cattail Marsh

To reach Cattail Marsh, turn south off Interstate Highway 10 at the Walden Road exit. Follow Walden Road about a mile to the entrance to Tyrell Park. The entrance to Cattail Marsh is about a mile south inside the park. Bear left at the Y, and turn left into the marsh at the sign.

Cattail Marsh is open from 7 a.m. to 5 p.m. daily. Photography blinds are not yet available, and permission to set up your own blind must be obtained before you go. Call S.A. Webb at 409-866-0023 for more information.

School field trips are welcomed by the staff at Cattail Marsh. A biologist will guide at no charge. Call 409-866-0023 for information and reservations.

For more information about Beaumont, call the Convention and Visitors Bureau, 409-833-4622 or 800-392-4401.



BILL BEAVES



FREQUENCY FLIERS

BIOLOGISTS AND VOLUNTEERS ENDURE LONG NIGHTS IN BIG THICKET RIVER BOTTOMS TO TRACK RADIO TRANSMITTER-EQUIPPED BATS. THE PROJECT SHOULD SHED SOME LIGHT ON THE STATUS OF THESE SECRETIVE FLYING MAMMALS.

By MIKE DIXON

It is after midnight and three of us, standing ankle-deep in tannin-stained water, are listening closely to a radio receiver. The “who? who? who-who-ah” of the barred owls seems to have stopped, but the bronze frogs continue to twang. We are in a baygall in Village Creek State Park, surrounded by the broad bases of tupelos and gum trees that spread overhead. I have almost forgotten the mosquitoes buzzing around my ears and the snakes slipping by in the water. Each of us is focused on the receiver, trying to ignore the static while we listen for the tell-tale blip of sound that will indicate “our” bat is back.

The first week of summer finds most college students recuperating from final exams or looking for summer jobs. But last summer five of us, both students and teachers, gave up our first week of summer vacation to join a group of volunteers and government employees looking for the southeastern myotis, a little-known bat that just barely makes its way into East Texas.

Bat biologists have recognized that this species may be declining, but more information is needed. The Texas Organization for Endangered Species (a private group) has placed the southeastern myotis on its “watchlist,” but Texas does not list the species as threatened or endangered.

Southeastern myotis bats live throughout the southeastern United States. They fly out at night, usually from roosts in caves, to feed over water on mosquitoes and other small flying insects. These bats are small and usually gray-colored, although bright orange individuals—presumably bleached by ammonia fumes in their roosts—are common. Females typically give birth to two young, whereas most bat species produce only one. In East Texas no caves are present, but in areas like the Big Thicket there certainly is no shortage of water or mosquitoes. We wanted to identify roosts these bats use. In the absence of caves, they probably would use large hollow trees.



SOUTHEASTERN MYOTIS BAT © MERLIN D. TUTTLE, BAT CONSERVATION INTERNATIONAL

Volunteers learn how to attach a radio transmitter to a bat.



© PAT MORTON, TPWD

Biologists Peggy Horner, right, and Jennifer Barrow place a mist net across a trail to capture bats.

We spent our first day learning the methods of bat capture and radio-tracking. Bats usually are caught by stretching a net across a trail or a body of water. These open areas are like highways to bats. We used nets made of such fine thread that they are hard to see unless you stand right next to one. They are called "mist nets" because of their appearance. It takes a surgeon's hands and patience to remove a captured bat. Sometimes they become so entangled that the net must be cut to release them unharmed. Peggy Horner and Pat Morton, biologists with the Endangered Resources

Branch of Texas Parks and Wildlife, weighed, measured and identified the captured bats, a difficult task. Radio transmitters were glued to the backs of the largest females so we could follow the signal to track their activity and discover roost sites.

Our first two nights of netting yielded just four bats after eight long hours of waiting in the darkness. Of these, three were myotis, but only one was large enough to carry a radio. We used a medical-quality adhesive to attach the tiny radio, smaller than a dime but a little thicker than a nickel, to the bat's back. The radio includes a transmitter, fine-tuned to a specific frequency, an antenna that extends along the animal's back, and a battery. We don't want to interfere with the bats' flying, so everything must be very light. This constrains

the size of the batteries, which limits their life and the power of the transmitter's signal. Even with all the advances made in the miniaturization of electronics, we couldn't hear the radio signal for more than about 100 yards through the trees. We checked that the radio was working and then released her at the point of capture.

We never heard the radio signal again.

The third night we caught two myotis. One of them was a youngster that



GLEN MILLS

couldn't have been more than about six weeks old and the other was a large female that received a radio. We searched for three hours the following afternoon to pick up her signal but had no luck. That evening several teams spread out through the trails, baygalls and sloughs of the area hoping that at least one group would pick up her signal.

We were armed with radio receivers and bat detectors. These devices detect bat vocalizations that are too high for our hearing and then convert and amplify the signals into noises that we can hear. Our bat detectors told us shortly after the sun went down that bats were out, but our tagged female hadn't yet appeared.

Suddenly our radio chirped. Once. Twice. And then silence.

I reached for the walkie-talkie buried in my backpack to notify the others that we had heard her signal. Before I could transmit our excitement, another group reported that she was near them. She had quickly flown through the baygall where we were standing and was now flying around them. Had she been roosting near us? Was she feeding in the area? We wandered about listening for her. Broad-banded water snakes loitered in the vegetation around us, while mollies slept in the water. Gulf Coast toads hopped and chorused. We listened until after 1 a.m., but none of the three groups stationed in the forest heard her again.

The next day was Friday, my last day to work on the project. I was scheduled to work from noon until 3 p.m. This was my last chance to find a roost. My team spent the first two hours walking the areas from the night before, looking for possible roost sites and always listening to the radio. After finding nothing, we regrouped. The two quick signals we had heard the night before suggested that our female had come from the east. Since it was our last chance to find a roost site, my team decided to walk that direction, even though it might mean wading through deep water. We walked along a slough, looking for large trees with signs of rotten centers, continually rotating the radio antenna listening for her signal.

Finally, we heard it. I had paused to examine a large, dead gum tree when the signal suddenly sounded loud and clear. After days of chaotic static, the distinct repetitive rhythm was like hearing my name called out in a crowd. I wanted to yell. I called the other groups combing the area to announce success. We were close. We first thought it was coming from the tree that I was standing next to, but the signal was not consistent. Project leader Peggy Horner, who had come running in response to our message of triumph, tried moving to higher ground. She walked next to a large tupelo and suddenly stopped dead in her tracks. Coming from the center of this tree, out of a large opening where the base had partially rotted away, were the unmistakable sounds of bats. We didn't need the radio or even the bat detector to hear their squeaks. We gathered together in awe. A large pile of guano in the middle of the tree indicated that the

Bats become entangled in the mist net while traveling to feeding areas.



GLEN MILLS

A radio transmitter glued to the bat's back will fall off in two weeks. Before it does, biologists hope to find the bat's roost.



GLEN MILLS

The southeastern bat feeds on insects living on the surface of slow-moving water in bottomland hardwood forests.



EIL. REAVES

bats had been there for a while. We took pictures of the tree like hunters next to a trophy. We couldn't see the bats until one accidentally fell out, righted itself and circled a few times before reentering.

With less than a half hour of time left in my work week, our group had succeeded. Others would continue the research, describing this roost site, only the second known in Texas, and looking for more bats and more roosts. The data we collected, and more like it, will be compiled and used to help make management decisions. I don't know if the southeastern myotis will be deemed threatened or if its habitats will need protection. But after wading through the swamps of East Texas, watching for snakes and listening to frogs, I consider the vision of that one bat flying around its roost to be a great personal reward. I hope the southeastern myotis survives in Texas long enough for my young son to one day see them too.


★

Mike Dixon is a biology professor at Texas Wesleyan University in Fort Worth.

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University students Katy Mirowski and Mitch Sternberg helped discover this southeastern bat roost. About 30 female bats and their young were inside this hollow tree in May.



SURVEYING FOR RARE BATS IN EAST TEXAS

© MERLIN D. TUTTLE, BAT CONSERVATION INTERNATIONAL

By PEGGY HORNER

The East Texas Rare Bat Survey began in spring 1994 to determine the current distribution of two potentially rare bat species, the southeastern myotis and eastern big-eared bat. Biologists from other southeastern states have noted a possible decline in both species. We knew both species existed in Texas, but exactly where and how many was unclear.

By capturing bats with mist nets, we now know the southeastern myotis bat is one of the most common bats in three state parks: Lake Livingston, Martin Dies, Jr., and Village Creek. One or both species also have been captured in the Big Thicket National Preserve, the Angelina, Davy Crockett, Sam Houston, and Sabine National Forests, Huntsville and Davis Hill State Parks, and TPWD wildlife management areas. The southern part of East Texas is still a stronghold for both these species.

The study is now focusing on the life history and abundance of these bats. Using radio telemetry technology, we have found large hollow trees used as maternity roosts by 25 to 50 female southeastern myotis bats. We also have discovered abandoned buildings that are home to 50 to 100 eastern big-eared bats. But where the bats forage, how they choose their roosts, or how much disturbance threatens their survival, are questions we still are trying to answer.

With the help of East Texas volunteers again this summer, we hope to find more roosts in different areas. By locating and monitoring bat roosts, we can answer questions about these elusive bats, and perhaps help ensure their presence in the forests of East Texas for many generations.

★

Peggy Horner is a biologist with TPWD's Resource Protection Division.

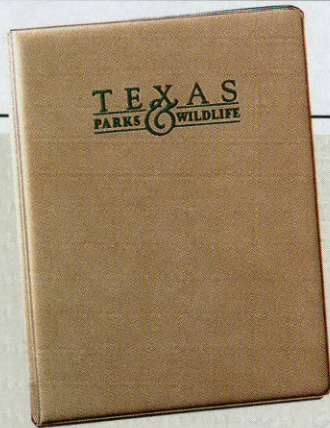
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Big-eared bats and southeastern bats will roost in abandoned buildings such as this one. If you are lucky enough to discover such a roost, don't disturb it.

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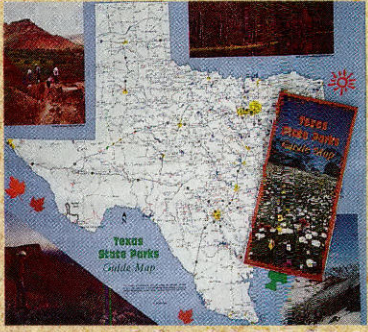
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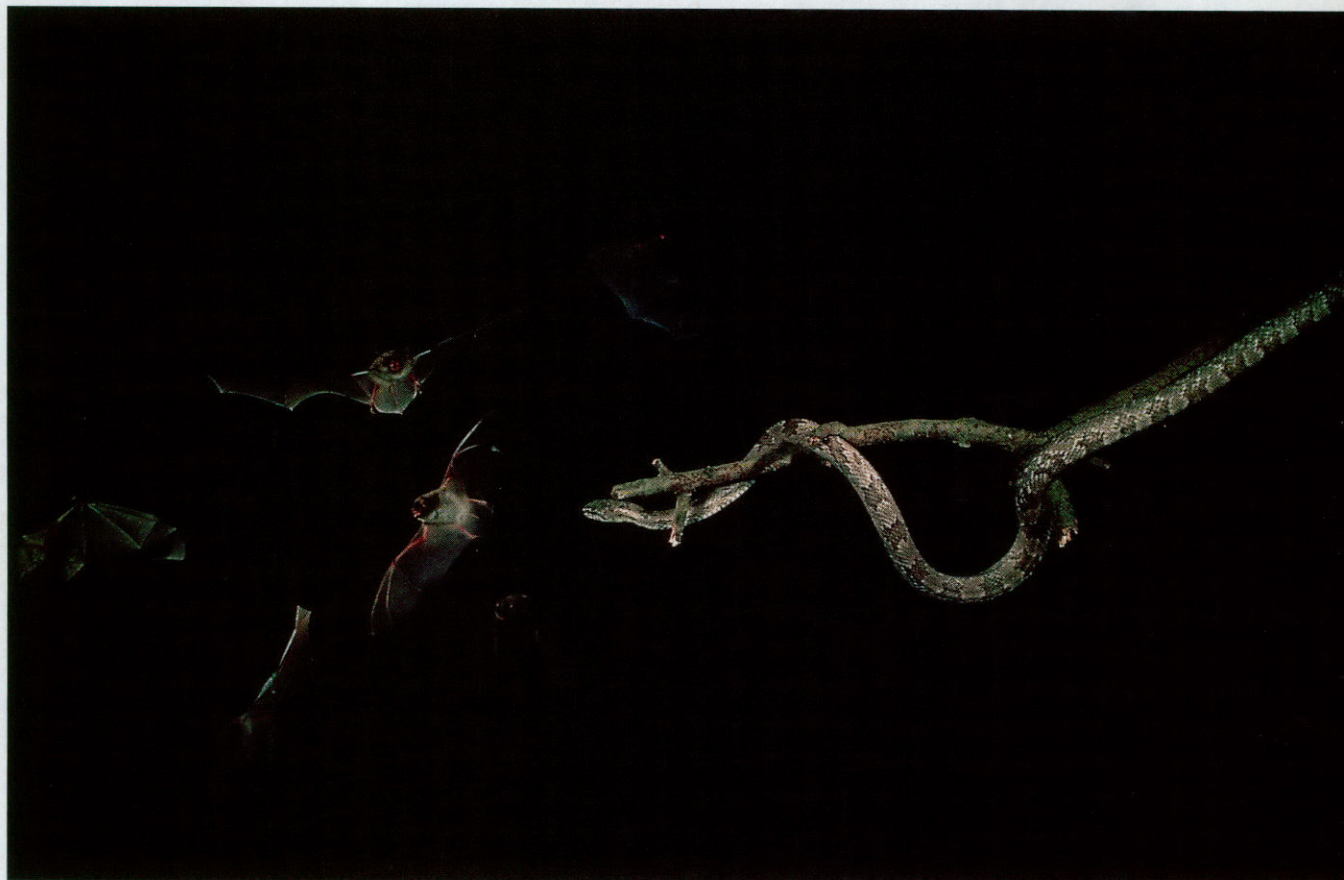
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RAT SNAKE CROSS-TRAINS

Surely catching rats and other small rodents is easier than plucking a southeastern bat out of mid-air, but this rat snake is going out on a limb to try to do just that. A variety of predators, including snakes, are drawn to bat caves and tree roosts to nab young, sick or unwary bats as they depart for their nightly foraging.



