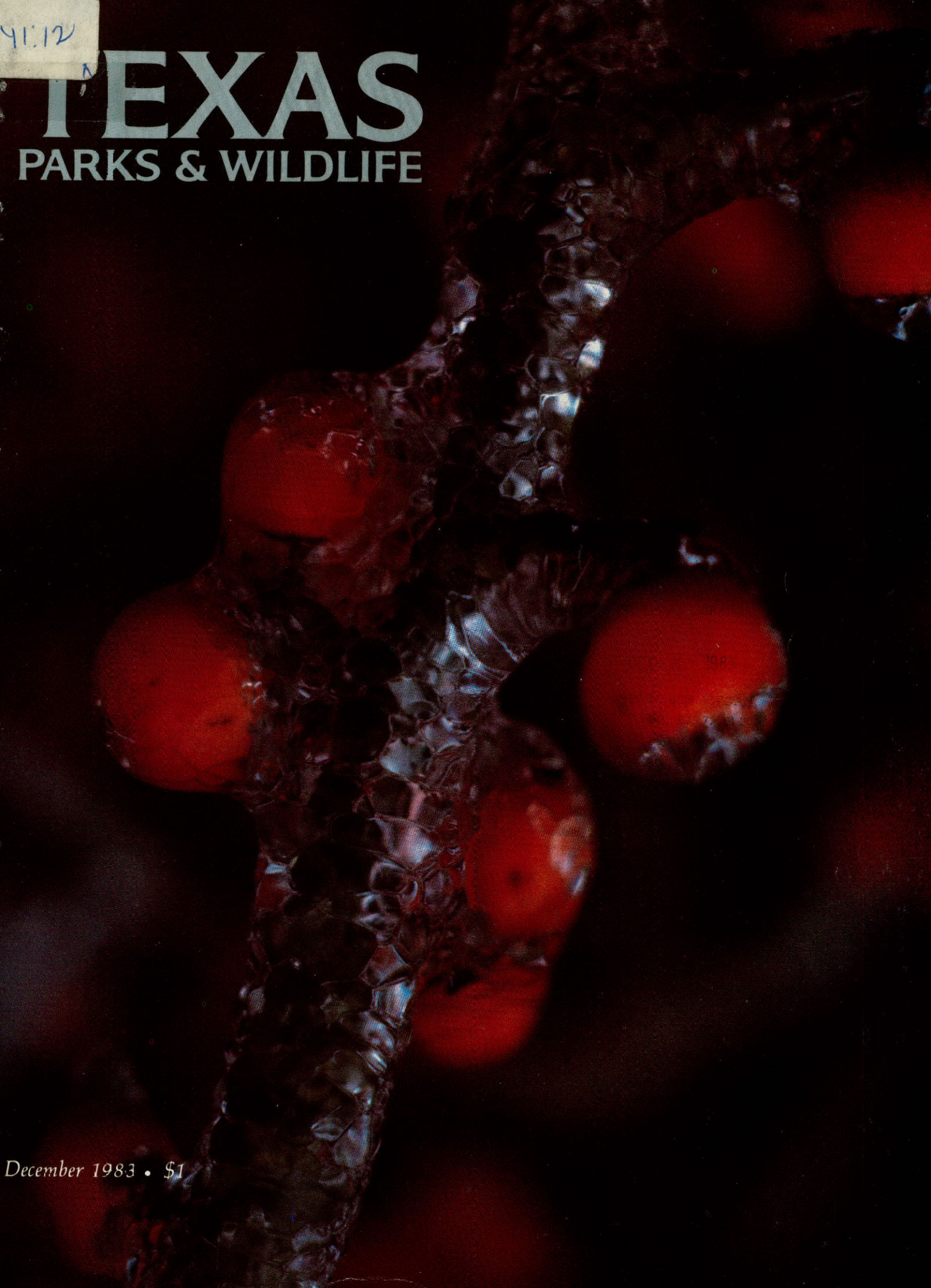


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PARKS & WILDLIFE

December 1983 • \$1





TEXAS PARKS & WILDLIFE

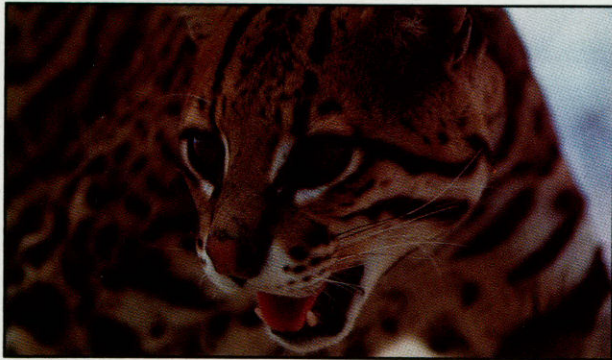
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Front Cover: Decorated by nature, these ice-covered berries give a festive touch to the outdoors at this time of year. Photo by Bill Reaves.

Inside Front: It may not be the *muy grande* of days gone by, but this Brush Country buck should still qualify as a trophy for most South Texas hunters. (See story on page 2.) Photo by Bill Reaves.



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

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BRUSH COUNTRY



DEER

Article by Mary-Love Bigony
Photos by Bill Reaves

South Texas whitetails are legendary. Or as Horace Gore puts it, "South Texas is where hunters go to get a trophy deer." Gore, the Texas Parks and Wildlife Department's white-tailed deer program leader, goes even further in perpetuating the Brush Country mystique: "For hours spent hunting, the chances of taking a trophy deer are greater in South Texas than anywhere in the nation."

The South Texas Brush Country covers some 35 million acres in 27 counties. Approximately half of that is deer range—top-notch deer range. The forage there is some of the best in the country and the growing season is long, making the plants available to deer almost year around. And historically the ranges have not been crowded, so there was plenty of this nutritious food to go around. Gore also pointed out that hunters have had limited access to some of the range so many deer have lived to old ages and, to a point, "the older they get the better they get."

But in the early part of the last decade, hunters and landowners began to notice some changes. The renowned South Texas bucks seemed to be getting smaller, and their racks didn't seem to be quite as large. Investigations by wildlife biologists confirmed that Brush Country bucks were declining in quality. The landowners for whom big bucks had become big business, and the sportsmen who hoped to bag a trophy whitetail had two questions: What was happening and what could be done?

Neither of these are easy questions to answer. But Parks and Wildlife biologists who have studied South Texas say the major problem facing all Brush Country wildlife—not just deer—is habitat destruction. When mechanized brush control came to South Texas in the 1930s, ranchers

A ratio of one buck to 1.5 or 2.5 does is best, but an emphasis on buck hunting distorts that ratio. Surplus does must be removed from the population to maintain a sexually balanced herd.



saw it as an economical way to increase grazing land for their livestock. Widespread brush clearing was common and often detrimental to whitetails as well as other wildlife. Biologists point out that any degree of brush control will affect deer, since it removes cover and destroys part of their food supply. A number of factors determine how much brush, if any, can be cleared—pasture size, density and species of brush, soil types and what, if anything, will be seeded in the cleared areas. But, they say, under no circumstances should more than 50 percent of the brush be removed.

Other problems have besieged South Texas deer. "Some biologists say we are experiencing a population explosion in deer," said Dr. Randy Simpson, game manager of the Guajolota Ranch near San Isidro. "We're getting more and more deer into this area of high-quality forage, therefore, there's less of it to go around." Simpson said that overpopulation is a relatively new phenomenon in the Brush Country; that in the early part of the century subsistence hunting and screwworm problems kept deer populations low.

"It's the simple fact of not enough groceries for what's out there," said Dr. Steve Bentsen, a McAllen veterinarian. "In most cases, this is simply from overuse of the range, both by an excessive deer population and by cattle and other livestock. South Texas is only recently getting into population problems," he continued, "as opposed to the Hill Country, which has had them all along."

The very practice of trophy deer hunting also may have caused a decline in the quality of the South Texas deer herd. "For many years, but particularly since World War II, trophy hunting has been a favorite pastime," said Simpson. "A hunter looks for the very best quality animal he can find, and when that animal is taken out of the population he can no longer pass on his genes."

Steve Bentsen agrees that trophy hunting may be leaving the less superior bucks to sire future generations, and points out that the concentration on hunting bucks has caused too wide a ratio of bucks to does. "From what has been our traditional harvest method, harvesting bucks only," said Bentsen, "you

are reducing the buck segment relative to the doe segment such that the bucks get killed and they get killed younger. But also in our method of trying to kill the best bucks every year we leave the lesser bucks to do the breeding, and consequently you have a decrease in the genetic pool as well." More on genetics later.

In the mid-1970s, efforts were made on a county-wide basis to reverse the declining quality of whitetails in Webb and Dimmit Counties, two of the Brush Country's most noted trophy deer counties. In Webb County, several owners of large tracts of hunting land alleged that buck harvest on small tracts of land was excessive, and that bucks were being harvested too early, before they reached their maximum body weight and antler size. Investigations by Parks and Wildlife Department biologists confirmed a decline in the average field-dressed weight, antler size and age of bucks harvested in Webb County, as well as a widening ratio of bucks to does.

In 1974, the department began a five-year experiment to determine if restricting the buck harvest in Webb County would reverse the decline in quality. For the first two years of the program, 1974 and 1975, permits were issued to landowners on an unlimited basis, although hunters were required to check all harvested bucks at one of four check stations in the county. Beginning in 1976, buck permits were issued to landowners based on the number of acres they owned. To meet a goal of harvesting no more than 25 percent of the buck population, landowners received one permit for each 230 acres they owned, although every bona fide landowner received at least one buck permit regardless of acreage. Once again, hunters were required to check their deer at Parks and Wildlife Department check stations.

At the end of the five-year Webb County experiment, department officials determined that restricting hunting pressure through buck permits did not significantly change the downward trend in buck quality. The experiment did reduce the buck

harvest on landownerships of less than 1,000 acres, but such tracts comprise only six percent of Webb County's deer range, so there was no significant reduction in buck harvest county-wide. A detailed report

by the department on the Webb County experiment stated, "The quality of the deer in Webb County or in any other county will not be improved simply by the issuance of buck permits. Improvement in antler

development and body size are dependent upon adequate quantities of high quality deer food—not harvest regulations." The buck permit system is still operational in Webb, Duval, Maverick and Zapata Counties, but there is no restriction on the number of permits landowners may receive.

Another experiment in Dimmit County attempted to reverse the decline in buck quality by adjusting the county's hunting regulations. Dimmit County landowners believed that too many bucks were being harvested, and since half the buck harvest takes place during the last two weeks in December, at the time of the rut, this experiment involved closing the season in mid-December, two weeks early. Like the Webb County experiment, the Dimmitt County shortened season did reduce the buck harvest somewhat, but did not affect the decline in deer quality.

While neither of these experiments managed to improve the quality of the deer herd, they did make landowners and the hunting public aware of the problems facing South Texas trophy deer. Department officials believe that in that respect the experiments were useful.

So what does it take to maintain a quality deer herd? Experts agree that the keys are nutritious forage and population control. "We need to keep a fairly balanced sex ratio," said biologist Donnie Harmel of the department's Kerr Wildlife Management Area. "Nature puts deer back in a one-to-one ratio, one buck to one doe. But hunters take more males out of the population. Managers should keep as few mature females on the range as possible. A sex ratio of one buck to 1.5 or 2.5 does is best," he continued. "A ratio of one buck to four or five does is getting out of line."

Steve Bentsen said that antlerless harvest is especially important in managing for a trophy deer herd,

South Texas deer began declining in antler size and body weight in the early part of the last decade, but deer on well-managed ranches are improving in both these respects.



since there are no trophy does, only trophy bucks. "The range will only carry a certain number of animals, and every one of those that is a doe is one less buck you can have," said Bentsen. "And you may as well have as many bucks as possible because they are your cash crop."

An equally important management step is to determine how many animals a tract of land can support, in order to make adequate nutrition available to each of those animals. Too many animals means not enough food.

"You need to work toward reducing the total population to the carrying capacity of the land," said Bentsen. "The carrying capacity is not a fixed number, it changes with the conditions. There are things that can be done to increase the carrying capacity, but the first thing to do is get the population down to the carrying capacity or slightly below it." Parks and Wildlife biologists say that a range's carrying capacity depends on the quality of the habitat, but South Texas ranges generally carry approximately one deer for each 25 to 30 acres. Animals in excess of the desired density should be removed.

"At the Guajolota Ranch we never are at the point at which we have to curtail the harvest," said Randy Simpson. "We always need to remove a fairly significant amount of the deer population in order to keep our deer per acre numbers within what we think is the carrying capacity of our ranch."

On most South Texas ranches, livestock and sometimes exotic animals must be figured into the carrying capacity. South Texas landowners use various systems of grazing livestock, the most common being continuous grazing. Some use deferred rotation grazing, where pastures are periodically relieved of grazing pressure. There are several rotation grazing systems, and department biologists say these are preferable to continuous grazing because they allow for improved seed production and restoration of plant vigor.

"In some cases I believe the cattle grazing system can be managed to be a plus to wildlife," said Simpson. "For example, we have here a type of grass called buffelgrass. It's very prolific, becomes very heavy and thick and can smother out other

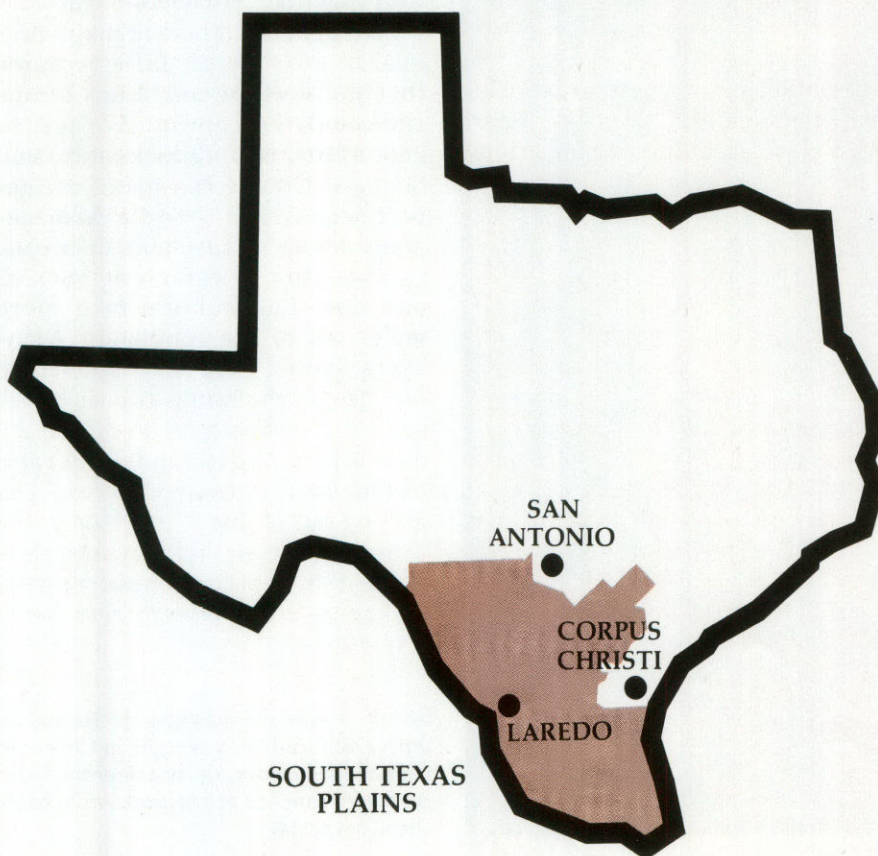
growth, specifically the forbs, or weeds, which are very important components of a deer's diet. You can use your grazing system to where the cattle will take the buffelgrass down severely, opening it up for the weeds and forbs. Of course, the buffelgrass will come back. It requires constant monitoring."

Experts generally agree that the genetics of a deer herd influences the quality of the animals. Studies on spike-antlered bucks begun at the Kerr Wildlife Management Area in the 1970s indicated that inferior size antlers are the result of poor nutrition or genetics; specifically, that bucks fathered by spikes had smaller antlers than bucks fathered by deer that had forked antlers as yearlings. Therefore, spike-antlered deer should not be protected. Spikes are legal game in every county in Texas, and hunters are beginning to overcome a deep-seated resistance to harvesting spike bucks.

"People have wanted to protect spikes because they felt they were protecting bucks for the future, that spikes would grow into bigger trophy animals," said Harmel, who has been involved with the Kerr Area research for years. "But a buck can have up to eight points on his first set of antlers, so if a buck is a spike while others in the same age class are not, that spike is an inferior deer." Harmel said spike bucks are not confined to the 1½-year age class; a buck of any age can have spike antlers.

Research underway at Mississippi State University indicates that the doe's contribution to the formation of spike antlers is equal to, or perhaps greater than, the buck's. In connection with this, Harry A. Jacobson of Mississippi State's Department of Wildlife and Fisheries raised the following question in a recent issue of *The Journal of the American Trophy Hunter*: "How are does found that are carrying the spike-antlered code and how many years will it take to eliminate these individuals from the gene pool?"

Regardless of what future genetic research discloses, establishing proper nutrition must be the first step in maintaining or improving a deer





The deer that made South Texas famous thrive on the highly nutritious forage that grows almost year around in the Brush Country. The South Texas Brush Country covers some 35 million acres in 27 counties (see map).

herd. "You may have the most genetically superior animal in three counties," said Simpson, "but if he doesn't have the nutrition he will be mediocre at best."

Many South Texas ranchers who have initiated management programs are seeing a turnaround in declining deer quality. Whitetails are showing increases in both body weight and antler size on managed properties that have implemented a judicious combination of management techniques.

Deer-proof fencing is proliferating as a management tool in South Texas. It allows landowners to maintain complete control of their deer herd and Donnie Harmel, who has had extensive experience with the

fencing, believes it can be effective. The Kerr Area has had a deer-proof fence in place since 1968 and one was installed at the Chaparral Wildlife Management Area last year. Harmel stressed that fencing is only a tool. "Once a deer-proof fence has been put up," said Harmel, "it's the manager's responsibility to see that the proper harvest is maintained. If you slack up, there's nowhere for the excess deer to go and they can cause severe range damage. You've got to be committed to a game management program if you put up a deer-proof fence."

Deer management is no simple task. "You have to enlist the help of somebody who knows what they're doing," said Beatsen. "Of course, the Parks and Wildlife Department does that for free and people are crazy not to take advantage of it." Among the subjects department biologists discuss with landowners are brush control; livestock management and grazing practices; population density, herd composition

and harvest rates; supplemental feeding, which is not encouraged; baiting, which is sometimes used to increase doe harvest; and planting food plots.

Simpson said that management will determine the future of South Texas deer. "We could always go for the quantity type hunt which would be satisfactory to a lot of people," he said. "But if a ranch down here wants to manage for and maintain a superior animal, it cannot go with the quantity attitude. Management plans are the key."

Many management practices are expensive, such as helicopter censuses, deer-proof fencing and the hiring of game managers for ranches. And these expenses are reflected in the prices sportsmen pay for hunting leases in the Brush Country. But quality doesn't come cheap, and quality wildlife is no exception. While it was nature's benevolence that created this trophy deer herd, it will be man's wisdom that preserves it. **

Texas is rich in history, legend and beauty. The American Indian did little to harm that beauty. During the long Indian tenure the land remained undefiled. And so it was for hundreds of years.

HAND OF MAN

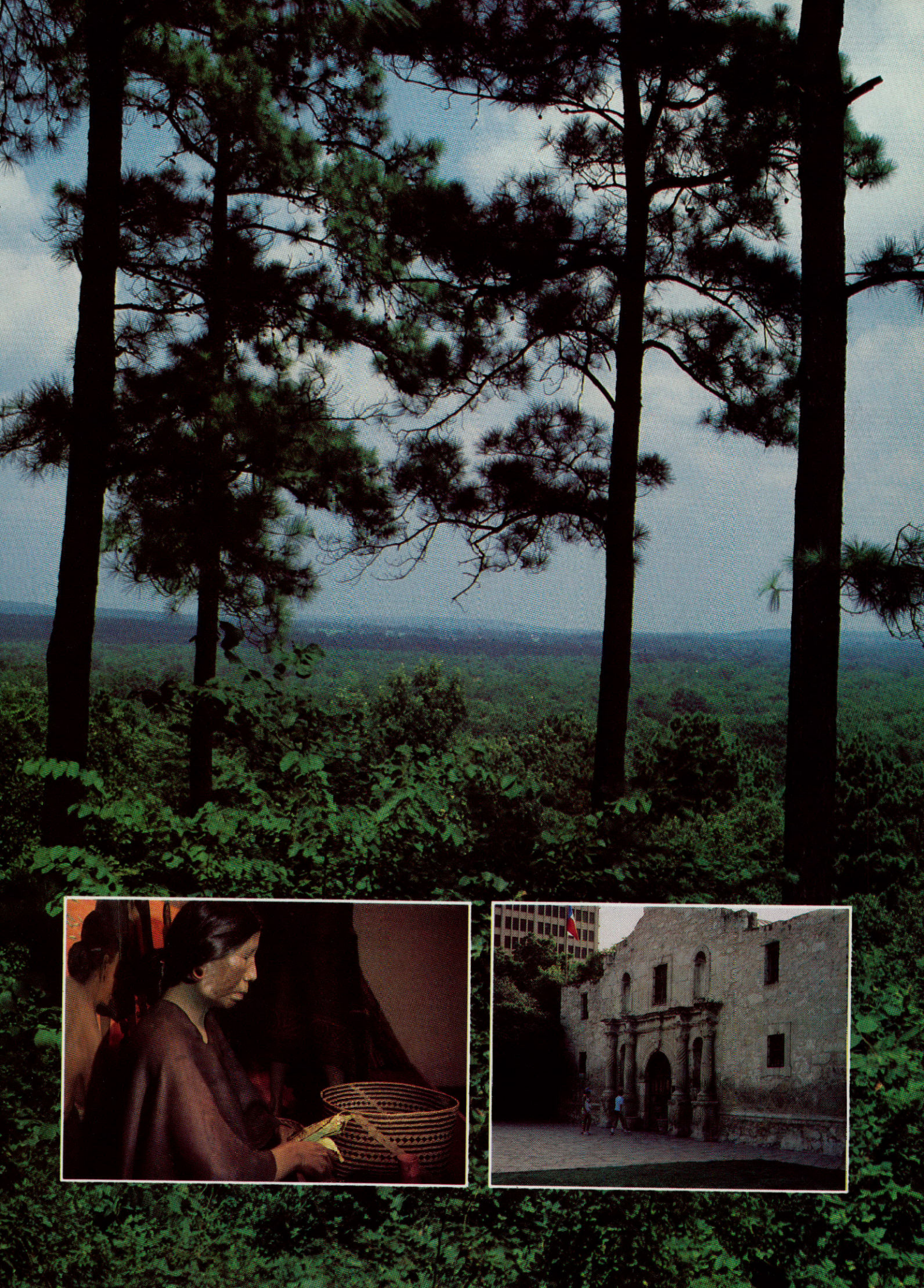
1983 STATE FAIR SLIDE SHOW

"And step by step since time began, I see the steady gain of man."

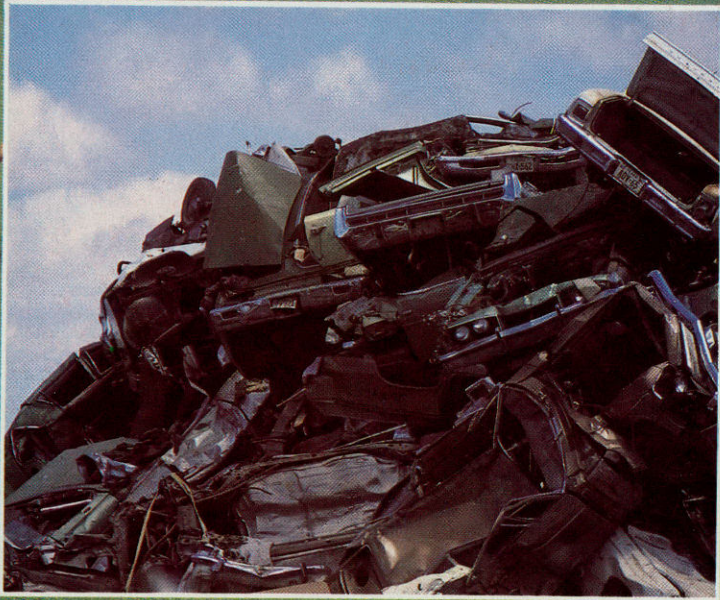
Those words are even more significant in the 1980s than when they were written a century ago by American poet John Greenleaf Whittier. It is virtually impossible to go anywhere today without seeing signs of man's progress. But often that progress is at the expense of our natural resources.

"The Hand of Man," the Texas Parks and Wildlife Department's audio-visual presentation at the State Fair of Texas in October, depicts the impact man has had on the environment and illustrates the importance of conservation professionals. The following pages present a brief look at "The Hand of Man." The complete program, which runs 18 minutes, is available at no charge for presentation to groups of 75 or more. Other audio-visual presentations available through the department are "Texas State Parks," which runs 19 minutes, and "Wild Flowers," which runs 12 minutes.

Groups interested in one of these shows should send a written request to the Director of Information and Education, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. Please send requests at least 30 days in advance of the date you wish to have the presentation, and include first and second choices for dates.







Leroy Williamson



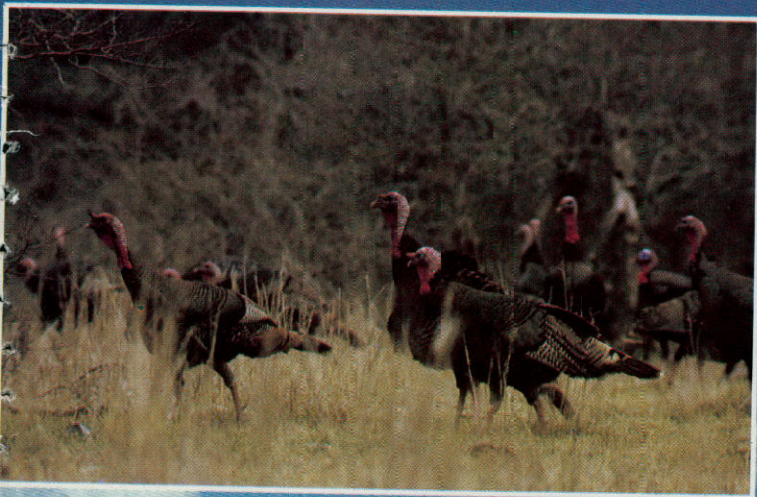
Leroy Williamson



Martin T. Folter

The hand of modern man has not been so kind. Expanding human populations have left their marks upon the landscape. The air we breathe and the water we drink are threatened. Many of the wild places are gone, having given way to freeways, factories and junkyards. Loss of habitat is the major problem facing wildlife.





Photos by Leroy Williamson

At a time when the hand of man is putting unparalleled pressure on our natural resources, the work of Texas Parks and Wildlife Department professionals has never been more demanding. Wildlife biologists conduct management programs for game and non-game birds and animals. Endangered Attwater's prairie chickens were trapped and relocated, and fitted with transmitters so biologists could track their progress. In the early 1970s, the Parks and Wildlife Department started trapping and restocking the eastern turkey in suitable habitat, and in 1977 the first turkey season in 36 years was held in East Texas. Fisheries biologists manage, protect and enhance our fresh and salt waters. Florida-strain largemouth bass stocked in dozens of Texas reservoirs give anglers a chance to land a trophy fish.

Caring hands can still save our native Texas; it's not too late. We are all conservationists, whether we are professionals in the field, sportsmen whose license fees and tax dollars finance conservation projects, or concerned citizens who fight to keep the landscape and beaches free of litter. The outdoors is a legacy bequeathed to us by generations who have come before. It's our responsibility now. People blessed with a land of wealth and beauty should not pass on ugliness and desolation.





Beaver Paddle-tailed

People often disagree about the beaver. Some think this master dam builder is the smartest thing in fur pants, and use such words as intelligent, energetic and helpful when speaking of it. Others claim the paddle-tailed engineer is all back and no brains, describing it as dumb, stubborn and destructive. A look at the beaver and its life-style may reveal why it is so controversial.

No creature, other than man, controls its environment so completely as the beaver—changing the surroundings to meet its needs. And since water rules the beaver's life, most of its efforts are aimed at making sure there's a good supply.

The chubby beaver is slow and clumsy on land, waddling along at the mercy of its predators. However, in water it becomes a sleek, streamlined swimmer that can travel at five or six miles an hour. No wonder the beaver chooses to surround itself with water and builds a dam to make sure there's enough. Water provides protection as well as an easy method of transportation. As water backs up behind the dam, it brings the beaver's food supply within reach. Raising the dam deepens the water and spreads it to new food sources as old ones are used.

Going back in time a million years or so, we discover the beaver is the descendant of an 800-pound prehistoric rodent. Adult beavers, which average between 30 and 60 pounds, may seem rather puny by comparison, but they still rank as the second largest rodents in the world, right behind the South American capybara. A record beaver found in 1921

weighed 110 pounds, and heavy-weights that tip the scales between 80 and 100 pounds still occasionally are caught.

The beaver has been described by some as a "furry hunk of homeliness," a description that may be close to the truth. However, from its big orange teeth to its paddlelike tail, the creature is well-designed for its aquatic life and lumberjack activities.

Its fur coat, which looks messy when wet and ungroomed, has an outer layer of long guard hairs that cover an inner layer of wooly underfur. The underfur is so thick and well-oiled that water usually cannot reach the skin beneath it. Those who have felt the beaver's fur underwater describe it as smooth and slippery. This slickness keeps water drag to a minimum as the animal swims. The dark chestnut brown of its winter fur may fade to a golden tan by spring. Fur colors range from almost black to reddish brown to blond.

Frequent grooming is necessary to keep the fur tidy. Each hind foot has a split or double toenail that serves as a comb. Drawing the hairs through these double nails removes excess water and straightens any tangles. Despite its large size, the beaver can twist and bend to reach every part of its wet fur with these toenail combs. The toenails also serve as toothpicks to remove wood splinters left between the teeth.

Once the fur is combed, it must be oiled. The beaver may not sit on its tail during the combing process, but it cannot oil itself until it does. Sitting back with the tail folded under the body exposes the opening

at the tail base in which the beaver's sex organs and its large oil glands are located. Using its front feet, the beaver reaches down, scoops up the strong-smelling oil released from the glands and rubs it on the fur. The toenail combs then spread the oil evenly throughout the fur. This grooming process takes place when the beaver leaves the water and requires about 10 or 15 minutes to complete.

The yellowish oil, called castoreum, also is used by the beaver to mark its territory. Using its front feet, the beaver rakes together a mud patty, which often contains wood chips and other debris, and places it in a highly visible spot. It then soaks the patty with castoreum. Researchers have found that this oil contains at least 45 chemical ingredients. The scented patty reveals the sex of the beaver that made it and many other messages only another beaver can understand. It serves as a chemical communication system.

Probably the most distinctive part of the beaver is its tail, which looks like a large scaly paddle. The adult's tail is about a foot long, six or seven inches wide and less than an inch thick. The base is covered with the same type of fur as the body, but the flat, scaly part has only a few short, bristly hairs.

The tail serves as a prop on dry land, bracing the beaver as it cuts down a tree. It also helps the beaver sit up so it can use its front feet for various chores. At any sign of danger the beaver slaps its flat tail on the water's surface with a loud smack, creating a big splash before it dives

In the water, the beaver's tail serves as a rudder, keeping the animal on a straight course, especially when the beaver is towing a large branch. The destination of this particular branch is probably the beaver's dam, but it could find its way into the home lodge or food supply. Daily attention is given to the dam and when repairs are needed, they are quickly made. It almost seems as if the beaver is never satisfied with its dam, but must keep adding to it and improving it.

Engineer

by Ilo Hiller



to safety. Some observers believe that slapping the tail in water and on land is not only a warning signal for fellow beavers, but also may be a sign of anger or an attempt to frighten away an approaching predator.

A downward thrust of the tail as the beaver submerges helps push its body under. Once underwater, the tail acts as a diving plane, determining the angle of descent. It also serves as a rudder, keeping the beaver on a straight course, especially when the animal is towing a tree or large branch. Seldom, if ever, is the tail used for actual swimming.

Large, webbed hind feet deliver the powerful strokes that push the beaver through the water. The webbing folds together ducklike as the foot is brought forward and spreads wide for the backward thrust. If the beaver is in no particular hurry, its back feet stroke at the same time, sending it forward in a smooth glide. As the forward movement slows, the feet stroke together again. But when the beaver needs to turn on the speed, it switches to alternate foot strokes. Since each foot is six or seven inches long and spreads to a width of about six inches, quite a bit of forward thrust is produced with each individual kick.

To increase its streamlined shape in the water, the beaver hugs its forearms to its chest. The front feet are clinched into fists and serve as bumpers. These flexible front feet can be used almost like hands. Even though it doesn't have thumbs, the beaver has five fingers that are able to pick up and grip objects with ease.

While the beaver is underwater, its heartbeat slows so less oxygen is needed. An extra large liver and big lungs make it possible for the beaver to store air and oxygen-rich blood for long dives. Three minutes is the beaver's usual time underwater, but it can stay down for as long as 15 minutes. It's not unusual for the beaver to travel as far as half a mile underwater before surfacing, especially if frightened.

The beaver has several waterproofing devices that go into operation as it submerges. Valves in the ears and nostrils snap shut and membranes slide over the eyes like goggles

to protect them and increase their underwater vision. Folds of skin meet tightly behind the large front teeth to seal off the mouth. These folds of skin also prevent splinters from entering the mouth as the beaver chomps away on land or in the water.

Speaking of chomping, another unmistakable feature is the beaver's large, orange buckteeth. As with other rodents, these front teeth grow continually and are kept worn down by constant gnawing. The front surface is very hard enamel that wears slowly. The backs are a

There is no mistaking the presence of a beaver in the neighborhood—the distinctive work done by its teeth gives it away (below). The animal's powerful incisors, which grow continually throughout its life, cut great chips from a tree and topple it to the ground. The tail is another distinctive characteristic of the beaver. It is about a foot long and resembles a scaly paddle.

Leroy Williamson



softer material that wears faster. This unequal wear gives the teeth a chisel-like edge, and the meeting at an angle makes it possible for the beaver to sharpen them. The 16 molars used to grind the beaver's woody food seldom show any sign of wear.

Small twigs are fed into the mouth with the front feet, nipped into small pieces by the front teeth, chewed by the molars and swallowed. When eating bark off larger sticks, the beaver picks up a piece about a foot long. One hand closes around it and the other grips it between the little finger and the other four. The stick is turned quickly and evenly by the fingers and moved slowly sideways. The sharp front teeth strip off the bark as you might eat corn off a cob. When its mouth fills with bark, the beaver pauses, chews, swallows, sharpens its teeth and then continues eating. Upon nearing the end, it holds the stick against the palm of its hand so the teeth can eat right up to the edge. The cleaned stick is then tossed aside and another is picked up. The discarded sticks have an almost threaded appearance because of the grooves the teeth cut while removing the bark from the turning stick. Later these cleaned sticks will be used to reinforce the beaver's dam.

A beaver dam is a remarkable structure, but the builder's reputation for engineering intelligence may be slightly exaggerated. Researchers who have spent time studying these dams say that persistence and hard work may be more responsible for the finished product than any so-called engineering skills. In many cases a dam that would hold the same amount of water could have been built with only a fraction of the work had it been placed either upstream or downstream from the chosen site. But whether the location seems ideal by human standards or not, once the site has been selected, the beavers stubbornly refuse to build elsewhere. Why the beaver chooses one site over another has puzzled people for years.

Beaver observers don't always agree on the way the dam is started. One explanation for the different methods observed may be that bea-



vers are adaptable. Some claim the beavers cut down a tree so that it falls across a creek. Logs and branches are then floated downstream to catch in the fallen tree. Others say beavers cut down branches, tow them to the middle of a stream, stick them in the mud on the bottom and add rocks and more mud to keep them there. More branches and logs are added and, when the structure is tall enough, the beavers begin building from it toward the shore.

According to Swedish researcher Lars Wilsson, who spent several years studying a beaver colony and experimenting with its residents, dam building is an instinctive action triggered by the sound of running water. He discovered that when plenty of water is available, beavers may live in an area for some time without starting a dam. But if the water level drops enough to ripple between or over some rocks or debris, the sound of the shallow, running water attracts the beavers and triggers a building urge. His captive beaver tried to build a dam in a bathtub full of water when a recording of running water was played beside the tub.

In the wild his beavers pushed or carried mud and rocks from the bottom of the stream to the low spot where the sound was occurring. The

low spot was built up with these materials until water no longer flowed over the top. The only problem was the water now flowed around either side of it. This, too, had to be stopped, so the barrier was extended on each end. Grass, leaves, twigs and other such materials were used along with more rocks and mud.

Eventually each end of the barrier reached land and the structure could be called a dam. But this wasn't the end of the work. As the water built up behind the low barrier, it got deep enough to flow over the top again. The beavers' solution was to add more material and raise the height of the dam.

Whatever building material is available is used in the construction of a dam. If you or I were adding sticks or small trees, we probably would place them lengthwise across the stream, but this is not the beavers' way. They place each stick or limb parallel to the flow of the water. When possible, the butt end is wedged into the muddy bottom and points upstream while the top leans toward the dam. Small trees may be included, but mud, grass, leaves and twigs are used to fill spaces between the larger pieces and stop leaks. Busy hands poke, probe and jam small sticks into place.

Debris carried downstream also catches in the dam and helps plug any holes. A dam in good repair leaks very little.

A pair of beavers can build a dam across a small stream in two or three days. Their untidy pile of wood may not look too impressive when the dam is finished, but don't sell them short. When the need arises, they are able to build some fantastic structures.

In his book "The World of the Beaver," Leonard Lee Rue III describes some large beaver dams he has seen. The longest was about 800 feet and the tallest stood about eight feet above the water level on the downstream side. Historical beaver dams discovered during his research included one in Wisconsin in 1919 that was 12 feet high and 640 feet long. Another located in Wyoming in 1955 was only 30 feet wide, but it stood 18 feet tall. Montana's Jefferson River contained a beaver dam 2,140 feet long, but the length record may be held by a 4,000-foot dam in

The sound of running water may trigger the beaver's urge to build a dam. One researcher's captive beaver tried to build a dam in a bathtub of water when a recording of running water was played. The untidy pile of sticks below is remarkably strong and leakproof when kept in repair by an active beaver.

New Hampshire. The lake this record dam created contained 40 beaver lodges.

A dam described in Lewis Morgan's book "The American Beaver and His Workings" was more than 450 feet long, 18 feet thick at the base and probably contained 250 tons of materials. Such a structure takes years of work and generations of beavers to build and maintain.

In their place in the wilderness, beavers usually are considered constructive animals. Their ponds hold water for dry times, help control floods and create attractive environments for many different wildlife creatures. However, when the beaver builds too close to man, it usually is considered a bad neighbor. It's hard to consider the beaver's needs when its pond floods your crops, roads or pastures or when its menu includes your trees and shrubbery.

When a beaver's dam conflicts with man's interests and attempts are made to remove it, we learn just how stubborn or persistent beavers can be. The animals will spend each night repairing or rebuilding a dam that has been damaged or destroyed during the day, and they will continue to do this indefinitely.

County road engineers often clash with beavers. Instead of building a small bridge over a ditch or creek, the men install a culvert pipe and

then build the road on top. This allows the water to continue to flow under the road through the pipe. With just a little work, the beaver can plug the pipe and back up water that eventually will flood the new road.

Culvert battles between men and beavers have continued for years. Each time the men remove the plug, the beavers replace it. One county engineer claims the beavers in his area have developed their ability to plug a culvert pipe to a fine art. He is sure they must have found some way to measure the inside diameter of the pipe because they go out each time and cut one-inch sticks about three-fourths the length of the pipe's diameter. The sticks are placed around the inside of the pipe with one end caught in the pipe corrugations and the other ends overlapped and interwoven toward the upstream direction. Pieces of brush and other small debris are added to the upstream side and the whole thing is plastered with mud. When the water backs up, the pressure wedges the entire mass even tighter.

The only practical solution to such a problem is destroying the animals or live-trapping them and moving them to a more suitable location. However, either solution may last for only a season or two. By then a new pair of beavers may move into the area, discover the pipe and decide it is perfect for their needs.

And where do these wandering beavers come from? They are two-year-olds that have been driven from their home lodges in the spring. Forced out on their own, they must find mates and establish their own territories.

Let's assume that during his travels downstream, a two-year-old male beaver meets a female beaver and they decide to set up housekeeping. Together they choose a suitable territory and, when necessary, start building a dam. Once their water supply is assured, they must build a place to live. The home structure may be either a lodge or burrow.

Lodges, like dams, are built of mud, rocks, debris and wood. They may be completely or partially surrounded by water and will have two or more underwater access tunnels.

Leroy Williamson





Burrows, most commonly used by southern beavers, are built into the bank of the river, pond or stream. From underwater entrances the beavers tunnel into the dirt and hollow out a living area above the waterline. When the burrow comes close to the surface or breaks through, a pile of interlacing sticks and branches plastered with mud is constructed over the burrow site. This gives added protection from land predators that might try to dig into the burrow from the top. As time passes and more surface material is added, the burrow may begin to look more like a lodge.

The living chamber for the new couple may start out small—1½ to two feet tall and no more than three feet or so in diameter. However, as

the family grows, the living area will be expanded. Large families may even construct two separate chambers divided by a wall. Both chambers will have their own entrance tunnels, called plunge holes. Living chambers three or more feet tall and six to 10 feet in diameter are common, and lodges eight to 14 feet tall and 40 feet across at the base have been reported.

Each living chamber, regardless of its size, is divided into two basic parts—one for eating and one for sleeping. The main floor, which is built a few inches above the water level, is used as a feeding and grooming area. Any water brought in by the beaver's fur drains off the elevated floor into the lower area around the plunge holes. In the

sleeping section, built like a shelf a few inches above the main floor, each beaver has its own soft bed of shredded wood.

In April or May of the following year the beaver couple probably will become parents. As the time for birth approaches, the female takes sole possession of the burrow while the male takes up temporary residence elsewhere. She prepares the bedchamber for the young by shredding fresh bark into the softest of bedding. Her litter may contain one to eight young, but four is the usual number. The young, called kits, are born fully furred, weigh about 1½ pounds and have their eyes open. They are miniatures of their parents, complete with teeth. During the first two weeks they remain in the burrow and are fed a rich, yellow milk, but by the end of the first month they are ready to go with their mother on swimming and feeding excursions. The male moves back home when they are a couple of weeks old.

These young beavers will stay with their parents in a family group, sharing the lodge and helping to keep the family dam in good repair. When the next litter is born the following year, they will be evicted with the father and return to the home burrow when he does. However, in two years, when the third litter arrives, they will not be allowed to return to the family lodge with the father. They will be forced to make their own way as their parents did. Sometimes they are allowed to build their own lodges and remain in the area, but if all of them stayed, the colony soon would strip the area of food. Forcing the two-year-olds to find new territories extends the period of time an area can support its resident beaver population.

Beavers live along many wooded rivers, lakes and streams in Texas, but their highest populations are found in the northeastern part of the state. Legal trapping efforts help keep their numbers under control.

Admired or despised (depending upon how close a neighbor it happens to be), the beaver is an interesting member of the wildlife community that always makes its presence known. **

PEACOCK BASS STOCKED AT ALCOA RESERVOIR

Peacock bass may have found a home in Texas.

In mid-September, Texas Parks and Wildlife Department biologists stocked 3,000 fingerling-sized peacock bass in Alcoa Lake near Rockdale. Discharge waters from the Aluminum Company of America power plant keep this lake's water temperatures warm enough to support the South American imports.

Limited stocking experiments at other lakes in the past have been hampered by cold water caused by winter plant shutdowns and associated decreases in water temperature.

Dick Luebke, manager of the department's Heart O' the Hills Research Station at Ingram, said he is excited about the Alcoa situation. "Alcoa Lake is by far the most promising release site we've found for peacock bass," Luebke said, explaining that the four coal-fired electric generating plant units operated by Alcoa will provide the constant flow of warm water essential to the fishes' survival.

The 914-acre lake reopened for fishing October 28 after a four-month closure due to high water temperatures. Entrance to the lake is on FM 2116, four miles south of Rockdale.

Luebke said although the lake is being reopened for fishing, the peacock bass will be too small to catch and retain until mid-1984. There currently is a statewide 16-inch minimum length limit on these fish.

NAVARRO HOUSE REOPENED FOR VISITATION

The Jose Antonio Navarro State Historic Site in downtown San Antonio has been reopened.

The restored homesite of Navarro, who was a signer of the Texas Declaration of Independence, has been closed since June for roof repairs.

The facility is opened Tuesdays through Saturdays, 10 a.m. to 4 p.m.

Outdoor Roundup

COMPILED BY THE
PARKS AND WILDLIFE
DEPARTMENT'S NEWS SERVICE



BLAZE ORANGE CAN PROTECT HUNTERS

The deer and turkey hunting season which started November 12 in most Texas counties would be substantially safer for hunters if they would wear blaze orange clothing.

This is the opinion of hunter education officials of the Texas Parks and Wildlife Department, who cite statistics from other states which show wearing the fluorescent color enhances safety without affecting hunter success.

"Hunter blaze or fluorescent orange is the most easily seen and recognized color for hunters under all weather and light conditions," said J.D. Peer, assistant hunter education coordinator. "In some states where this material is mandatory, the number of 'mistaken for game' accidents has been reduced by as much as

50 percent."

Hunter orange is not mandatory in Texas except during public hunts on the department's wildlife management areas for deer, turkey, quail and javelina. When hunting these species, hunters are required to wear a minimum of 400 square inches of the orange material.

"Another plus for hunter orange is that about 10 percent of hunters have some form of visual deficiency for color," Peer added. "The traditional red clothing cannot be seen well by hunters who have trouble distinguishing colors."

Peer advises Texas hunters to be sure blaze orange clothing they purchase meets the standards of the states where it is required. Faded material should be replaced, he said.

FURBEARER REGULATION CHANGES MINOR

The Texas Parks and Wildlife Commission has authorized several minor modifications to the statewide furbearing animal and trapping regulations.

At their October meeting, the commission set a take and possession limit of one fur-bearing animal per day during the portion of the year outside the regular fur season.

This provides for the taking of furbearers for personal use. The pelts taken during this time may be possessed but not sold, according to Bruce Thompson, furbearer program leader.

Another change is establishment of a 36-hour time limit for trappers to examine traps and snares and remove captured animals. There previously was no time limit.

Also, licensed trappers and retail fur buyers now will be allowed to hold legally taken dried pelts for as long as desired after the close of the regular fur season.

Further information on furbearer regulations may be obtained by writing Thompson at 4200 Smith School Road, Austin, Texas 78744. A pamphlet containing the furbearer regulations will be distributed later.

NO AOUADAD SHEEP HUNTS AT CAPROCK THIS YEAR

Texas Parks and Wildlife Department officials said there will be no public hunt for aoudad (Barbary) sheep at Caprock Canyons State Park this year because of low aoudad populations.

The public hunts were held during the past three years in an effort to reduce pressure on the native mule deer populations caused by the exotic aoudads.

Very few sightings of aoudad sheep were reported by the park staff this year, officials said. The 39 hunters who participated in the January 1983 hunt took only eight sheep.

ALLIGATOR STATUS RECLASSIFIED BY FISH & WILDLIFE SERVICE

The Interior Department's U.S. Fish & Wildlife Service (USFWS) has announced the reclassification of the American alligator in Texas, a move that will place management of the reptile in the hands of the Texas Parks and Wildlife Department.

The USFWS said alligators formerly were classified as a threatened species in coastal areas and endangered elsewhere in the state. Effective November 14, 1983, the alligator will be classified as threatened due to similarity of appearance, meaning they are not in danger of extinction but closely resemble other animals

that are endangered.

USFWS officials said the status change was based on studies by university, state and private biologists which show increased numbers of alligators in coastal marsh and inland habitats. A TP&WD survey completed in 1980 estimated the coastal alligator population at more than 90,000 animals, and another study cited by federal officials indicated populations have doubled in the past five years in some prime Texas habitats.

TP&WD officials said proposed regulations for managing alligator populations will be forthcoming.

OPERATION GAME THIEF CALLS, REWARDS RISE

Cash rewards of up to \$300 were authorized by the Operation Game Thief Committee in their October meeting to 14 persons whose tips led to convictions of game and fish law violators since May 1983.

The committee granted a total of \$2,600 for the six-month period, marking completion of the growing program's second year of operation.

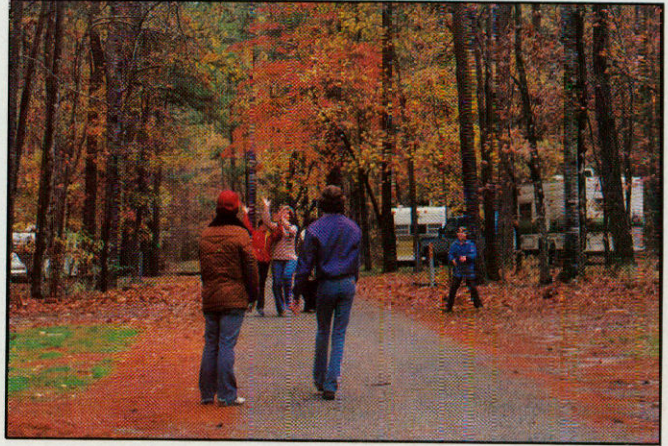
The reward program is funded entirely from donations by individuals and organizations concerned about poaching in Texas. During its first two years the program has paid \$14,625 in rewards to 85 callers whose information led to 633 convictions and more than \$78,000 in fines.

The past six months saw several of the anonymous calls result in arrests for flagrant offenses. One tip led to the arrest of two fishermen illegally

netting redfish and trout. Game wardens confiscated several thousand feet of gill nets, and the poachers were assessed \$600 in fines. The caller received \$300 for his tip. Another \$300 reward was granted a caller whose information helped catch a group of antelope poachers in West Texas.

The Texas Legislature in its last session removed the \$200 upper limit on rewards, leaving the amount of rewards to the discretion of the committee. The Game Thief Committee, which serves without pay, meets every six months to review cases and disburse rewards.

Stanley Brooks, OGT coordinator for the Texas Parks and Wildlife Department, said calls to the toll-free number, 1-800-792-GAME, increased 153 percent during the second year of the program over the first year.



STATE PARKS UNDERUTILIZED IN FALL AND WINTER

Texas' system of state parks is one of the nation's finest, but many of its facilities go begging during the fall and winter.

Texas Parks and Wildlife Department officials said many state parks which are filled to capacity during the summer are almost vacant when cooler weather arrives, especially on weekdays.

There are more than 100 parks in the system, and most offer overnight camping facilities at modest fees. Cabins are offered at Lake Brownwood, Possum Kingdom, Bastrop, Caddo Lake, Daingerfield and Garner State Parks. Fall and winter months are a better time to reserve a cabin, because they

are not always booked for every day as they are during the summer.

Facilities such as Mustang Island and Galveston Island State Parks offer saltwater fishing, while many inland parks such as Garner, Huntsville, Possum Kingdom, Inks Lake and Daingerfield have good fishing lakes within their borders or are located on the shores of large reservoirs. Boat ramps and fishing piers also are standard offerings at these parks.

For a free brochure listing all the state parks and their facilities, write the Texas Parks and Wildlife Department, 4220 Smith School Road, Austin, Texas 78744.

JANUARY IN . . .

TEXAS PARKS & WILDLIFE

San Antonio's Spanish missions have a long and venerable history, a history that is an integral part of Texas' past. They played a significant role in the settlement of the southwestern United States, and two centuries later historical research is shedding new light on the early mission period. The 18th-century missions of San Jose, Concepcion, San Juan and Espada and the acequia systems of the latter two now comprise

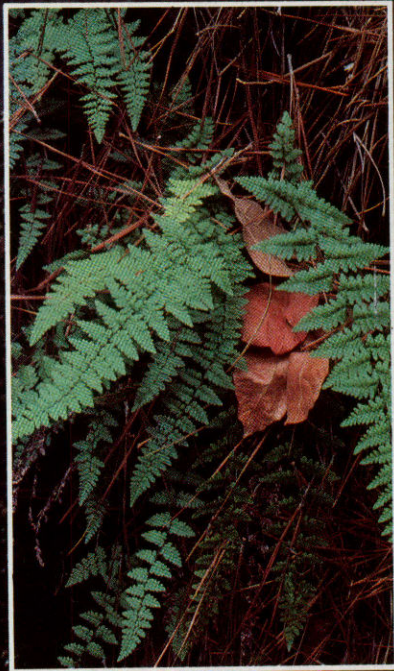
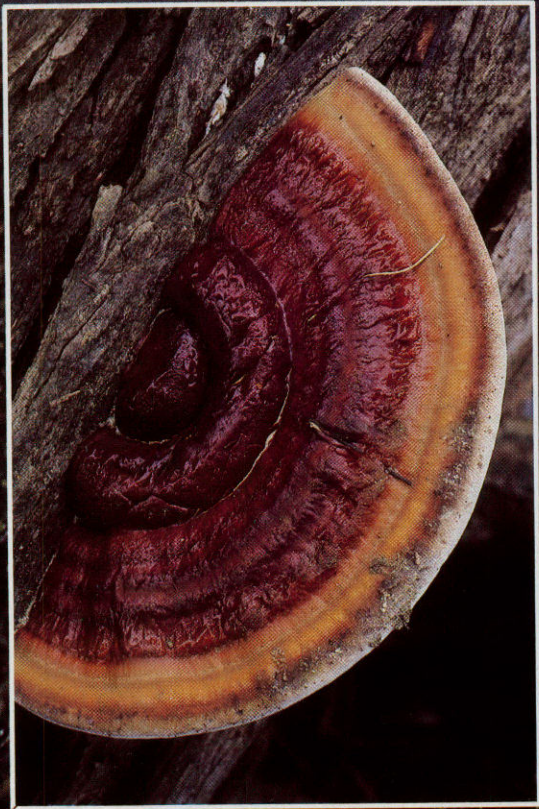
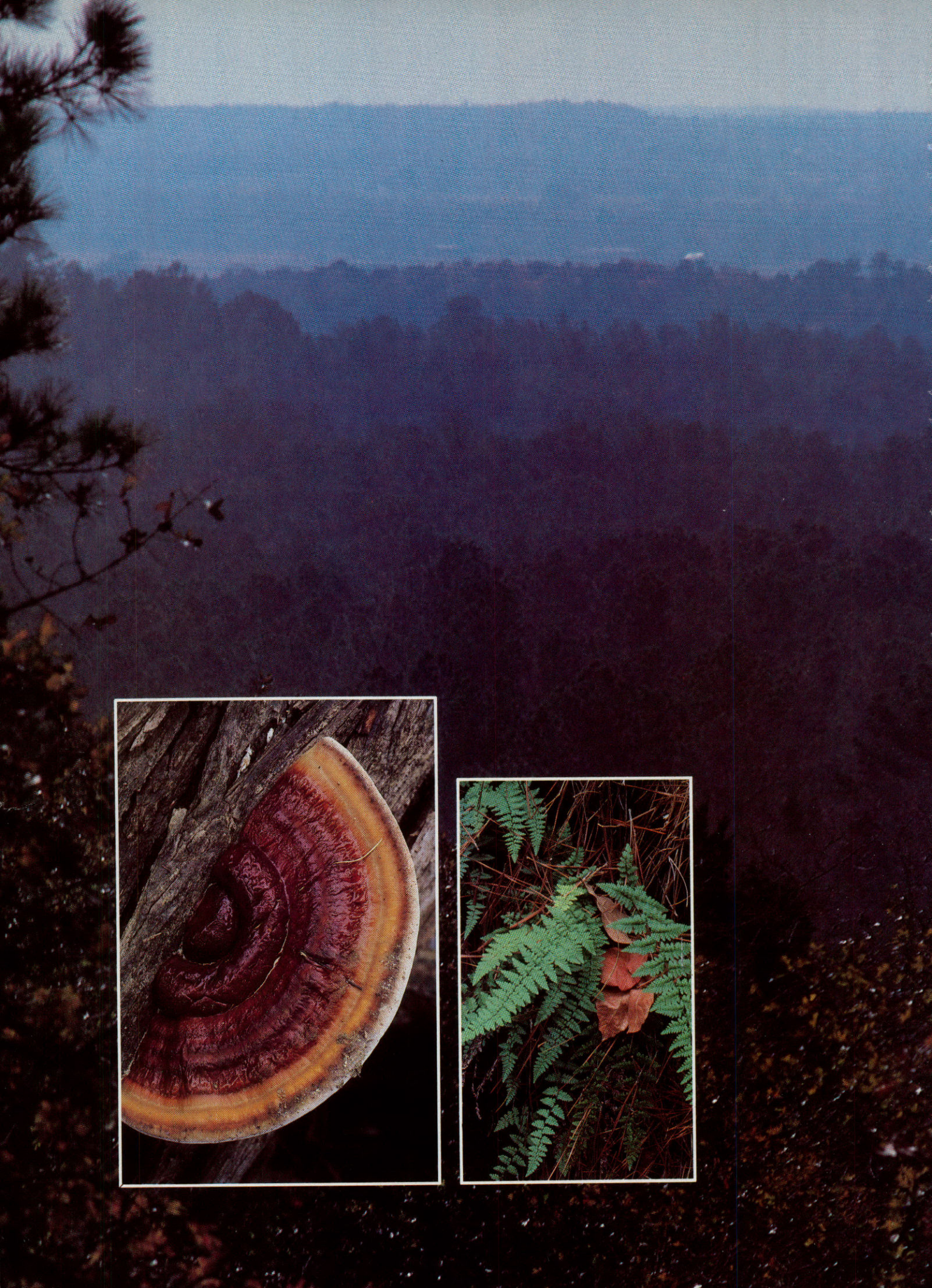
the San Antonio Missions National Historical Park. Next month we'll visit this unique new park and trace the missions' history. Texas is the winter home for more ducks and geese than any state in the central flyway, but there are signs that some of the state's most important waterfowl habitats are reaching their capacity. Next month we'll have the first of two articles or problems facing Texas' important wetland regions. Also in the January issue are stories on a survey of nesting golden eagles in the Panhandle; the Caddo Indians, whose story is told at Caddoan Mounds State Historic Site; the Texas shrimp industry and a photo story on mushrooms.


**STOP
POACHING**

OPERATION GAME THIEF

Reward for information leading to the conviction of game and fish law violators. Call day or night.

1-(800) 792-GAME





LOST PINES REMNANT OF THE PAST

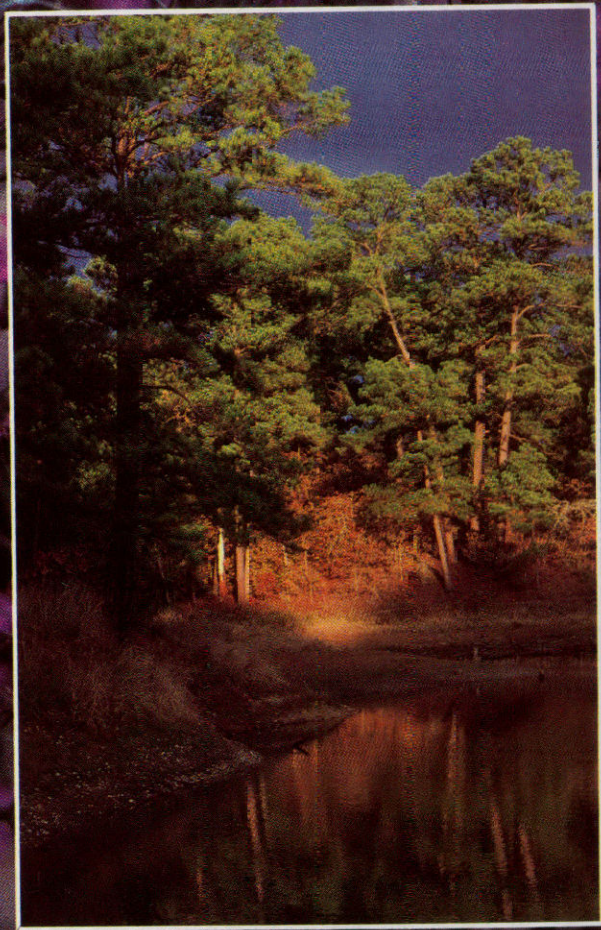
Article and Photos by Paul Montgomery

Over a million years ago, a wetter, cooler climate pervaded Texas. The effects then, both on vegetation and landscape, were much different from those we are accustomed to today. This ancient climate left us with few geologic clues to its existence, especially in Central Texas where weathering from our subtropical climate tends to erase evidence from the past, but clues do exist. One exciting bit of evidence is a small ancient forest of loblolly pines situated on a river terrace in Bastrop County. These isolated pines, which can be seen in Bastrop State Park, are separated from the great pine forests of East Texas and Louisiana by more than 100 miles. How they got there and why they remain are questions whose answers provide us with a glimpse back in time to a very different Texas.

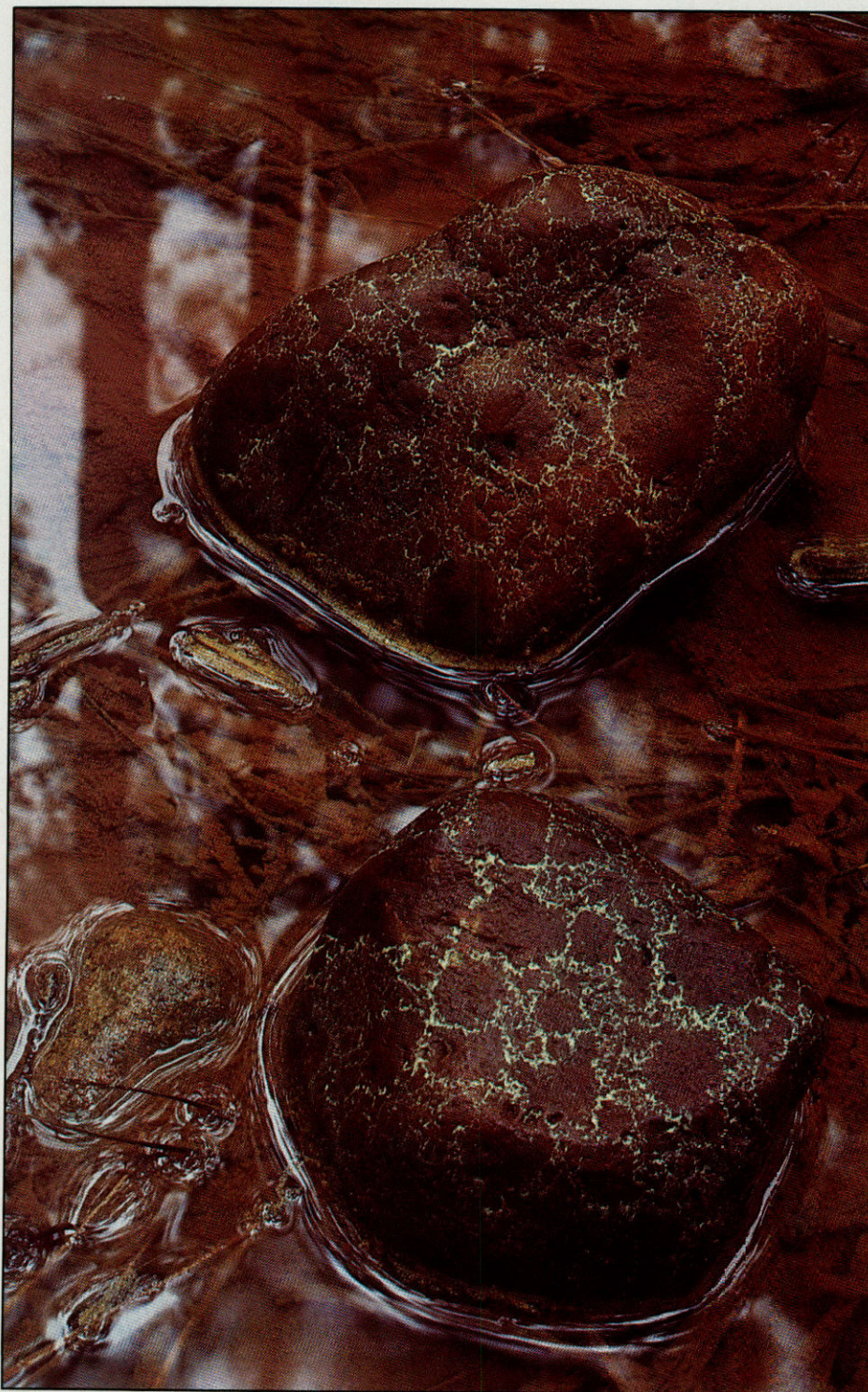
During the Pleistocene Period, the pine-forested regions of East Texas and Louisiana began responding to wetter climatic conditions by expanding westward along Texas rivers. Under these influences they gradually migrated into Central Texas. Evidence for this migration is not only the Lost Pines, but also the patches of soil found along river terraces that closely resemble those sandy, acidic soils of East Texas. A much larger Colorado River was responsible for the development of the soil on which the pines ultimately began to grow. Gravels were deposited and redeposited over ancient sandstone along the terraces of a more strongly flowing stream. The soil that resulted was porous, acidic and had greater water trapping capabilities than the heavy, limestone-based prairie soil to the west. Although these heavy clay soils prevented further expansion of the Bastrop pines, the trees continue to exist today because of the porosity of the sandstone on which they grow. The climate of Texas began to change near the end of the Pleistocene, giving way to the present warmer, drier conditions. This modern climate effectively isolated and slowed the advance of the pine forests, but it did not eliminate them.

Bastrop State Park contains a forest ecosystem of loblolly pine, fungi and orchids that differs greatly from the mesquite and cedar of arid brush prairies nearby. Visitors today surely must wonder about the origins of such unusual life forms and how they came to live in an area so unfavorable to their existence. Marginally surviving on an isolated river terrace in Central Texas, the Lost Pines are a reminder that Texas once was dramatically different. **

This loblolly and post oak vista is visible from atop the highest point in Bastrop State Park along Park Road 1. Ling chih shelf fungus, *Ganoderma lucidum* (inset left), grows rarely in the park near the pond on the park road. Lipferns, *Cheilanthes* sp. (inset right), are found on rocky, sandy ledges above stream beds.



Most specimens of Hooker palafoxia, *Palafoxia hookeriana*, that are found in the park are small, but the one at left is three feet tall with numerous fresh blooms. The 70-square-mile pine forest (inset) is America's southwesternmost stand of loblolly pines. Iron oxide in the Carrizo sandstone cements smooth quartz grains (below).







Early southern coralroot, *Corallorhiza wisteriana* (above), appears in February in the park's low, swampy areas. The pine forest (left) provides a home for living things away from their normal range, such as the pinewoods lily, *Eustylis purpurea* (inset), which occurs as far west as the park, although it is fairly uncommon there.

Coastal Bend Lakes

Texana/Coletto Creek - Family-style Fishing and Basses's Paradise

Article by Jim Cox and Photos by Glen Mills

The temptation is overwhelming to call Lake Texana and Coletto Creek Reservoir identical twins. They are roughly the same size and about the same age. They serve the same Coastal Bend region and both, in the eyes of the fisherman, already are showing considerable potential.

Yet each is unique and appears destined to serve a separate angling constituency.

A generality would be that Texana, located just east of Edna, is developing as a family-style lake catering to the bank fisherman, overnight camper and minnow-dipper. Coletto Creek, about 15 miles west of Victoria, is shaping up as a bass-chaser's paradise because of its more restricted access and its potential as a largemouth bass producer.

Both lakes may surprise the first-time visitor with their appearance. Situated in a coastal prairie region not noted for an abundance of trees, these two lakes have considerable acreages of timber both in the lake and along the shorelines. In fact, bay or gulf anglers whose hopes are blown away by high winds would do well to stop by either of these reservoirs instead of heading straight home. Regardless of the wind direction, sheltered coves offer respite from wind and sun.

Although the overall geography of the two lakes appears similar, water clarity differences are dramatic. Coletto Creek is basically clear, having a limited watershed and a more stable water level. Texana is subject to becoming murky after

rains, and its lower end is easily roiled by strong southerly winds.

Another important difference is water temperature. Discharges from an electric generating plant on Coletto Creek keep that reservoir's waters warmer than Texana, which is a water supply and flood control reservoir with no artificially heated water.

Department biologists believe this will give an edge to Coletto Creek in terms of a long growing season for bass and other sport fish, and will make it a more productive winter and early-spring fishery than Texana.

The following is a closer look at the individual offerings of these two emerging reservoirs.

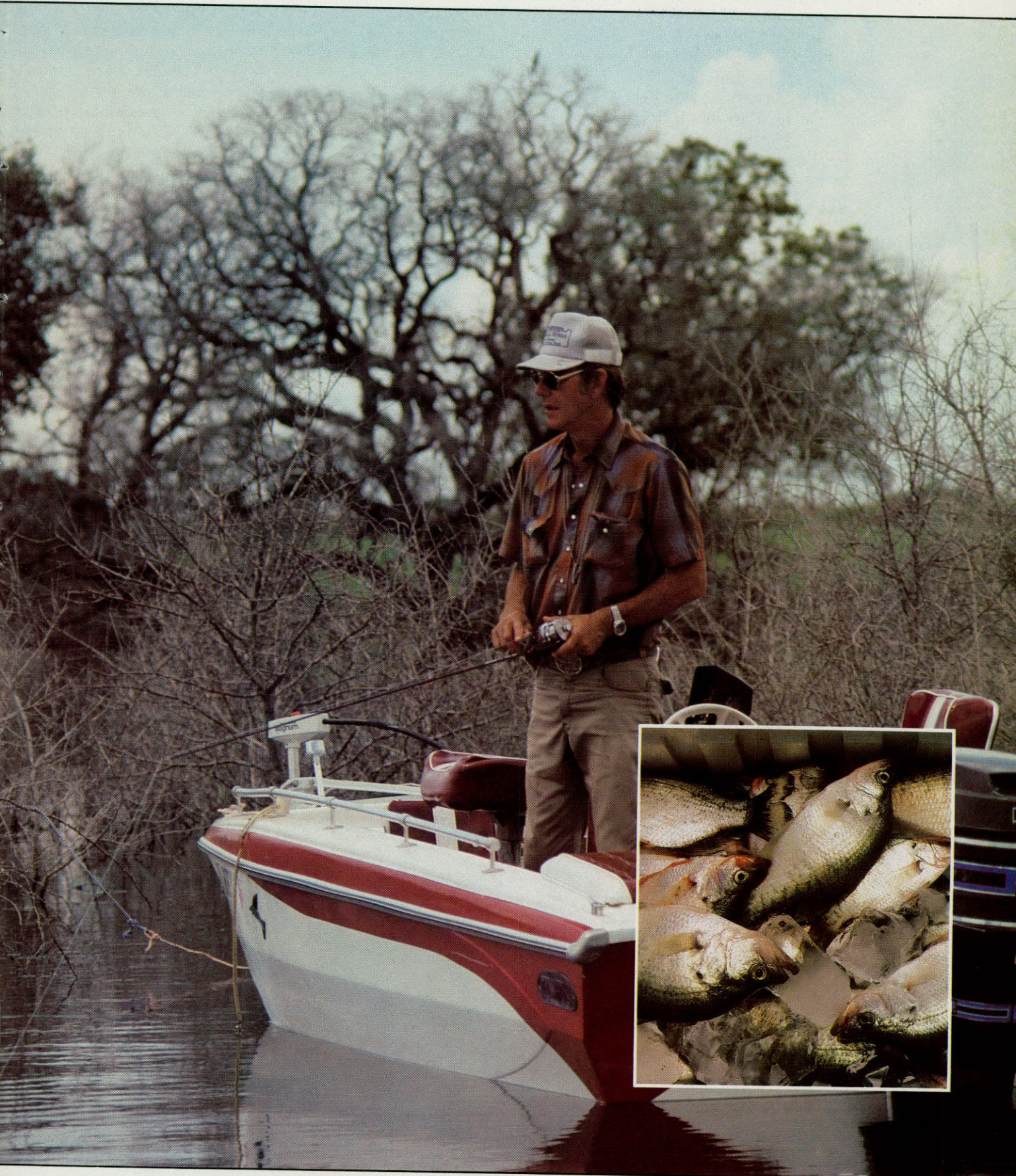
LAKE TEXANA

Driving along the flat prairie land east of Edna on State Highway 111, the motorist would be hard-pressed to imagine what lies ahead. About eight miles out of the city, the prairie yields to forested bottomland, and the Lake Texana State Park sign signals a shady, manicured entry to Lake Texana. In a scene reminiscent of East Texas, the 11,000-acre reservoir has a fertile, fishy appearance. And in this case, appearances don't lie.

Still in its infancy, Lake Texana was impounded four years ago, but

Lake Texana's many sloughs, coves and wooded flats provide plenty of spots in which to toss a lure. The lake already is a crappie hotspot (inset) and crappie fishing should get even better in the years to come.





did not reach its present level until early 1982. Its two major arms reach 18 miles up the Navidad River, the stream impounded to create the lake, and 13 miles up Mustang Creek. Basically shallow except over the main channels, the winding arms offer abundant and enticing sloughs, coves and wooded flats in which to toss a lure.

It might be speculated that the lake is too new to provide much of a fishery, but it already may be ahead of schedule. It got somewhat of a head start in establishing a fishery, since the Navidad and its tributaries

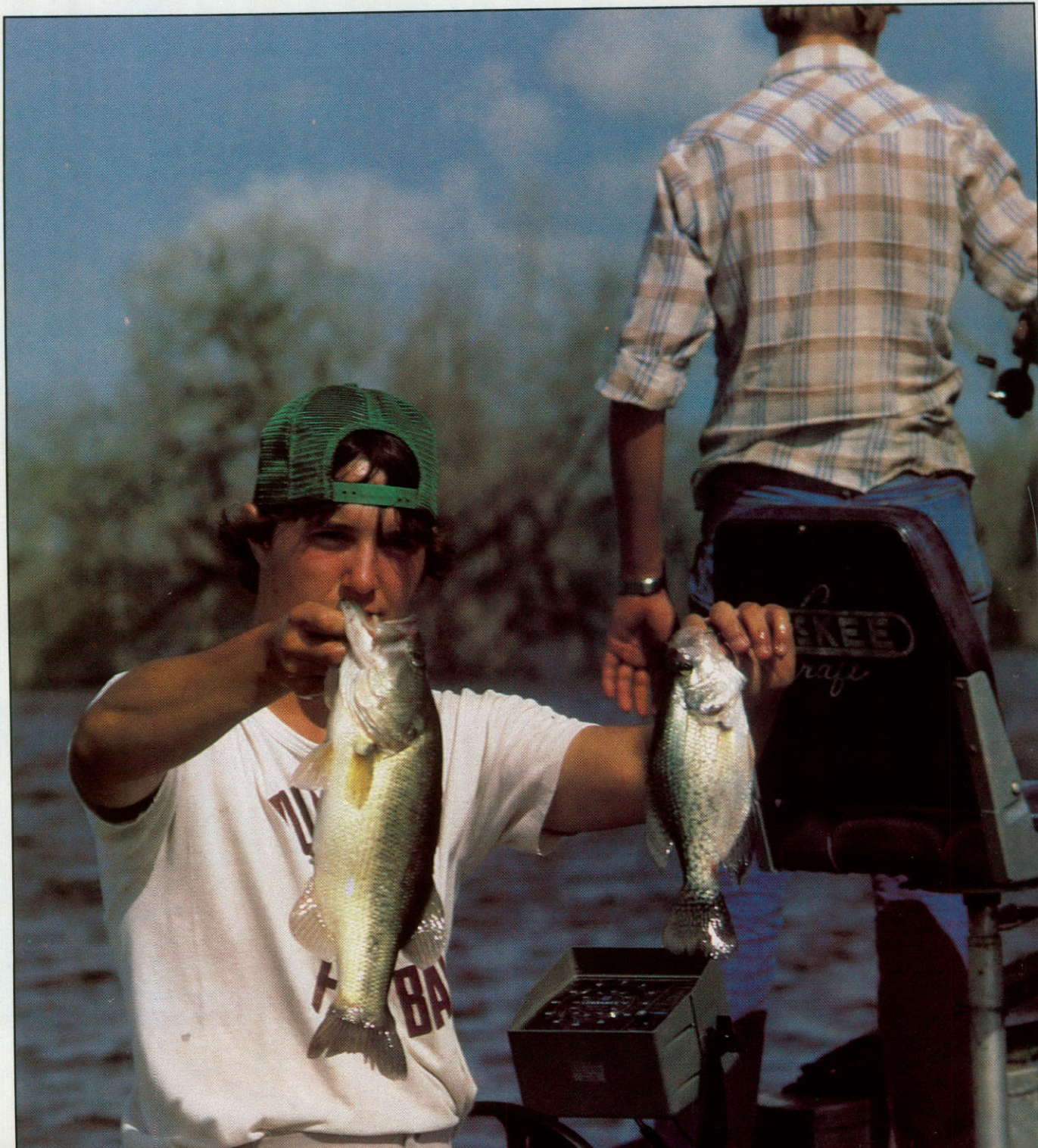
had some native fish before impoundment. The department also stocked a number of ponds in the lakebed with Florida-strain largemouth bass in 1979. This was followed by subsequent stockings of Floridas, as well as striped bass, channel catfish and threadfin shad as the lake filled.

On a recent visit it became obvious that Texana already has bloomed into a crappie hotspot. A couple taking their boat out of the water consented to let visitors peek inside a 36-quart ice chest that was almost full of white crappie. The fish were

caught in about two hours' time beneath the Highway 111 bridge.

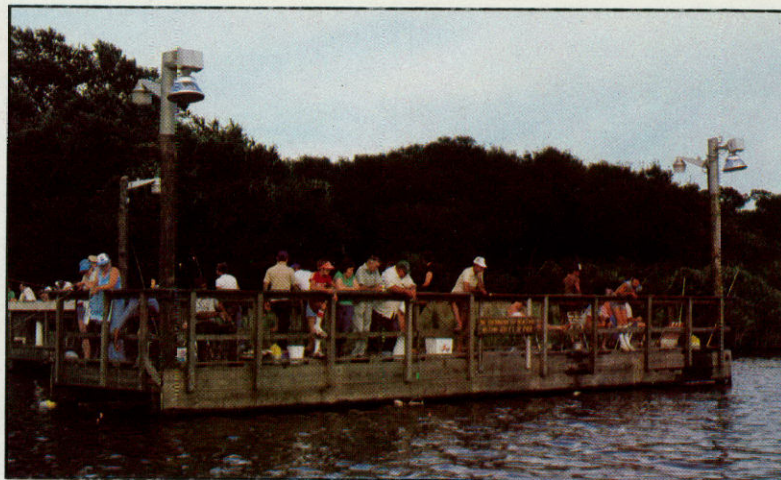
Thus encouraged, the visitors launched their boat and headed straightway for the concrete bridge pylons. Numerous boats were there, and several families were boating the tasty crappie with regularity. Although the average size of the crappie was fairly small, about three-fourths pound, some more than a pound were caught and others exceeding two pounds are reportedly available.

Evidence of the popularity of the lake's crappie fishery also was of-





In addition to largemouth bass and crappie (left), Texana has been stocked with striped bass, channel catfish and threadfin shad. Eight public boat ramps offer access to the lake and overnight camping facilities and fishing piers are available at Lake Texana State Park.



ferred by John Billings, who operates Lakeview General Store by the lake. Billings said he has to order minnows in the hundreds of dozens to keep up with demand, and even with those quantities he has sold out on some weekends.

Billings and department biologists agree that Texana has the shallow, somewhat turbid habitat crappie love. While crappie populations are cyclical in nature, Lake Texana should be an outstanding producer for years to come.

While apparently less sought-after than crappie, the channel catfish fishery is improving and should reach outstanding levels soon. Trotliners on the lake report that fishing has improved markedly in the past year, and the fish are in excellent condition.

Billings, who is an active bass tournament fisherman as well as merchant, hastens to add that bass fishing on Texana is not being overshadowed by crappie. "Fishing for bass was slow during the spring and first part of the summer because of so much rain and murky water," he said, "but it has been great since then." It was great indeed for one angler who recently caught a lake-record bass of eight pounds, two

ounces. This fish apparently was among the first group stocked in 1979, but many from the later stockings have grown into the two- to four-pound class.

Billings notes that Texana is an enjoyable place to fish for bass, with plenty of shallow-water habitat studded with trees, stumps and aquatic vegetation. Topwater lures such as buzzbaits are the ticket during warm weather in the wooded coves. Billings uses his knowledge of the river channel locations to find concentrations of bass where shallow weeds or other cover are found near the steep sides of the channel. He prefers Texas-rigged plastic worms in dark colors, such as purple white-tail or solid black, in this kind of water. Billings uses a depth-finder to pinpoint these choice locations, but anglers can take advantage of the lake's visible structure to find bass as well. Excellent topographic maps can be obtained at stores near the lake and in Edna.

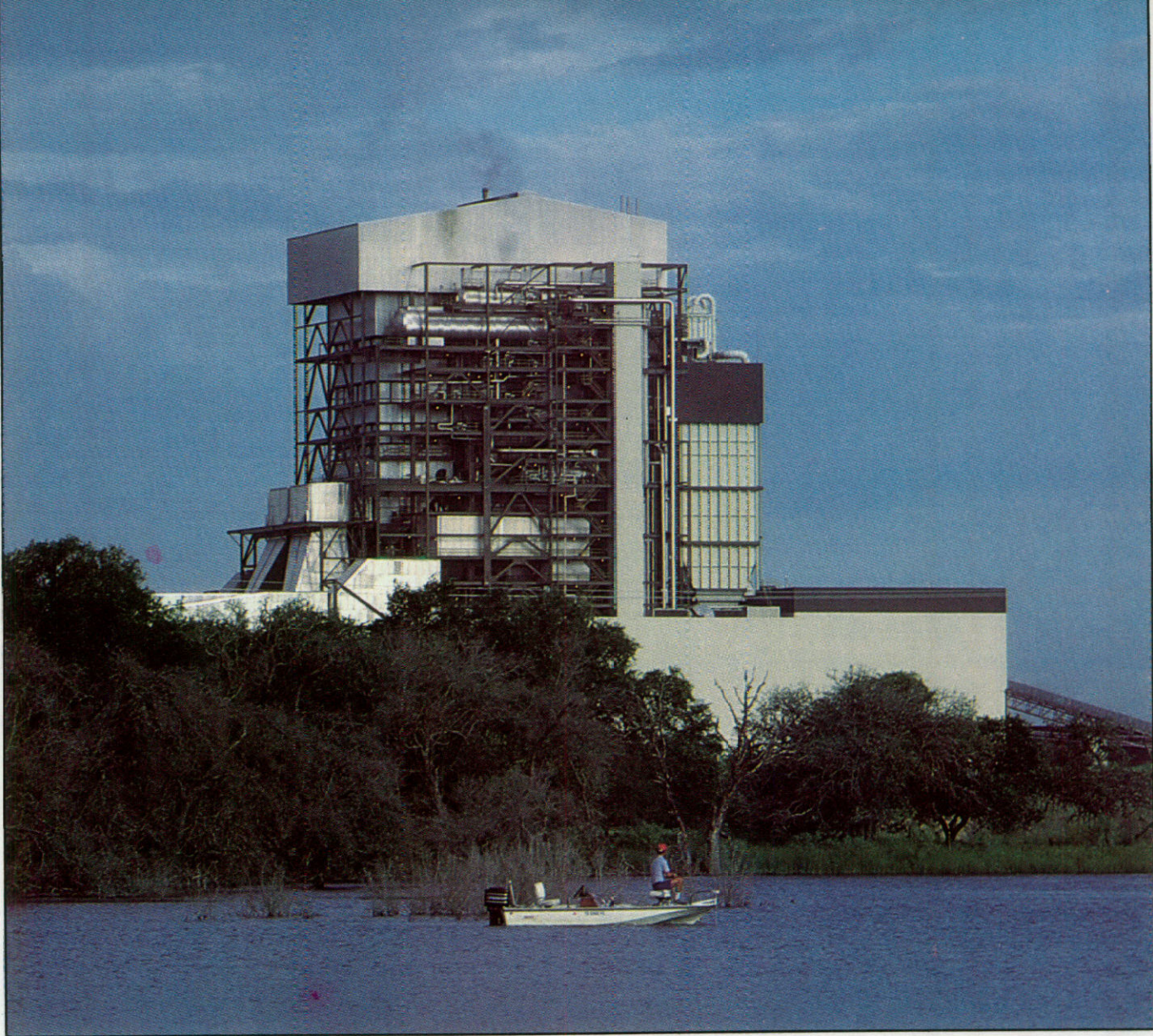
Lake Texana also is the site of an experiment involving striped bass, and biologists believe it's working. The lake was stocked in early 1983 with 375,000 striped bass fry which were only 10 days old when released. The traditional stocking technique involves raising newly hatched stripers in hatchery ponds to fingerling size (one to three inches) before releasing them into reservoirs. If successful, the experimental fry stocking procedure could result in more stripers stocked each year at significantly reduced costs.

Although it's too early to predict that fry stocking will work in all

lakes, subsequent surveys at Texana indicate the fish had excellent survival and should be large enough for harvest in early 1984. Looking farther into the future, biologists expect some of the stripers to pass through the Texana dam and create a fishery in the Lavaca and Navidad Rivers as well as Lavaca Bay. The department also stocked 23,500 striped fingerlings in the Swan Lake area of Lavaca Bay earlier this year, making the possibility of a bay and river striped fishery even more likely in the future.

One point of interest to Lake Texana visitors is that a large percentage of the fishing boats on the lake are equipped with airboat motors and floundering lights. Billings said a boat ramp just 10 miles south of the Texana dam off State Highway 616 near Lolita offers access to the Lavaca River just upstream from its confluence with Lavaca Bay. The brackish river waters often have large numbers of speckled trout, flounder and redfish. He said the trout fishing, especially during the winter, is excellent in that area.

Boat-towing visitors to Lake Texana can select from eight public boat ramps. Their locations are: Off State Highway 172 at Ganado (Mustang Creek arm); Stavinoha Road, off SH 172 on the east side of the lake; intersection of FM 1593 and SH 111, on the main lake; Simons Road, off FM 3131; Breckenridge Campgrounds, across the highway from the state park; one ramp on each side of the lake at the U.S. Highway 59 bridge; and Freeman Road, off US 59 east of Ganado.



All fishing regulations at Texana are standard, with 10 per day, 20 in possession and 10 inches minimum length for bass; 25 channel or blue catfish in the aggregate per day, possession limit 50, minimum size nine inches; flathead (yellow) catfish, minimum size nine inches, daily limit five, possession limit 10; striped bass, five per day, 10 in possession. There are no bag or length limits on crappie.

Although the lake hosts large numbers of waterfowl each winter, hunting is prohibited by the Lavaca-Navidad River Authority.

The 575-acre Lake Texana State Park offers attractive camping and picnicking facilities. For reservations and information call the park superintendent at 512-782-5718.

COLETO CREEK

Any bass fisherman who can gaze

upon 3,100-acre Coletto Creek Reservoir without getting an itchy casting thumb should go in for a check-up. All the elements are present to create an outstanding bass fishery—warm, fertile water; an abundance of standing timber and aquatic vegetation; excellent depth variations; and plenty of shad and other forage fish.

Department fisheries biologists recognized this potential even before the lake was impounded in 1980. As soon as the reservoir began collecting water it was stocked liberally with Florida-strain largemouth bass, which grow faster and attain larger sizes than native largemouths. The first shipment was 356 surplus brood fish from the San Marcos hatchery, followed by more than 400,000 fingerling-sized Floridas stocked during the next three years.

To assure that the bass and other

game fish have plenty to eat, crews stocked threadfin shad at Coletto Creek in 1980. Surveys since that time indicate the threadfins, which are excellent forage because of their small size, have expanded their population.

The bass are eating well, if lake record catches are any indication. Wilfred Korth, chief ranger for the Coletto Creek Regional Park at the lake, said the current record is a 10-pound, nine-ounce bass caught during the summer. "It seemed there was a new lake record set just about every month this year," said Korth, an avid fisherman himself.

If the Coletto Creek fishery provides an excellent and long-lasting fishery, the Guadalupe-Blanco River Authority deserves much of the credit, in the opinion of department officials. Biologist Jimmy Dean of

San Antonio said the GBRA followed TP&WD recommendations on a clearing plan which left most of the timber and other natural structure in the lake bed, with only the areas adjacent to the spillway and the GBRA park bulldozed before impoundment.

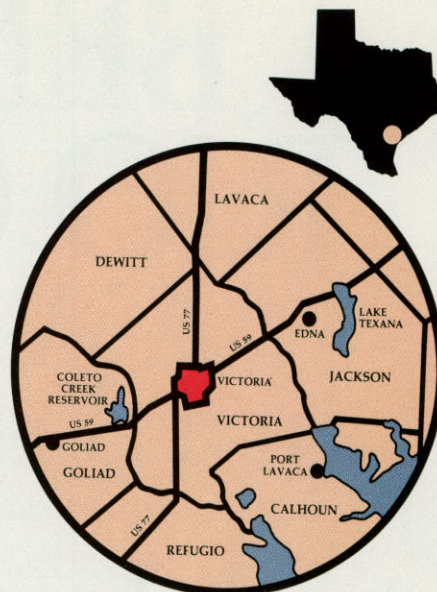
Another factor which may help Coletto Creek's long-term bass production is a three-per-day bag limit and 16-inch minimum length limit for largemouth bass. Coletto Creek joins Fayette Power Project Reservoir near LaGrange and Lake Nacogdoches at Nacogdoches as the only three Texas lakes with this particular limit. Bag limits on all other species of fish are standard, and are identical to those at Texana.

Korth said it would be difficult to pick a portion of the lake that has better bass fishing than any other. "That's one of the great things about this lake. You can find good fishing virtually all over," he said. The impoundment flooded four creek bottoms; the Coletto, Perdido, Turkey and Sulphur. Thus wooded coves and well-defined creek channels abound in both the upper and lower ends of the lake.

Coletto Creek's bass fishing tends to overshadow the other sport fish, but fishing for crappie, catfish and hybrid striped bass is on the upswing as well. Korth said crappie fishing was outstanding at times in 1982, and after a slow summer period has been excellent this fall. He agrees with department biologists that Coletto may never match Texana for crappie fishing, but it promises to be better than average.

Another area in which Coletto Creek differs from Texana is that Coletto has been stocked with hybrid striped bass rather than pure stripers. The approximately 65,000 hybrids placed in the lake in 1981-82 are flourishing, and some have grown past the four-pound mark. "The hybrids so far have been a winter and early spring fishery," Korth said. "It appears they are easier to locate and catch during the cold-weather months. I'm sure they are available all year, but fishermen don't go after them as much in the summer."

As on other power plant lakes stocked with hybrids, the fish often congregate during the winter as closely as possible to the hot water



discharge canal to feed on bait fish that also are attracted by the warm current. Water temperatures range from 90 to 95 degrees in summer to the 60s in winter.

Korth said fishermen at Coletto Creek have discovered a hybrid striper fishing technique that may be untried by fishermen in other regions. "Most of the hybrids caught last winter hit dead shrimp drifted along the bottom," Korth said. "The other method is jiggging a slab-type spoon in deep water."

Trotling is allowed on Coletto Creek, and fishermen report good catches of channel and blue catfish. The largest blue boated so far weighed 18 pounds, Korth said.

Since the reservoir and all shoreline property around it is owned by the GBRA, lake access is limited to the regional park. To reach the park entrance, take U.S. Highway 59 east from Goliad or west out of Victoria and watch for the Coletto Creek Reservoir sign on the north side of the highway. Entry fee is \$5 per vehicle, and the fee includes boat ramp rights. A \$70 per vehicle annual permit also may be purchased. A fee of \$8 per vehicle is charged for each vehicle occupying a campsite with water and electricity. For information on reservations and facilities, contact the Chief Ranger, Coletto Creek Regional Park, P.O. Drawer 68, Fannin, Texas 77960, 512-575-6366. **



Discharges from an electric generating plant on Coletto Creek keep that reservoir's waters warmer than Texana. Biologists believe the warmer water will give Coletto Creek an edge in terms of a long growing season for bass and other sport fish and make it a more productive winter and early spring fishery. Most of the timber and other natural structure was left in the lake bed. In an effort to help Coletto Creek's long-term bass production, there is a three-per-day bag limit and a 16-inch minimum length limit for largemouth bass.

BENTSEN- RIO GRANDE

A Wildlife Island in a Sea of Agriculture

Article by Mary-Love Bigony and Photos by Bill Reaves

Next best thing to a tropical vacation this winter might be a trip to the subtropical Rio Grande Valley. The skies are sunny and the temperature ranges from mild to warm. Citrus groves and palm trees lend a picture-postcard loveliness to the area's international atmosphere.

One spot that should be high on any list of places to visit in the Valley is Bentsen-Rio Grande Valley State Park. Like the rest of the area it's beautiful, but even more important is its value as a nature preserve. The park has been called "an island in a sea of agricultural lands," since it is one of the few remaining patches of native vegetation in the Lower Valley. Widespread clearing for cropland in the early 20th century reduced native brush, and consequently much of the wildlife such habitat attracts. Bentsen-Rio Grande Valley State Park is a haven for a variety of wild animals, and is particularly well known for its abundant and often unusual birdlife.

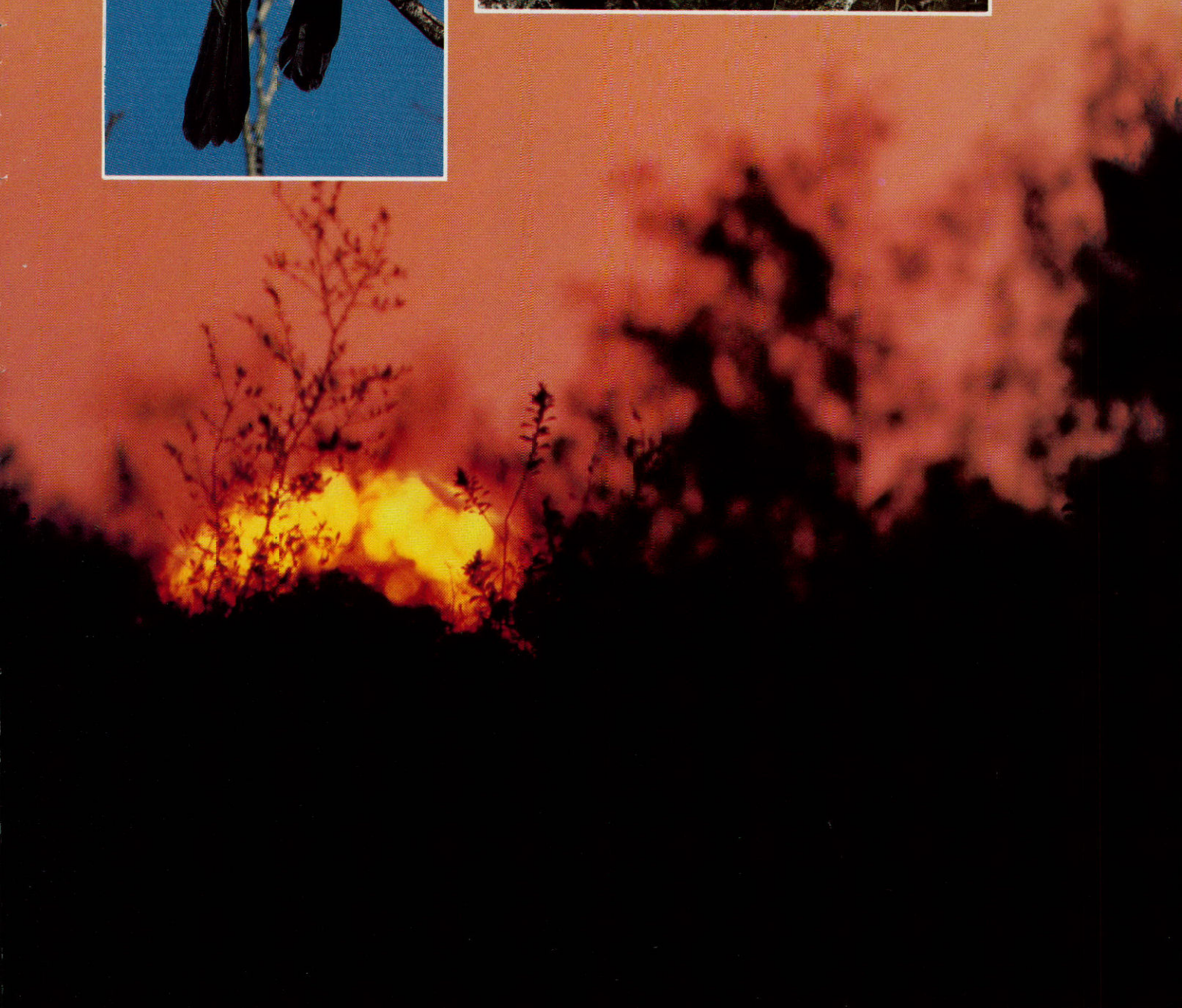
Most of Bentsen-Rio Grande's 587 acres are typical of South Texas and the southwestern United States—dry brushland commonly called chaparral. But there also are spots of moist river woodlands where thick stands of cedar elm, hackberry, anaqua and Mexican ash grow. Many of the trees in more humid areas are decked with Spanish moss. Subtropical vegetation would be far more common in the park if it weren't for the scanty rainfall, since the warm

climate and fertile soils have the potential to support lush plants. But annual rainfall is low and most of it is lost to evaporation, so the more luxuriant vegetation is confined to areas along the Rio Grande, irrigated fields or resacas, which are low-lying former channels of the Rio Grande.

This combination of habitats is responsible for an interesting assortment of animals, many of which are Mexican species found no farther north than this southern tip of Texas. The birdlife here is famous, and birders come to Bentsen-Rio Grande from all parts of the world. Even people who have only a casual interest in birds can't help but be impressed by the area's avian beauties. In general, the more tropical birds are found in the woodlands while species of the American Southwest and Mexican deserts live in the brushlands.

The park's headquarters has a field checklist of Bentsen-Rio Grande's birdlife. A few of the species that are seldom, if ever, found anywhere else in the United States are the gray hawk, rose-throated becard, ringed kingfisher, clay-colored robin and varied bunting. Year-round residents include the Lichtenstein's oriole, kiskadee flycatcher, green jay, white-collared

Groove-billed anis (inset left) and road-runners (inset right) are attracted to the park's brushy habitat. South Texas is the northernmost part of the ani's range.



seedeater, white-tailed kite, pauraque and chachalaca. Among the birds that nest in the park are the groove-billed ani, elf owl, white-winged dove, yellow-billed cuckoo, tropical kingbird and Weid's crested flycatcher. This is merely a sample of the

birds that can be seen in the park; the checklist includes more than 200 species.

The thought of seeing these birds will excite even some veteran birders, but nonbirders might also enjoy taking along an illustrated field guide

and trying to identify some of them. Many species are abundant and easy to observe.

While the beautiful and vocal birds are the most apparent of the park's wildlife, interesting mammals, snakes, lizards and amphibians also live in the area. The ocelot and jaguarundi, both listed as endangered in Texas, inhabit the dense, thorny chaparral thickets. There are also bobcats, coyotes, javelinas and several species of bats. Amphibians include the Rio Grande siren, Rio Grande leopard frog and giant toad, as well as smaller frogs and toads. A dozen or so species of snakes inhabit the park, but the coral snake is usually the only poisonous one; rattlesnakes are uncommon. The harmless Texas indigo snake is the most common, and other species include bullsnakes, racers, garters, whipsnakes, brown snakes and great plains rat snakes. Lizards include whiptails, racerunners, skinks, tree lizards and spiny lizards.

Of all the living things in Bentsen-Rio Grande Valley, the plants are the easiest to observe and study. The park makes this an interesting task with a well-marked nature trail. The Singing Chaparral Trail, named for the brushy vegetation and the bird songs that invariably accompany a walk, is marked with 26 numbered stops corresponding to a trail guide available at the headquarters. The booklet provides a description of each of the numbered plants, using both English and Spanish names when possible; some have no English names. It also urges the visitor to watch for animal tracks, points out the changing vegetation and describes several of the butterflies found in the park. The entire trail is 1½ miles, but there are two loops within the trail that afford shorter walks. A 1.8-mile hiking trail loops through the brushland and past an

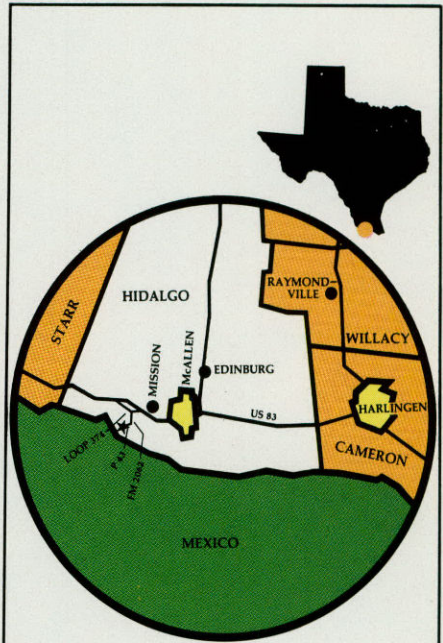


Lichtenstein's orioles (left) range from Nicaragua north to the Rio Grande Valley and are fairly common in the state park. Campsites accommodate overnight visitors and a fish cleaning table is available to anglers.



old oxbow lake or resaca, with an extension that takes the hiker to the Rio Grande. This trail also contains two loops for shorter walks.

Bentsen-Rio Grande Valley State Park is a remnant of the past, an example of how this area looked before the bulldozer and plow invaded the Lower Valley. Park visitors can take home more than pretty pictures; they can leave with an insight into South Texas' interesting plants and wildlife. **



Bentsen-Rio Grande Valley State Park

Location: Hidalgo County, three miles west of Mission on US 83, continuing west on Loop 374, then south on FM 2062 for 2.6 miles; enter on Park Road 43.

Facilities: 77 trailer sites with paved pullouts, water, electrical and sewage hookups, table and grill; 65 regular campsites with table, grill and water nearby; 11 picnic sites, including 1 group picnic area with 10 tables; 3 restrooms, 2 with showers; snack bar within three miles; 1 sanitary dump station; open group shelter; playground; fish cleaning table; boat ramp.

For reservations or information: call 512-585-1107 or write Bentsen-Rio Grande Valley State Park, P.O. Box 988, Mission 78572.



A close-up, high-contrast photograph of an owl's eye. The eye is large and round, with a dark pupil and a yellowish-brown iris. The surrounding feathers are dark and textured, with some lighter feathers visible on the right side. The lighting is dramatic, highlighting the texture of the feathers and the intensity of the eye.

**Young
Naturalist**

ANIMAL EYES

by Ilo Hiller

As we gaze at the world of nature around us and marvel at the things we see, little thought is given to the amazing organs that make such sight possible—our eyes.

Each species of animal has special modifications that adapt its eyes for its life-style, but our eyes and those of the more highly developed animals work basically the same way. Light passes through the cornea, a curved transparent covering that bends light so it can be focused. The light then enters the eye through the pupil, a hole in the eye's surface. The size of this hole and the amount of light that may enter is regulated by the muscles of the colored iris. In bright sunlight the iris contracts, reducing the opening to allow less light to enter. This protects the sensitive inner surface of the eye. At night or in a darkened room, the iris retracts, creating a larger opening through which as much light as possible can enter.

The adjustable pupil opening controlled by the iris in a human eye is round, but it may take other shapes in the animal kingdom. It may look like an hourglass, horse-shoe, teardrop, keyhole, star, diamond, rectangle, square, oval or slit.

Many hoofed mammals have horizontal pupils that give them a wide-angle view of their surroundings. Members of the cat family, alligators and some snakes are a few examples of animals that have vertical pupils that close to mere slits in bright light, yet open wide in low light. The gecko, a tropical lizard, also has a vertical eye slit; however, the edges of its iris are scalloped. When they close they leave four small pinholes that allow light to enter the eye during bright daylight.

Only a few fishes, such as sharks, can adjust their pupils. The rest must rely on the filtering effect of water to help control the brightness of light.

Regardless of the shape or type of opening, once light enters the pupil it passes through a transparent lens that controls and focuses it. Muscles change the shape of the lens to sharpen the focus for near or distant vision.

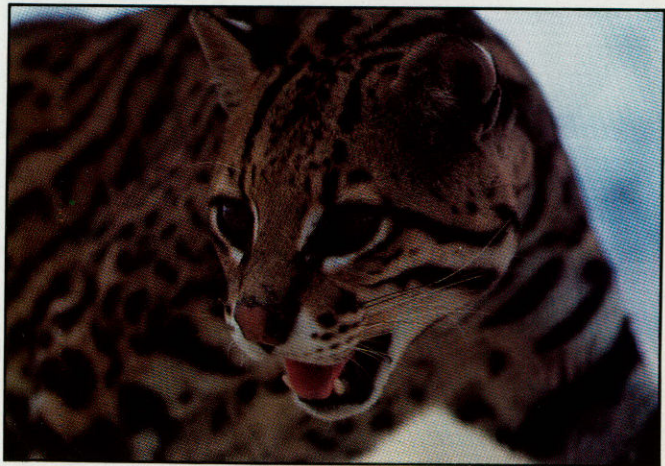
When relaxed, our eyes are in focus for distant objects. If we need to focus them on something nearby, the muscles and ligaments attached to the lenses cause them to bulge forward. This method of focusing is used by most mammals, birds and reptiles (except snakes). Birds and lizards can make their lenses actually bulge through their pupils to focus on a gnat that is less than an inch away.

Amphibians, snakes and fish focus their eyes by moving their lenses backward and forward with pressure. Muscle contractions compress the transparent eye jelly found behind each lens. This pushes the lenses forward. When the pressure is released, the lenses move backward.

Owl eyes (left) do not move in their sockets, so the bird must turn its head to change views. All birds and some other animals have internal eyelids, nictitating membranes (top right), that clean and protect their eyes. The pupil controls the amount of light entering the eye. In humans (bottom right), it is round, but in some animals, such as the ocelot (center right), it is a vertical slit.



Martin T. Fuller



Jim Whitcomb



Reagan Bradshaw

Like a window shade, a protective shield moves over the ray's pupil (below) to restrict sunlight when the ray comes to the surface. Fish (bottom left) focus their eyes by using pressure to move their lenses forward and backward. The hermit crab (bottom right) and blue crab (opposite page) have eyes on the ends of movable stalks.

Since water does away with the focusing ability of the cornea, the fish's flat cornea serves only as a protective window. All focusing must be done by the movable lens, and the range of vision is limited. Fortunately, a fish's eyes focus on nearby objects when relaxed, and its field of vision is wide, making it harder for something to slip up on the fish unseen.

By whatever method the animal uses, once the light is focused by the lens, it passes on to the retina at the back of the eye. There a layer of light-receptor cells convert it into nerve impulses. Two types of light-receptor cells are involved in this conversion process—rods and cones.

Jim Whitcomb



Janet Geipman



Leroy Williamson



Rods report the contrasts between light and dark images. They are extremely sensitive to light and are essential for night vision since they can pick up the dim shades of twilight and darkness. No animal can see in total darkness, as in a cave, but on even the darkest night there is a faint light from the moon and stars that can be used by sensitive eyes.

Cones, which report color, need much more light to function than rods do, and they play a major role in daytime vision. Animals that see the best in daylight have cone-packed retinas.

The number of rods and cones present in the eye varies from one animal species to another. Nocturnal animals (those active at night) must be able to see in dim light, so their eyes have more rods than human eyes. Having fewer cones limits an animal's ability to see color; however, having a lot of cone cells does not mean an animal will be able to sense color. The red squirrel has pure-cone retinas, but researchers believe it has only a basic sense of color. Cats also have cone cells, and their eyes are stimulated by lights of various colors, but they do not appear to "see" these colors and are considered color-blind.

Animals that need to see in both darkness and daylight have retinas with both rods and cones. They also may have a light-reflecting layer of cells called the tapetum, which is located behind the retina. This tapetum layer reflects light back to the sensitive rods and improves night vision. It also causes the eyes of these animals to appear to glow in the dark. (See "Eyeshine" in the April 1980 *Texas Parks and Wildlife* magazine).

This scattering of light by the tapetum can reduce daytime vision in some species. It is believed that a cat's



vision may be slightly fogged by it during the day. Although cats can see much better than humans at night, humans (who have no tapetum layer) may see six times better than cats during the day. The tapetum layer in a shark's eye is made up of crystal-like plates that project from the retina at a 45-degree angle. When exposed to the sun, special light-absorbing pigment cells cover the crystal plates to block out the light so its daytime vision is not hampered.

Good vision in the animal kingdom seems to be in proportion to the importance of sight to an animal's existence. Nocturnal animals that depend more on their other senses than sight may have poor eyesight. Others, such as the owl, depend on sight and have developed very sensitive eyes. Creatures that fly and predators that hunt fast-moving prey usually have big eyes and sharp vision. Those that live underground or eat vegetation ordinarily have smaller eyes and poorer eyesight. Bright light makes an object visible at a greater distance, so daytime creatures usually have better eyesight than nocturnal ones.

Most birds are active only during the day, and their cone-packed or pure-cone retinas give them excellent eyesight. In fact, certain species of birds have better vision than any other daytime creature. A soaring hawk can spot a grasshopper a half-mile away, and the

slightest movement of a mouse in a field far below is noticed. It is estimated that a hawk can see at least eight times as well as a human. However, as twilight fades into darkness, the excellent daytime vision of most birds becomes useless. All night they must sit on their roosts almost completely blind and wait for dawn to make it possible for them to see again.

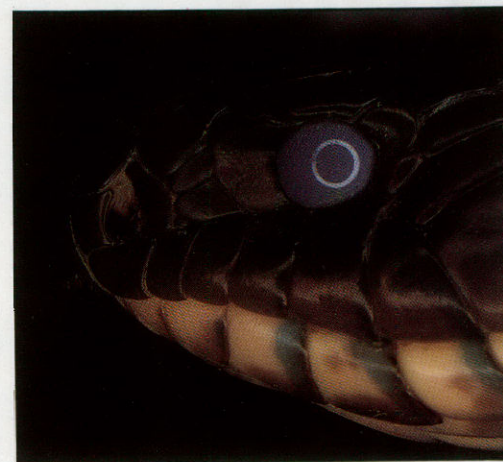
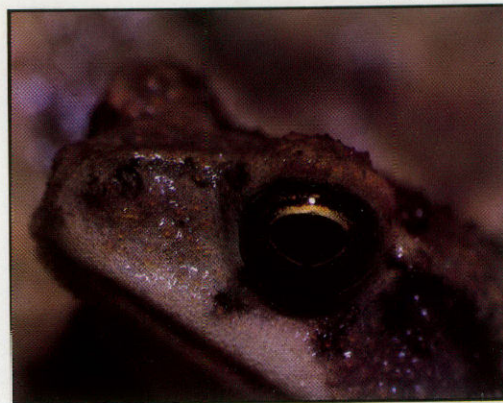
In order for our eyes to see, the nerve impulses produced by the rods and cones must be carried from the eye to the brain by the optic nerve. In the brain these impulses are converted to an image.

Our eyes focus together on the same object, so we have what is known as binocular or stereoscopic vision (three dimensional). The space between our eyes causes each eye to send a slightly different picture to our brain. (Close one eye, then open it and close the other one. By switching back and forth, you will see the slightly different view each eye receives and then sends to the brain.) The overlapping portion of these two views gives depth to our vision and allows us to determine dimensions and distances.

Reaching for a glass of milk at mealtimes would be a problem if you had no depth perception. Since you could not tell how far away the glass was sitting, you might close your hand before you got to it, or you might tip it over because you reached through it, thinking it

Spiders (below) have simple functioning eyes. Most species have six or eight of them and the arrangement varies. Frog eyes (top right) serve two purposes. When the bulging eyes are drawn into the body, they help push food down the frog's throat. Its protective eye scales turn milky (bottom right) just before the snake is ready to shed its skin. (The white ring you see is a reflection of the ring light strobe used to take the picture.)

Leroy Williamson



Jim Whitcomb

was farther away. People with faulty depth perception often bump into things or run into door casings because they can't tell exactly where the objects or openings are located. Their eyes do not send correct messages to the brain.

Accurate estimation of distance is important to predators, so most have their eyes positioned toward the front and use binocular vision. Prey species, on the other hand, must be constantly alert, seeing as much of the area around them as possible to avoid predators. For this reason their eyes are positioned more on the sides of their heads and they have a type of vision known as monocular. Each of their eyes works independently, sending a two-dimensional picture of what it sees to the brain. Some animals, such as lizards, actually can direct their eyes independently—one to the back and one to the front, or perhaps one up and one down. Others are able to see almost all the way around without moving their heads or eyes. With its monocular vision, the rabbit can see where it is going while still watching behind for a pursuer. At the same time it can see if a hawk is swooping down from above. A tiny area directly in front provides the rabbit with binocular vision.

Most animals have a combination of binocular and monocular vision. The owl is an exception in the bird family. Since its eyes are not movable in their sockets, this bird must turn its head to change its view. The fixed eyes report a binocular view to its brain no matter which way the head is facing.

Placement of the eyes is directly related to the animal's life-style and needs. Since a turtle's shell protects it from above, it has little need to scan the area overhead. However, since a turtle must search the ground or bottom of the pond for food, its eyes are directed downward. This gives it a good view of the area it needs to see.

The woodcock's eyes are placed toward the top of its head. When this bird buries its beak in the ground looking for worms or other food, the eyes are still able to watch for predators. In an upright position, the woodcock sees a flat, monocular world on either side, but in the front and back where the images overlap, the bird sees a three-dimensional, binocular world.

The bittern has eyes near the bottom of its head. When frightened, this shorebird raises its head, points its beak to the sky and freezes so it blends in with the background reeds of its habitat. The location of its eyes makes it possible for the bittern to watch for danger while its head is up.

The prairie dog's eyes are widely spaced and located high on its head so it can scan its surroundings with little or no body movement. With its head raised just barely above the top of its burrow, the prairie dog can search for danger above, in front, behind and to the sides. To reduce the glare of the bright sun, the prairie dog's eyes have a special feature—built-in sunglasses. The lenses in their eyes are amber instead of clear.

Another special feature found in some animals' eyes

is an internal eyelid, called the nictitating membrane. If you look closely at the family cat's eyes when it is dozing off, you may see these special eyelids. They move from the inside corners across the eyes sideways, like sliding doors.

All birds have these membrane eyelids. They serve as windshield wipers and protect the eye from drying wind when the bird is in flight. Birds that dive beneath the water can use these special eyelids as underwater lenses to help them focus on food. In addition to their special eyelids, birds also have regular eyelids. With the exception of the owl, which lowers its top eyelid, birds blink by raising their lower lids.

Snakes do not have eyelids, but their eyes are covered and protected by a transparent skin scale. As the snake goes about its daily activities, these eye scales become scratched, but when the snake sheds its skin, replacement scales are a part of the new skin. Just before the skin is shed, the eye scales separate from the eyes. They appear milky and the snake's vision is clouded.

Throughout the animal kingdom there are creatures with eyes so primitive that they can do little more than detect the presence of light or so complex that it is almost impossible for us to imagine what their vision is like.

Earthworms "see" in all directions at once through light-sensitive cells scattered over the surface of their

bodies, but these cells merely indicate the direction of light. Such light-sensitive areas on caterpillars make it possible for them to go up twigs toward the light where the freshest greenery is located.

The primitive eyes of the spider are among the simplest in the animal kingdom. The transparent cornea on the surface is little more than a spot of skin through which light can pass. Behind it is a crystalline lens that focuses the light on the visual cells located under it. Chemicals in these visual cells are transformed by the light and send messages to the spider's "brain." What the spiders see is a question to be pondered, but some species must be able to receive fairly clear images. Jumping spiders, wolf spiders and tarantulas are able to pounce with accuracy on their prey.

Moving into the insect world we come to the amazing compound eye. Each eye is composed of thousands of individual units that work together to form an image. Because of the speed with which the housefly's 4,000 units transmit images, we may appear to be moving in slow motion through its eyes. Insects also can see ultraviolet light, so the colors in their world are a lot different from those we see.

Sight is an amazing function from the most primitive to the most complex method. But we are the most fortunate of all animals because our vision stimulates our curiosity to know more about the world around us and discover the secrets of nature.

**

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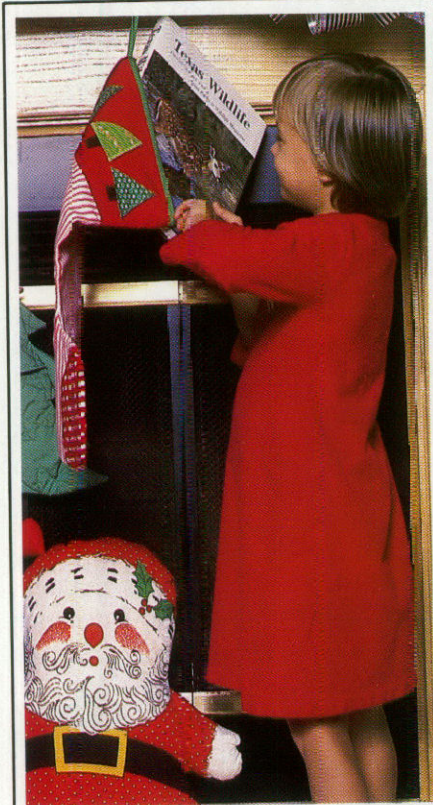


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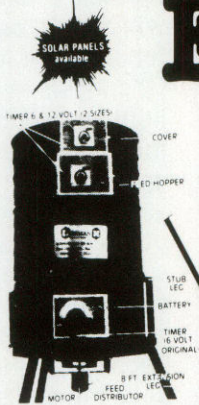
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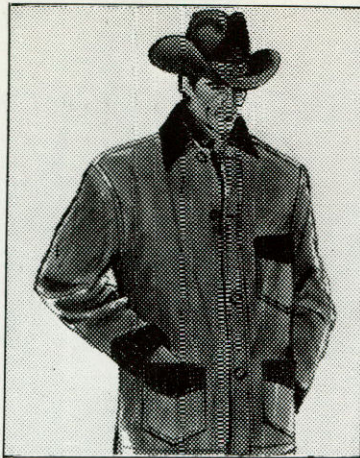
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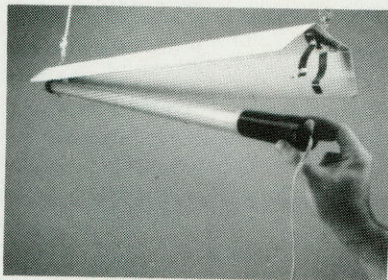
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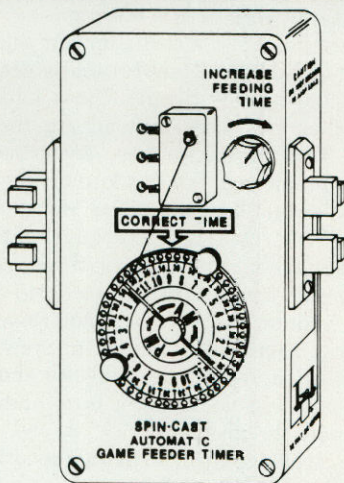
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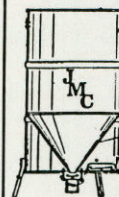
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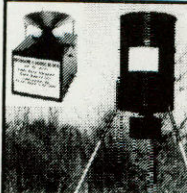


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Letters to the Editor

CCC Anniversary

I have been receiving *Texas Parks & Wildlife* for almost a year now and have enjoyed every issue. The September 1983 issue tops them all, with the article "CCC 50th Anniversary" by Sue Moss. Ms. Moss' work brought happiness and good memories of old days to thousands of senior citizens. Please convey my thanks to her for a job well done.

Donald Fred Hobbs
Huntsville

Collecting Artifacts

I enjoyed "In Search of the First Texans" in the October issue. I was wondering if it is in violation of any state or federal law for a landowner to pick up Indian artifacts such as arrowheads, stones or bones from his own property? The article seemed to imply that it is more of a moral obligation to leave such artifacts undisturbed.

Sandra Machinsky
Columbus

■ You are correct. It does not violate the letter of the Antiquities Code for a landowner to remove artifacts from his property, but it does violate the spirit of the law.

It's the Tops

I'm enclosing my check for a one-year renewal. Your magazine is tops with our whole family, from the preschoolers through gramps and granny.

Mrs. M.B. Johnson
Sabinal

Whistling Doves

How do doves make their shrill noise when they take off in flight? Is it done with the vocal chords, wings beating in the air or what? I have puzzled over this matter for a long time.

Ray Maberry
Longview

■ Our wildlife biologists say the shrill noise made when mourning doves take to the air is created by air passing over the long, thin, stiff primary wing feathers. While the noise is more noticeable when the bird is beating its wings at a faster than normal rate during takeoff, it also can be heard as a dove flies directly overhead.

Bird Sighting

I've subscribed to *Texas Parks & Wildlife* for many years, and have some information that may be of interest to birders. At my home on Surfside Beach, Folletts Island, I recently saw six or seven orange and black-colored birds. I looked them up in "Texas Wildlife" and they looked like the picture of the Lichtenstein's oriole by Bill Reaves, except the males seemed to have longer black streamer tails. In my 50 years in the field I've never seen any bird like them, or as beautiful.

J.C. Cutting
Houston

Guadalupe River Clean-up

Your well-intentioned article on the "Guadalupe River Clean-up" in the September issue has riled many of the people who live on the Guadalupe in the very region your article mentions.

There has been a clean-up campaign on the Guadalupe River for many years conducted by Boy Scouts, Lions Clubs and other local civic-minded organizations. This campaign has never been widely publicized, but it is known about as evidenced by comments made by some of the river travelers. I live on the river and frequently chastise those who throw their cans and other litter into the river. A common answer is, "Don't sweat it, fellow, there will be a clean-up crew to pick it up later on." So publicity about clean-ups will do nothing but further aggravate the problem.

Also, if I were an advertising executive for Abbott's Outfitters, I couldn't have done a better job of flaunting this outfit than was done on pages 16 and 17 of that issue. I am opposed to any kind of commercial endorsement in your articles, but for an article about litter you picked the worst example possible. In 1981, Abbott's Outfitters dumped more than 150 cubic yards of fill into the Guadalupe to provide additional parking for their business. After a big howl by local residents, they then applied to the Corps of Engineers for a permit to make

this fill-in. They were refused and ordered to remove the fill from the river. To this day they have not removed one shovelful of the material.

The clean-up you wrote about is appreciated, but it is just one part of a year-round clean-up quietly carried out by residents along the River Road.

Finally, the article's most important message is in the last paragraph: "... the best way to keep the Guadalupe clean is to haul out everything you take in ..." Help us develop this kind of thinking. When that is accomplished, clean-up articles no longer will be necessary.

Beldon Peters
Canyon Lake

Enjoy Every Article

I subscribed to *Texas Parks & Wildlife* five months ago, and have enjoyed every article in each of the five issues I've received. I want to congratulate everyone who helps make *Texas Parks & Wildlife* such a good magazine.

Raimundo A. Gravis
Miami, Florida

BACK COVERS

Inside: Looking almost like a glitter-covered wood carving, this seahorse swims in a vertical position using rapid waves of its dorsal fin. The fin may move at a rate of 35 times per second. The head is used for steering, and the tail can wrap around objects to anchor the creature. Eggs are laid in the belly pouch of the male where they are fertilized. They hatch in four or five weeks and are miniature copies of their parents. Each eye is on a turret and can move independently. (See Young Naturalist feature on page 40 for more information on animal eyes.) Photo by Leroy Williamson.

Outside: South Texas is considered prime habitat for the handsome Harris' hawk. This immature specimen already displays the broad white band at the base of the tail. On hot, sunny days when the thermals are good, this bird soars with ease and grace high in the air. It usually hunts in the early morning or late afternoon. Photo by Wyman P. Meinzer Jr.



