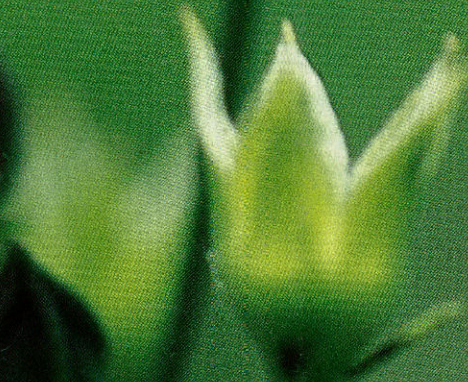


# TEXAS

PARKS & WILDLIFE



June 1988







# TEXAS PARKS & WILDLIFE

June 1988, Vol. 46, No. 6

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## MAGAZINE

(ISSN 0040-4586)

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

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Published monthly by the Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. Circulation: 512-389-4830; Editorial Office: 512-389-4992. Copyright © 1988 by the Texas Parks and Wildlife Department. No part of the contents of this magazine may be reproduced by any means without the permission of *Texas Parks & Wildlife*. The magazine is not responsible for unsolicited materials provided for editorial consideration. The inclusion of advertising is considered a service to subscribers and is not an endorsement of products nor concurrence with advertising claims. Rate schedule available upon request. Subscription rates: \$8 for one year and \$15 for two years. Foreign subscription rates: \$10 for one year and \$18 for two years.

Postmaster: If undeliverable, please send notices by form 3579 to 4200 Smith School Road, Austin, Texas 78744. Second class postage paid at Austin, Texas, with additional mailing offices.

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AUG 16 1988 *pl*

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## Covers

**Front:** The endangered Texas poppy-mallow *Callirhoe scabriuscula* is found in deep sand that is blown from alluvial deposits along the upper Colorado River (Discover the whereabouts of the other 17 endangered/threatened plants in Texas on page 2.) Photo by Paul M. Montgomery. **Inside Front:** A pair of coyote pups shoving and pushing for position is a common event on the plains of North Texas in early summer. Photo by D.K. Langford.



# Living on the Edge

Article by Jackie Poole and David Riskind  
Photos by Paul M. Montgomery

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Without protection, most endangered and threatened plants are surely doomed.

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**D**espite recent economic trends, Texas is an extremely wealthy state in terms of its plant resources. From the Pineywoods of East Texas to the deserts of West Texas, and from the high plains of the Panhandle to the subtropical Lower Rio Grande Valley, Texas contains more types of climate than many countries. The soils, geology and landforms are also diverse. Such diversity has led to a very rich flora.

Probably 10 percent of the almost 6,000 native Texas plants can be considered rare, due to restrictions in distribution, abundance or habitat preference. The concern with Texas' special botanical heritage is part of a national and global concern for the conservation of the plant resources which sustain all living things. The Convention on the International Trade in Endangered Species protects plants and animals at an international level. National concern was expressed by the passing of the 1973 U.S. Endangered Species Act; Texas offers state protection through the 1981 legislation which added plant conservation to the Texas Parks and Wildlife Code.

To date, 18 Texas plants have been listed by both the U.S. Fish and Wildlife

Service and the Texas Parks and Wildlife Department. Plants are listed as endangered or threatened based on their scarcity or the threats to their existence. Information on a species is gathered, usually over several years, and examined prior to listing as endangered or threatened. These terms have specific meanings as defined by the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department. An endangered plant is any species in danger of extinction throughout all, or a significant portion of its range. A threatened plant is any species likely to become an endangered species in the foreseeable future throughout all, or a significant portion of its range.

Why is it important to preserve these species? Such plants could provide direct and indirect economic benefits, as well as provide for our aesthetic and ethical well-being. Direct economic benefits include agricultural, industrial and pharmaceutical uses. Plants provide food, fibers, lubricants and medicines. Yet very few species have been researched enough to realize their economic potential. To lose through extinction a potential cure for cancer or a food crop which lessens world hunger would be a tragedy.



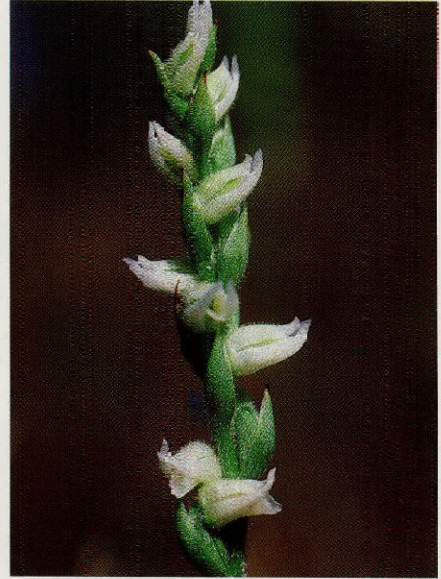




Texas snowbell, *Syrax texana*



Tobusch fishhook cactus, *Ancistrocactus tobuschii*



Navasota ladies'-tresses, *Spiranthes parksii*



Slender rush-pea, *Hoffmannseggia tenella*





Ashy dogweed, *Dyssodia tephroleuca*





Texas wildrice, *Zizania texana*

**T**exas wildrice, *Zizania texana*, is an example of an endangered plant with potential for direct economic benefits. Commercial wildrice, *Zizania aquatica*, grows in more northerly latitudes. Hybridization or genetic engineering between these two species could produce a strain that could be grown in milder climates.

Today, Texas wildrice is found only along the San Marcos River. Conditions have changed since this plant was a troublesome weed in irrigation ditches around San Marcos. Higher stream levels and water sport enthusiasts keep the plant from lifting its flowering stalks above the surface, thus pollination is impossible and seeds are not set. Non-native plants such as elephant ears crowd out the wildrice along the river's edge. Stretches of the river are sometimes mowed to keep down vegetation, including the wildrice. The area covered by Texas wildrice has shrunk dramatically in the last 10 years.

The white bladderpod, *Lesquerella pallida*, is another endangered species with possible economic importance. The seeds of several species have been found to contain high quality industrial oils that could be used in place of

sperm whale oil. Texas species also may have this potential. The white bladderpod grows in alkaline seepage openings in the midst of the acidic East Texas Pineywoods, much like islands in a sea. In wet springs, this short-lived plant is covered with sprays of small white flowers. The species, first collected in the 1880s, was thought to be extinct. However, scientists rediscovered the plant almost 100 years later. Three small populations are all that are known to exist today.

The threatened McKittrick pennyroyal, *Hedeoma apiculatum*, probably has various medicinal uses. Many species of this genus are used as insect repellents, vasodilators (drugs which dilate the blood vessels) and diaphoretics (drugs which increase perspiration). The McKittrick pennyroyal is well protected, as virtually all of its habitat is within Guadalupe Mountains National Park. However, trails have had to be rerouted to avoid trampling of the compact, aromatic mint.

Species such as the endangered Texas bitterweed, *Hymenoxys texana*, may prove of economic benefit through their relations to weedy species, such as the common bitterweed, *Hymenoxys odorata*, which plagues Texas ranchers.

Research on the Texas bitterweed may provide clues to the control of its noxious relative. The diminutive Texas bitterweed is found on coastal prairies in Fort Bend and Harris Counties, west of Houston. In winter, a rosette of leaves the size of a quarter appears, and in spring, stalks crowned with yellow petalless flowers appear. By June, these delicate annuals have withered, leaving no visible trace of their presence.

Some plants such as the endangered ashy dogweed, *Thymophylla tephroleuca* or *Dyssodia tephroleuca*, are filled with strong-smelling, aromatic compounds. These chemicals, which protect the plant from being eaten, may have medicinal or agricultural uses as yet unknown. In addition, the plant has horticultural value. The drought-tolerant species produces a bouquet of golden, daisy-like flowers among its soft, gray leaves and stems. The ashy dogweed is known from one location in South Texas.

Several other species have important aesthetic, horticultural or ornamental value. One of these is the endangered Texas snowbells, *Styrax texana*. The shockingly white flowers with their bright yellow anthers contrast with the brilliant green leaves and their soft





Black lace cactus, *Echinocereus reichenbachii* var. *albertii*

white undersides. Fewer than 50 Texas snowbells are known to exist in the wild. All occur along creeks of the Edwards Plateau on cliff faces inaccessible to browsing animals.

Also worthy of cultivation, the Texas poppy-mallow, *Callirhoe scabriuscula*, produces a tall, sturdy candelabra of flowers that resemble winecups. This endangered plant is found in deep sand that is blown from deposits along the upper Colorado River. Much of its habitat has been converted to cropland, tame pasture or oil and gas fields.

Certain plants such as the orchids and the cacti have entire societies devoted to their study, collection and cultivation. Only one orchid, the Navasota ladies'-tresses, *Spiranthes parksii*, is thus far listed as endangered in Texas. Small, whitish flowers plait themselves around the slender stem which arises from a rosette of fleshy leaves for a few weeks in the fall. They are usually found in post oak woodlands near drainages and seem to prefer for areas underlain by lignite, making them susceptible to strip mining.

The cacti, of course, maintain the largest hobbyist following in Texas. Two endangered cacti which are fa-

vored collectors' items are the Nellie cory cactus, *Coryphantha minima*, and the Davis' green pitaya, *Echinocereus viridiflorus* var. *davisi*. Both cacti are found only on novaculite (a quartz-like mineral from which whetstones are made) in West Texas. Commonly referred to as dwarf cacti, both are so small that their flowers are larger than their stems. In fact, the Davis' green pitaya is so tiny that it can be easily located only when it produces its yellowish-green flowers in the early spring. Because the Nellie cory cactus is more visible, it has been extirpated by collecting from highway rights-of-way and remains only on private land due to the vigilance of the owners.

Another species which suffers from hobbyists, and particularly commercial collection, is Lloyd's mariposa cactus, *Neoilodyia mariposensis*. This small, whitish, golfball-shaped species was not uncommon in the southern Trans-Pecos. However, several sites in the Big Bend area have been denuded by commercial collectors of all small cacti, including this threatened species.

It is easy to understand why someone would want to have a black lace cactus, *Echinocereus reichenbachii* var. *albertii*. This small, barrel-shaped cactus



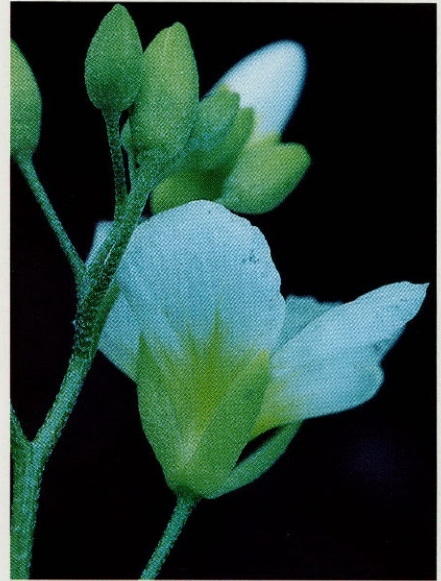




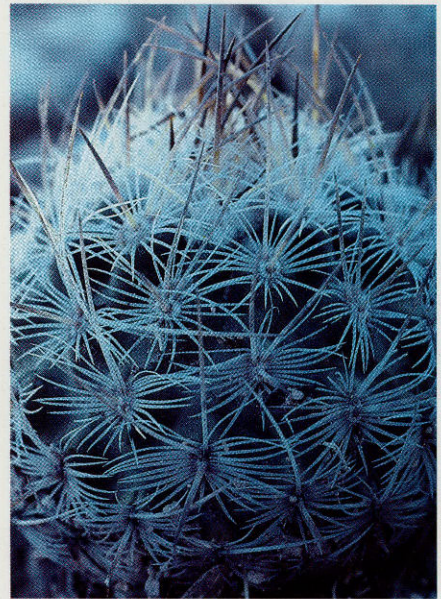
McKittrick pennyroyal, *Hedeoma apiculatum*



Johnston's frankenia, *Frankenia johnstonii*



White bladderpod, *Lesquerella pallida*



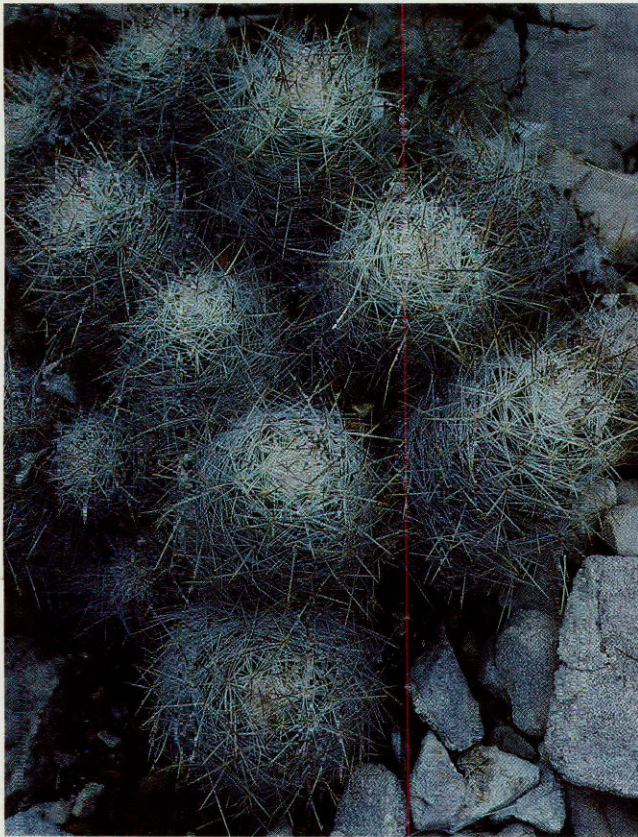
Lloyd's mariposa cactus, *Neolloydia mariposensis*





Texas poppy-mallow, *Callirhoe scaberruscula*





Sneed pincushion, *Coryphantha sneedii* var. *sneedii*



Lloyd's hedgehog cactus, *Echinocereus lloydii*

produces numerous, large, bright-pink flowers in the spring. This endangered species is somewhat unusual for a cactus, in that it prefers saline soils along tidally influenced creeks in south coastal Texas.

Why someone would want to take an entire population of the Tobusch fishhook cactus, *Ancistrocactus tobuschii*, is not as easy to comprehend. Yet an entire population was taken recently by collectors. This inconspicuous endangered species usually occurs on the gravelly limestone floodplains of Central Texas rivers. The plant is small, low-growing and produces yellowish-green flowers in the early spring.

Because of the remote locations of its populations, the bunched cory cactus, *Coryphantha ramillosa*, has not suffered from collection as much as other species. This threatened species occurs in small, scattered populations primarily along the Rio Grande in West Texas.

Although not difficult to locate, Lloyd's hedgehog cactus, *Echinocereus lloydii*, is often difficult to identify. This endangered species is similar in appearance to other hedgehogs and may even be a hybrid. Lloyd's hedgehogs occur in small populations scattered across West Texas, southern New Mex-

ico and adjacent Mexico. Clusters of large flowers in various shades of orange, red or purple make this cactus an extremely attractive species. However, agriculture and highway development have altered much of this species' habitat.

The endangered Sneed pincushion cactus, *Coryphantha sneedii* var. *sneedii*, is similar in appearance to a closely related species, big cob cory cactus, *Coryphantha strobiliformis*. They are found together, and only a close observer can distinguish the two. The Sneed pincushion cactus occurs in several mountain ranges in western Texas and adjacent New Mexico. The barrel-shaped plant produces small, pinkish flowers in the spring. Housing developments encroach on the urban part of its range.

Not all plants are of direct benefit to humans, or at least are currently perceived as beneficial. However, the survival of a species should not be wholly dependent on its utility to humanity. Every species has intrinsic value—a right to exist, whether God-given, or as a component in the complex, global ecosystem. Two species with no discernible immediate value are the slender rush-pea and Johnston's frankenia.

The slender rush-pea, *Hoffmannseggia tenella*, is a small and inconspicuous legume. Its major population center is a cemetery in South Texas. Most other suitable habitat has been developed, paved or plowed. This endangered species is quite common in the limited area where it occurs and undoubtedly plays an important role in the ecosystem of which it is a part.

There are no known medicinal, agricultural, industrial or horticultural uses known for the entire family of plants of which Johnston's frankenia, *Frankenia johnstonii* is a member. This small, wiry, brownish bush with tiny white flowers grows in South Texas and northern Mexico. This endangered species has had much of its habitat converted to game pasture, or irreparably damaged by oil and gas production.

**W**hat is being done to save these species aside from passing legislation, creating lists and enforcing laws? Cacti are being raised from seed for the collectors who must have particular species. Hopefully, these seed-grown plants will eventually eliminate the need for field-collected plants. Botanical gardens and universities are raising plants for education, research





McKittrick pennyroyal, *Hedeoma apiculatum*



and reintroduction into the wild. Private conservation groups such as The Center for Plant Conservation have developed programs to control such efforts to avoid hybridization or other types of genetic contamination.

Hybridization with other species must be avoided, and representative genetic samples of natural populations should be obtained. As much of the genetic diversity of a species as possible needs to be preserved for the continued existence of the species. Specimens in botanical gardens, or individuals in scattered backyards, will not maintain a species. Endangered plants do not live in a vacuum; they rely on, and are relied upon by other species within their natural habitat.

**T**he most effective way to save a species is to protect the habitat in which it naturally occurs. Land may be protected by creating natural areas, parks, historical sites, wildlife management areas, conservation preserves or research natural areas. Agreements may be arranged with other governmental agencies to protect certain tracts. Conservation easements may be negotiated or arranged with private landowners. Once habitat is protected, the area cannot

always be left alone. Often, active management strategies, such as prescribed burning, must be used to maintain a certain stage of ecological succession. Management should mimic natural processes as closely as possible. Without protection and subsequent management, most endangered or threatened species are surely doomed.

The Resource Protection Division of the Texas Parks and Wildlife Department is responsible for the listing and protection of the endangered, threatened and protected plants of the state. The pertinent laws and rules, the most recent list and a state map with general locations are available to the public.

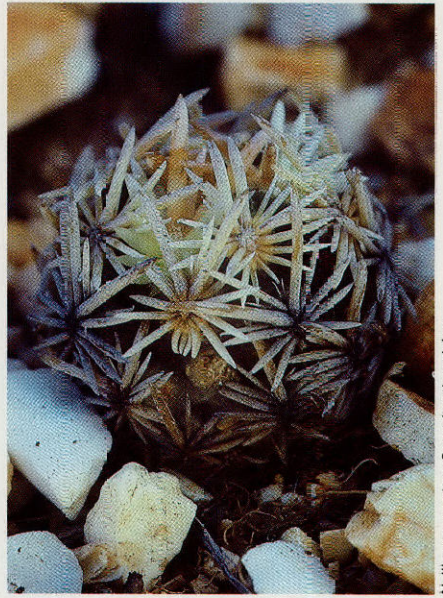
If you have information concerning any of the plants in this article please contact Jackie Poole, Texas Natural Heritage Program, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. The more knowledge gathered on these rare species, the less likely they are to become extinct. \* \*

**Editor's Note:** The department has produced a book on the endangered, threatened or protected plants of Texas. It is available for \$8.50, including tax and postage; contact the department at 1-800-792-1112 for specifics.





Texas bitterweed, *Hymenoxys texana*



Nellie cory cactus, *Coryphantha minima*



Bunched cory cactus, *Coryphantha ramiflora*



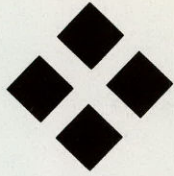
Davis green pitaya, *Echinocereus viridiflorus* var. *davisii*





Bighorn capture in Nevada by Leroy Williamson





## **There is hope for restoring the desert bighorn sheep in Texas.**

There was a time when bighorn sheep occupied most of the desert mountain ranges in West Texas. But bighorns began to decline in number almost as soon as settlers arrived.

Some desert bighorns were taken by professional hunters to feed the railroad crews in the late 1800s and early 1900s, but this did only minimal damage to the herd. It was the domestic sheep brought in by the settlers which did the most damage to the Texas desert bighorn population.

Domestic sheep competed with the bighorn for forage, carried diseases for which the bighorn had no immunity and created a need for net wire fences, which denied the bighorns access to water and other critical habitats. By the early 1900s, bighorn numbers were declining; by the 1950s the bighorn had disappeared.

In 1954, the Texas Parks and Wildlife

Department (then called the Texas Game and Fish Commission) began a bighorn restoration program at the Black Gap Wildlife Management Area near Big Bend, and subsequently expanded this program to the Sierra Diablo Wildlife Management Area near Van Horn and the Chilicote Ranch.

At each of these locations, a limited amount of broodstock was placed in an enclosure. The sheep reproduced until a sufficient number of animals was available to release into the wild. As a result of these efforts, 20 bighorns were released from the Black Gap pasture in 1971 and two releases, each consisting of seven sheep, were made from the Sierra Diablo pen in 1973 and 1979.

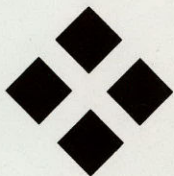
The release on the Black Gap Area ultimately failed due to disease and predation, but the Sierra Diablo releases were successful, resulting in a

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by Charles Winkler, Big Game Program Director

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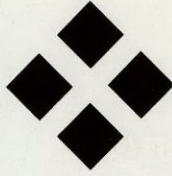
# **NEVER SAY DIE**











*Captive bighorn sheep at the Sierra Diablo Wildlife Management Area in West Texas produce lambs which are released into vacant habitat. Lamb survival has been the most critical problem at this brood facility, and biologists are working to reduce the high mortality rate.*

---

wild population currently estimated at 25 to 30 animals. The program at the Chilicote Ranch has not been an overwhelming success; however, the 600-acre pasture holds 25 sheep and in 1987 five bighorns were released into the surrounding mountains. (For more information read "Bighorns Have Seen Better Days," available from the Texas Parks and Wildlife Department).

In 1982, with the Texas bighorn program at its lowest point since its conception, the Parks and Wildlife Department joined forces with the Texas Bighorn Society, an organization

dedicated to restoring the desert bighorn to its native Texas habitat. Thus began an ambitious program to turn the tide for Texas bighorns. A set of pens was built on the Sierra Diablo Area at a cost of more than \$200,000. The facility was designed to hold approximately 40 sheep in captivity, thus producing enough lambs to allow annual releases of 20 bighorns into vacant habitat. This project was described in more detail in the article "Raising Bighorns" in the October 1983 issue of *Texas Parks & Wildlife*.

The Sierra Diablo brood facility was stocked with 29 bighorns from Arizona, Nevada, Utah and Texas, but within six months of its completion, lamb survival became a problem. At approximately 60 days after birth, most of the lambs became sick with a respiratory ailment and died or required intensive veterinary treatment to survive.

Despite these setbacks, 20 bighorns were transferred from the facility to the Elephant Mountain Wildlife Management Area near Alpine in February 1987. Although three of the sheep died, the group produced at least three lambs and has stayed on Elephant Mountain; 19 of 20 sheep released carried radio transmitters and are checked three times a week to determine the animals' general location and to confirm that they're alive (the transmitters produce a special mortality signal if they remain immobile for more than four hours).

Occasionally, some of the sheep are sighted by biologists and technicians working on the area, but visual contact has been held to a minimum to avoid disturbing the sheep and causing them to move from the mountain. If they stay on the mountain through another lambing season, biologists believe these lambs will be imprinted to the area and will be reluctant to leave.

It is somewhat surprising that the

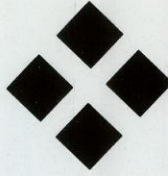
### **West Texas Bighorns**

For the first time in more than 50 years, desert bighorn sheep are once again roaming the Van Horn mountains in southwestern Culberson County. A herd of 25 desert bighorns was released in October 1987 on a 100,000-acre ranch, about 40 miles from the Sierra Diablo Wildlife Management Area.

A cooperative roundup conducted by biologists of the Texas Parks and Wildlife Department and the Nevada Department of Wildlife last fall resulted in the collection of 47 desert bighorns from two mountain ranges in Nevada. The State of Nevada retained 22 of the sheep for relocation there, while five rams and 20 ewes were flown to the Texas release site.

Although the TPWD already has a herd of bighorn sheep at the Sierra Diablo WMA, it is the policy of the department that all bighorns brought into the state be stocked at new locations to prevent possible exchanges of disease organisms between herds.





*Some of the bighorns raised at Sierra Diablo were transferred to Elephant Mountain Wildlife Management Area. Radio transmitters on the released sheep allow biologists to determine the animals' general location and confirm that they are still alive.*

---

sheep have stayed on the 10,000-acre mountain when there are millions of acres of equally good or better bighorn habitat within their view. Biologists are happy that they have chosen to stay at Elephant Mountain since the sheep would have to contend with predators, forage competition from livestock and exotic wildlife, exposure to diseases and illegal hunting in these other habitats.

Meanwhile, the department has been trying to find the disease agents responsible for the low lamb survival at Sierra Diablo and has attempted to reduce the high mortality rate. During the first two years of operation, every sick lamb at the facility was transferred to the Glaze Veterinary Clinic in Kerrville and given intensive treatment until it died or recovered sufficiently to be returned to Sierra Diablo. Although several disease agents were identified in the sick lambs, no common agent was found that could be attributed to the deaths in the pens. Unfortunately, only 22 of the 37 lambs that were born during that two-year period grew to adulthood.

However, these lambs did have one thing in common: their immune systems were producing few antibodies to fight diseases. Normally, newborn animals receive immunity from diseases through the colostrum in the mother's milk until their own immune systems are capable of producing the needed antibodies to ward off diseases. In these lambs, the body was apparently unable to carry out this essential function. The reason is unclear, but it is believed to be related to the introduction of sheep from different geographic populations into the pens.

These small populations built up natural immunities to the diseases in their own environment but were highly susceptible to diseases in the other populations. As these diseases were

transferred back and forth among the sheep in the pens, they became more virulent and wore down the animals' resistance.

In 1985, the sheep began receiving treatments of interferon, a substance which all animals produce naturally to increase antibody production and which can be manufactured artificially in laboratories. Current results of this treatment are inconclusive but the treatments will continue as long as interferon is available, or until more conclusive results are obtained.

Although desert bighorn sheep are still in a precarious position in Texas, they are more secure than they have been since restoration efforts were initiated in 1954. Just 10 years ago there was only a dwindling population at the Black Gap WMA, a small free-ranging population plus eight penned sheep at the Sierra Diablo WMA and seven sheep in the newly established Chillicote pasture.

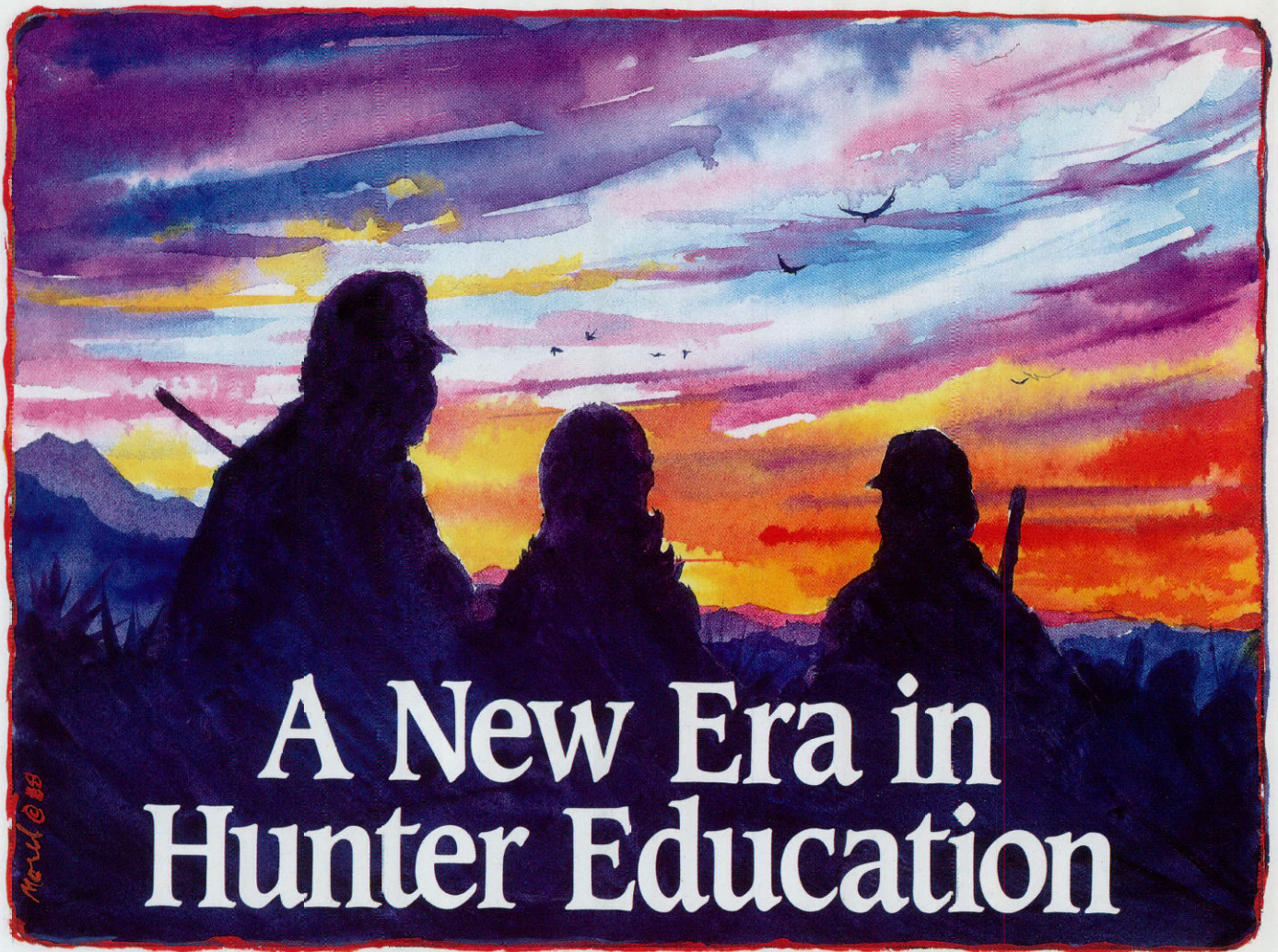
The total population of bighorns in Texas at that time was estimated at 43 sheep. Today the state's population is estimated at 151 animals, with new populations occupying the Elephant Mountain WMA and the Van Horn Mountains. While the future of this magnificent animal is not exactly bright, it is less clouded than it was a few years ago.

The success of the Texas bighorn program reached a point that officials felt that a surplus ram could be harvested without harming the herd's reproductive potential. Governor Bill Clements presided over a special drawing ceremony at the State Capitol on January 21, picking the name of Johnny McKenzie of Mesquite to participate in the hunt. Although 31 sheep were spotted, adverse weather conditions hampered the hunt, preventing the hunting party from locating the mature ram they were seeking. \* \*









# A New Era in Hunter Education

Article by Steve Hall  
Illustrations by Chris Morel

This month, the Texas Hunter Education Program begins a mandatory program that ultimately will affect the thousands of Texas hunters born on or after September 2, 1971.

The Texas Parks and Wildlife Department has administered a volunteer hunter safety program since 1972 that has certified more than 160,000 students, many of whom needed the course to hunt in other states. Currently, 39 states require hunter education training.

There are slight variations among state hunter education laws. New York's, which was the first in the country in 1949, affects all first-time license buyers. California's, which began in 1954, is the same as New York's, except that it applies only to residents. Colorado's law, passed in 1970, requires everyone born on or after January 1, 1949, to pass the course, including

archers. New Mexico hunters and license buyers under 18 must have proof of completion—and so on.

As individual states and provinces developed hunter education programs, concern over reciprocity grew. State and provincial coordinators began to meet annually to discuss ways of combining and enhancing individual efforts so that students in all states could acquire the same quality training.

In 1971, federal monies became available through the United States Fish and Wildlife Service. Specifically, hunter education funds became available through taxes on handguns and archery equipment. Programs receive matching shares based on the populations of their states and the amount the state initially spends. Texas has used its shares to assist in the administration of the voluntary program and will continue to do so in the mandatory training.

But what does hunter education really mean to Texans, especially young

hunters? What will the hunter gain from the training? Where and when are courses taught? Who teaches them? What is the so-called bottom line?

Answering these questions in reverse order, the bottom line in hunter education is to influence the behavior of hunters so they act safely, responsibly and knowledgeably while in the field. Hunter education instructors strive to achieve this by presenting information that creates an atmosphere for new knowledge, skills and attitudes, motivating students to do the right things while hunting.

The key word is motivation. Without motivation, hunter education is like a car without an engine. And just as there are different cars and engines, there are also various methods of instruction and motivation, the primary concerns of teachers.

Parents, game wardens, professional educators and volunteers teach hunter education in Texas. Parents who do not actually teach the course to groups still



can use it as a tool to help their own children learn more about sporting arms and hunting. By attending the course with their children, parents assist in the learning process, giving the young hunter maximum benefits from the course. Parents facilitate their youngsters' understanding of the information and usually learn a great deal themselves.

Game wardens and professional educators will play a vital role in mandatory hunter education. Game wardens, in addition to enforcing hunting laws and regulations, are concerned with education. In fact, education is the warden's primary goal because it helps citizens understand their roles as outdoor users, informs them about current regulations and information, and stresses avoidance of accidents and violations.

Professional educators can instruct students at a time when formal learning is a way of life. During their school years many students get their first taste of hunting, wildlife and the outdoors. Hunter education in schools becomes an avenue for peer groups to share ideas and presents the opportunity to reach the most people at any one time.

However, it is the volunteer instructors who form the backbone of the hunter education program. These volunteers are dedicated citizens who, on behalf of the hunter education program, give countless hours of their time, talents and resources to make sure students realize the importance of safety, ethics and overall responsibility in hunting or any other outdoor pursuit.

Weldon Blackard, a volunteer area

chief instructor from Carrizo Springs, started teaching as a result of his involvement with Boy Scouts of America. Having taught more than 500 students, he states: "Hunter education works; there's no other way. I usually meet former students in town and they always have a particular story relating to what they learned from the course. This, in itself, is gratifying and it is why I continue to teach." About his fellow instructors, Weldon said, "You meet some of the grandest folks at workshops around the state. As a result, I have personally taken up muzzleloading and bowhunting, two things I would probably not have enjoyed without their help."

D.B. Collinsworth, a retired teacher and volunteer instructor from Riesel, says: "I joined the program because I felt I was filling a niche and that the information was important for hunters. Now that I have seen the results, I know that hunter education gives the student an overall perspective and awareness of what hunting is all about. But, they need to keep on learning and apply what they learn to be successful. My rewards are the stories they relate after taking the course. I ask them to call or write because I find myself hunting through their experiences."

Earlie Rose, another area chief instructor from San Angelo, joined the program after he saw two people shoot each other while hunting. "The course reminds the careless never to forget safety."

Of the 1,219 courses taught in 1987, volunteer instructors taught a total of 1,044 of them, averaging better than



## Mandatory Hunter Education Requirements

### Who must attend:

Hunters whose date of birth is on or after September 2, 1971.

### When the program starts:

June 1 1988

### When certification is required:

#### September 1, 1989:

—Hunters whose date of birth is during the period September 2, 1971 through August 31, 1973.

#### September 1, 1990:

—Hunters whose date of birth is during the period September 2, 1971 through August 31, 1974.

#### September 1, 1991:

—Hunters whose date of birth is during the period September 2, 1971 through August 31, 1975.

#### September 1, 1992:

—Hunters whose date of birth is during the period September 2, 1971 through August 31, 1976.

#### September 1, 1993:

—All hunters who are at least 12 years old and whose date of birth is on or after September 2, 1971.

### Who is exempt:

—Hunters whose date of birth is on or before September 1, 1971.

—Hunters who already have been certified in the voluntary Texas Hunter Safety (Education) Program.

—Hunters who have been certified through another state's resource agency. (Note: Check with the Texas Parks and Wildlife Department's Hunter Education Section to determine whether a comparable course is acceptable or not.)

—Hunters under 17 years of age whose date of birth is on or after September 2, 1971 when accompanied by a licensed hunter 17 years of age or older.

### Minimum age:

12 years (Those under 12 years of age may attend and receive recognition of attendance, but must take the course again after turning 12.)

### Course fee:

\$5.00, duplicate certification card, \$2.00.



## Project WILD Provides Education For Young People

To help young people develop an awareness and appreciation of wildlife, both game and nongame species, and enable them to make responsible and ethical decisions with regard to wildlife and the environment, the Texas Parks and Wildlife Department implements an environmental education program called Project WILD.

This award-winning program, which is being implemented in 43 states and Canada, is designed for use by teachers; environmental educators; park and nature center personnel; Scout, Camp Fire and 4-H leaders and others who work with young people. At present, more than 5,000 teachers and youth workers have attended "WILD" workshops in Texas.

Like the hunter education course, Project WILD is taught by trained volunteer instructors who conduct workshops designed to explain the philosophy of the program and show how it can be integrated into a school curriculum or youth program. The material usually is presented in one six-hour workshop session or two three-hour sessions. (Teachers who attend the workshop can earn six clock hours of advanced academic credit toward their career ladder requirements.) No charge is made for the materials.

The heart of the program is the Project WILD activity guides—elementary, secondary and aquatic. The "hands on" activities were developed jointly by classroom teachers, private conservation groups, wildlife experts and other community representatives.

Two of the activities—studying owl pellets and learning about animal tracks—have been featured in recent "Young Naturalist" articles.

For more information about the program and workshops in your area, contact: Ilo Hiller, Project WILD Coordinator, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, or call 512-389-4791.

12 hours per course. Currently, there are about 1,300 instructors in the program. Their number-one concern in the past was attendance only by those needing the course at the last minute to hunt out of state. The mandatory program will certainly address this concern, since an estimated 20,000 hunters per age class will be affected by the law.

In order to handle these estimates, Texas will need additional volunteer instructors who meet high standards and who are willing to pass on knowledge and skills. Instructors must meet certain requirements and attend training courses. They also must act as a role model and should maintain certain desirable qualities such as enthusiasm for the course. Such attributes help the program maintain high standards. Texas hunter education students will be proud of what they've learned here and will be safe and responsible hunters who earn the respect of landowners and others.

Instructors offer courses in a variety of manners and locations. Times vary from weekends to nights, but each course must be at least 10 hours, taught over a minimum of two days. If students cannot attend classes in school, such as in the vocational agriculture curriculum, they should contact a local game warden, volunteer or a Texas Parks and Wildlife local office. Information also may be obtained by calling the Austin headquarters, at 512-389-4999.

Prospective students should watch the newspapers. Periodically, local outdoor news columns will advertise courses,

especially from August through October. Local sporting goods retailers, community education centers, youth organizations such as Boy Scouts, Ducks Unlimited, 4-H and outdoor camps also may offer the hunter education course.

The typical class covers many topics and uses a variety of instructional techniques and visual aids. Primary sessions include hunters' responsibilities to other hunters, to landowners, to the resource, to nonhunters and toward themselves. This covers everything from safety rules, hunting regulations, survival and ethics to wildlife identification, conservation, management principles and care of game. Students are introduced to firearm types, actions, ammunition and handling techniques, including transportation and field situations. Less traditional hunting techniques such as bowhunting, muzzle-loading and handgunning are covered. Finally, special considerations are covered and might include topics such as water safety, first aid, hunting dogs, nontoxic shot and all-terrain vehicles.

A student might participate or be involved in open discussions, demonstrations, questions, films, problems, personal accounts, reviews, examinations, field exercises and live firing opportunities at the range.

Other benefits of the course are a better appreciation of the outdoors; a sense of stewardship, sportsmanship and fair chase; and future companionship and involvement, perhaps through instruction of another generation of hunters.

A student's diploma in hunter edu-







cation is an investment in a safe and responsible future for hunters. Herein lies the answer to what hunter education really means to Texans, especially to young hunters.

The bond formed among parents who hunt and their children, other family members or friends, is one that creates education in the real sense. By taking a stroll through the woods, young outdoorsmen learn a great deal, but they can learn much more if they have their companion and teacher nearby to help them understand what they are seeing. They may need direction in order not to stray into unethical behavior. Ideally, outdoor education teachers and parents are leading them down the right path.

Young hunters must realize that unethical or illegal actions by hunters are unacceptable. For example, if a young hunter hears that a friend was involved in a burglary, he or she might be embarrassed and cancel the friendship or try to help the friend reform. But if the same person heard that a friend shot a deer illegally, he might try to help hide the fact or even accept some of the meat. If it was a trophy animal, he might even admire the act.

Fact is, the friend who shot the deer illegally is stealing just like the burglar. And the same is true for the hunter who shoots at animals that are too far away, uses the wrong size loads, or misidentifies the target, such as shooting at a meadowlark instead of a quail.

Another problem is attitude—one that says, "I don't need a safety course." When a hunter believes this, it leaves the door open for accidents. There is also a correlation between unsafe actions and the acceptance of illegal acts.

In 1987, the majority of hunting accidents in Texas were mistakes in judgment such as misidentifying wildlife. But close behind were accidents caused by safety violations; 21 of these were self-inflicted. Most were accidents in which the firearm was being removed or placed in a vehicle, and many were simply careless mistakes.

The startling fact is that 59 of the total 81 accidents were among those 20 years old or older, showing the importance of never forgetting two sound principles: 1) *Watch that muzzle* and 2) *Be sure of your target*. Adult hunters either get too comfortable with bad habits, have accidents when violating the law, or do not practice what they

are teaching their children.

Competition for leisure time, urban sprawl, wildlife degradation and an increase in the number of working, single parents have eliminated the once prevalent learning environments for hunters—the rural backyards. Today, hunting skills take planning, continual practice on a range, parental concern, involvement, support of key organizations and money. Just belonging to a group isn't enough anymore. Individuals must help the group to succeed by doing all they can and by playing the role model. The future of sport hunting depends on these efforts.

Egotism, competitiveness, machismo and profiteering are obstacles to hunter education. You realize this by hearing about hunters who have shot animals to impress others, to beat another's record, to cheat, or worse yet, to gain monetary rewards. These hunters aren't sportsmen.

The future hunter needs to realize that success is found in the quality, totality and correctness of the hunt, whether a shot was fired or not. The Texas Hunter Education Program aims to produce students who can safeguard the sport of hunting. \* \*



# Outdoor Roundup

by Jim Cox

## McKittrick Canyon Trout Spawn In Hatchery

Texas' "mystery trout" have spawned at a Texas Parks and Wildlife Department fish hatchery, but biologists say it will be a while before the fishes' true identity is known.

Joe Warren, manager of the Dundee State Fish Hatchery, said several trout collected last November from McKittrick Canyon in the Guadalupe Mountains National Park of West Texas have been induced to spawn. As of March 31, about 20 fertile eggs had been produced.

The existence of wild trout in a West Texas stream creates an interesting puzzle for fishery biologists. If the fish are rainbow trout, they must have been stocked there by someone years ago. If electrophoretic analysis of the fish indicates they are cutthroat trout, or rainbow-cutthroat hybrids, it would indicate the fish are remnants of a population native to that area.

The possibility of native cutthroats appears to be supported by archives indicating that an Army patrol from Ft. Davis camped at the stream during the 1800s and caught some kind of trout. What kind of trout they caught, however, is unknown.

Warren said producing fertile eggs so soon was a surprise. "I'm thrilled that they hatched," said Warren, explaining that he had planned only to allow the fish to grow through 1988 and spawn later. "We noticed the fish going through some pre-spawn motions in the raceway, so we decided to give them a chance."

The McKittrick trout experiment is part of a continuing search for strains of trout that have tolerance for high temperatures.

## Safe Boating Week Slated For June 5-11

Gov. Bill Clements has proclaimed June 5-11 "Safe Boating Week" in Texas, and the Texas Parks and Wildlife Department is launching a campaign to increase public awareness of the need for boating safety education programs and safe boating procedures.

Officials encourage persons interested in taking the department's free boating safety course to call toll-free 1-800-792-1112 (512-389-4999 in Austin) or write the TPWD, 4200 Smith School Road, Austin, Texas 78744, or contact a local U.S. Coast Guard Auxiliary or Power Squadron unit.

Texas boat owners will receive a leaflet entitled "Commandments of Boating Safety" in their boat registration renewal packets.

## Oddities Abound In New State Fish Records

The fish records committee of the Texas Parks and Wildlife Department has certified four new state records.

Three of the record fish are saltwater species that probably are unfamiliar to most anglers. They are a 32-pound, six-ounce banded shrimp eel caught by Cy Bennett of Ingleside on March 24 out of Port Aransas; a five-pound unicorn filefish caught by Eugene Foreman II of Groves on September 25, 1987 off Sabine Pass; and a 31-pound almaco jack caught by Rusty Schwartz of Houston on March 6 out of Freeport. Schwartz' fish was taken with scuba gear and spear-gun, and it will be a record in the unrestricted category, reserved for fish taken with legal means other than rod and reel.

John L. Parker of Conroe earned a state record with a two-pound, 12.4-ounce goldfish he caught November 14, 1987 in Lake Conroe.

## Crappie Limits Already Working

Special length and bag limits on crappie have brought about dramatic improvements in populations of the popular panfish on three reservoirs, Texas Parks and Wildlife Department officials said.

Phil Durocher, inland fisheries management coordinator, said length limits on crappie were almost unheard of in most parts of the country in September 1985 when a 10-inch minimum length limit and daily bag limit of 25 went into effect on several Texas reservoirs.

"The experimental regulations were proposed in an attempt to improve crappie populations and crappie fishing in lakes where both had been on the decline," Durocher said. Extensive survey results indicate this has been accomplished on Lakes Meredith in the Panhandle, Whitney in Central Texas and Palestine in East Texas.

The results, though preliminary, also tend to disprove some old theories about crappie. "In the past, it was believed that crappie

could not be overharvested and that there always were enough brood fish in a lake to maintain a fishery," he said. These trends show that young crappie were being overharvested in these reservoirs."

## Foundation To Aid Public Hunting

The Texas Public Hunting Lands Foundation, a nonprofit corporation, has been formed to support the Texas Parks and Wildlife Department's Type II Wildlife Management Areas.

The first project undertaken by the foundation is restoration of the eastern wild turkey to Type II lands in East Texas by purchasing birds from other states.

Foundation members are Bill Roth of Lone Star Brewery, Ted Horrocks of Winchester-Olin Corporation and Bill Carter of Carter's Country in Houston. Funds collected by the corporation will be allocated to the TPWD for use on the specified project.

Officials said the foundation's announced goal is to assist the Parks and Wildlife Department's Wildlife Division in its efforts to provide public hunting and to promote the concept of public hunting opportunity and wise use of the state's natural resources.

## July In . . .

# TEXAS PARKS & WILDLIFE

Pack up the beach gear and the sunscreen, we're heading for the coast in the July issue. We'll visit all the coastal state parks, from the Louisiana border to the southern tip of Texas. We'll learn about the secret life behind the sand dunes and see some of the flowers and other plants that thrive in a hot, sandy environment. For divers, there are some tips on underwater photography and a look at the SS *V.A. Fogg*, one of the top diving spots in the Gulf of Mexico. Also in the July issue are stories on freshwater inflows, and a Young Naturalist feature on the octopus.





## Operation Game Thief Has Busy Fall Period

Anonymous callers were active against poaching during the past six months, providing information that led to the arrest of 205 game and fish law violators.

Capt. Stanley Brooks of the Texas Parks and Wildlife Department's Operation Game Thief (OGT) program, said the 1,064 calls received for the six-month period ending in April were 49 percent above the previous fall's total.

OGT offers cash rewards to persons who call toll-free 1-800-792-GAME and give information on suspected violations of game and fish laws. The rewards are funded entirely from tax-deductible donations provided by individuals and organizations.

Brooks said the six-month period saw 438 citations issued, and 99 percent of the violators cited were convicted. They paid \$69,820 in fines, and the OGT committee approved \$10,675 in rewards to 62 callers.

Rewards were granted for a variety of violations. Two of the most significant cases involved the illegal use of electrical shocking devices to catch fish. Three violators paid more than \$12,600 in fines on 45 charges after they were arrested in possession of 66 flat-head catfish on a river. The caller received \$500 for the tip leading to their arrest.

Another fisherman paid more than \$3,500 in fines on 15 charges after being caught shocking fish in a lake. A \$300 award was authorized for this case.

Another significant case involved two hunters who were arrested for illegally killing six deer at night from a public road. They also were jailed overnight for public intoxication. These violators paid more than \$8,200 in fines the next day. The caller responsible for their arrests was granted a \$500 reward.

Since the inception of OGT in 1981, the program has been responsible for arrests of more than 1,300 violators who paid almost \$300,000 in fines. The committee has granted \$64,325 in rewards to 340 callers.

## Coyote Trapping Underway On Nine Management Areas

Texas Parks and Wildlife Department officials said visitors to Type II wildlife management areas in East Texas should be aware that a predator control program is underway on nine of the units.

Charles Winkler, big game program director, said leg hold traps will be used through the end of May in efforts to control coyotes. "The department has stocked deer on these nine areas," Winkler said. "The coyote control program is intended to cut predation on fawns and allow the deer population to increase."

The trapping is being done under the direction of the Predatory Animal Control section of the U.S. Department of Agriculture.

Winkler said he does not anticipate problems, since hunting seasons for most species are currently closed. However, he added that persons taking dogs into the areas should be aware of the possible presence of traps.

## Rare Paddlefish Subject Of Management Plan

Texas Parks and Wildlife Department biologists have embarked on a project to secure the future of one of the state's most unusual fishes—the paddlefish.

Known for their broad, paddle-like snout, paddlefish formerly were found in all of East Texas' major river systems. Dam construction and water quality changes are believed to be key factors in the fish's decline, according to biologist Ronnie Pitman of the TPWD's Heart O' the Hills Research Station at Ingram. "Paddlefish feed on microscopic organisms called zooplankton, so they are highly dependent upon good water quality," Pitman said. "They also require water flowing over clean gravel for spawning, and this kind of habitat has been destroyed in many Texas river systems."

Now only remnant populations are thought to remain in three river drainages—the Red, Neches and Sabine.



## Plastic May Have Caused Beached Whale's Death

The death of a 20-foot whale March 29 in the surf near Matagorda may have been caused by the animal's ingesting pieces of plastic sheeting, investigators said.

The whale, tentatively identified as a Minke whale, was first sighted in shallow surf waters by ranch workers on March 25, about four miles southwest of the mouth of the Colorado River.

A rescue team made up of Texas Parks and Wildlife biologists, workers from the Texas Marine Mammal Stranding Network, SeaWorld Marine World of Galveston, the University of Texas Marine Science Institute at Port Aransas, Texas A&M University at Galveston and local veterinarians and ranch hands tried unsuccessfully to keep the whale alive.

Photographs and measurements were taken of the 2,000-pound whale, and blood, tissue and bone samples were collected for analysis. No external wounds or other signs of disease or injury were found, but several small pieces of plastic sheeting were found in one of the whale's three stomachs and within the passageway between the second and third stomach.

Rob Weeks, an assistant coordinator of the whale stranding net-

work, said investigators don't know if the plastic caused the whale to become sick, but added that it "probably was a factor."

Biologists theorize the whale probably ingested the plastic while feeding. Persons sighting stranded marine mammals may contact a TPWD field office, or call the stranding network's 24-hour number, 409-845-4344.

## White Bass Tagging Study Underway At Whitney

Texas Parks and Wildlife Department crews have tagged 1,500 white bass in a study being conducted to determine movements and harvest rates of the popular game fish.

Biologist Maurice Muoneke said the fish were collected with electroshocking equipment in the Brazos and Nolan Rivers above Lake Whitney during April, and released in the same area.

Anglers catching white bass in that area should watch for a blue spaghetti streamer attached to the fish's dorsal area. The tag should be removed from the fish and sent to the address inscribed on the streamer.

Anglers returning tags will be eligible for rewards from \$5 to \$100, funded by the Sportsman's Club of Fort Worth.



# THUNDER

by Paul M. Montgomery

At any given moment there are some 1,800 thunderstorms rumbling over the earth's surface, and during the late spring and early summer probably a good portion of them are in Texas.

Late May and early June are the wettest times of the year for most parts of Texas, and much of the rain comes in the form of two basic kinds of thunderstorms: the air mass or heat varieties, and those that are severe and localized.

Air mass thunderstorms are created by the rising of warm, moist air from the Gulf of Mexico and depend on solar heating of the earth's surface for their formation. They usually dissipate by evening but by day they can form, unpredictably, over any part of our state. Isolated and relatively small, air mass thunderstorms are commonly observed in warm, tropical skies. The thunderstorms in West Texas and the puffy storms that form over the Coastal Plains are good examples of this variety.

Severe, localized thunderstorms are different from air mass varieties in that they develop quickly, persist longer and do not depend exclusively on the earth's heating for their formation and survival. Often forming during the nighttime, they can precede cool fronts in spring, autumn and winter. Severe thunderstorms often contain elements destructive to human life and property—tornadoes, hail, flooding and high winds. These large storms are capable of combining to form squall lines preceding fronts, but isolated storms also are possible.

In May 1936, a squall line moved from the northwest across the Rolling Plains toward Colorado City, Texas. According to the National Weather Service, the line of clouds had formed in response to a cool front stalled out over New Mexico. This front, although weakened, continued to send strong







Paul M. Montgomery

upper level impulses across Texas. As these impulses or waves of cool air collided with warm, moist air from the Gulf of Mexico, thunderstorms also began forming in the western half of Texas and were pushed eastward. All residents on the Rolling Plains had the misfortune of lying in this storm system's path on that dark, spring day.

In less than 30 minutes, rivers of rain gushed over Colorado City's street curbs and down alleyways; pea-sized hail lay in drifts against store fronts while tree limbs were scattered along every sidewalk. Near the edge of town, powerlines draped dangerously close to wet, saturated ground as traffic came to a standstill. Even wheat fields in surrounding areas lay beaten down by high winds and heavy rainfall.

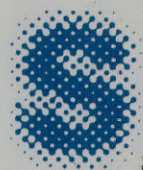
These weather events are not uncommon to Texas in the spring and summer. Residents have come to expect both the best and the worst from them. While tornadoes, lightning, hail and high winds are regarded as the most destructive forces of thunderstorms, it is often forgotten that they bring welcome rain to many drought stricken areas of our state. North Texas and West Texas often rely upon thunderstorms for their only source of rain during the summer. In fact, without thunderstorms, our earth would quickly lose the vital negative electrical charges that allow it to produce nitrogen, upon which all plants depend.

Despite the awesome and even frightening qualities of thunderstorms, they also provide us with great visual displays of beauty and power, we admire them from a safe distance. Who can forget the excitement of observing summer lightning from a mountain top in West Texas or hearing the ominous roll of thunder from an approaching squall line on the High Plains? A dissipating evening thunderstorm casting its reflection on an East Texas lake can provide memories that dim our recollections of the forests themselves. \*\*





Paul M. Montgomery



evere, localized storms, pictured on the preceding page and above, provide drama and elements of danger. The thunderhead at right seems to dwarf the Chisos Mountains in Big Bend National Park.





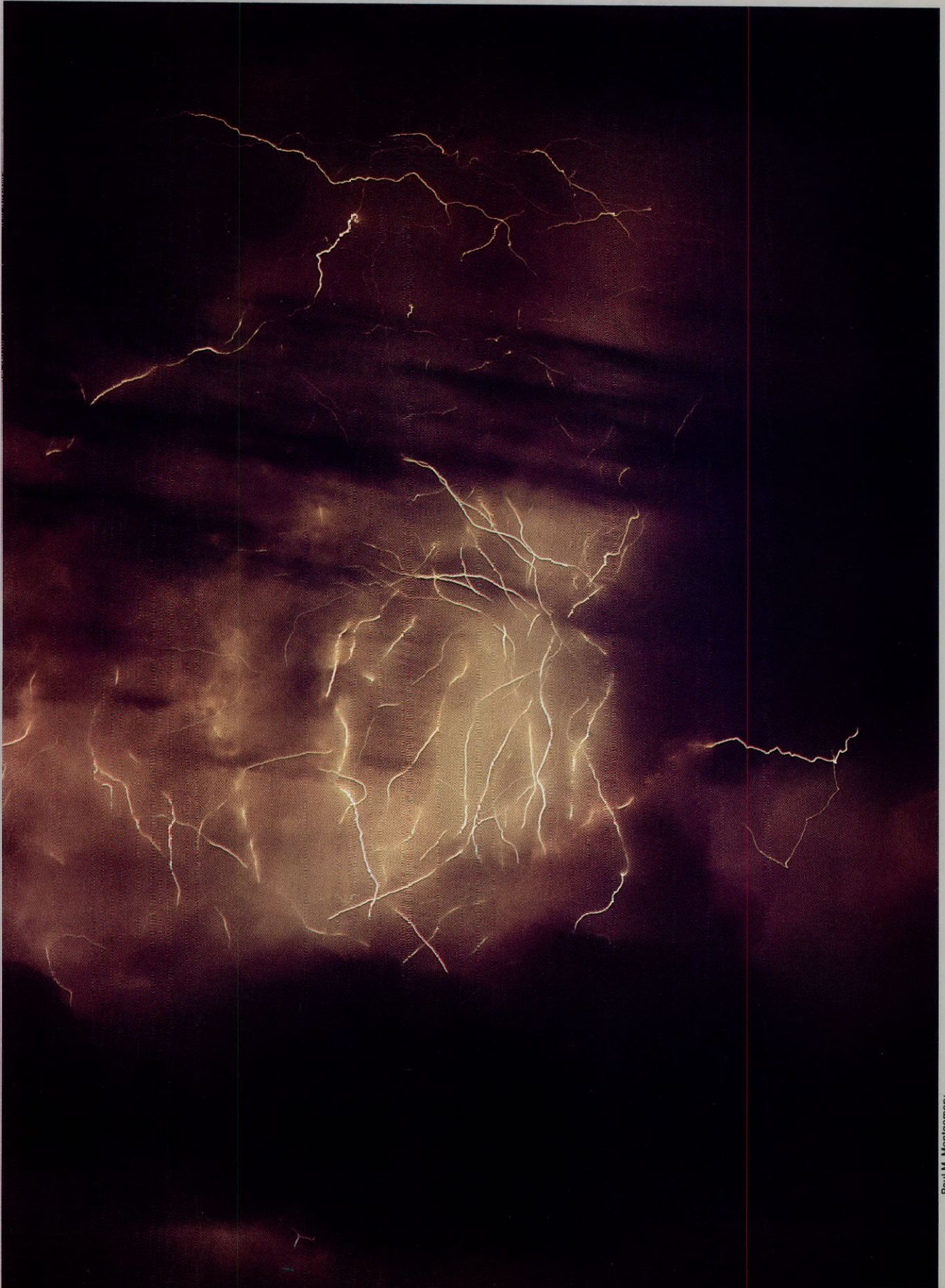


Tracy Lynch



Paul W. Montgomery

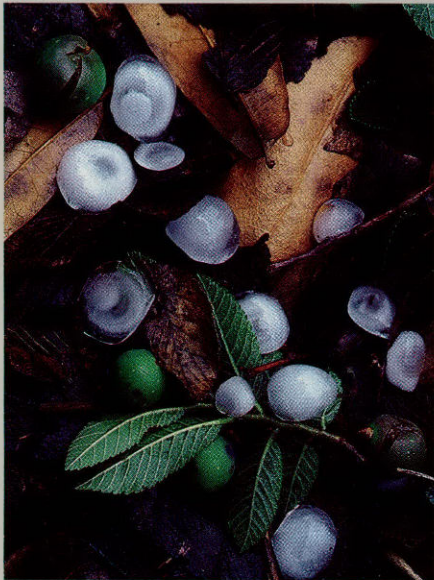




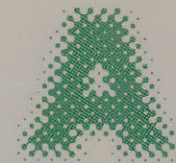




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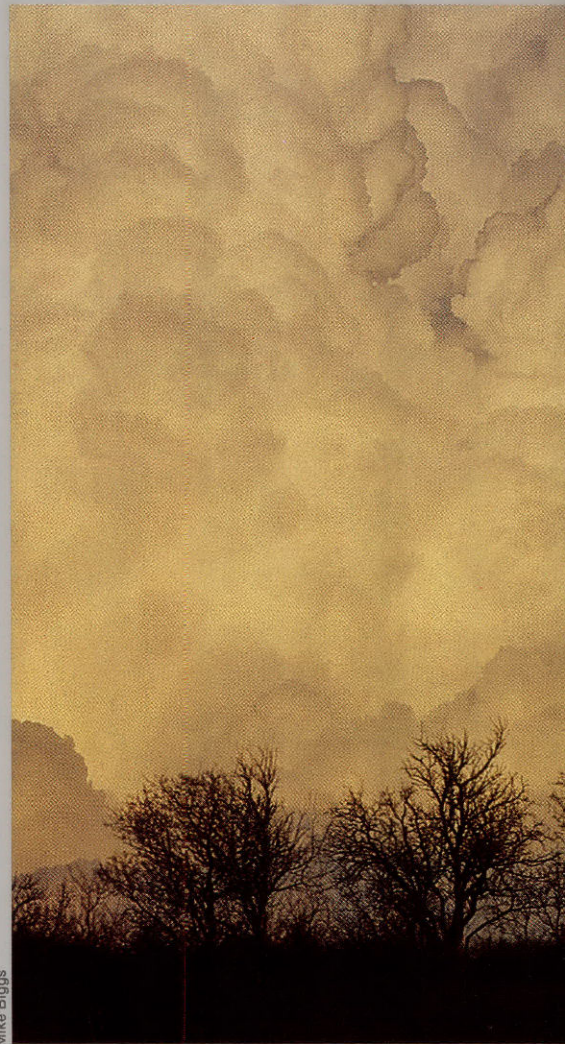


air mass thunderstorms (above and far left) are isolated and relatively small, and can form unpredictably over any part of the state. Hail (left) often accompanies severe, localized thunderstorms.



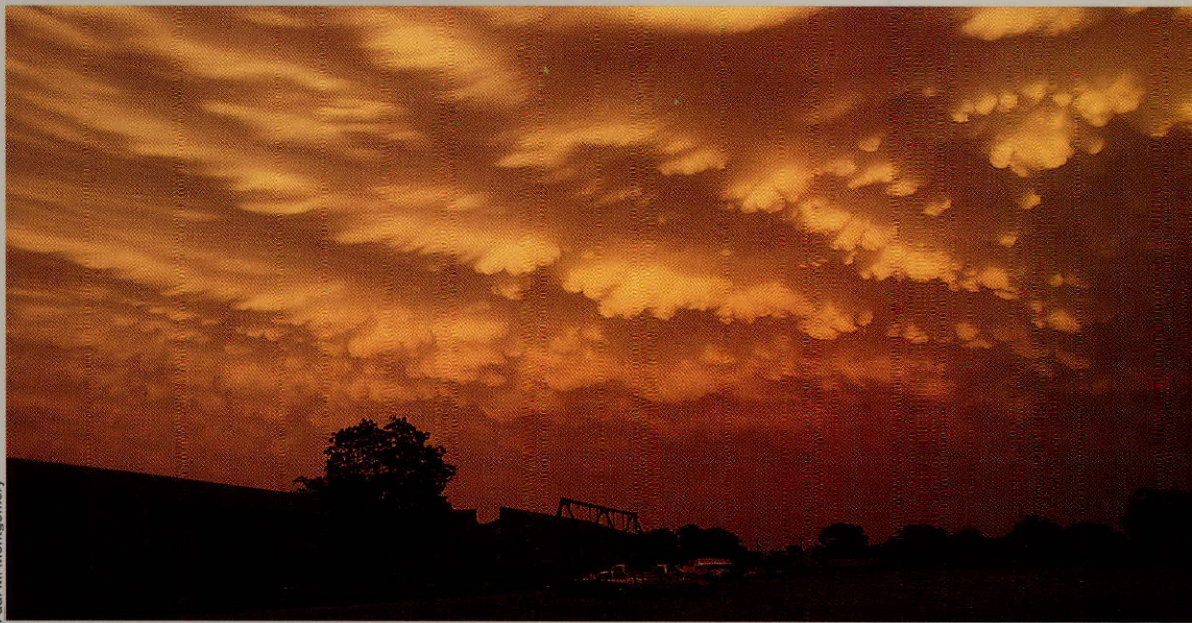


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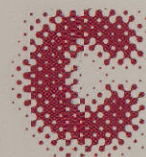


Mike Biggs





Paul M. Montgomery



umulonimbus clouds (left and above) are heavy and dense. Clouds of the *cu-mulonimbus mammatus* variety (above) have hanging pouches on the underside and usually indicate severe turbulence. A dissipating thunderstorm (far left) paints the sky with rich colors.



# HOT FISHING ON THE BORDER

by Jim Cox



Leroy Williamson

Here's a recipe for Lake Falcon bass fishing: a stout two-handed rod, 25-pound-test line, a 10-pound bag of plastic worms and a machete.

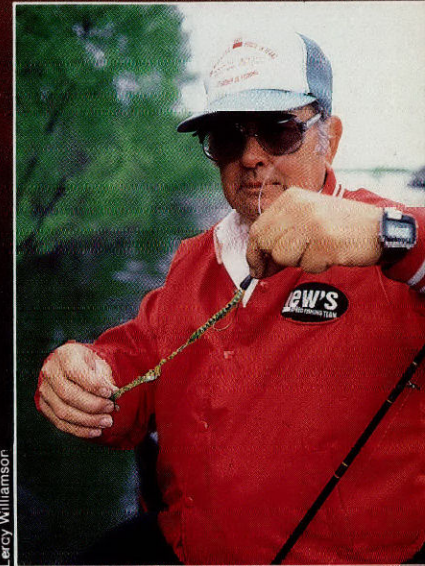
The first three items are for doing battle with the big border reservoir's resurgent gang of largemouth bass; the big-bladed knife might be needed to get a bass boat through the jungle of huisache, willow, retama and other terrestrial plants inundated by the reservoir's high water level.

Fishermen who visited Falcon three or four years ago would hardly recognize it now. The lake rose some 30 feet during fall 1986, ending a four-year period during which most boat ramps were high and dry and lakeside businesses were struggling. But also during that low-water period, native

brush and trees invaded the fertile lake bed. When the rising waters flooded thousands of acres of the secondary growth it revitalized the habitat for game fish, especially largemouth bass.

How much has bass fishing improved on Falcon? Tommy Gray, who has operated his lakeside Redwood Lodge at Zapata for a quarter-century, is ecstatic. "I think the fishing for quality-sized bass is as good here as on any lake in the state right now, and by next year it will be the best in the state," Gray said.

Gray, who has combined guiding with his motel business through the years, said the bass population at Falcon is comparable to the salad days of the mid-1950s when fishing was phenomenal by any standard. Just one isolated example to illustrate the lake's production is a bass tournament held



Leroy Williamson



Leroy Williamson



in late February. Gray said the competitors caught (and later released) more than 800 bass averaging approximately four pounds. The first-place string of five fish weighed 31.7 pounds, for an average of 6.34 pounds. The second-place string weighed 28.69 pounds, averaging 5.74 pounds per fish.

Those fish were caught during the late winter period, but one of Lake Falcon's main attributes is its consistent year-round bass fishing. So if you are planning a fishing outing this summer and don't mind braving 100-degree-plus weather, Falcon will produce action hot enough to make you forget the weather.

"I have caught bass on Falcon in midsummer, in the middle of the day when you could hardly get your breath it was so hot," said Austin bass tournament fisherman Cicero Patton, "and the thing about Falcon is that the bass never seem to move out of that shallow water."

Indeed if there has been one overriding characteristic of Lake Falcon bass fishing through the years it is the shallow-water aspect. "If you are fishing two feet of water and not catching anything, you move even shallower," Patton said. "This is true any time of year, but especially during the summer."

Patton, who has fished most of Texas' better bass lakes, claims Lake Falcon bass pack more power than any other. "Falcon fish are the toughest and strongest. I have never seen a lake where three- and four-pound bass can break 20-pound-test line like they do at Falcon," the angler said.

Falcon is made to order for the "flipping" or "pitching" craze that has swept through the bass fishing fraternity in the past couple of years. Rather than casting to a likely area, Patton maneuvers his boat right up to the brush or other structure and simply flips the weedless plastic worm into the thick of it. "It's amazing how tight Falcon bass hold to structure," Patton said. "Sometimes you can drop a lure six inches outside a bush and not get a bite, then drop it right into the middle and get your arm broken."

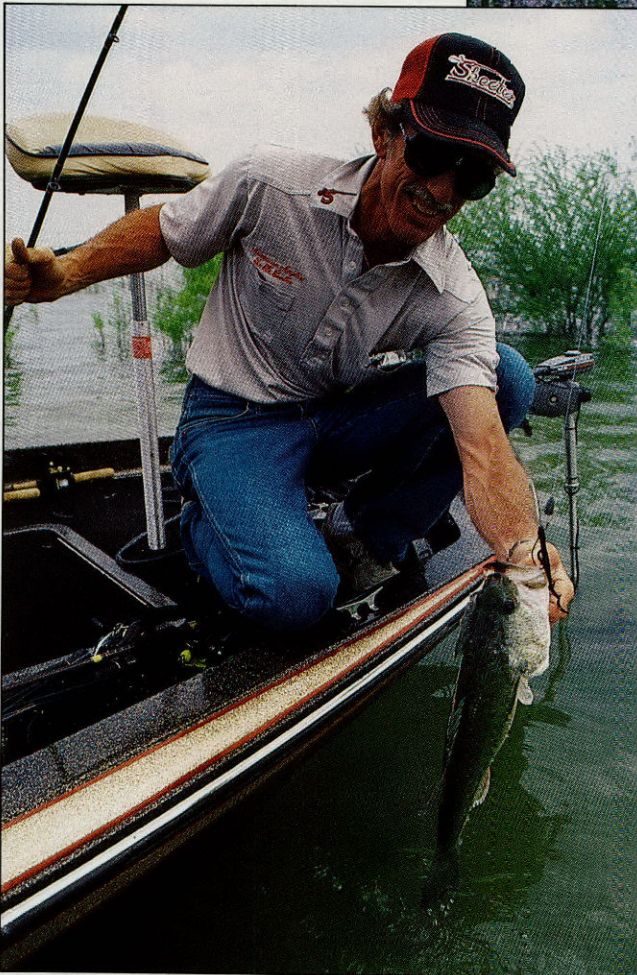
Perhaps it's a feeling of security bass get from the shade and cover of vegetation that keeps them from being "spooked" by this close-range fishing method. "I have fished during high winds and had my boat literally crash into a bush, then back off, flip a worm

in there and catch a fish," Patton added.

Gray agrees with Patton's observations on Falcon's summertime bass. "I have caught as many good fish in the middle of summer as any other time, and during midday as often as not," Gray said. "My best advice would be to pitch a worm on the shady side of a huisache bush and watch out."

Another veteran Falcon Lake observer is Gaylen Gilbreath, who for the past 13 years has guided hunters and fishermen in the Falcon area and parts of northern Mexico. Gilbreath said Falcon bass fishing differs from fishing lakes in East Texas and elsewhere in that you can catch fish in one foot of water or 20 feet. "There apparently is no thermocline on Falcon, even in the hot summertime," said Gilbreath, "so any depth of water usually has enough oxygen to support fish."

Gilbreath said fishing shallow brush with worms is a productive method; he also recommends topwater lures. "As soon as the spawn is over, from about April on, topwater lures should really



Leroy Williamson



*Submerged willow and huisache offer plenty of fishy-locking targets for Cicero Patton's spinnerbait (above). A 30-foot rise in the water level has created improved habitat for Falcon's number-one sport fish, the largemouth bass (left).*





Leroy Williamson

work well," the guide said, adding that along flooded creek channels and rocky points are usually good areas for topwater action.

Gilbreath believes, as do Gray and Patton, that the best is yet to come for Lake Falcon bass fishing. "The lake is just full of bass from nine to 12 inches long. They had a big spawn and the tremendous amount of cover in the lake let a lot of them survive," he said. "I would bet that by spring 1989 we will have the best bass fishing in the nation right here."

Gilbreath's optimism also comes from the water supply situation, he said. Upstream reservoirs, such as Amistad near Del Rio, also are full, so no radical lowering of water levels is an-

anticipated in the near future. "Lowering the level during the spring could hurt the bass spawn, but the lake will have to drop 30 feet before we will run out of this new cover," said Gilbreath.

It might be suspected that glowing predictions of Lake Falcon's fishing future are overdone a bit by local guides and business operators who depend on outside visitors for their livelihood. But comments from Parks and Wildlife Department fishery biologists also give credence to the bold predictions. "I don't see how fishing prospects could look much better," opined biologist Jimmy Dean of San Antonio. "The lake has the habitat now to support an expanding bass population. Really, all it needs is a little time for the fish to

grow into all the available territory."

That the bass are scattered over a wide area was obvious last October when Dean and a fishery crew operated an electroshocking boat to sample populations of bass and other game fish. "We really didn't collect an impressive number of bass, except for young-of-the-year fish that comprised about 88 percent of the total," Dean noted. "I think that illustrates that the mature bass are scattered over a wide area, and also that the 1987 spawn and survival of young fish was very good."

Dean said the condition of larger bass in the survey was good, but the yearling fish were slightly below average in body condition. "This doesn't worry me because I expect forage species to take



advantage of the added fertility in the water and expand rapidly," he said. "With more forage and the long growing season, it won't take those small fish long to grow into the quality size range." He added that bass growth rates at Falcon during good years probably are comparable to those of bass in heated power plant lakes, because of Falcon's far southerly latitude.

The lake's bass population has received a strong infusion of the Florida bass gene, with approximately a million Florida and Florida/northern crosses stocked since 1975. Although the lake so far has no entries on the state's list of 50 biggest bass, a 12½-pounder has been caught and numerous bass in the 10-pound class have been documented. As with other reservoirs in south and west Texas, the 14-inch minimum length limit imposed in September 1985 should help protect the horde of small bass that will be growing into catchable size in the coming year or two.

Falcon offers much more than just largemouth bass fishing, as a host of white bass fishermen will attest. "Zapata Armada" is the moniker applied by Gilbreath to the group of anglers, mostly of the winter Texan variety, who pursue whites up and down the lake. "They use CB radios to follow the schools of whites, and when they locate a big school it gets to be quite a convention," Gilbreath said. Although the largest concentrations of white bass occur during the spring when they make their spawning run up the Rio Grande, they can be caught during the summer when they frequently surface in pursuit of shad and minnows. Shad-imitation lures, including topwaters, can be used effectively on the surface-striking whites.

Falcon also has striped bass, but the numbers of larger stripers apparently have not rebounded from a major die-off that occurred during the lake's low-water period. Fair numbers of stripers in the one- to three-pound class continue to be caught in surveys and by anglers, leading to speculation that the fish might have spawned in the river above the lake. That theory has yet to be proven, however, Dean said.

Falcon also has been, and continues to be, an excellent catfish lake, Dean noted. He said channel and blue catfish populations, as indicated by net and electroshocking surveys, are similar to

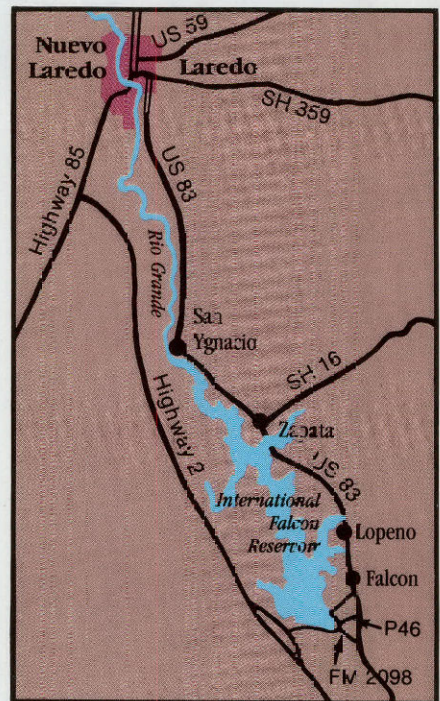


*The Mexican ground squirrel and kiskadee flycatcher are among the variety of bird and animal life at Lake Falcon State Recreation Area. Camping is a year-round activity at Falcon; annual visitation of more than two million makes it one of the most popular parks in the state.*



largemouth bass populations in that a high percentage appears to be yearling fish. "About 90 percent of the channel catfish we collected were under one pound, and 65 percent of the blues also were in that size class. He said when the two species were combined, 23 percent were between one and three pounds, and 12 percent were in the 4-12 pound class. As on Amistad Reservoir upstream, fishing for catfish over baited areas is popular at Falcon. Anglers scatter soured wheat or maize in marked areas and then use traditional catfish baits such as shrimp, earthworms or stinkbait to catch the fish drawn into the baited hole.

If you plan to fish on the Mexican side of Falcon, purchasing a \$15 Mexico fishing license would be a good idea. The licenses are available at marinas and businesses at Zapata. It is advisable not to get out of your boat on the Mexican side, and also be sure to







avoid disturbing any nets frequently set by Mexicans on the Mexico side of the lake.

For those planning a first-time visit to Lake Falcon, the city of Zapata is located about 50 miles south of Laredo on U.S. Highway 83. Zapata is situated at the lake's upper end, and the dam is some 30 miles to the south. Zapata offers a variety of lodging and retail outlets. If camping out is your style, Falcon State Recreation Area is located near the dam off Highway 83, and it offers a full lineup of overnight camping and picnic facilities.

Reservations are a must at this popular state park, especially during the busy summer months, according to Superintendent Ross Hartnett. "I expect the park to set all kinds of visitation records this year mainly because of the higher water level in the lake and the good fishing," said Hartnett. He said visitation dropped to dismal

levels of around 180,000 annually during the low-water periods of 1985 and 1986, but it should rebound past the 250,000 mark in 1988. "The water was so low two years ago that our boat ramp became almost unusable, and boaters were backing down a sloping shoreline instead of using the ramp."

Hartnett said the park's visitors are an interesting mix. "During the winter we have lots of people from the north, then in the spring the bass clubbers come in every weekend, and in the summer we have the usual influx of family campers," he said.

The park's facilities include 55 sites that are designated as picnic sites during the summer months and campsites during the winter. Each has a shade shelter, and 31 have water and electrical connections, fire rings, cooking grills and lantern holders. For information or reservations, call the park at 512-848-5327

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## Hot Weather Protection

Lake Falcon, Texas' southernmost major reservoir, is legendary for its searing-hot summer temperatures. The South Texas Brush Country can swelter under 100-degree-plus heat for weeks on end. And on a reservoir like Falcon, the sun's harmful effects are increased by rays reflected from the water's surface. That's why anglers are considered by doctors to be in a "high risk" category.

With proper precautions, however, fishermen can safely endure summer fishing in relative comfort.

One of the simplest rules to follow is avoiding exposure during the midday period when the sun is strongest. This means that during daylight savings time it's best to stay off the lake between 11 a.m. and 3 p.m.

Here are a few other tips:

- Wear loose-fitting, light-colored clothes with long sleeves and pants. Avoid the traditional angler's "gimme hat," using instead a broad-brimmed straw hat that shades the back of the neck.

- Use a sunscreen with a sun protection factor of 15 or more printed on the label. Apply it before going out in the sun, and reapply it after washing, swimming or sweating.

- Take plenty of ice water or other liquids, but not alcoholic beverages. Alcohol actually has a dehydrating effect on the body. For an extended trip, fill a gallon milk jug with water, add the juice of a half or whole fresh lime or lemon and freeze. As it thaws, it provides a fresh-tasting drink that quenches your thirst.

- For further protection against the sun, wet a dish towel or other lightweight cloth and put it under your hat, letting it hang down to form a curtain for the back of your neck.

- Use only high-quality sunglasses with lenses that are "polarized" to screen out ultraviolet rays. These protect the eyes from fatigue and damage, and actually help the fisherman see more submerged objects through the glare.

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## OLD GUERRERO

# Town at the bottom of the lake

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Article and Photos by Bob Parvin

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Half submerged now by the waters of Falcon Reservoir, the crumbling ruins of Guerrero once comprised the seat of a noble frontier ranching culture whose traditions pioneered the ways of the modern cowboy.

The 235-year-old remains of the city are found on Mexican shores far up the west bank of Falcon's Rio Salado arm. Part of the old city decomposes in shallow water where long heaps of tumbled, water-bleached stoneworks rise to help define a once extensive and orderly layout of streets and buildings.

The other half of the ghost city covers several acres of adjoining dry shore. Here the hand-hewn sandstone walls of long-abandoned municipal buildings, schools, hacienda courtyards, small houses, stores and warehouses loom out of the entangling mesquite brush as hallowed reminders of the antiquity and former stature of Guerrero's architectural character.

High reservoir levels flood the central plaza area, turning its bandstand into a pedestalled island, filling the nearby church up to its nave, and drowning the designwork of gardens,

walkways and sitting areas that once graced the plaza.

Guerrero was vacated after completion of Falcon Dam in late 1952. The town's 4,000 inhabitants were relocated by the Mexican government to Guerrero Nuevo, which was built on higher ground beside the dam.

Revilla, the old city's original name, had presided for two centuries over the portion of the Rio Grande Valley now swallowed by the lake. It was established in 1750, as Spanish ranchers from the interiors of Nuevo Leon and Coahuila were attracted to the riverlands as part of a spirited effort by New Spain to colonize the vast open territories of the northeastern "Mexico Seno" and South Texas (below the Nueces River). This region had lain vulnerable since earlier in the century when Spain leapfrogged into Central and Eastern Texas to establish mission colonies as part of a plan to discourage French intrusion from Louisiana.

The Texas exploits had dearly cost the Royal Treasury. So the Spanish government devised a less expensive "free-enterprise" plan for colonization of the Mexico Seno. In return for providing limited financial assistance, tax remissions and military protection for set-

tlers, the government encouraged the establishment of permanent, self-sufficient colonies throughout the region. After a proving period of 10 years, the viceroy promised to divide lands for private ownership and pull back authority to allow the settlements a limited autonomy.

The homesteading program was made even more appealing by the selection of a popular and able leader for the colony: Jose de Escandon. A nobleman-soldier, Escandon had already achieved folk-hero status for his deeds to pacify the Mexican Sierra Gorda region.

After a scouting expedition in 1747, Escandon recommended 14 settlement locations from Tampico to the Nueces River, with two colonies to be placed on the south bank of the Rio Grande (today's border towns of Reynosa and Camargo, Mexico). As soon as Escandon's settlement plan for "Nuevo Santander" was given the Viceroy's seal of approval, more than 2,500 prospective homesteaders had lined up with their baggage, ox-wagons and livestock to take on the new frontier challenge. In short order, all of the proposed settlements were occupied (and most remain viable to this day).



Yet, still more pioneers came. Prominent among these late-comers were independent Spanish ranchmen, already accustomed to the demands of Mexico's frontier. For a break in Royal taxes, they were allowed by Escandon to set up villas and haciendas at their own expense along vacant riverlands upstream from Camargo.

In such a way, Revilla was sited at the mouth of the Rio Salado, followed by Rancho Dolores on the north bank of the Rio Grande, then Mier at the mouth

of the Rio Alamo some 20 miles below Revilla and, lastly, Laredo far upstream at the ford called Paseo de Jacinto.

Revilla, Mier, Camargo and Reynosa rapidly populated and prospered as trade and cultural centers for their respective valley areas—but not without learning hard lessons taught by the isolation, harsh environment and ever-present dangers of Indian violence and thievery.

The mainstay of each community was ranching, and immense herds of longhorned cattle, horses, mules and sheep were fostered by tough vaqueros. To manage herds in the thorny chaparral, they reinvented the Spanish war saddle to include a high, sturdier pommel to act as a brace in roping cattle. *Chaparreras* were adapted from Spanish brush fenders to protect legs. New techniques for breaking and riding horses, as well as for roping and herding cattle were also developed and later passed along as part of the methodology and equipment of the North American cowboy.

As soon as the colony herds were left to graze the open range of the Rio Grande, the Comanche and Apache were there to steal them away. By the late 1700s, one of the Comanche war trails from the Texas Plains veered toward the colonies of the lower Rio Grande. Smaller, less defensible outposts like Rancho Dolores and Laredo were temporarily abandoned because of Indian raids.

To better withstand the ravages of the Indians, as well as the oppressively hot and humid climate of the valley, a unique style of architecture was developed by the Spaniards. Family groups in outlying ranch areas built defensive compounds. Squarish, high-walled houses were constructed of heavy sandstone blocks, with adobe mortar for insulation and smoothly-plastered walls which the Indians could not scale. Flat rooftops were sealed off with a layer of *chipichil*, a pea-gravel-and-lime concrete that protected from fire arrows. Parapeted walls and even gunnery towers were included in some of the designs. Gunports called *torneras* served as windows. In fact, conventional windows did not become an architectural feature in the areas until after the end of the Indian wars in the 1880s.

As Indian problems worsened, petitions by the colonists for strengthened

military help went mostly unheeded. Frustrations with the centralist government led to attempts by the isolated Rio Grande communities to organize revolts against Spanish rule, then Mexican authority and finally, in 1839, to establish a separatist state called the Republic of the Rio Grande. A declaration of independence was drafted at Guerrero and the new flag of the Republic of the Rio Grande (the seventh to fly over Texas), was carried to Laredo. Had it succeeded, the Republic would have caused a redrawing of the maps of Texas and Mexico to include all of the territory of Nuevo Santander to the Nueces River.

Once the boundaries were settled and peace was reestablished after the 1840s, the Rio Grande communities settled down to the quiet business of cattle raising, small-scale farming and borderland trade. For a hundred more years, life in the valley remained insular and traditional.

But in 1944, a treaty was signed between Mexico and the USA to create Falcon as the first of a series of Rio Grande reservoirs. The descendants of Escandon's pioneers, now numbering more than 7,000 at Revilla and a dozen smaller settlements throughout the valley, were given new lands on the gravel ridges surrounding the proposed lake, plus a three-year timetable to resettle before the reservoir filled.

Falcon's floodgates closed in December 1952, and on August 23, 1953, an enormous flood washed down the Rio Grande and half-filled the reservoir. Forced to evacuate overnight, families hastily gathered their possessions and livestock and bid farewell to homes and a way of life that had endured for two centuries. The following summer, rains from Hurricane Alice lifted Falcon over its spillway.

The flooded shores of Guerrero are a place for the thinking fisherman. Is it imprudent to toss spinnerbaits into the depths over a plaza where generations of love-struck young vaqueros promanaded their senioritas under soft Rio Grande nights? Is it sinful to lure lunkers from the flooded chambers of a church building once so filled with prayers for the victims of a 100-year war with marauding Indians? Do you drop anchor or solemnly lower it over the spot where cries for revolution once echoed throughout a whole province?

Falcon is full of such questions. \* \*



*Falcon Reservoir anglers are reminded of the town of Guerrero, whose 235-year-old remains lie half submerged by the lake's water.*



Mike Biggs

# Hunting Lease Primer





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by William I. Morrill

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My work as a consulting wildlife biologist takes me throughout Texas and Mexico and brings me into contact with some enthusiastic hunters. Because more than 95 percent of Texas is privately owned and trespass laws are strictly enforced, nearly half of Texas hunters pay access fees to hunt private lands (hunt leasing).

There's more to the hunting experience than just harvesting an animal. Hunting can be analyzed many ways, but I prefer using five components: anticipation, preparation, participation, discussion and recollection.

Every hunter understands the excitement of anticipation and preparation for the hunt. Participation is the culmination of those first two. Discussion is reliving participation by relating your experience to a friend, or for that matter, anyone who will listen. But recollection involves all of the previous four, and sweetens the experience each time. It is the most lasting reward.

One question I often hear is, "How can I be sure a hunting lease will live up to what it promises before I put down a deposit?" I usually encourage hunters to question prospective lessors since hunters, like all consumers, want to get the best quality for the money they spend.

The important questions to ask are similar, if not identical, for various hunting situations and types of leases. If a hunter is interested in a lease for white-tailed deer (or any other kind of wildlife), here are 10 important questions he or she should ask the lessor:

1. Where is the lease; what portion of the county is it in?

Quality and quantity can and often do vary between regions. Hill Country



Bill Morrill

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*Becoming familiar with the lease is an important preparation for hunting.*

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deer are usually smaller but more numerous. However, some Hill Country ranches have deer almost as large as South Texas deer. But you should expect to pay a hefty price for this quality. Ranches in Dimmit County are known for their better than average quail crops, while proximity to river or creek habitat is usually better for turkey.

2. What type of hunting and hunting facilities are available?

Will there be hunting from blinds, walking, driving or hunting behind dogs? Are visitors and/or young hunters welcome? You should choose the type of hunting that appeals to you, realizing that the more labor the lessor puts in, the higher the price will be. Facilities can be anything from a comfortable cabin to no camping at all.

3. How many acres comprise the ranch and how many hunters are allowed on it at one time?

You may not want to be crowded into a small place with other hunters unless there is a dense population of deer. The type of hunting available will determine much about the ability of a ranch to provide a quality experience.

4. What animals are available for me to hunt and how many may I harvest?

There may be multiple species available, and you have a right to know what your opportunities are for your dollar. But just because a species is offered doesn't mean you'll have the opportunity to harvest it. (See #10 below.)

5. Is there a set fee or a graduated system of fees?

What is the maximum fee to be paid and the lease fee one could pay? Some landowners charge greater access fees if you hunt different animals or want to harvest more than a minimum. Some landowners may restrict what they allow you to harvest, such as only bucks that are deemed to be "mature." Some charge more for increasing quality of animals harvested. The latter may be one of the best bargains, since you get what you pay for.

5. Is the ranch under a game management program?

Are you working with a wildlife biologist and if so, who is the person? If there is a program, the lessor should have a good idea about what is available and have a set of goals. A wildlife biologist is an excellent source of information about the potentials of a lease. Do not hesitate to question the biologist.





Bill Reeves

*Ask a prospective lessor about facilities such as blinds on the lease.*

7. How many animals does the lessor plan to harvest this year?

If they say, "a bunch," perhaps they have that many, but are not concerned with knowledge or information necessary for management. But if they do not know or don't care, you may be buying a "pig in a poke." Whenever I purchase something, I want to know that the person I am buying it from knows his product. As an example, whenever I purchase a hunting dog, I am very discriminating about its breeding and how its ancestors have performed. I would rather hear about its pedigree than listen to its owner expound upon generalities about the dog. I believe this same type of careful scrutiny is important in picking a lease to spend your hard-earned dollars on.

8. How many years has the lessor operated this lease?

You want someone who knows the land and its ability to produce wildlife. If it has been hunted for several previous years, ask for the telephone number of a couple of the hunters and call

them. Hunters are usually more than happy to discuss their experiences, good or bad, with other hunters.

9. How many does and bucks were harvested last year?

This information can give a good indication of the amount of pressure put on a property. If it is a day lease, add about 20 percent to the figure for a wound/loss rate. If it is a season lease, add about 10 to 15 percent wound/loss rate. If there were many more does than bucks harvested and there is no management program, you may be able to assume your chances for a doe are better than for a buck.

10. What was the percentage of hunter success for last season?

You need some way to determine the track record of the potential lease. This technique is one I offer hunters. If every full day a person hunted is considered one hunter day, and two people hunted morning and afternoon for two days, this would be two people hunting two complete hunter days (remember one hunter day = morning +

afternoon hunt), or four hunter days. (Two hunters times two hunter days equals four total hunter days.) If three deer were harvested, this would be three deer for four hunter days or 75 percent hunter success ( $3/4$ ). This gives you some indication of your chances for harvest. Some lessors may be able to tell you and some may not, but it is hoped that in the future all lessors will see the benefit of this system. Keep in mind, success in the hunting experience is more than just the harvest.

There are no guarantees to guard against the few unscrupulous lessors, but answers to the foregoing questions should improve your chances of finding an ethical lessor and having a quality hunting experience. These questions also are especially useful to a hunter who is looking at a particular lease for the first time. Additionally, the Texas Parks and Wildlife Department, the Texas Wildlife Association and the Department of Agriculture offer a list of leasing landowners to interested hunters. My best advice is to know what you want before you ask and listen closely to the answers.

Once you have asked the questions and are satisfied with the responses, make your reservations and pay your deposit. Then relax, knowing you have prepared well. You may enjoy one of the most rewarding aspects of hunting—anticipation.

Should the old fears creep into your thoughts, remember, success can never be guaranteed. But the important elements of hunting—anticipation, preparation, discussion and recollection—all contribute to the hunting experience. Success in one or several aspects usually means a positive and successful hunting adventure. Good luck and good hunting. \*\*







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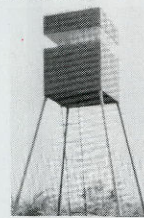
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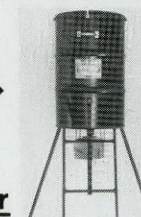


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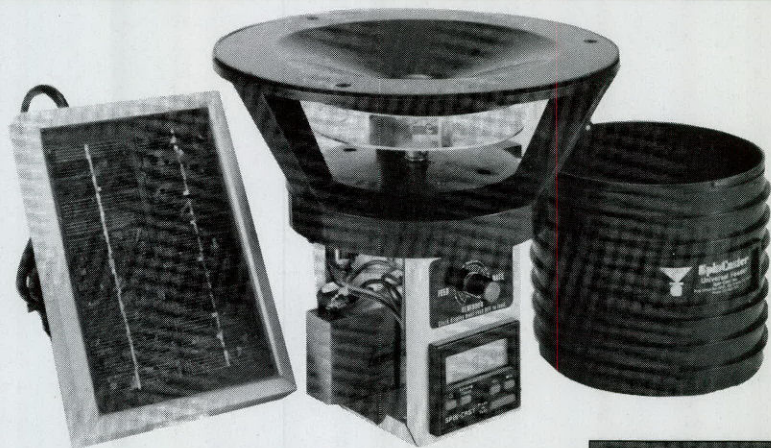
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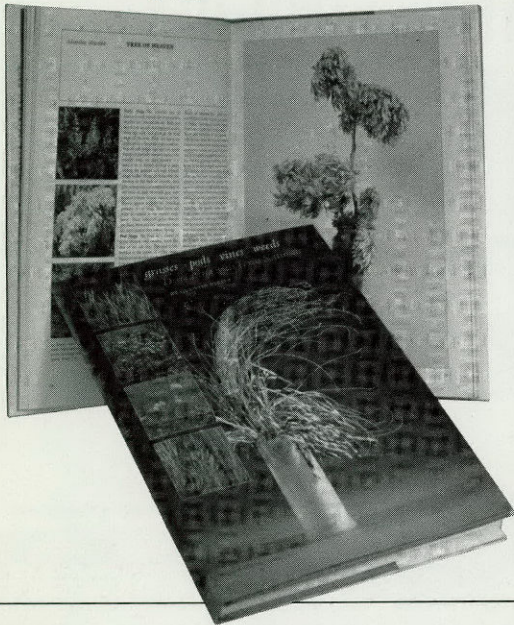
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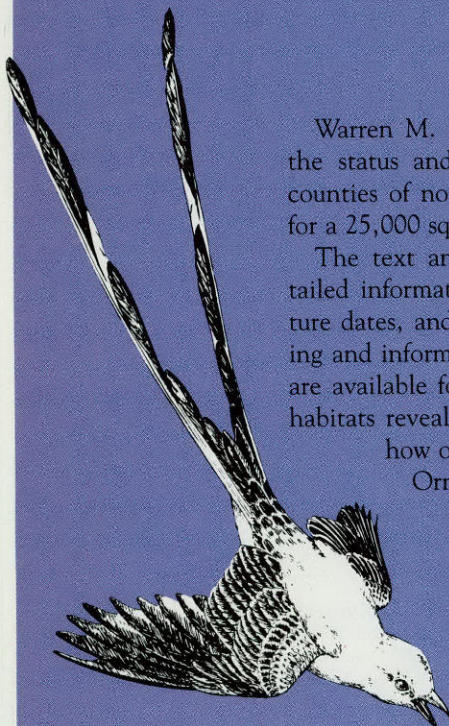
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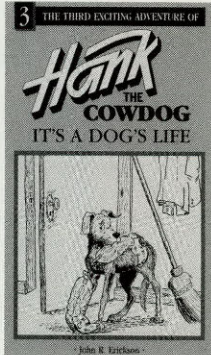
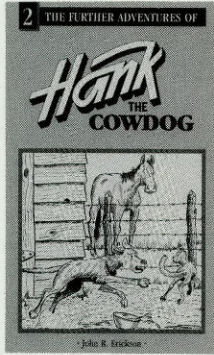
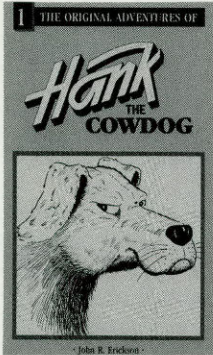
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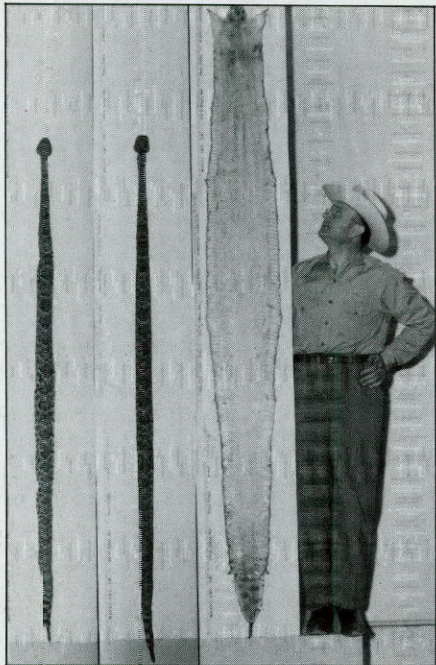
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# Letters



## A Rattler Tale

I want to compliment you on the excellent article entitled "Rattler Tales" in your March 1988 issue. The article and its accompanying photos are by far the best I have seen on rattlesnakes. Perhaps more people now have a better understanding of these impressive reptiles.

In the article, there was mention of my father, W.G. McMillan, and his lifelong ambition to see live rattlesnakes over six feet long. From 1935 until his death in 1958, we always had some type of reptile around the house, either in cages, sacks or wooden boxes. I can recall on several occasions the maids refusing to go into the basement to do the laundry because "Mr. Mac" had rattlesnakes in a sack somewhere down there.

I was there when we received two large rattlesnakes, and I can assure you that it is a real shock to be so close to snakes that large. I was asked to hold the tail end of a giant, six-foot, 11-inch snake while its measurement was taken. And as you can imagine, there was considerable discussion on who would let go first after the measurement.

Fortunately, the man holding the snake's head was finally persuaded to be the last to turn loose. Two rattlesnakes this size can make a three-car garage seem small. I was relieved when the snakes were back in their proper boxes.

This photograph was taken in three different sequences: the snake immediately

after its death from formaldehyde (far left); the relaxed snake one hour later that has stretched five inches (center); the skinned snake measuring eight feet, eight inches long (far right).

This photo illustrates the fact that snake skins are much larger in size than the actual live snake.

W.G. McMillan, Jr.  
Lubbock

## Deer Feeders

As a rancher and deer hunter, I am concerned about hunters who use deer feeders prior to and during the hunting season.

My concern is that many hunters go home at the close of deer season in January and don't give the deer another thought until the next fall. In cases like these, the lease agreement should include a clause that makes the hunter pay extra fees to the landowner to cover the cost of corn and/or other feed for at least 60 days after the close of the season.

As most hunters know, January and February can be hard on wildlife, especially those species that have become accustomed to corn feeders.

John L. Bluntzer  
Robstown

## Dove Season

How can your readers influence the Texas Parks and Wildlife Department to change the opening day of dove season?

It was great when everybody was off for Labor Day and dove season opened on September 1. But now, September 1 is usually a workday or school day. This year, Labor Day falls on Monday, September 5.

The last Saturday in August would be a better date for just about everybody. Who do we contact to request a change of the September 1 opening date?

John Brennan  
Sherman

■ Comments on dove hunting regulations should be addressed to the Dove Program Leader, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas, 78744.

All comments received will be analyzed, compiled and submitted to the Texas Parks and Wildlife Commission for consideration before the 1988-89 dove hunting regulations are finalized in July.

The Commission, however, does not have the option of opening the dove season during August. The Migratory Bird

Treaty of 1916 (between the U.S. and Canada) specifies September 1 as the earliest opening date permitted for any migratory game bird hunting season in the United States. In response to public requests for as early a season as possible, Texas (and most states that permit dove hunting), have traditionally opened the dove season on September 1 regardless of the day of the week.

## LBJ Buffalo Herd

I'm writing in response to a letter from Tommie Bergson of Midland in your April 1988 issue requesting information on protected buffalo herds in Texas.

One of those protected buffalo herds is right here in Stonewall at LBJ State Historical Park. The park also has some long-horns and white-tailed deer.

During the eight years I have lived here (I'm 13 years old), I have enjoyed visiting the buffalo at the LBJ ranch.

Wendy Riggs  
Stonewall

## BACK COVERS

**Inside:** One of the most popular members of the cuckoo family is the greater roadrunner, also known as the chaparral or paisano. The roadrunner, as its name indicates, runs on the ground and seldom takes flight. When pursued, a sprinting roadrunner may take to the air briefly, before crash diving into brush to escape from enemies. Although more abundant in New Mexico where it is the state bird, roadrunners are found throughout Texas from near sea level to about 7,000 feet elevation. Photo by Steve Bentsen. **Outside:** For the first time in more than 50 years, desert bighorn sheep are once again roaming the Van Horn mountains in southwestern Culberson County. A cooperative roundup conducted by the Texas Parks and Wildlife Department and the Nevada Department of Wildlife resulted in the collection of 47 desert bighorns from two mountain ranges in Nevada. In October 1987, 25 of these bighorns (five rams and 20 ewes) were released on a 100,000-acre ranch, approximately 40 miles from the Sierra Diablo Wildlife Management Area. (See the story on West Texas bighorns on page 12.) Photo by Glen Mills.







