# Texas Game and Fish

MAY 1959 20 CENTS

*photo by Bob Waldrop*

***A frisky squirrel scampering across the lawn of the Capitol of Texas forms a thought provoking symbol—the important role the State plays in protecting and perpetuating wildlife. By basing programs on studies made by biologists, the Game and Fish Commission and the Legislature can insure plentiful fish and wildlife for the future.***

# Texas Game and Fish

THE OFFICIAL MAGAZINE OF THE GAME AND FISH COMMISSION DEDICATED TO THE PROTECTION AND CONSERVATION OF OUR NATURAL RESOURCES; AND TO THE IMPROVEMENT OF HUNTING AND FISHING IN TEXAS.

May, 1959 Vol. XVII, No. 5





TEXAS GAME AND FISH is published monthly by the Texas Game and Fish Commission. Subscription price $2 per year. Single copies of current issue 20 cents each.

Subscriptions to TEXAS GAME AND FISH are available from the Austin offices, or from most licensed deputies. Checks and money orders should be made payable to STATE GAME AND FISH COMMISSION, Editorial and Advertising Offices, Walton Building, Austin, Texas. Entered as second-class matter May 19, 1943, at the post office at Austin, Texas, under the act of March 3, 1879.

Postmaster: If undeliverable, please notify TEXAS GAME AND FISH on form 3578-P at the Walton Building, Austin, Texas.





Produced by

INFORMATION AND EDUCATION DIVISION

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## The Cover


The Sportsmen's Map of Texas highlights some of the wildlife and fish found in the State's varied countrysides and streams. From the Gambel's quail and antelope in the west to the whitetails and turkey on the east, from the mourning dove in the north to the whitewing of the south, no portion of Texas remains barren of the untamed beings which stir the interest of outdoorsmen of all ages. Each one holds a dynamic place in the scheme of things. Cover painting by Clay McGaughy.

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# Companions in Creation

by PRICE DANIEL
Governor of Texas

In God's creation of the world, the land and sea came first. Then it was populated by fish, birds, and animals.

After that God made man in His own image and gave man dominion over everything.

With this responsibility and with His help, it is up to man what kind of world we shall have in our fleeting moments and for future generations. Since man must live off the things that came from the land and the water there are no material things of more importance.

Texas has been bountifully blessed in its land resources. No other State is so rich in geography. We have mountains, seashores, fertile valleys and rolling plains, dense pine forests and treeless prairies. The State is slashed across by streams that carry runoff water from the rains that fall over its broad acres. We have built dams across these streams to impound this water for our human population and wildlife.

We have a heterogeneous land, rich and beautiful. Down through the years there has been an abundance of all kinds of wildlife, but as human population increased, our wildlife began to diminish.

Our thoughtful forefathers realized this, and they began to set up controls to prevent the decimation of our wildlife resources. As the plow turned more land for agriculture, they made provisions for more cover for wildlife where it was needed.

Because Texas is a good place in which to live, Texas continues a spectacular growth in population. Fences have shut off the boundaries of free range and bulldozers have knocked down millions of acres of wildlife habitat.

Automation came to relieve us of many working hours and give us more time for leisure. Lacking ordinary outdoor exercise of our forefathers, we look for an outlet for body energy and surcease from the rush of everyday living.

Down through the years man has lived by hunting and fishing. The Children of Israel feasted on quail; Christ fed the multitude on fishes. Turkey became our Thanksgiving symbol because our Pilgrim Fathers found it to be good food.

Today we have established new values in our wildlife resources, and they provide a great recreational potential in a freedom-loving world. Men who talk of hunting and fishing have little time for basic unhappiness. Just as important, our biologists have found that what is good for wildlife is good for the land.

Protection of the quality of our land and the quantity of our water assures future generations a rich heritage. This in itself is a problem that requires the efforts not only of our game and fish people, but all who are interested in our renewable resources. As we grow in numbers this is an increasing problem.

By building dams upstream we change the entire ecology. Construction of huge petrochemical plants, paper mills and other industrial installations requires that we take extreme care not to endanger the land and water around.

This is all a part of the great task today facing man in his continued fight for survival and advancement.

There is no more important cog in the wheels of progress than the Game and Fish Commission, because it deals with our most fundamental problem. No longer is it just a law enforcement organization. The work of its researchers, its planners, and educators helps to shape our future in all things akin to nature.

As Governor, I recognize the tremendous task of protecting our wild life resources. As a landowner, I realize that I am a part of the program.

Unless we as individuals cooperate with the landowner and with the scientists and administrators of this program, it will fail. Our land will become barren and the whole world will suffer.

Each of us has an individual responsibility. I hope all of us will share it to our mutual advantage, but more important—to the benefit of the generations which follow.

# a Texas Awakening

THE VARIED AND ABUNDANT NATIVE ANIMAL LIFE of Texas was the subject of interesting comment by many of the earliest explorers of this State. Cabeza de Vaca, the first white man to penetrate the interior of Texas, about 1528, wrote of the great herds of bison ("vacas" he called them, meaning cows) that he observed coming down the valleys leading from the Balcones Escarpment. The conquistador, Coronado, in 1541, was amazed at the great number of bison that he saw as he crossed the Great Plains. Many years later, in 1845-47, the German geologist, Ferdinand von Roemer, commented on the richness of Texas wild animal life, as he traveled over many parts of this State.

Texas in its primitive condition had a great and varied wild animal life because it had a great and varied wild plant life to sustain the animal life, plus a great diversity of topographic and weather conditions. Texas primitive "wild life" extended upward to the human level—the Indians. The Red Men were numerous, ranging from the land-tilling Caddoes of the East Texas forests to the nomadic, fighting Comanches of the Plains. In its primitive state, Texas was a picturesque country in every aspect.

The capacity of the native animal life of Texas to propagate itself maintained its numbers against the simple demands of the Indians for food and for the hides that served them in some degree as clothing and shelter. But when the white men came with their deadly firearms, their ideas of killing for sport, and their tendency to commercialize the meat, hide and fur resources, Texas native animal life soon began to decline.

First came the slaughter of the lordly bison. Hunters, seeking hides for the eastern market, began their onslaught soon after the close of the Civil War. It was possibly the most sensational slaughter-to-extinction of a great game species in the history of the world. Other valuable wild life fell under the withering fire of the white man who was slowly advancing from east to west across Texas.

Early Texans, like many other pioneers, looked upon wild game as an inexhaustable natural resource to be had for the taking.

A few years of this sort of unremitting warfare brought the white-tailed deer almost to the point of extinction in East Texas forests, and swept the antelope from the western plains. Nearly all forms of game declined throughout most of the State. Adding to the fire of modern guns were other dangers to wild game coming from the increasing population and the ways of civilized man. Sewage and industrial waste polluted the streams, killing freshwater fish in which Texas was poorer than in most other forms of wild life. Cultivated fields increased siltation

by STUART McGREGOR
editor, Texas Almanac

which covered the oyster beds and otherwise damaged the marine life of the coastal bays.

Assorted bird life of Texas also was being destroyed. The semi-tropical Gulf Coast at the southern end of the central flyway leading south from Canada brings to Texas annually millions of ducks, geese, and other wild game and non-game birds. The slaughter of these was great as it was of doves, turkeys, and other valuable non-migratory birds. While Texans were not as guilty as the people of some other parts of the United States, Texans still played their role in the tragedy of the passenger pigeon.

By the first decade of the present century it began to appear that the wild game life of Texas—fish, fowl and mammal—soon would become extinct. Slowly there was a public awakening to the seriousness of the situation. The State Game, Fish and Oyster Commission had been established in 1895 but for some years it was not given either the legal basis for an effective game conservation program or the funds with which to attempt it. Furthermore, it was soon evident that a state agency and game protective laws alone could not save Texas wildlife resources. Wide public interest and cooperation were necessary.

Newspaper and magazine writers began to pick up the challenge, calling to the public's attention the importance of the issue and pointing to sportsmen their own great self-interest in ending the needless slaughter of wild game life. William G. Sterrett, among others, devoted much of his life to the campaign for Texas wild life conservation, and also served as a member of the Game Commission. Slowly the tide began to turn. With the cooperation of the sporting and general public, the Game and Fish Commission, with less financial support than has been provided in many states, was able to crystallize a program of wildlife conservation that soon began to materialize in an increase in the population of deer, turkey, and most other forms of game life that had been approaching extinction. Today, Texas at least is no longer confronted by the sad prospects that were faced a few decades ago.

The value of Texas wild game life today is very great. It is difficult to set a money value on this resource, because it is largely intangible. However, an indication of its financial worth may be found in an estimate which was made some years ago in each state through a cooperative survey of game conservation agencies. The actual annual money value of Texas wild life resources was placed at more than $200 million at that time. It undoubtedly is much increased today. It is inestimably greater if its worth is measured in human health and happiness. **

# DISCOVER THE Dickey Birds

by ROGER TORY PETERSON
naturalist, author, artist

TEXAS, AS EVERYONE KNOWS, IS VAST. So vast that it can boast a greater variety of birds than any other state in the Union. Although it is a pleasure just to watch birds and to name them, it is the discovery of rarities that gives birding all the elements of a sport.

Many people who are already mildly interested in birds are afraid to pursue the subject because, as they sometimes express it, they "can hardly tell a robin from a sparrow." Others, perhaps, have shied away from an unfamiliar terminology. Such people do themselves needless injustice. The enjoyment of birds depends neither upon intensive study nor academic qualifications. Those who claim to be hardly able to distinguish a robin from a sparrow certainly recognize a hummingbird, a gull, a duck, goose or swan, an owl, pelican and many others of the various families. They are, in fact, already quite a long way on the road to knowing birds.

We are concerned in Texas with 487 basic species. Texas has the largest avifauna of any of the 50 states. More than 540 species have been recorded if one includes several extinct species. (California runs a poor second with nearly 100 fewer species.) This is three-quarters of all the species known to occur between Mexico and the Canadian border, and more than two-thirds of all those listed for the area between Mexico and the Arctic Sea.

Nearly 800 miles from top to bottom or from east to west and covering some 267,000 square miles, Texas can claim diversity by virtue of size alone, but even more significant than size in determining its rich avifauna is the State's location on the continent. East meets West, biologically, along the 100th meridian, and within the State North meets South, especially along the Rio Grande where birds from the northern plains meet Mexican types. Altitudes range from sea level along the Gulf to 8,000 feet in the Trans-Pecos; rainfall varies from a wet 50-plus inches on the Louisiana border to an xeric (arid) –10 inches in the extreme west.

A large percentage of those North American birds that spend the winter in the tropics pass through Texas on their migrations, greatly augmenting a large winter and a large resident population. Truly Texas is the state above all others that offers the most lively 'birding,' a fact that is now luring many binocular-toting tourists from the rest of the United States.

Three hundred and eighty miles of Coast, with long barrier beaches, including the longest island for its width in the world (Padre Island) are tenanted throughout the year by myriads of shorebirds, gulls, terns, pelicans and other coastal birds. These sandy strips guard great salt lagoons and coastal marshes that harbor some of the finest waterfowl concentrations on the continent. The Aransas National Wildlife Refuge is world famous for its relict flock of whooping cranes (which Dr. Clarence Cottam recently stated is worth not less than a million dollars a year to the State of Texas, through tourist trade alone). Further down the Coast at Laguna Atascosa great flocks of redheads and other ducks spend the winter. Many islands such as Green Island, Lydia Ann Island and the Second Chain of Islands swarm with nesting colonial water birds, including such spectacular long-legged waders as spoonbills and reddish egrets.

Perhaps the most noted bird mecca in Texas is Rockport, made famous by Connie Hagar who with her husband Jack Hagar operate the Rockport Cottages, which are often

**NEW FIELD GUIDE FOR TEXAS BIRDS!**

**Texas is to have its own bird book. Roger Tory Peterson, after nearly five years of intensive work, has prepared the text and plates for his newest book, Field Guide to Texas Birds. It is due off the Houghton Mifflin presses by late October. The price will be $3 each.**

**This will be one of the most beautiful works ever produced by this great naturalist-artist. It will be sold through the Game and Fish Commission at the cost of production. There will be other announcements later, but if you wish you may now send $3 to the Game and Fish Commission, Walton State Building, Austin, and a copy will be reserved for you. The delivery cannot be made, however, before late October or probably early November.**

filled to capacity with bird watchers —especially during spring migration. The best time is in April or early May when northers sometimes pin down great numbers of migrants along the Gulf. Over 400 species have been recorded at Rockport.

The belt of coastal prairie, 30 to 50 miles wide is dissected by rivers whose rich groves give great variety to a region where bird life would otherwise be mainly represented by grassland species.

East Texas is heavily forested, partly with pines and partly with deciduous woods, from the Louisiana border westward roughly to 95° to 96° W. South of this forested area is the coastal prairie. Many birds such as the wood thrush, Kentucky warbler, and Acadian flycatcher, breed in this East Texas forested area but are seen only as migrants in the wide coastal belt. Several eastern species such as the red-cockaded woodpecker and pygmy nuthatch are found in Texas only in the pine forests of this part of the State while in the swampy stream bottoms Swainson's and prothonotary warblers nest and occasionally even swallow-tailed kites may be seen.

Inland further lies the Blackland Prairie area, a belt running from San Antonio to the central-northern part of the State. Here, along the line that includes San Antonio, Austin, Waco, Dallas, and Fort Worth, is the western limit for many eastern birds and the eastern limit for some western species.

Southern Texas, covered with great stretches of mesquite and other brush has its own specialties, but its most exciting section is the lower Rio Grande Valley where a number of Mexican birds have established their only outposts on North American soil. The Santa Ana National Wildlife Refuge is by far the largest sample of the original Rio Grande woodland left and here green jays, chachalacas, kiskadees, red-billed pigeons, Audubon's oriole, olive-backed warblers and tropical kingbirds can be counted on.

The Edwards Plateau, the hilly area covered by cedar and scrub oak in the west-central part of the State boasts the only bird that nests ex-

• *Continued on page 44*


Birds at left, top to bottom, are:
Blue Jay
Scrub Jay
Piñon Jay
Black-billed Magpie
Ringed Kingfisher

In the right column are:
Steller's Jay
Mexican Jay
Green Jay
Green Kingfisher
Belted Kingfisher

# Treasures in the Timber

by FRANK W. RASOR
forest supervisor
U.S. Fish and Wildlife Service

HEAVY CUTTING OF TIMBER, the destructiveness of wild fires, and the pollution of streams by soil erosion were effective in reducing food and shelter for wildlife in early Texas. As the human population increased, the abundant wildlife population decreased. The wild turkey almost disappeared due to drastic changes in its habitat plus heavy hunting pressure. The deer, being the principal big game animal of Texas, decreased primarily due to heavy hunting pressure.

Since the Texas National Forests were set up, the United States Forest Service, in cooperation with the Game and Fish Commission, has worked to reverse a trend of decreasing population of wildlife. Wildlife management work now is carried out on the national forests, and recreational facilities have been developed for the public who visit the national forests.

Land for the Texas National Forests was purchased by the Federal Government in the mid-1930s and placed under the administration of the U. S. Forest Service. Most of the land was acquired from large lumber companies prior to World War II. At the present time, the total acreage of the Texas National Forests is 657,994 acres.

Four separate national forests have central headquarters in Lufkin. The Angelina National Forest consists of 154,392 acres in Angelina, San Augustine, and Jasper Counties. The Davy Crockett National Forest consists of 161,556 acres in Houston and Trinity Counties. The Sabine National Forest consists of 183,842 acres in Jasper, Sabine, San Augustine, and Shelby Counties. The Sam Houston National Forest consists of 158,204 acres in Montgomery, San Jacinto, and Walker Counties.

Texas National Forests are managed under a multiple-use policy. The five major resources, timber, water, wildlife, recreation, and forage, are coordinated so that no single resource is managed to the detriment of any of the other four. For example, timber cutting is done only after consideration of the other resources. Certain trees are left as wildlife food sources. Special areas set up for recreation have restrictive types of timber cutting done in them. Roads are constructed so as to cause a minimum of soil erosion.

The Texas National Forests are operated in the black. In 1958, the receipts from the sale of timber products and other uses exceeded $2 million. Operating expenses for the same period were less than one-half million dollars. As a result of a law passed in 1914, the national forests return 25% of their receipts to the counties in which they lie. In 1958, this amounted to more than $500,000 or 87c for every acre of national forest land.

As one of the fire resources, wildlife has its place in the management of the national forests. Of the 657,994 acres on the forest, more than 590,000 acres are open to hunting under the regular hunting laws of the State of Texas. An additional 54,000 acres are open to hunting under special conditions set up by the Forest Service and the Game and Fish Commission. Only 13,000 acres are closed to hunting and they lie in one game restoration area and in recreational areas and administrative sites.

In 1943, the Texas Legislature passed a bill allowing the Game and Fish Commission to enter into cooperative agreements with the U. S. Forest Service. Since that time, the two organizations have worked hand in hand for the betterment of wildlife. Basically, the policy is for the U. S. Forest Service to manage the habitat and the Game and Fish Commission to handle the law enforcement. The biologists of the Game and Fish Commission have been extremely helpful in habitat work. They have set up studies of food requirements of deer and turkey and have installed food plots on the national forests.

As a result of the 1943 law, five areas have been set up on the national forests to receive intensive wildlife management. The first area established was the Moore Plantation Game Restoration Area of 11,500 acres on the Sabine National Forest. This area was set up in 1949 and closed to all hunting. Gradually, the hunting around the area improved as the deer herd inside increased and spread to the surrounding country. In 1958, a special five-day hunt was held on this area. Hunters were selected by drawings and allowed on the area by special permit. Five deer were killed by 102 hunters. The U. S. Forest Service and the Game and Fish Commission had personnel on the area to supervise the hunt.

In 1952, the White Rock Creek Game Restoration Area was set up on the Davy Crockett National Forest. This area covers 100,000 acres of private land and 12,000 acres of national forest land. The private land is open to hunting while the national forest land is closed. This is the only large block of national forest land closed to hunting at this time.

Three areas were established in 1954. They are the Alabama Creek Area on the Davy Crockett National Forest, and the Bannister Area and the Boykin Springs Area, both on the Angelina National Forest. These areas are open to hunting, but are set up as demonstration areas to show what will result from intensive public education and law enforcement.

Much work has been accomplished on these areas. On the Moore Area, deer and turkey were stocked in 1951. The increase in deer was the main reason for opening this area for hunting in 1958. The turkey, which were of the Rio Grande strain, were unable to adapt to the habitat and have gradually died out. Since acorns are important as food for deer and turkey, the biologists of the Game and Fish Commission have set up a study on this area to determine what species of oaks, and what size trees, are the best acorn producers. Deer were stocked on the White Rock Creek Area in 1952. Stocking of wild turkey has started on the Alabama Creek Area. Food plots for deer and turkey have been established on several of the areas. Quail furnished by the State were released this winter on all of the national forests except the Sabine.

The Forest Service has taken three steps to see that wildlife receives proper consideration in timber stand improvement work.

1. The TSI policy for the Texas National Forests set up certain basic requirements for wildlife.
2. Each of the seven ranger districts has its own set of TSI instructions that are based on the Forest policy, but have slight variations due to local conditions.
3. A TSI prescription is made for each area to be worked over. This contains any special wildlife considerations for each particular area.

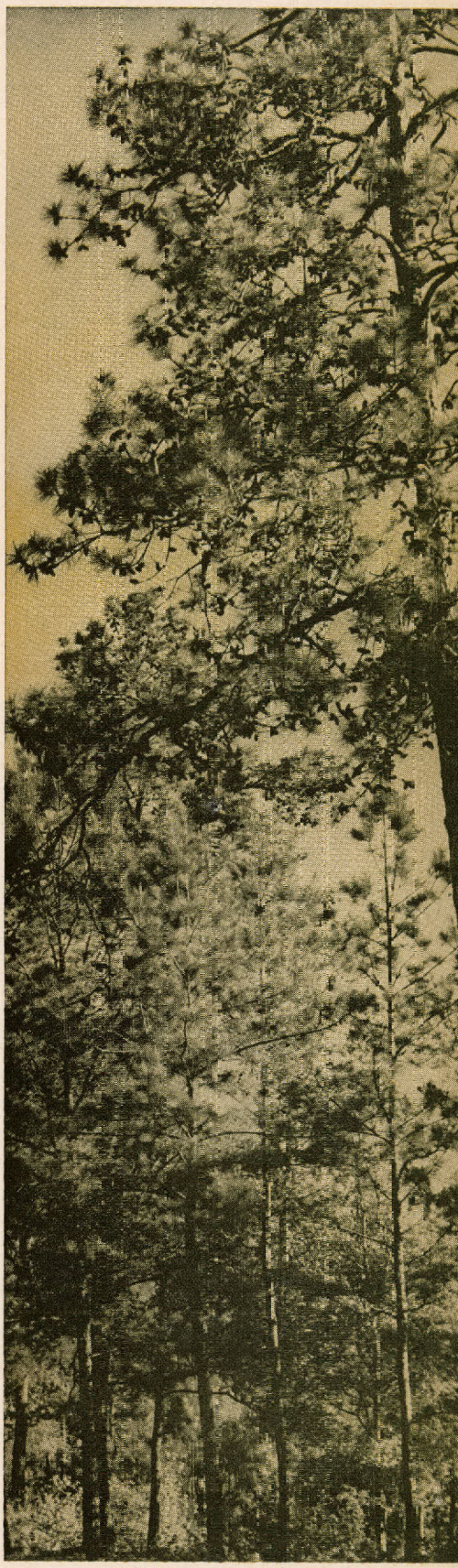
The most important wildlife consideration covered by the TSI policy and instructions is game food trees. The national forest policy, prepared with the help of the biologists of the Game and Fish Commission, sets up a minimum number of food-bearing trees, primarily oaks, to be left per acre. If present, a number of trees below food-bearing size are left to replace the larger trees when they die. The game food trees should be as evenly distributed over the area as possible. If adequate trees are not present on an area, additional trees will be left on adjacent areas. Since all tree species have some value as wildlife, any species not found frequently in an area is left. All den trees with suitable openings for animals such as squirrels or raccoons, whether occupied or not, are left. On some areas, dense clumps of fruit-bearing shrubs are thinned to promote heavier production of fruit.

Undesirable trees are treated by girdling, prescribed burning, and chemicals. One man works ahead of the crew, marking the trees to be left for game food, or as den trees, by putting an orange plastic band around each tree. In this way, the trees to be left for game are easily seen by the crew. In many areas, more trees than are actually needed are left since they need no treatment. Prescribed burning is particularly helpful to the hunter as it removes the underbrush, giving him a better shot at his target. It also causes the small trees and brush to sprout and thus provides browse for deer.

In addition to hunting, there are 445 miles of fishing streams and 752 acres of lakes on the national forests. The Angelina, Sabine, and Neches Rivers flow through national forest land and offer good fishing for bass, bream, and catfish. Other small streams on the national forests also offer good fishing spots. The Angelina National Forest has three lakes for fishing. They are Bouton Lake, Bannister Lake, and Boykin Springs. On the Davy Crockett is Ratcliff Lake. The Sam Houston has Stubblefield Lake and Double Lake, and the Sabine has Red Hills Lake. In several of these lakes, steps have been taken to stop the spread of aquatic plants that threaten to choke the lakes. Fertilizer has been distributed in several lakes to improve the supply of food. Much help has been received from fish biologists of the Game and Fish Commission.

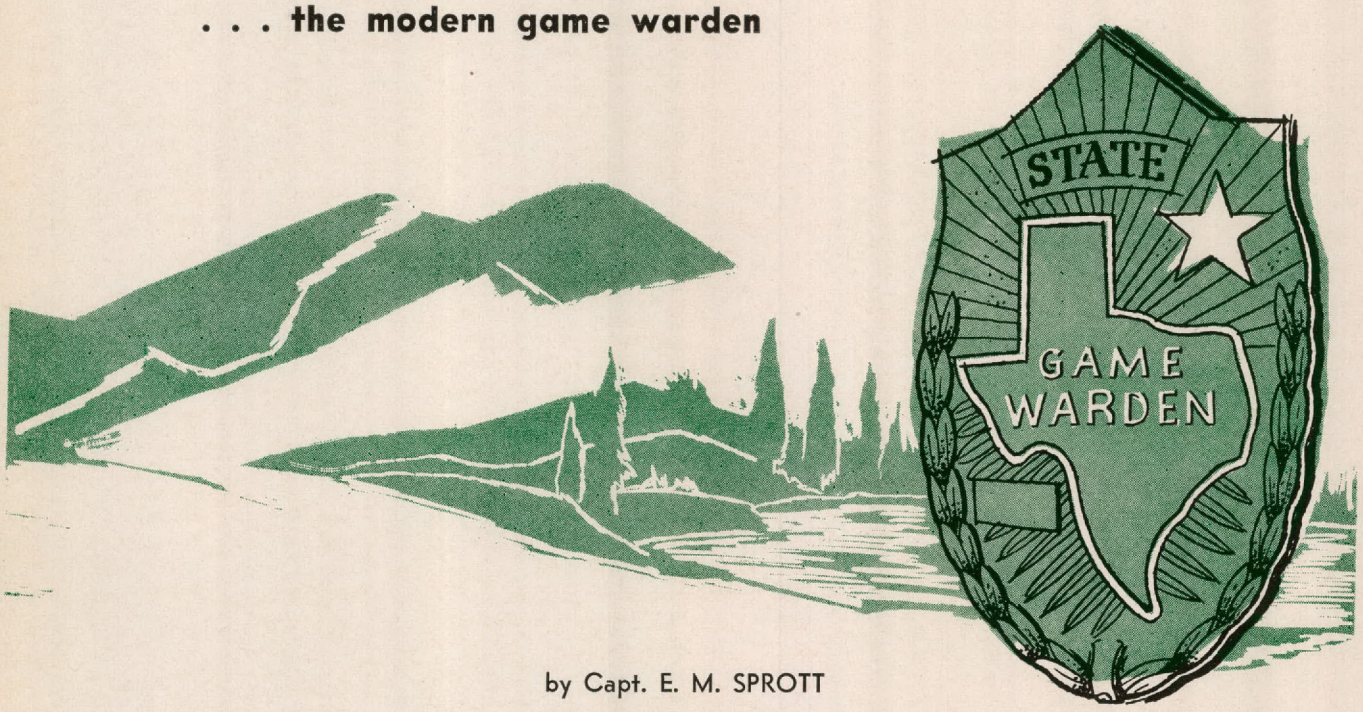
Another important use of the national forest is recreation. Operation Outdoors was launched by the Forest Service in 1958 to improve existing facilities and provide additional facilities to meet the expected demand in 1963. Five major recreation areas have been developed on the Texas National Forests, and several less developed areas for camping and picnicking or hunting and fishing.

Maps showing the location of these areas, plus the main roads through the national forests, can be obtained from the Forest Supervisor, P. O. Box 380, Lufkin, Texas. **



# Badge of a DIPLOMAT

## . . . the modern game warden




by Capt. E. M. SPROTT
director, law enforcement

GAME WARDEN DUTIES ARE CONSTANTLY UNDERGOING EVOLUTION from the strong-arm tactics of past codes of law enforcement to the diplomatic method of salesmanship. His duties are fast developing into the modern techniques of selling a program sorely wanted by the public.

Wildlife conservation should be the easiest thing in the world to sell. Everyone is interested. We have recognized the fact that wildlife conservation is a matter of managing people. And education is the basis of future and lasting wildlife conservation.

Prosecution of habitual violators will continue to be a part of duties, but policies have changed. Hiding in disguise to get evidence of violations by hunters and fishermen is no longer accepted warden procedure. Now a fully identified officer in uniform contacts the hunter and fisherman in action, passing on sound conservation policies and offering advice beneficial to their welfare. The conservation officer now makes it his business to meet with civic groups, schools, and sportsmen's clubs to give them the knowledge of experts on wildlife management.

The modern conservation officer is selected only after much effort. He is required by the Commission to be between the ages of 21 and 40 years, have a high school diploma, and reasonable physical features. First, he must indicate a natural desire and love to preserve our wildlife resources. He must be considered of good moral background and strong character by those who have known him throughout his life. He must demonstrate a personality that will be accepted by those with whom he comes in contact. The seller must first sell himself to the buyer before a product can be successfully sold.

After candidates for conservation officers are selected, they are carefully trained by the best talent available, on subjects that they will need most. They spend four months at Texas A. and M. College, learning modern techniques of wildlife management under the tutorship of A. and M. wildlife experts, first aid and small water craft safety by Red Cross experts, firearm safety by National Rifle Association experts, and game and fish law enforcement by personnel of the Game and Fish Commission.

It is the desire of the administrators of the Department to not leave one stone unturned to give conservation officers the best training available for the services they will be obligated to give the people that support the agency. The people of Texas deserve the best. **

# Your Money at Work

by C. L. FRIOU
fiscal director

TEXANS ARE RECOGNIZING the real value of hunting and fishing. This recognition is sending more and more people into the open each year in search of the enjoyment these two wholesome outdoor activities have to offer. One result of this increased interest and participation in hunting and fishing is the expansion of the Game and Fish Commission's responsibilities, as reflected in the Commission's annual report for the fiscal year ending August 31, 1958.

Over $4½ million was expended last year to improve the lot of the hunters and the fishermen and to conserve precious resources for the citizens of the future. This investment figure is about $1 million greater than the amount spent the previous fiscal year.

Revenue collections for the same period amounted to more than $1 million more than the income for the fiscal year ending in 1957. These increases, both in income and expenditures, were authorized by the 55th Legislature.

Law enforcement expenditures increased $155,000 over those for the previous year. Fines and arrests, although totaling $93,000 were $17,000 less than in 1957.

Nearly $1 million was spent on wildlife restoration projects for the year. Approximately 75% of this amount is reimbursed from Federal Aid funds. Marine and inland fisheries expenditures accounted for about 29% of the total amount invested by the Commission in 1958.

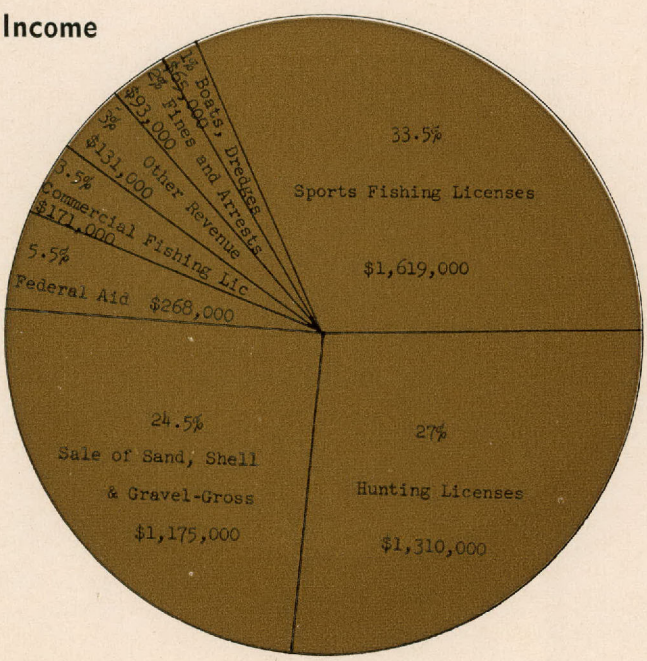
Other departmental divisions made up the remaining 19% of the operating expenditures. This portion includes refunds to city, county, and State Highway Department for sand, shell, and gravel used on streets and roads.

The sale of sports fishing licenses brought in nearly $1 million more in 1958 than in 1957. Nearly $400,000 more was realized from hunting licenses the last fiscal year than the year before.

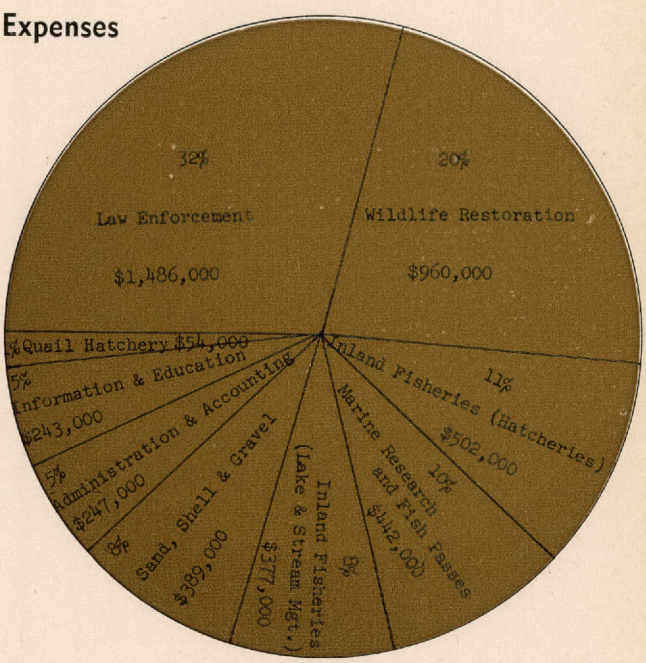
Income from the sale of sand, shell, and gravel and commercial license sales showed a small increase over last year's figure. Ninety per cent of all freshwater fish research and management conducted throughout the State was supplemented by Federal Aid funds.

Increases in expenses and income for the Game and Fish Commission very nearly parallel the increase in the number of persons harvesting game and fish each year. Your enthusiastic interest in the conservation of the State's natural resources and the management of fish and wildlife is the insurance that these efforts will continue. **

**Income**




**Expenses**



# Temptation of the Gulf

by the Staff
of the
Coastal Fisheries Division

GOOD FISHING AWAITS the anglers who try the Texas Coast. Speckled trout, the State's number one salt water sport fish, are bigger and more abundant than they have been in many years. The same holds true for most of the other popular marine species.

Strategically located biologists of the Coastal Fisheries Division make enthusiastic predictions based on their studies over the last year. Lack of a killing freeze last winter gives a seven-year build-up of those fishes whose populations were drastically reduced by the freeze of 1951.

Ample rainfall is another factor which is contributing to an even better fishing outlook. Rain lowers bay salinities and brings nutrients from the rivers. Shrimp and some other food components of the sport fish then flourish. Fish find ample food and the populations expand.

### Lower Laguna Madre

In the lower Laguna Madre, Redfish Bay (just north of Port Mansfield) is one of the most consistent fish producers on the Coast and yields generally larger fish. Principal fish caught are speckled trout and redfish. Drum are also abundant, and some flounder are taken.

Night fishing under batteries of flood lights is the rage in this area and for good reason. Fine catches began in mid-March and should continue for some time. This night fishing from piers on the Arroyo Colorado and in the Intracoastal Waterway yields tremendous amounts of trout. Day trout fishing is popular in the waterway from Port Mansfield south to Three Islands while small trout and redfish can be caught in the Arroyo all summer.

Flounder usually can be found from April through September in the Arroyo, in the vicinity of the Willacy-Cameron County line, and in the Three Islands area.

Redfishing is best between Three Islands and the Padre Island shore; however, shallow draft skiffs or water scooters are needed to get into the shallow area. These redfish, which are in the 2- to 4-year class, are generally taken on spoons.

Fishermen must observe minimum size limits of 12 inches on speckled trout, 12 inches on flounder, and 14 inches on redfish in Cameron, Kenedy, and Willacy Counties.

Tarpon and pompano can be found just north of the Port Isabel-Padre Island causeway during the summer months while snook, redfish, and large trout frequent the Brownsville Ship Channel during the winter months.

Spanish mackerel, jewfish and many other species of fish can be caught from the jetties during the summer. Trout, drum, and redfish can be found in the deep pockets along the Gulf beach throughout the year. (These spots, which are within casting distance of the beach, can be spotted by the deeper green color of the water and the absence of breaking waves.)

Offshore, Spanish and king mackerel, ling, sailfish, and marlin can be had. The new artificial fishing bank located just north of the sea buoy should be completed by summer and should be a good spot to find ling, mackerel, and snapper. Natural banks are to be found further out. Shallow water snapper banks lie just 10 miles northeast of the Mansfield Pass.

### Upper Laguna Madre

Speckled trout are abundant and prospects for redfish and flounder are also good. Drum, though plentiful, are not as numerous as in previous years.

Though the fresher waters should increase the shrimp supply, the trash fish population is also increased. Pinfish, croakers, and hard head catfish, all bait thieves, will be about in large numbers. Crabs, good catches in themselves, will be so abundant as to be a nuisance.

Trout of ½ to 3 pounds can be found in the grass flats west of the Intracoastal Waterway between markers 27 and 63, in the Point of Rocks area which should also yield redfish, and at the "landcut." The latter, which is the name given the Intracoastal Waterway where it connects the Upper and Lower Laguna, is a famous producer of fine strings of trout, but it was a disappointment to anglers last year.

Larger trout can be found along the western shoreline between markers 63 and 83. These are fish which moved north from Baffin Bay in the spring. They are huge trout which feed on large mullet, and as a consequence do not feed often.

They do not bite readily and are difficult to land.

Redfish populations can be found in the shallow water along the west shoreline as well as in the Point of Rocks area near the entrance of Baffin Bay.

The spoilbanks along the Intracoastal Waterway and "the bulkheads" north of the Corpus Christi-Padre Island Causeway should make for good floundering.

In fishing the grass flats a skiff is almost a necessity. Best results are gained by drifting and casting downwind ahead of the boat. Live shrimp, fished below a cork, or lures (Mirrolures and the amber, red-headed Fisherman's Favorite have been used to good effect in the past) should be used in these instances. For the large trout along the King Ranch shoreline wade fishing is a "must." These fish are usually found in water 12 to 18 inches deep and are most frequently taken on artificial bait.

In fishing "the landcut" it is well to be equipped for bottom fishing. More fish are caught on the western side of the cut than on the eastern side, and the stretch between markers 187 and 201 has been particularly productive. Lightly weighted live bait (shrimp or fish) drifting along the bottom or deep running lures inched along the bottom work effectively.

For redfish it is best to wade-fish using a spoon or to bottom-fish from a skiff. Dead shrimp and cut pinfish are often used as bait.

With the exception of flounder most fish are caught between daybreak and 10 a.m. or after 4 p.m.

### Corpus Christi, Nueces, and Redfish Bays

Corpus Christi Bay with an area of 150 square miles and an average depth of about 11 feet has a number of species not usually found in the shallower bays. Trout, drum, redfish, and flounder are still the most sought-after fish, however.

Reefs (some of them marked with the orange and white "GFC" buoys), grass flats, piers, jetties, and oil well platforms serve as good fishing areas.

The bay side of Mustang Island provides shallow flats and coves which are good fishing areas. The Shamrock Island vicinity is famous for fine catches of both redfish and trout. Oil wells with their shell mats serve as feeding areas for some large speckled trout.

Nueces Bay is very shallow with depth of about 2 to 3 feet. Boat travel should be cautious because of the numerous reefs. These reefs and the grassy flats make good fishing areas.

Redfish Bay near Aransas Pass has been a good nursery ground and top fishing spot for South Texas anglers. California and Hog Island Holes, the Aransas Pass Channel, Cummin's Cut, and Ransom Island are all usually good prospects. Live bait and lures are both effective in this shallow bay.

A shortcut of the Intracoastal Waterway is under construction through this area, and spoil from the dredging operation is muddying this normally clear bay. Fishing and numbers of fish produced by this bay will be sharply curtailed, for the spoil from the operation is being dumped on the grassy flats. Access to what will be left of the bay will be improved, for the U. S. Corps of Engineers have provided for access channels from the new waterway into the bay.

### Port Aransas

Prospects are good for Gulf fishing if good weather comes to stay. The recently expanded artificial bank (located 1½ miles southwest of the sea buoy) was an excellent fishing spot last summer for Spanish and king mackerel and ling. Small snappers can also be expected in greater numbers after the recent tripling in size of this reef.

Trout, reds, drum, and sharks can be expected in the surf, and jetty fishing when the water is clear can yield Spanish mackerel and jewfish.

Deeper fishing in the Gulf requires a larger, more seaworthy boat. Fishermen so equipped can look forward to sailfish, marlin, amberjack, bonito, and a wide variety of the deeper water fishes.

Port Aransas anglers by the way are using lighter tackle and adding more action (and fish) to their efforts. Standard tackle even on the charter boats is the 7-foot South Bend popping rod, a light reel, and monofilament line of about 20-pound test. This light tackle replaces the older "meat rod" and 40-pound test line that could horse in the fish. The newer versions can be used for casting live bait into mackerel schools which frequent the oil rigs standing offshore as well as for trolling hoodies through the schools.

### Rockport Area

This region consists of clear (for Texas) bays with numerous reefs and plenty of grassy flats. The "GFC" buoys mark many good fishing reefs in Aransas and Copano Bays. (Maps showing the locations of all these buoys along the Texas Coast are available at the Marine Laboratory in Rockport. These are the same maps printed in the March issue of Texas Game and Fish.

Other good spots are the inlets along the St. Joseph Island shore, the bayous south of Rockport, the upper end of St. Charles Bay, the head of Copano Bay, and the grass flats and holes throughout the area. These places are feeding grounds for larger trout and redfish.

Some of the deeper bayous and cuts, especially the more secluded ones, often house tarpon through the summer and early fall months.

Skipjacks and gafftopsail catfish move through Aransas Pass and can usually be located by the flocks of gulls and terns feeding with them. Skipjacks can almost always be found in the channel between Port Aransas and Mud Island during the summer months. Occasionally, hard-hitting schools of fast-moving jackfish are to be seen in the same area.

In San Carlos, Mesquite, and San Antonio Bays trout fishing is very good, and redfish and flounder are also numerous. Fishing is best once again on the grass flats, over reefs, and in bayous and inlets.

### Matagorda Bay and Vicinity

Large numbers of 1- to 3-pound trout are in the bay with some 6-pound trout making appearances. Commercial fishermen say that there are more trout in the bay this year than for the past 10 years. Fishing for this species should be profitable on Half Moon Reef, along the shore of the Baptist Young People's Union grounds at Palacios, Fence Post Reef,

• *Continued on page 46*

# WORK before the harvest

by E. A. WALKER
director, wildlife restoration

"SO YOU WISH TO BE a wildlife biologist with the Texas Game and Fish Commission, Mr. Jones? What are your reasons for wanting this job and what are your qualifications?" "Well, Mr. Walker, I like to hunt and fish. I also have a degree from Podunk College. Besides that, I have killed many deer and thousands of bobwhite quail. I believe I can make a good wildlife biologist."

These quotes are more or less typical of the conversations which take place when many persons make application for employment as wildlife biologists with the Restoration Division of the Texas Game and Fish Commission. They reflect the general lack of knowledge relative to the qualifications and work of wildlife biologists of the Game Department.

What sort of persons do make up this division of the Game Department? What is the Restoration Division and what does it accomplish for the Texas hunter?

In 1957 the Pittman-Robertson Act was passed in the national congress. One result of this act was that an 11% excise tax was levied on all sporting arms and ammunition. This money is gathered in Washington and is reappropriated to the states on the basis of the total area and the total number of hunting licenses sold in the state. Administration of the program is through the U. S. Fish and Wildlife Service, Bureau of Sports Fisheries and Wildlife, Washington, D. C.

Texas was one of the early states to avail themselves of these tax monies, and the actual hiring of trained wildlife technicians began in 1938 in this State. A. and M. College incorporated a new department to train wildlife biologists the same year.

The Game and Fish Commission set up the Division of Wildlife Restoration to coordinate the several projects designed to use Pittman-Robertson funds.

During the past two years, the yearly apportionment of Pittman-Robertson monies to Texas has been in the neighborhood of $800,000 per year. Of each dollar spent on approved Pittman-Robertson projects, 75c comes from the Federal government from the tax on guns and ammunition and 25c from the State.

### THE JOBS OF THE DIVISION

There are certain activities in connection with game restoration and management, and wildlife research for which Pittman-Robertson funds may be spent. These include wildlife research such as life history studies, research to find ways of estimating game numbers, food habits studies, economic surveys to determine worth of wildlife, and associated endeavors.

Funds may be spent to purchase wildlife management areas for research and demonstration purposes and to preserve rare species. On such areas surplus game populations are being harvested by impartially selected hunters at no charge.

Pittman-Robertson money is used to trap game birds and animals in areas of plenty and restock them in places where there are suitable amounts of food, cover, water, and protection, but insufficient brood stock. Over 8,000 wild turkeys, 15,000 deer, 4,000 antelope, and 196 javelina have been trapped and moved to new ranges in Texas since the P-R program began in 1937-1938.

The development of State-owned wildlife management areas is financed by Federal Aid or P-R money. Buildings, fences, roads, and minimum hunter facilities are installed. Maintenance of these improvements is handled from the same source.

Inventory and regulatory projects aimed at keeping a running inventory of game numbers and wildlife conditions in 80 Texas counties are kept operating through the use of Federal Aid or Pittman-Robertson funds. To this writing, 23 additional counties have directed their representatives in the present session of the Texas Legislature to include them under regulatory responsibility for the Game and Fish Commission.

In order to handle these many varied duties, an organization of the division has been developed through the years.

The division as a whole is composed of one director, three assistant directors, 20 project leaders or acting leaders, 13 assistant leaders, 29 field assistants, four secretaries, one bookkeeper, and one office manager for a total of 72 full-time employees. This number does not include extra labor or part-time workers. The personnel of the division has more than doubled since 1950.

Long-range plans for proposed operations cover three to five years, and each year a yearly plan must also be prepared. Details of proposed operations must be prepared by the staff, processed in Austin by the coordination personnel consisting of the director, assistant directors, and secretaries, and submitted for approval to the regional office of the Fish and Wildlife Service in Albuquerque, New Mexico, and to Washington, D. C. After approval, these plans, called projects, are undertaken according to a prearranged outline of jobs and on a time schedule. At the end of the year, each job requires a completion report which must be prepared by the project leader, submitted to the Austin office and later sent to the U. S. Fish and Wildlife Service.

At the present, there are a total of 43 separate wildlife projects in operation in the State. These include the activities of land acquisition, surveys and investigation, trapping and transplanting, research, management, and maintenance.

A detailed list of existing projects included in the activities of the Restoration Division appears each year in the Annual Report of the Game and Fish Commission.

SELECTION OF PERSONNEL

Employees selected to work in the division are hired by the Director after approval by the Executive Secretary.

All project leaders and assistant project leaders are known as wildlife biologists. An assistant leader must hold a degree from a reputable college or university with the major effort in wildlife management or biology. Persons possessing master's degrees have definite priorities over those at the bachelor level.

Project leaders, in addition to having the qualifications listed for assistant leaders, must have creditably completed at least four years of responsible and difficult wildlife restoration work, and must have demonstrated qualities of leadership.

Field assistants are nontechnical personnel who are employed to do routine work and gather and tabulate information under the supervision of leaders and assistant leaders.

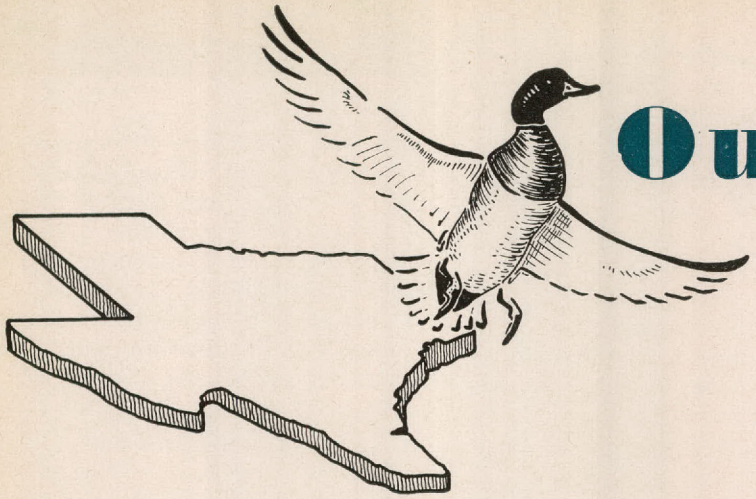
The State-owned areas comprise seven wildlife management units. These lands now total some 115,823 acres where wildlife research and demonstrations can be carried out and where the Texas hunter has a chance, through impartial drawings, to help harvest surplus game when such surpluses occur. Last year approximately 12,857 persons applied to hunt 663 deer and javelina. One thousand five hundred and twenty-three hunters drew permits and killed 351 deer and 24 javelina. Five hundred and four quail hunters applied to hunt bobwhite on the Gene Howe Wildlife Management Area in Hemphill County last year. Forty-four successful applicants killed 234 quail during the hunt. Later, a rabbit hunt was arranged and 139 cottontails were taken.

Waterfowl also came in for a place in the hunting program when 516 hunters were allowed to hunt on the newly purchased 8,400-acre Big Hill Bayou marsh in Jefferson County.

Long-range planning calls for continued purchase of such areas until one is owned in each major vegetation type in the State.

Down through the years, the Texas hunter can look forward to a more efficient game management program. The entire personnel of the Restoration Division is dedicated to finding better means of maintaining a high population level of game species in this State. Its efforts are coordinated with the over-all objectives of the Texas Game and Fish Commission in providing more and better hunting for Texas gunners.

Eighty Texas counties are presently operating under regulatory authority of the Game and Fish Commission. This arrangement permits the harvesting of more game birds and animals in times of plenty and less in times when populations are low. Better and more deer can be expected in the future, along with more efficient use of other game species. **



# Our Winter Guests

by BOB SINGLETON and HAROLD IRBY, biologists

TEXAS, ESPECIALLY THE GULF COAST region, is the historical wintering grounds for a major portion of the ducks and geese migrating each year down the Central Flyway—Montana, Wyoming, North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, New Mexico, and Texas.

The total number of these travelers through the states to the wintering grounds may vary from 6 million to 9 million birds. More than half of this number may be expected to spend the winter months in Texas. During the 1958-59 season, 51% of the total flyway waterfowl population were found here.

What kinds of waterfowl winter in the Central Flyway states? Puddle ducks — mallard, pintail, gadwall, baldpate, green-winged teal, blue-winged teal, shoveler, wood duck, mottled duck—make up 60.5%; diving ducks—redhead, canvasback, scaup, ringneck, goldeneye, buffllehead, ruddy duck—21.9%; coots 8.7%; geese—canada, white-fronted, snow, blue geese—5.5%, and miscellaneous and unidentified ducks made up the remaining 3.4%.

Texas winters about 90% of the total population of pintails, about 90% of the redhead population, more than 90% of the population of snow and blue geese, about 50% of the Canada goose population, but only about 20% of the mallard population. We winter about 50% of the population of puddle ducks and more than 90% of the total flyway population of diving ducks.

Where do all of these birds spend the fall and winter months while in Texas? The percentage or number of waterfowl wintering in any one region of the State will vary from year to year, depending upon rainfall, weather, surface water, and food conditions. During the drought years, late 40's through early 50's, 50% to 70% of the total State population was located in the coastal region. However, the heavy rainfall of 1957-1958 resulted in excellent waterfowl conditions over much of the entire State. The playa lakes in the Panhandle were in wonderful shape; the ducks responded, and a high population wintered in the Panhandle.

The wooded river bottoms likewise harbored many ducks. The crop of acorns was too good for the mallards and teal to pass up. Some of the Hill Country rivers such as the Llano will winter a surprisingly large number of ducks, mallards, teal, and pintail. With attractive circumstances over all of the State, the ducks were not forced into a limited coastal region, but were dispersed over the entire State.

During the drought years, our coastal waterfowl population rose to a peak of 3,215,000 birds. However, during the 1957-58 season, the peak population on the Gulf Coast was slightly more than 800,000 birds. During that same season, 1957-58, however, our statewide waterfowl population was at a high peak.

What conditions favor wintering waterfowl, and why do so many winter in Texas each year? The only items that mankind can attempt to provide for ducks and geese are fresh surface water, food, and protection. And our efforts are very puny and insignificant when compared to the results that are produced after a year of favorable rainfall. If Mother Nature is gracious enough to supply the required rainfall, then a crop of native food plants are generally produced with little or no effort on our part.

One thing remains—that of providing a protected site where the ducks and geese can escape gun pressure and can feed, loaf, and preen at their leisure. It always pays dividends to leave a portion of any hunting site closed to hunting and all other disturbances.

The coastal region of Texas which winters great populations of waterfowl can be divided into three zones.

The Deep Marsh-Rice Belt area east of Galveston Bay is an extension of the deep marshes of Louisiana. This is an area of almost year-round inundation, varying from fresh to brackish and saline. The fresh and brackish marshes afford a much greater abundance of food plants than does the saline marsh. These

marshes provide expansive feeding sites for concentrations of waterfowl, especially snow geese. Their choice grazing area is that which has been burned to improve conditions for grazing livestock.

The Shallow Marsh-Rice Belt area may well be considered as a transition or intermediate type. It passes from the deep marsh to the tidal marsh and extends from Galveston Bay generally through Matagorda Bay and Calhoun County. It tends to be rather shallow, inundated by fall and spring rains, and varies from fresh to slightly brackish; brackish in those areas adjacent to the Gulf of Mexico. The tidal marshes become apparent in this region. The deep marshes gradually give way to the shallow ones which in turn give way to the tidal marshes. The tidal marshes in this region are limited to the low areas immediately adjacent to the bays and on the bay side of Matagorda Peninsula.

The Tidal Marsh extends from Matagorda Bay and Calhoun County to the Rio Grande River at Brownsville. It is essentially a narrow saline marsh flooded by tidal action. Extreme conditions of salinity exist in this area. Numerous small flats and ponds line the bays. The extensive shallow bays in this region are by far the most productive feeding grounds for our wintering waterfowl —supporting as many as 1,500,000 ducks during the 1958-59 season. The submerged aquatics form extensive underwater meadows. Besides the shallow bays, numerous small fresh water ponds and potholes supply an abundance of waterfowl food plants in years when growing conditions are favorable.

Marshes adjacent to the rice belt, the rice belt, and the shallow bays on the lower southern portion of the Coast, are of first importance to both wintering waterfowl and the resident species. These areas serve both as feeding and resting sites. During December, 1958, more than 2,500,000 ducks and geese were present.

There is a definite tie-in between the habitat type and the species of waterfowl frequenting it. The relationship is more pronounced in some species than in others. On the Coast, mallards are limited almost exclusively to the deep marsh and rice belt area, while redheads are associated with the shallow bays along the most southern portion of the Coast. There is very little overlapping of these species. Snow and blue geese, pintails, and green-winged teals are found over the entire Coast, but usually in far greater numbers in the northeastern half; scaups are usually in greater numbers on the southern half. The resident mottled ducks are distributed over the entire coastal prairie, but are more abundant in the area between Port Arthur and Freeport. While the extent of their nesting range has not been fully defined, it appears to include a strip along the Coast running inland from 50 to 70 or perhaps 100 miles.

One other species, the fulvous tree duck or Mexican squealer, nests in considerable numbers on the Texas Coast. The colorful black-bellied tree duck nests in the southern portion of the State.

An interesting facet of our wintering waterfowl is where they come from, or where they may have spent a previous winter.

Various organizations interested in the welfare of the waterfowl resource—U. S. Fish and Wildlife Service, Canadian Wildlife Service, Ducks Unlimited, and the State Game and Fish Departments—have joined in a Continental Waterfowl Banding Program This program was designed to answer some of the many riddles of the far-traveling waterfowl. (1) What main migration routes or patterns exist? Are they subject to change? If so, why? (a) Where do the birds originate? (b) Where do they go to winter? (c) What routes do they use to get there? (2) What affects the timing of the annual southward movement, by species, along the migration routes.

The recovery of a single waterfowl band yields certain important information—an indication of its route from banding site to recovery site; the interval of time elapsing between banding date and recovery date. Bands frequently cast some light on the longevity or life span of waterfowl.

However, a banding program aimed at solving some of the questions above must be very carefully planned and carried to conclusion. The Continental Waterfowl Banding Program is on a national and international basis and has been planned and developed to yield information leading to the solutions of some if not all of the questions. Each year several of the various State Game Commissions cooperate in this program by supplying men, equipment, or retriever dogs to work on the waterfowl nesting grounds in Canada and in the states that produce waterfowl. This year, Harold Irby, who cooperated in preparing this report, will represent Texas in the banding program in Canada during the months of July and August.

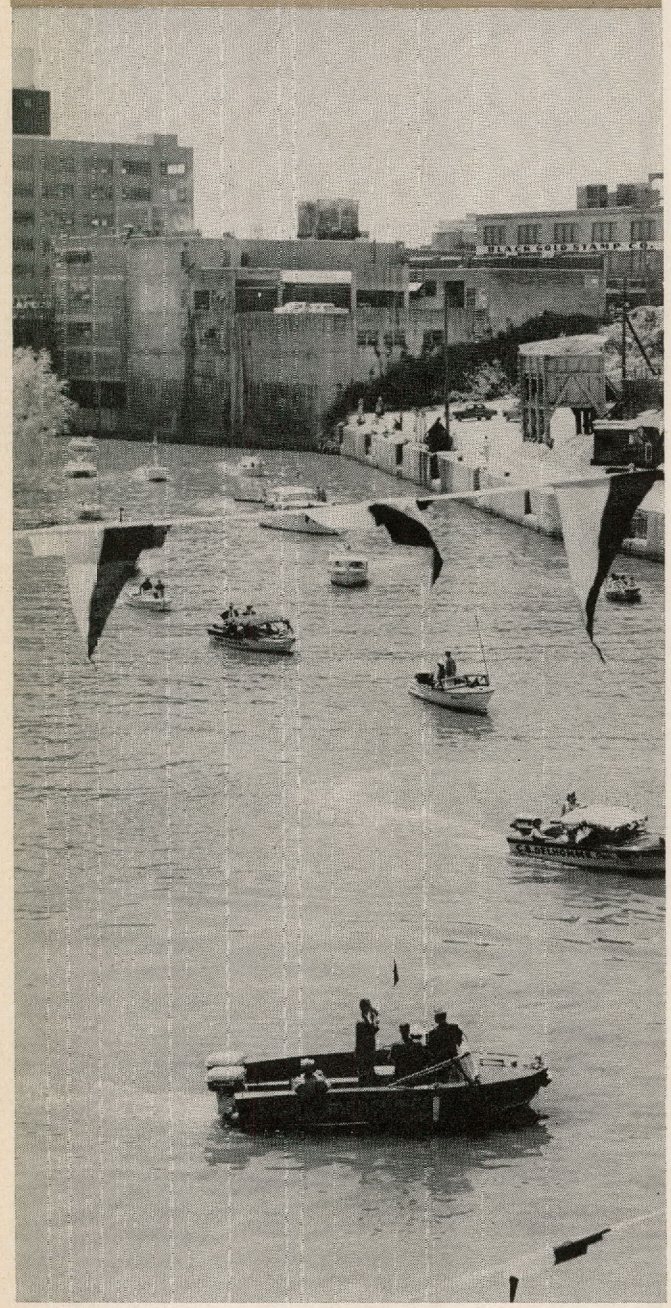
This banding program is designed to trap and band at least 10% of the nesting population of any one species in any particular location. Thus each banded bird will represent a certain number of unbanded individuals.

A study of the band return pattern will yield highly valuable information on the migration route of that particular flock; the number of bands recovered will tell us a great deal about how many birds are being harvested from a certain flock, or from a certain species. This data is then employed in numerous ways. We can determine which, if any, flock or species is being overharvested or under-harvested, and regulations can be designed to either decrease or increase the annual harvest.

The information collected from band recoveries is checked with the data we collect each year through waterfowl kill questionnaires sent to a large number of duck and goose hunters scattered all over the State. This questionnaire is also designed to give us valuable information on the total kill of each species of ducks and geese in Texas. By using all of the means and methods now at our command, and by developing new methods as they are needed, we shall learn the answers to some of the riddles. However, as one riddle is solved, another seems to appear.**

# FAMILIES AFLOAT

by RUSSELL TINSLEY



Varied styles of boats, motors parade before the Houston Boat Show.

**boating**

BOATING is becoming one of the most important family pastimes in Texas. There are now more than 200,000 individually owned boats in the State. Some of them are fishing boats, but most of them are for family pleasure.

Back in the youth of my grandfather, there wasn't any boating in Texas to speak of. He says they had a few old wooden flat-bottomed boats used by trot line fishermen on some of the rivers. The boats only floated in the spring after rains had flooded the otherwise nearly dry river beds.

Today there is a handsome rig parked beside at least one house in every block. Thousands more are berthed in boat barns and marinas and tied to docks.

Foremost reason for the boom, of course, is the network of sprawling man-made impoundments across the State. The big lakes of Texas are ideally suited for boating and water sports. Today there is not a Texan living more than a few short hours drive from blue ribbon boating water. Most of them have good boating practically in their back yards.

All this would not have been possible, naturally, had it not been for the current trend toward "pleasure today, pay tomorrow." Even the most basic rigs cost in the neighborhood of $1,000. There are few family budgets which would allow the plunking down of a thousand bucks in cash. But installment buying has made boating a reality in many Texas households.

A person seldom sees boats made of wood anymore. Modern construction materials and techniques have put boats on the market which require little or no upkeep. Mass production has brought these boats down from the rich man's class. Aluminum and fiberglas are sturdy, weather-proof materials which have revolutionized the boat-building industry.

Today's outboard motors are powerful, quiet-running units. It used to take 10 or more powerful tugs on the starter cord to get the old "putt-putt" going. Now a simple yank on the rope and you are in business. Electrical starter units have eliminated the starter rope entirely on most of the larger engines. Even the largest, most elaborate rigs are perfect for fishing. The biggest motors will idle down to require the ultra-slow movement needed to troll successfully for fish.

The Outboard Boating Club of America, which keeps complete statistics on boating in the United States, estimates there were about 295,000 outboard motors in operation in Texas in 1958, and about 200,000 boats. Sixty-five per cent of these boats were under 16 feet in length.

While the pleasure end of boating has grown in Texas, the industrial side of the sport has boomed, too. Some of the best boats on the market today are manufactured here in Texas. Boating trailers and other pleasure boating accessories also are manufactured in our State.

With more man-made lakes in the planning state and an anticipated sharp rise in population in coming years, pleasure boating should make even more of an impact on the Texas recreational scene. **

# With Nature the Stage

by THERON D. CARROLL

If an anonymous Chinese philosopher was correct—in 1958, the Game and Fish Commission gave motion picture information to the people of Texas which was equivalent to more than 5½ billion words. That is, assuming that a motion picture film could be considered "a picture" and "one picture is worth more than 10,000 words."

A total of 2,910 bookings were made from the 231 prints of 16 mm, sound motion picture prints available from the Commission's library in 1958.

Schools and colleges accounted for 53% of these film bookings; Scouts, 4-H Clubs, Future Farmers of America, and other groups 14%; sportsmen's clubs 15%; churches, civic clubs, and other groups 18%.

The average monthly viewing audience for the year was 46,549 and, since the schools and colleges were the chief film users, the nine school months produced the most film booking activity and the vacation months were the "slow" ones.

The value placed on the Commission's films as teaching aids becomes increasingly evident when it is noted that many far-sighted teachers are now booking films for the 1959-60 school year.

Drought-breaking rains of the past few months have chased the Commission's field photographers indoors—to other chores. Weather permitting, they will return to the outdoors in a "double-time" effort to add new films on Texas wildlife to the Commission's expanding library.

A deer management film is under way along with a film story on lake treatment work, wild turkey management, and fox hunting. No definite completion dates are available but, if past production rates are maintained, 1960 should see at least two of these motion pictures placed in circulation.

Films are but one of the Commission's Visual Aid services to the people of Texas. Packets of wildlife pictures (in full colors), bulletins, leaflets, pamphlets and interesting reprints from Texas Game and Fish help to round out a "show and tell" program designed to inform all our citizens of the values and pleasures found in our out-of-doors.

The following films are available in limited supply for booking in Texas only from the Game and Fish Commission's film library. Address requests to Mrs. Irene Schneider.

**Outlaw of the Cameron**
**Master Whitetail**
**Deer Live in Danger**
**Roadrunner Battles a Rattlesnake**
**Canada Goose**
**Knights of the Texas Flyways**
**Behind the Flyways**
**Bird Migration**
**The Beaver**
**Camouflage**
**How Nature Protects Animals**
**Shooting Safety**
**Animals in Spring—in Summer**
**Common Animals of the Woods**
**Mammals Are Interesting**
**Life Along the Waterways**
**Reptiles**
**Seashore Life**
**Trigger Happy Harry**
**Mollusca**
**Pond Life**
**The Frog**
**Marine Life**
**Realm of the Wild**
**The Texas Pronghorn**
**Yours Is the Land**
**Fair Play**
**Shotgun Shooting—And How**
**Bird Dogs**
**This Living Earth Series**
**This Spinning Game**
**The Sunfish**
**Life in the Desert**
**White-winged Dove**
**Wildlife Conservation Review—'59**
**Whooping Crane**
**The Story of the Menhaden**

# Across the Broad Acres

by W. W. ALLCORN
land commissioner

WHEN CHRISTOPHER COLUMBUS STEPPED ASHORE in the West Indies in October, 1492, he drew the curtain to an immense area of land, some fertile and some desert —land for all type and for all purposes.

From this it may be inferred that the history of any nation or state has been and continues to be largely a history of land. The political, social, and economic superstructure of a people is traceable to the land they control. Especially is this true of western nations and of Texas.

Events leading to the annexation of Texas by the United States were significant in the land history of the State. Relations between the Republic of Texas and the United States during this time may be separated into three periods, each of which lasted about three years.

During the first period, Texas sought annexation. Partly as a result of the slavery controversy then raging in the United States and partly in fear of war with Mexico, the United States refused annexation.

In the second period, Texas altered her attitude, withdrew her application for annexation, and made plans to perpetuate her republic. During this period, Texas was recognized by powers such as Great Britain, France, Holland, and Belgium. Americans, laboring under the influence of what they considered a Manifest Destiny, feared the influence of foreign powers in Texas.

This led to the third phase, which was characaterized by renewed U. S. interest in Texas. On June 8, 1844, a treaty of annexation was defeated in the United States Senate, largely by partisan politics. This treaty stipulated that the United States would pay Texas debts up to $10 million, but that Texas would have to surrender title to all public lands.

Texas was fortunate that this treaty was not approved, because only a small part of the land that she would have traded for $10 million has since put more than $700 million in the Permanent School and University Funds. Later that year, President John Tyler of the United States proposed that the treaty of annexation be adopted by a joint resolution of Congress, and this maneuver succeeded, the treaty receiving approval on February 28, 1845.

Provisions of the treaty as confirmed by the joint resolution allowed Texas to retain her public domain and provided also that the new state should keep her debts, which amounted to about $13 million at that time. All in all, it was a better arrangement than the earlier treaty which had been defeated.

Congressional approval was greeted in Texas by considerable enthusiasm.

The initiative in annexation proceedings now lay with Texas. President of the Republic Anson Jones called a convention to meet at Austin on July 4, 1845, to decide whether or not Texas should accept the proposal. The decision being in the affirmative, the State of Texas was admitted into the Union on December 29, 1845, and the State government was formally installed on February 19, 1846. Thomas Wm. Ward, who had been Commissioner of the General Land Office under the Republic, assumed the same position in the State government. His duties remained essentially the same.

Shortly after Texas was annexed by the United States, war broke out between Mexico and the Union over the newly-acquired territory. Mexico had never relinquished her claim to Texas, and had repeatedly warned the United States that annexation of what she considered a rebellious province would mean war. From the beginning of hostilities, however, the United States experienced a minimum of difficulty in subduing her southern adversary. Less than two years after the war began, it came to a conclusion with the Treaty of Guadalupe-Hidalgo, signed February 2, 1848. Among other provisions, Mexico gave up her claim to Texas.

Hardly had the war come to an end than a dispute arose between the United States and Texas over 78,892,800 acres of land claimed by Texas. When Mexico concluded the Treaty of Guadalupe-Hidalgo, she sold this and other land to the United States for $15 million. Mexico had never recognized Texas' claim to the land in question, which included parts of what is now New Mexico, Kansas, Colorado, and Wyoming.

However, when the United States began taking possession of this land, anger in Texas mounted. The Legislature passed a resolution renewing Texas' claim to the disputed area.

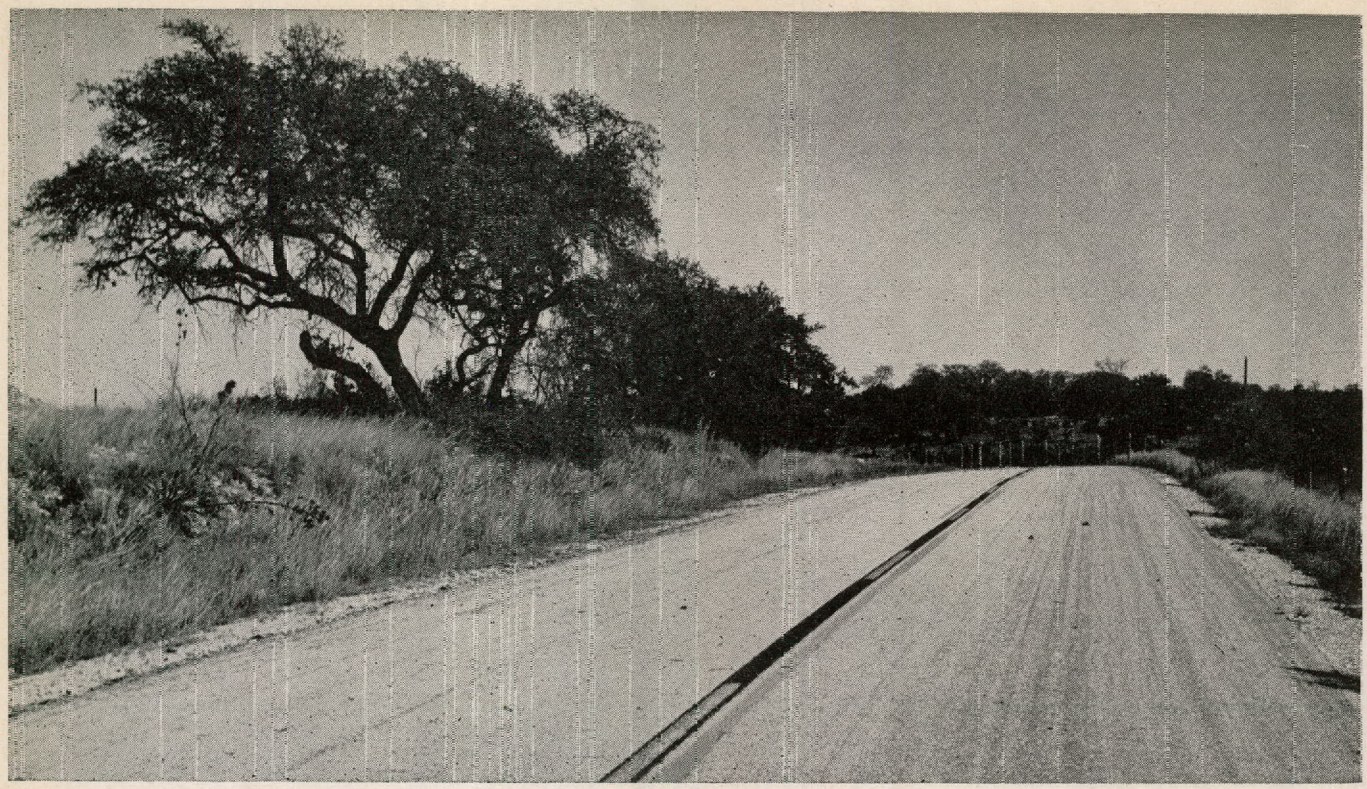
A solution to the problem was worked out in the Compromise of 1850 by which the United States was to pay Texas $10 million for the area. On February 28, 1855, Congress paid Texas an additional $5,496,477.77 for this land. Therefore, Texas profited handsomely by some shrewd bargaining on the part of its early leaders. Not only was Texas able to pay its public debt, but the State reserved its present domain to itself as well.

This public domain of land has been the basis of growth for the State's two big educational funds, the Permanent School Fund and the Permanent University Fund, as the result of mineral exploration within Texas and especially because of oil development on public land set aside for the benefit of these funds.

As a direct result of oil exploration and development in Texas, the Permanent School Fund and Permanent University Fund have mushroomed. Much oil exploration and development have been done on State-owned lands. This has been the major source of income for these funds, which now total more than $700 million.

Even today these permanent funds are growing as a result of oil and other mineral development on State-owned lands. As a result, the public school systems and higher education in Texas will continue developing in a manner befitting the Lone Star State.

Thus, the history of Texas land is still being written. **



# Super Trails Through Texas

by RODNEY PIRTLE
Information and Statistics, Highway Dept.

THE FACT THAT ONE OUT OF EVERY FOUR TEXANS over 11 years of age, about 2 million people, either hunts or fishes each year is no startling revelation to sportsmen. But is the extent of the migratory wanderings of sportsmen common knowledge?

Statistics show that each Texas hunter spends approximately 13 man-days on 11 trips each year in his quest for wild game, while Texas fishermen average about 17 man-days fishing on 13 fishing trips annually.

If the generalization may be made that sportsmen of necessity are travelers, perhaps it is safe to make the further generalization that Texas outdoorsmen, whether consciously or unconsciously, are interested in Texas highways.

So, just for the sake of self-gratification, it might be well to examine the existing Texas highway facility, and see what plans have been made for expanding this system in the future.

Presently, the State system stretches to every corner of the State for a total of about 55,000 miles. Over 1,400 miles of the system now embodies what has been referred to as "the design of the future." More specifically, there are 85 miles of urban freeway, 476 miles of rural freeway, and 865 miles of multi-lane divided highway.

Some of this modern construction was made possible by the passage of the Federal Aid Highways Act of 1956 which provided for 90% Federal participation in the construction of the National System of Interstate Defense Highways. Upon completion of the 41,000 miles of Interstate highways, 3,033 miles of this total will be located within the boundaries of Texas.

The Interstate system is designed and calculated to accomplish one sweeping major objective—to move large volumes of traffic between the major population centers of Texas at a faster rate of speed and with a maximum of safety. To this end, access to this system will be systematically controlled and grade separa-

tions and interchanges will eliminate intersections. On the national scene, it will actually be possible, barring physical limitations, to drive from coast to coast and from border to border without stopping.

These superhighways will be divided into four to eight lanes, except in the lightly traveled stretches; but even in those, a minimum right of way of 150 feet will be secured for a double-track highway when traffic warrants.

Due to the very nature of outdoor sporting, hunters and fishermen will be happy to learn that, where necessary, by-passes will be provided around all large metropolitan areas on the Interstate system. This design feature was decided upon after competent surveys revealed that most of the through traffic which is forced to wend its way through out cities does not stop but simply causes congestion which deprives establishments in the business district of trade they would otherwise enjoy.

Although it is possible that the Interstate system may carry the Texas sportsman the bulk of the way to his destination, the chances are that it won't get him to the fishin' hole or the deer lease. More likely, the last "hard-top" road before the trip's end will either be a U. S. highway, a State highway, or a Farm- or Ranch-to-market road. These roads form a much more extensive network of highways than does the Interstate system.

The Highway Department, for example, is now maintaining about 29,000 miles of Farm- and Ranch-to-Market roads. Of this total FM mileage, 23,000 miles have been constructed during the past decade, and from 1,500 to 2,000 miles of these roads are being added to the FM system each year. As of January 1, 1959, there were about 28,000 miles of FM road in rural areas and 1,000 miles in urban areas, constituting approximately one-half of the entire State highway system.

Through the eyes of the sportsman, then, the distinguishing feature of the State system is the fact that this network extends to the far reaches of the map, rolling past most of the main cattle guards and front gates in the State.

No scholarly (or otherwise) discussion of our highways would be complete, unfortunately, without confronting the problem of traffic accidents and fatalities. Although the highway death toll dropped from 2,539 in 1957 to 2,342 in 1958, the picture can never be bright as long as five people per day are dying on Texas highways, as they are now.

Someone has said that necessity is the mother of invention, and the Highway Department has recognized that it is obviously necessary to take every possible measure to reduce traffic accidents. For this reason, safety control measures have been adopted as an important part of the Department's work. Careful records are maintained on all rural accidents. Repeating patterns of accidents near the same location are used by the Department to guide installation of appropriate corrective measures.

It is estimated that the construction of the Interstate system alone will save 4,000 lives per year on a national scale and greatly reduce the number of persons injured and property damaged.

In spite of these improved highways, however, the fact remains that the source of most highway accidents is driver responsibility. And certainly no one but the Texas motorist can effectively control our biggest highway killer—driver carelessness.

In view of the tremendous number of miles traveled by Texas sportsmen each year, the Highway Department is singularly interested in seeing hunters and fishermen arrive at their destinations with a maximum of speed, safety, and efficiency. Many dramatic changes in this direction are anticipated in the highway design of the future—all in an attempt to help Texas outdoorsmen, along with businessmen and tourists, continue to prove that Texas highways, are indeed, happy ways. **

# Camping Ready Made

TEXAS STATE PARKS face future summers prepared to care for many more campers than ever before.

Facilities now complete or under way will double the camping facilities of Abilene, Blanco, Bonham, Buescher, Fort Parker, Goose Island, Huntsville, Inks Lake, Kerrville Lake Corpus Christi and Possum Kingdom State Parks. Daingerfield will be ready to care for 75% increase; Bentsen-Rio Grande for a third more; Lake Brownwood for 25% more, and Garner 10% more campers.

Expressed in increased number of campers, it means that 70,000 more can be welcomed through the summer of 1959. The additions are: 10,000 more at Lake Corpus Christi; 8,500 more at Inks Lake; 7,800 more at Lake Brownwood; 7,500 more each at Possum Kingdom and Goose Island; 7,000 more at Garner; 4,500 more at Fort Parker; 4,000 more at Bastrop; 3,500 more at Huntsville; 2,800 more at Bonham; 2,000 more at Daingerfield; 1,900 more at Bentsen; 1,800 more at Buescher; 1,500 more at Abilene; 1,000 more at Kerrville, and 800 more at Blanco.

The increasing importance given to this type of recreation is in direct response to an unmistakable trend among vacationers to tenting and camping. A similar trend is observed for week-enders and those who go out for a couple of days outing.

Figures back up the existence of such a trend. State Parks Statistics, gathered and published by the National Park Service combine returns from 89 public park agencies in 48 states. The latest published statistics reveal a 22% gain for a year in attendance at group camps and 16% increase in tent and trailer campers.

The Texas State Parks Board did not have to wait for the statistics to sense the trend. Two years ago the Texas Legislature was asked by the Board for appropriations to set up and operate eight group camps. Six were authorized. They are at Bastrop, Bonham, Caddo Lake, Cleburne, Fort Parker and Lake Brownwood. Their popularity was so great that some have had to be enlarged.

The Group Camps met the need of organizations but did not take care of the individual and family campers. No claim is made that every state park supplies all that a camper would enjoy. In general, campers can be classified as tent campers and trailer campers. Of course, there are other possible groupings like cot campers and the growing number of rugged individuals who take their camping raw. They carry a bed roll or a sleeping bag. All of the recreational parks

can give them a place to stay.

Accommodations for the trailer campers vary greatly. At some parks like Tyler they can get keys to an enclosed camping area. The same key admits them to facilities for their care and comfort that are kept locked. The Texas unit of a national caravan club camped at Tyler Park March 27, 28 and 29. Some other parks like Caddo Lake offer trailer sites with water, light, and sewage connections. Most parks provide a trailer site without individual utilities. The standard pattern for such a trailer camp is a grouping of trailer sites along a stream, as at Balmorhea, or spot of natural beauty. Community rest rooms, hot and cold showers, and laundry tubs are placed nearby for convenient use. Separate service structures for men and women are in these camps.

Most tent campers travel by automobile or light truck. Among the pioneers in planning for vacationers of this type was Texas. Many states had built cabins in their parks and Texas was well along in this type of facility, thanks largely to the Civilian Conservation Corps. After the C.C.C. days other cabins were added. In the early days of state parks, visitors were happy with a rather primitive cabin like those in Pioneer Village of Bastrop State Park emphasizing an artistic structure in a woodland setting but no plumbing. This type progressed to good plumbing, ceiling fans, and eventually air cooling.

Then an observant park supervisor noticed that at Garner State Park, which was well equipped with cabins, most of the occupants preferred to sleep on the screened porches. At Goose Island the campers liked the roofed but open shelters along the waterfront. The question was propounded: "Why not design a low-cost, simple camping shelter suitable for all parks?"

An experimental shelter was planned with care. Trial units were placed in Buescher State Park in 1952. These test shelters had a roof, concrete floor, table, grill and a water hydrant. They were open, unscreened, and very simple. But the public liked them.

Huntsville, Garner, Kerrville, Inks Lake, and many of the parks now have camping shelters but they are shelters improved as experience dictated. Campers complained of flies, gnats, or mosquitoes. Now the camping shelters are screened. They are boarded high enough to keep people sleeping on cots out of sight and they have roofs protruding far enough to provide shade. Among camping families it is common to find the men folks sleeping outside the shelter while the women and children sleep inside safe from prowling animals and crawling things.

Trial and error have shown that a good workable camping area should have from 10 to 12 shelters grouped so that their occupants can all have easy access to community facilities. These facilities are smaller but about the same as those found useful in the bigger group camps.

Experience has shown that a growing percentage of tent campers really want something with a few more conveniences than a tent. Not that tenting is on a decline. Sears-Roebuck sold four times as many tents in 1957 than in 1949.

At the end of last summer's camping season, a review of camping was taken and reported in the Septemper, 1958, issue of S-Parks. The issue has been exhausted by calls for extra copies. One of the requests came from Provincial authorities of Canada.

In preparation of this camping report park managers and park users were questioned. Their answers boiled down to a definite indication that campers like to feel that they are "roughing it," but they do not want it too rough. One manager reported that the first thing the average camper inquires about is a place to take a shower. Next, he wants some ice. Some park commissaries sell more ice than any other single commodity.

Different types of campers choose different parks. Whether accessibility is the main determining factor remains to be tested more completely.

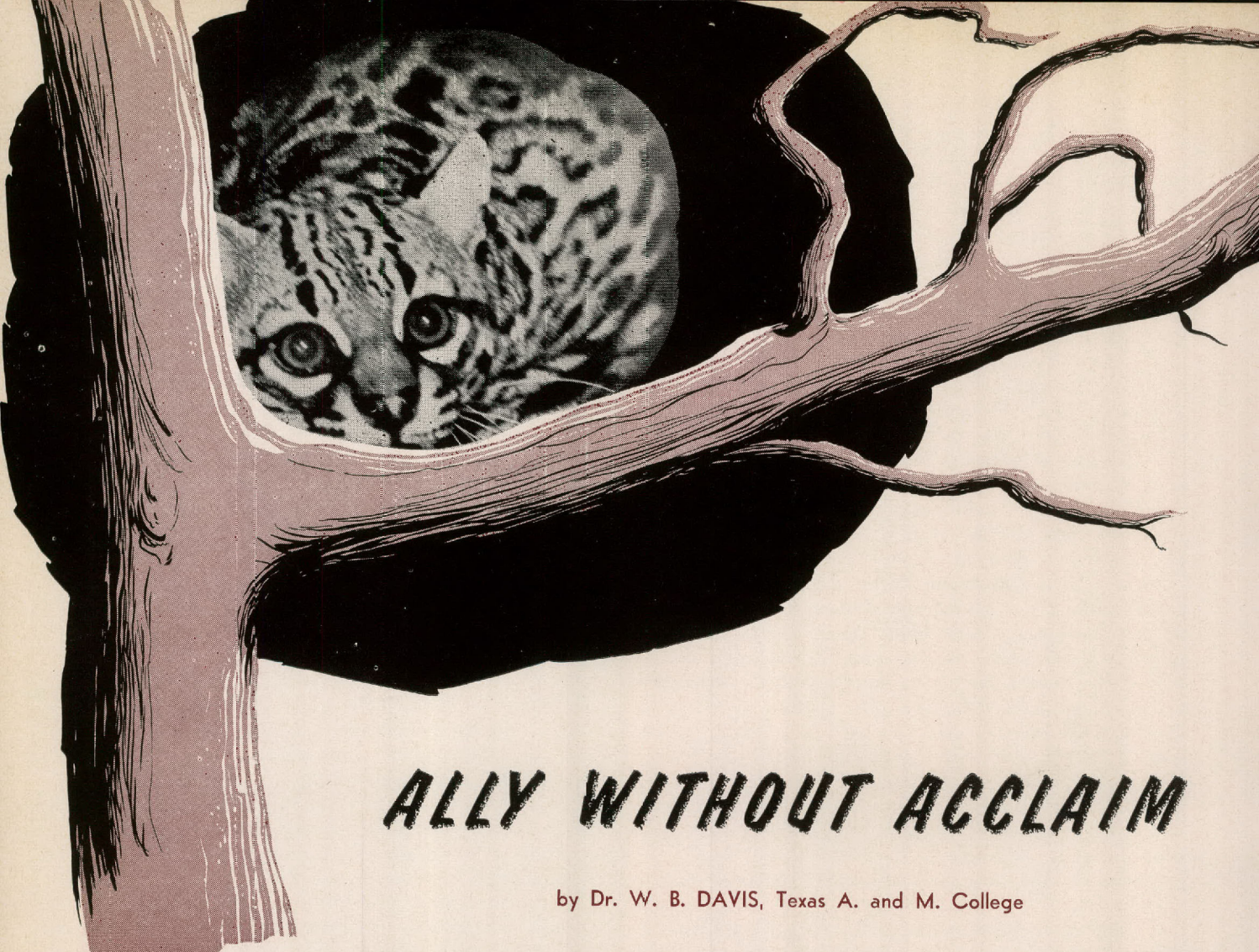
In Davis Mountains State Park about one camper in 10 has a trailer. Tyler and Caddo Lake State Parks have a higher percentage of trailers. Possum Kingdom has about 20% of its campers arriving in trailers. Garner State Park has about 5% in trailers.

Of the tenters in the Davis Mountain Park last summer about 5% had good tents; three out of 10 had shelters of some sort, including station wagons. The others slept on cots or in bed rolls under the clear skies of the region. The campers, generally, were family groups of from two to 10 people; four was the average.

While a camper seldom will go into the picnicking area of a park, picnickers are prone to invade the camping sites. The observant park manager soon finds that it is well to keep campers and picnickers separated.

A veteran Dallas camper said that a basic campground requirement is a level, well-drained area, easily accessible. Level ground is important because tents have a tendency to tumble and sleepers are likely to roll on sloping ground. Trash and garbage receptacles are important, for the average camper wants a clean area in which the kids can play. Water should be available but a camper will walk half a mile for it if need be. A safe place for a campfire is an asset. It will be used, if not for looks and atmosphere, for disposing of paper and burnable trash. In wild areas the true camper will make his own toilet facilities and leave the area so the next comer will not know anyone has been there. In out of the way places, the good camper will bury his garbage.

As one manager viewed it: "We have all sorts of campers. There is the solid camper who was born to camp and enjoy the outdoors. He enjoys whatever conditions are encountered. Then we have the camper who wants everything just like the camping book says, including good weather. One big Texas dew will separate the true campers from the ones who call themselves campers." **



# ALLY WITHOUT ACCLAIM

by Dr. W. B. DAVIS, Texas A. and M. College

"PREDATOR" MEANS MANY THINGS to many people. To the average rancher and sportsman the only good predator is a dead one. To the big game manager who is working with an over-population of deer, predators can be able co-workers who aid him, the deer herd itself, and the range vegetation by killing the weaker animals. To the Texas peanut farmer who experienced the late plague of cotton rats, an insurge of predators would have been a godsend in his efforts to control those hordes. To the trained biologist predators are NECESSARY parts of the complicated web of life. To him their complete removal would be disastrous. Consequently the role of predators is a many-faceted subject and each facet has its "experts" and adherents.

The average person thinks of a predator as a meat-eating mammal, but Webster is more generous. He includes anything that rapes, plunders, pillages, destroys or consumes, and he mentions specifically birds, mammals, and insects.

The major mammalian predators in Texas are technically known as carnivores (flesh eaters) and placed in five families—Ursidae (bears), Canidae (wolves, foxes), Procyonidae (raccoon, ringtail), Mustelidae (such as weasel, skunks, badger), and Felidae (cats). The opossum technically is in a group by itself, the marsupials (pouched mammals). Many of these "predators" are classed by State law as fur-bearing animals, and are subject to protection and regulation. These include wild otter, mink, badger, skunk (four species), raccoon, ringtail, fox (four species), and opossum. The black bear, now a rare oddity in the State, has the distinction of being the only predator that is classed by law as a game animal. This leaves only the following predators with no protection by law—coyotes, wolves, weasels, black-footed ferret, and all species of native cats.

Now what about these "unprotected" predators? Should they be eliminated? If not, what good are they? Let's examine the evidence from a biologist's point of view. Two species, the long-tailed weasel and the black-footed ferret are relatively rare and extremely rare, respectively, and should be offered year-round protection by law. In fact, the black-footed ferret should be placed on the same lofty pedestal with the whooping crane because it, too, is a Vanishing American. Both of these "weasels" feed chiefly on small rodents and cause little or no economic loss.

Coyotes and wolves are more controversial, but even with them the picture is not as dark as it is often painted. Gray wolves, of course, have long since vanished from the Texas landscape but occasional individuals wander into the Trans-Pecos from

Mexico. Coyotes and red wolves are fairly common throughout the western two-thirds of the State and they are the chief targets of predator control activities. Little authentic information is available on the economic impact of red wolves, but there is a wealth of information on coyotes. Let us examine it.

The best clues to the economic status of these predators is their feeding habits. Charles Sperry, formerly with the U. S. Fish and Wildlife Service, examined the contents of more than 8,000 coyotes' stomachs from the West, including 569 from Texas. Here is what he found. Those coyotes ate on an annual basis —rabbits, 33%; carrion (dead livestock, deer that died from causes not attributable to coyotes), 25%; rodents, 18%, sheep and goats, 13.5%; deer, 3.5%; other material, including birds, insects, plant material, 7%. The only seriously questionable items in the list are sheep and goats. The deer loss is negligible.

The economic balance is preponderantly in favor of the coyote because more than half of its diet consists of rabbits and rodents which compete with livestock for range vegetation. When one considers that 148 jack rabbits can consume as much range vegetation as one cow and 30 rabbits as much as one sheep, and that coyotes feed regularly on rabbits, the real value of the coyote to the rancher becomes apparent. Indeed, a few thinking ranchers protect their coyotes.

In the cat family, the only species of any real economic importance as predators in Texas are the mountain lion and the bobcat. Both feed on livestock to some extent, but their chief prey is native wildlife. In one study of 118 bobcat stomachs, native mammals, mainly rabbits and rodents, comprised nearly 90% of the diet. Occasionally they kill and eat deer, but most of the deer meat found in bobcat stomachs has had fly maggots in it which strongly suggests it was carrion. Bobcats prey to some extent on domestic sheep, goats and poultry, but the damage is usually not great except in rare instances.

The best study of the food habits of mountain lions was that done by F. C. Hibben in Arizona and New Mexico. Deer accounted for 82% of the diet; porcupines, 5.8%; cottontails, 4%; jack rabbits, 2%; domestic cow, 1.6%; miscellaneous (including domestic sheep and goats, rodents and grasses), 4.7%. On balance, a diet of this sort is beneficial. The high percentage of deer in the diet is decidedly beneficial both to man and to the deer because the lions tend to keep deer populations from getting out of hand.

No one can seriously condemn the control of populations of such predators as coyotes, red wolves, bobcats, and mountain lions on range lands and other non-farming areas if the objective is not complete eradication over large areas. And certainly no one can justifiably protest the elimination of a particular predator caught in the act of killing a domestic animal. But wholesale, indiscriminate killing of predators has no justification whatsoever from a biological point of view.

Many of the problem deer areas in Texas are in sections of the State, the Edwards Plateau for example, where the larger predators have been removed by trapping, poisoning, and shooting. There it is not uncommon to find a stocking of one deer to eight acres and on some ranches it reaches one deer to two acres—320 deer to a section. And what deer! The average dressed weight of legal bucks is between 70 and 80 pounds. One legal buck tipped the scales at the astonishing weight of 26 pounds!

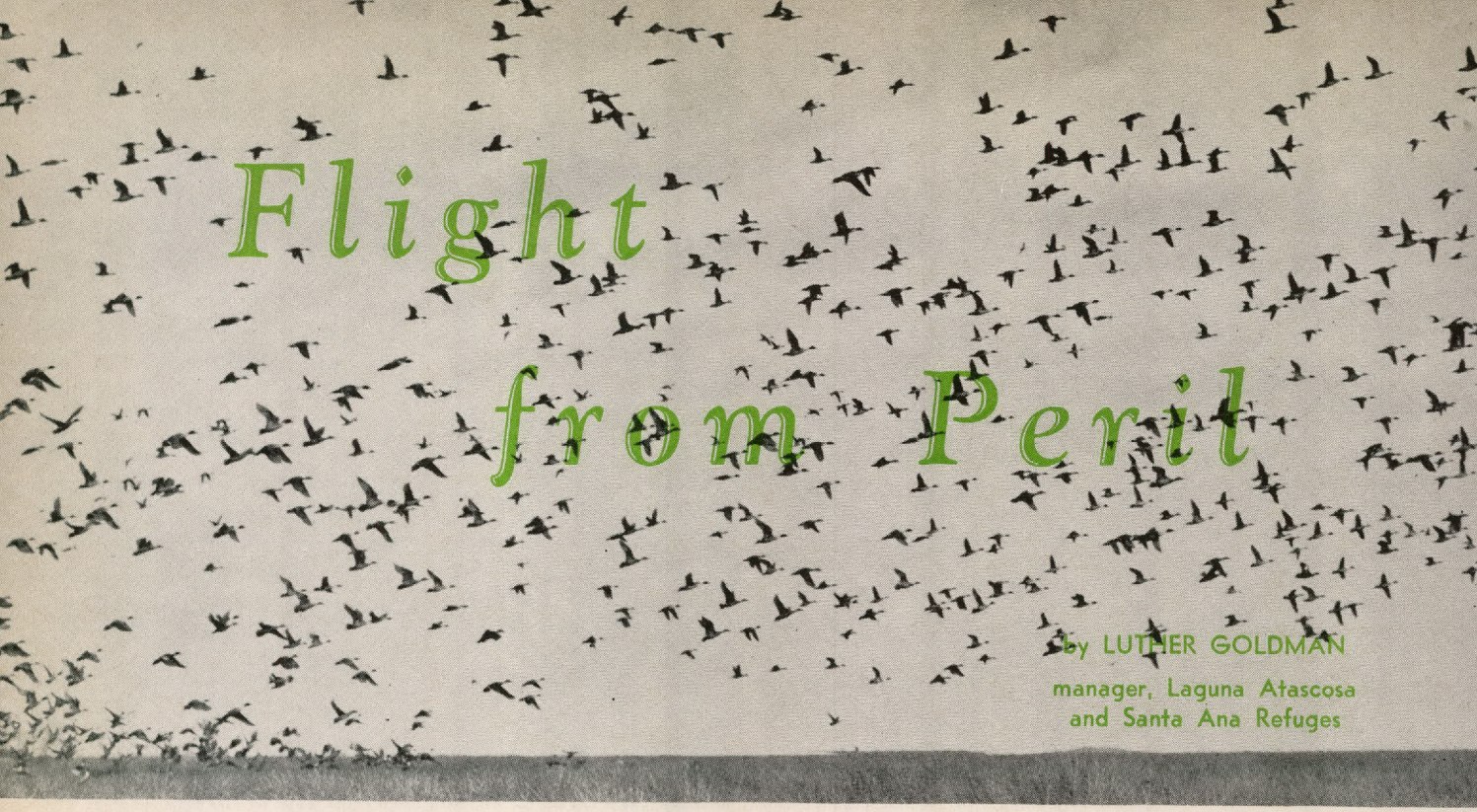
On the other hand, some of our best deer come from areas where the larger predators are not so relentlessly hunted down and killed. In the brush country of South Texas we have few deer problems because predators are there to help keep the deer in check. Interestingly, the only ranches in that area that have serious surpluses of deer are those on which predators have been, and still are being, materially reduced or completely eliminated.

The classic example of mismanagement of predators and deer is that of the Kaibab National Forest in Arizona. Removal of predators, principally mountain lions and coyotes, coupled with little or no hunting of the deer by man, soon resulted in a population of deer far beyond the carrying capacity of the range. Result? Tremendous losses of deer by starvation and such a depletion of deer food plants that foresters estimated it would take 40 to 50 years for the range to recover to a point where it could again support a good deer population.

The moral of this story is that predators fill a vital role in the welfare of wildlife populations by tending to keep the prey species within numerical bounds. The Law of Nature demands death to sustain life. In a stable population birth rate and death rate must be equal and predators help to keep the death rate in balance. If all predators were removed from the face of the earth it would soon be a sorry state of affairs unless rats, mice, rabbits and others that feed on plants somehow would practice planned parenthood.

Personally, from a biological point of view, all of our large predators (coyotes, wolves, and all of the native cats) should be placed on the game list and, with proper license, hunted for sport. Those who have participated in a cat chase or who have called up coyotes can attest to the thrills and excitement that accompany such sport. After all, any resident animal we choose can be placed on the game list.

We in Texas would do well to reevaluate the status of predators in the management of our rangelands, our livestock, and our wildlife. There's a lot of good in every "bad" creature—if you look for it. **



# Flight from Peril

by LUTHER GOLDMAN
manager, Laguna Atascosa and Santa Ana Refuges

DURING THE EARLY HISTORY of waterfowl restoration and conservation in this country, emphasis was placed upon seeing that duck and goose ancestral breeding grounds were preserved, restored, or protected from drainage and destruction. Of next importance was the establishing of waterfowl refuges within known flyways, as much as possible, for the migrants to get rest, temporary relief from shotgun bombardment, and a place to get a bit of food before going on to points farther south. In the mid-30's there was a realization that something must be done for waterfowl on their wintering grounds in the southern part of the United States. Each of the flyways was studied, and logical areas were picked out for possible refuge locations. In Texas, five Department of Interior (Bureau of Sport Fisheries and Wildlife) Refuges were set up.

The first area established in the State lies at the south end of the Central Flyway—Muleshoe Refuge. This waterfowl area is located 20 miles south of Muleshoe on Highway 214 on the High Plains of West Texas near the New Mexico border. Of its total of 5,809 acres, there are 588 acres of lakes and ponds that collect water during the rainy period. The water in the lakes is quite alkaline here, but the lakes come in for tremendous waterfowl use. Over 700,000 ducks have been estimated using Muleshoe Refuge in midwinter. Mallards make up the greatest part of this number, but pintails, widgeon, shovelers, scaups, buffleheads, and ruddy ducks also are present for the winter season.

Besides the large concentration of waterfowl, spectacular numbers of little brown cranes winter at Muleshoe Refuge. More cranes can be found here than at any other place in North America. Some 30,000 have been observed at one time. Cranes can be seen any time after September and up until March. Refuge personnel farm 160 acres of food used by the visiting waterfowl.

Prairie dogs, burrowing owls, and scaled quail are other wildlife species to be observed at Muleshoe.

In 1937, the Aransas National Wildlife Refuge was established. This coastal area encompasses some 47,261 acres, lying southeast of Austwell and within easy driving distance of Corpus Christi, Rockport, and Victoria. The refuge overlooks Matagorda Island from a broad peninsula between San Antonio Bay and St. Charles Bay. Much of the area is upland with live oak, post oak and sweet bay brushland cover interspersed by open grasslands.

Many have heard of the Aransas Refuge because it is the wintering grounds of the rare whooping cranes. In addition to giving protection to this great bird, it provides important wintering grounds for waterfowl. Ducks numbering up to 120,000 have been observed on the Aransas Refuge and Canada geese have been estimated at 35,000. Pintails and widgeon are the most common species but 27 duck and goose varieties have been recorded there. Sandhill cranes are at home in the winter, and wild turkeys are permanent residents. The refuge has an extensive coastline that is attractive to many kinds of shorebirds and wading birds. Inland ponds and tanks also attract numbers of birds. A total of 296 different species of birds have been recorded on the refuge since its beginning in 1937.

White-tailed deer, javelinas, and raccoons are among the important mammals to be found there.

The next refuge to come into the National Refuge System was the 11,429-acre Hagerman Refuge which was established in February 1946. It is located in the vicinity of Denison. It includes 2,500 acres of open water on the upper end of the Big Mineral Arm of Lake Texoma. The refuge is reached from either Denison or Sherman, after approximately

a 16-mile drive over blacktop road. In the Central Flyway, like the other refuges, its chief function is to provide resting and feeding areas for migratory waterfowl, and for those that decide to stay, a winter home. There are times when the fall migration of ducks and geese total more than 100,000 birds. Mallards make up the biggest count, followed by pintails, then American widgeon and scaup. All the major species of geese of the Central Flyway have been recorded here.

Hagerman Refuge has a large farming program, consisting of approximately 1,000 acres.

Coming on down the Coast to the south end of the Central Flyway, one finds the Laguna Atascosa National Wildlife Refuge, which is located north of Brownsville and 25 miles northeast of San Benito. This refuge, on the eastern edge of Cameron County, was established in August, 1946, primarily to furnish a wintering ground for the redhead duck, whose numbers had become alarmingly low. The 100-mile-long Laguna Madre, with its extensive growth of shoal grass and widgeon grass, is the chief larder for this duck species, and it is said that seven-eighths of all the redheads of North America come to winter in its waters and vicinity. Approximately 500,000 redheads have been estimated using the refuge, which lies in part along the Laguna Madre.

Within its 41,590 acres is an island lake known as Laguna Atascosa. The refuge gets its name from this lake which covers well over 3,000 acres of the area. Originally it was a back bay of Laguna Madre, but it has since been dammed off and an effort is being made to create a fresh-water lake so that redheads and other ducks that feed in the shallow Laguna Madre can be assured of a place to drink and rest. Next in size to the big lake, Laguna Atascosa, is the impoundment known as the Cayo Atascoso. This rather narrow body of water (300 feet to ½ mile wide) 6 miles long, is one of the favorite concentration areas for redheads.

Besides redheads, many thousands of pintails utilize the refuge in winter. Peak pintail numbers have been close to a half million when surrounding areas have little or no fresh water to offer. The mallard duck, though the most abundant in other parts of the State and nation, is one of the rarest at Laguna. American widgeon come down the flyway in good numbers in October and November, and as many as 60,000 are estimated using the refuge at peak use. Many of these continue to Mexico during December.

Coots begin to arrive in late September and build up a concentration totaling some 200,000. Like the widgeon, many go on into Mexico.

Because of its varied wildlife habitat conditions, and its southern geographical location where winters are generally mild, birdlife of all kinds is abundant the year around.

Farming to raise goose food is an important activity on the refuge; approximately 600 acres are cultivated for this purpose. Since geese are primarily grazers, the chief crop at Laguna is a tender-leaf grain such as winter wheat. The goose population has built up from 500 wintering geese at the start of the refuge to this year's peak of 8,200. Canada geese, lesser snow geese, white-fronted geese and blue geese are all on hand from early October until about the third week in March.

The Laguna Atascosa Refuge has been a haven for wildlife species that have lost their homes in the areas surrounding the refuge, as the heavy Lower Rio Grande brushland has been cleared to make way for cotton farming. The refuge and the holdings of just two or three neighboring ranches now form a sort of island, the only wildlife habitat in a "sea" of cleared farmland.

Mammals of this refuge include Texas white-tailed deer, javelinas, ocelots, bob-cats, coyotes, raccoons, skunks, opossums, jackrabbits, cottontails, ground squirrels, woodrats, and (rarely) jaguarundis and badgers.

The last Federal Wildlife Refuge to be mentioned is the smallest, the Santa Ana National Wildlife Refuge, approximately 2,000 acres, located in the Lower Rio Grande Valley, in Hidalgo County, on the Rio Grande about 8 miles south of the City of Alamo.

The area is covered in general with a jungle-like forest of hackberry, elm, ebony, ash, anacua, tepehuaje, and guayacan that have a dense understory of vines and shrubs. Some of the trees are festooned with Spanish moss.

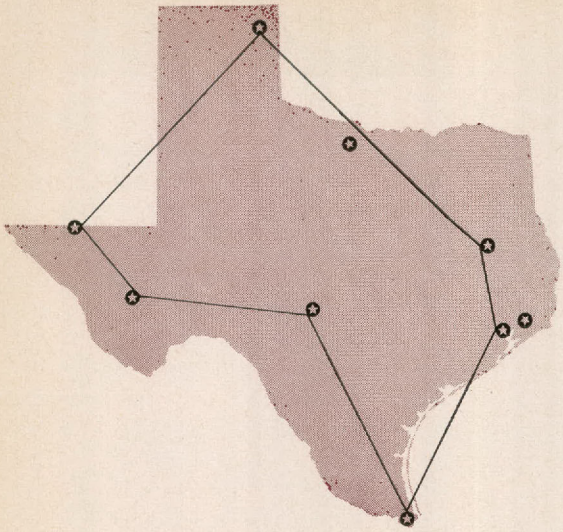
Called the "gem of the refuge system," this unique area preserves the representative flora and fauna in this remnant of the forested bottomland, at one time so prevalent along the Rio Grande, and of the old resacas (dry river channels) left behind by the fickle river as it frequently changed its course. Several bird species found here are seldom recorded elsewhere within the United States. Among these are the least grebe, white-fronted dove, red-billed pigeon, groove-billed ani, chachalaca, gray hawk, pauraque, kiskadee, beardless flycatcher, green jay, black-headed oriole, Lichtenstein's oriole, white-collared seedeater, the olive sparrow, and occasionally the jacana and rose-throated becard.

White-winged doves nest here by the hundreds in the spring and summer, and the tropical duck species, the black-bellied tree-duck, comes out of Mexico in the spring to nest on the refuge.

In between floodings from the river, which are getting more and more infrequent since the construction of Falcon Dam, water is supplied to old resaca beds by pumping from wells. The ponds formed are the watering places of the many bird species that use the area, as the long-legged wading birds, such as the common egret, great blue heron, snowy egret, and wood ibis.

The bridled weasel is at home on the edges of the brush area. The rare jaguarundi and ocelot occupy the wooded parts of the refuge. Other mammals include the coyote, bobcat, raccoon, striped skunk, opossum, beaver, cottontail, and the woodrat.

Waterfowl hunters who haven't visited the National Waterfowl Refuges should do so to observe how the Duck Stamp money they spent in purchasing this important stamp has been put to use. **



# Charting the Conservation Course

by HOWARD D. DODGEN
Executive Secretary, Game and Fish Commission

SINCE STEPHEN F. AUSTIN WITH A COLONY of 100 families first landed on the banks of the Brazos at San Felipe wildlife has been vital to Texans.

For nearly a half-century these colonists lived off wild game that roamed the prairies and hills of the State. There was no protection to either fish or game.

By the time the first railroad came to Texas, however, it became apparent that man could deplete the wild game resources of the State.

The first game law in Texas was on Galveston Island in 1861, when the quail season was closed for two years.

In another dozen years the first rail connection into the continental system was begun. Laborers on the railroads killed off wildlife in a wanton slaughter. Deer, buffalo, and bighorn sheep fell before the single-shot Sharps rifles, and the new repeating rifles.

Commercial fishermen were dragging so many nets and seines that additional laws were passed in 1874 to prohibit this use in certain coastal waters. Meantime, logs washed down the Texas streams during floods caused by heavy rains were causing log jams. In 1879 there was a law passed to provide fish ladders and designate a commissioner to enforce the law. J. H. Dinkins was appointed and served as Fish Ladder Commissioner, without pay, in 1879-80.

At that time the population of Texas had increased to 1,600,000 and in 1880 the first general game laws of Texas were enacted. There were 83 counties claiming exemption to the general laws.

A year later the first effort at restocking was begun with the construction of a fish hatchery at Barton Springs, near Austin, for the propagation of German carp.

Then came one of the most effective changes in the history of Texas. Barbed-wire fences were introduced from 1882-1885. There were threats of wars among landowners and cattlemen using the free range, over which game animals also ranged.

Also in 1882 the U. S. Fish Commission stocked in Texas some 2 million herring, 3 million shad, 250,000 salmon from California, and 4,000 rainbow trout.

By 1883 some 130 counties, or more than half in Texas, were claiming exemption from all game laws.

In 1885 it was announced that the last wild buffalo had fallen to the hunters' guns, but the same year the Fish Commission was abolished. There was too much public opposition to the introduction of carp, which had begun to take over Texas streams.

The year of 1890 also left its impact in the wildlife history of Texas. That was the year that smokeless powder first came into being.

In 1892 the first research was be-

Howard Carney
Atlanta

Robert G. Carr
San Angelo

Henry Coffield
Marfa

J. W. Elliott
Mexia

Herbert J. Frensley
Houston

gun in Texas, when Dr. E. A. Mearns started a three-year survey of wildlife on the Mexican border.

By 1895 it again became apparent that additional controls were needed in coastal waters. At that time the office of Fish and Oyster Commissioner was created. I. P. Kibbe was appointed and served until 1906.

The first great pollution probably came in 1901 with the discovery of the Spindletop oil field. Waste oil was a serious threat, not only in the Beaumont area, but later with the discovery of oil in other counties.

Slaughter of wildlife continued, however, at the hands of the early-day hunters. In 1903 there was a five-year closed season on antelope, mountain sheep, pheasants. The sale of these animals and non-game birds also was prohibited.

The year's bag limit on deer was placed at six bucks in a two-month season and head-lighting was outlawed.

The problem of wildlife control became so acute that by 1907 the enforcement of the game laws was strengthened by the addition of the word Game to the Commission. Thus it became the Game, Fish and Oyster Commission, with R. H. Wood the first commissioner.

It wasn't until 1909 that the first hunting license law was enacted, requiring licenses for all except those hunting in their home and adjoining counties. That year 5,000 licenses were sold.

Texas was growing and in 1910 the census gave the State a population of 3,896,542. And as the population increased, the wildlife resources began to disappear. The greater prairie chicken of the Central Texas blackland prairies vanished. During the next few years the Game, Fish and Oyster Commission had to reduce the quail bag from 25 to 15 per day.

We began negotiations with Canada for the protection of waterfowl. Finally in 1919 waterfowl and shore birds were given their first protection. The bag limit on ducks was set at 25 per day.

The State also took action to protect turkeys and a closed season was ordered on turkey hens. There were only six game wardens back in those days. They had their hands full in trying to enforce the shooting ban on migratory birds after the treaty with Canada.

It was along about this time that the automobile came into general use. Wagon trails were becoming highways for the horseless carriage and game habitat suffered accordingly. New roads were cut through field and forest. The more modern transportation facilities made it much easier for hunters to get farther away from their own areas for hunting.

By 1923 the situation had become so grave the Legislature made it possible to employ additional game wardens, by turning over to the Commission the total funds collected. The warden force was jumped to 45.

In the meantime, however, the wildlife resources continued to decrease. Although the warden force grew to nearly 100 men, it was apparent that much more needed to be done. In 1925 the first game preserve was created. Laws were passed prohibiting the sale of fresh water fish.

The next big step in the program came in 1927, during the first term of Dan Moody as governor. At that time W. J. Tucker was named secretary of the Game, Fish and Oyster Commission. During the same period the Guadalupe Mountain area in West Texas was stocked with 44 elk by the late Judge J. C. Hunter.

In 1929 the Legislature made it possible to step up the authority of the Commission by authorizing the over-lapping appointment of six members of the Commission.

This was perhaps the greatest forward step toward the present program which has been bringing back wildlife to Texas. All this has been in face of the increasing population. The 1930 census gave Texas 5,824,715 population, with 124,707,130 acres of land in cultivation. Every acre planted in effect meant a decrease in food and cover, except

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Henry LeBlanc
Port Arthur

Hal Peterson
Kerrville

Ben F. Vaughan, Jr.
Corpus Christi

Frank Wood
Wichita Falls

# Palette of Posies

by DR. B. C. THARP
professor of botany
University of Texas

SPRING WILD FLOWERS OPEN FIRST in the forested area of Southeast Texas, and down the Coastal Prairie and the Rio Grande Plain.

In Southeast Texas pine forests, the greatest variety of showy, woody flowering plants occurs. Leading off in early February, mostly along small streams or on moist shaded hillsides are three different kinds of azaleas followed by snowdrop, storax, fringe-tree, tree and bush huckleberry, black haws, wild roses of several kinds, magnolia, flowering dogwood, red haw, red bud and several kinds of buckeye. Woody vines also contribute to the floral splendor: yellow jasmine; crossvine; wistaria; honey-suckle, both red and white. White honey-suckle, a native of Asia, has escaped from cultivation and has become a vicious weed in many localities. Its delightfully fragrant flowers open white, turn creamy yellow the second day, deepen in color the third, and fall by the fourth day.

Of these woody plants the tree huckleberry extends westward in the oak-hickory forest to Central Texas, and down the coastal strip of scrub timber on deep sand to Kenedy County. Black haw, red haw, flowering dogwood, McCartney's rose, red bud, and buckeye also range westward, some of them into the Edwards Plateau. (Red bud and red haw extend to the mountains beyond the Pecos River.)

But the regions west of the pine woods have several woody flowering trees and shrubs of their own not found farther east: agarita (agritos) and Texas mountain laurel (not by any means a laurel, but rather a bean) in Central and Western Texas; and many species of acacia (huisache, huajillo, black brush and cat claw being some of the common names applied to the more common representatives). Madroña, also called Naked Indian for the beautiful smooth reddish-tan of the new bark left by the annual spring peel-off of the old, ranges westward from the eastern margin of the Edwards Plateau to the mountains in Western Texas. Yucca blooms there—various species, some called Spanish Bayonet from the very stiff, cruelly spine-tipped leaves, others with leaves more pliable called Beargrass. Bush honey-suckle also occurs from Central Texas westward.

West of the Pecos, one of the most singular and attractive shrubs is Jacob's Staff, or Ocotillo, whose diverging branches, viewed in profile on a mesa slope at twilight give the impression of long bony fingers. Covered throughout with foliage, each branch displays in spring a flaming tip of dense orange-red flowers. In the mountains the Apache Plume, a member of the rose family, inhabits the rocky banks of canyon streams dry most of the time. Its display of white, yellow-centered flowers is most attractive.

Shrub cousin to the Trumpet Creeper of East Texas also occupies dry runs and rocky hillsides with thick patches of golden-yellow bloom. The Desert Willow with pinkish-lavender Catalpa-like flowers occupies boulder-filled channels of desert streams. It has been widely planted for highway beautification.

Of the herbaceous wild flowers, the earliest and most conspicuous are violets. In the East Texas forested region there are many kinds. Only one of the open woods species, the Missouri Violet, extends westward as far as the Edwards Plateau. One other, the white Bog Violet is found in bogs in Palmetto State Park, Gonzales County. A few early wild flowers owe their prominence not so much to spectacular showiness as to the fact of their friendly peeping out from among last year's dead leaves and grass. Shy little bluets, saxifrages, dwarf mustards, chickweeds, dwarf dandelions and spring beauty are examples. Spiderworts, trillium, blue-eyed grasses, iris (together with intermediate-sized blue and purple-flowered cousins), yellow-eyed-grass, yellow stargrass, buttercups, May apple, corydalis, pitcher plant bull nettle, poppy-mallow, evening primroses (both white and yellow in color, and often miscalled buttercups by us Texans), and Pink Texas Star all occur in Southeastern Texas. Some occur westward to Central Texas; a few still farther.

Cacti of a variety of forms from the devil's head, pin cushion and nipple cactus to pencil-cactus, chol-la ("Tree Cactus") and prickly-pear are most abundant in the central and western portions of the State.

One small prickly-pear cactus occurs from Central Texas eastward in sandy wooded areas. Collectively they are a beautifully showy-flowered group, beset with vicious spines.

Another wide-spread group is represented by the genus phlox. Most are showy spring bloomers, but a few in the mountains of Western Texas (along with most other plants native to that region) wait for summer rains. It is of interest to Texans that phlox drummondii, the wild ancestral stock from which the multi-varied annual garden phloxes have developed under cultivation during the past century and a quarter, occurs naturally only in deep sandy soil southwest of the Colorado River in Bastrop County. It is now cultivated in every civilized country in the world. In its native range it is closely associated with the bluebonnet, the official Texas state flower.

Verbena is represented by numerous species—some with long slender spikes of inconspicuous flowers, other by congested spikes of the much more striking flowers. These last, at opening, appear to be in a flat rosette, with the buds in the center, terminating a continuously elongating fruiting spike. Numerous representatives of both groups occur widely, the showy kinds being the more numerous in early spring. Mints of great variety grow wide-spread: sages with flowers of both red and blue; horsemints of variously lavender-pink, to pale yellow with brown flecks, to almost white; hoarhound, early introduced from Europe as a remedy for coughs and colds, long ago escaped and is now

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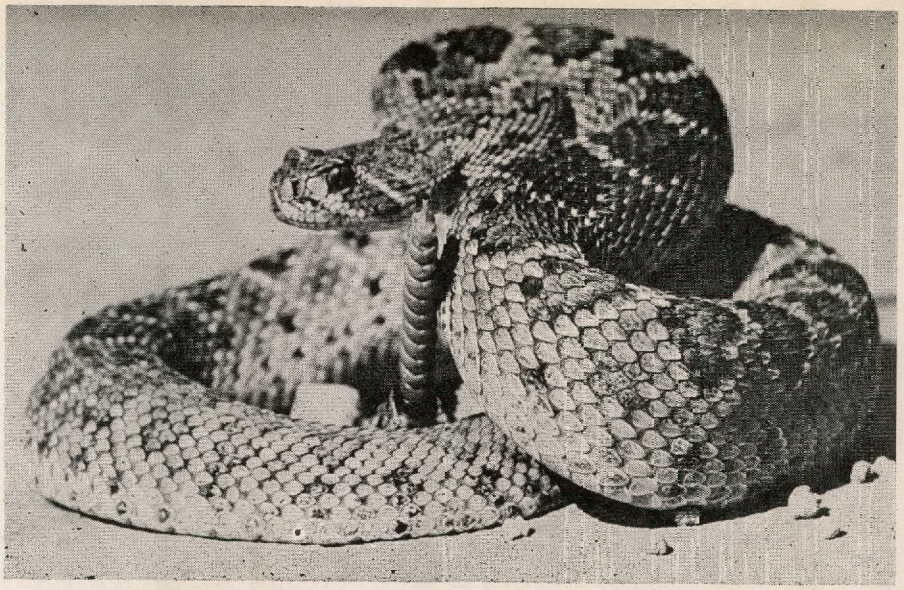
# Of Things that Crawl



by AL FLURY, fisheries biologist

SNAKES ARE PROBABLY THE MOST TALKED ABOUT and least understood creatures in Texas. Only four general kinds: rattlesnakes, cottonmouths, copperheads, and coral snakes are poisonous. The majority of snakes are both harmless and beneficial to man, yet the poisonous kinds fix themselves in many people's minds and cause the condemnation of not only all snakes but also of lizards, worms, eels, or anything that faintly resembles a snake.

All snakes are carnivorous and most will eat any animal of proper size, though a few have specialized food habits. The Texas poisonous snakes (except the coral snake), the harmless water and garter snakes give living birth. All others in the State lay eggs.

Snake species vary tremendously in size from worm snakes which never get over about 8 inches long to bull snakes and blue snakes which frequently pass the 6- or 7-foot mark.

At home on land or water, amphibians are, in the family tree of animals, higher (more advanced) than fish; lower (more primitive) than reptiles. Like reptiles, they are coldblooded and become inactive at low temperatures. This restricts their distribution largely to the tropical and temperate regions of the globe. An amphibian's skin is scaleless, usually moist and slimy, so to prevent dessication it must stay fairly close to water or be able to burrow to moist soil.

Frogs and toads are recognized by almost everyone, but not by specific names. Salamanders, another type of amphibian which retain their tails as adults, are less well known even as a general type.

Around a water hole in spring, male frogs join in a loud mating chorus. Breeding usually occurs in late winter or spring but, especially in dry regions, may occur any time that rain falls. Eggs are laid in a pond or stream by the female and the male ejects spermatozoa into the water, one of which fertilizes each egg.

Here the amphibians' life begins, in a jelly-like mass or series of strings in the water. In a few days, the eggs hatch into tadpoles—black round-bodied little beasties with a flattened, fleshy tail for swimming and a hard, horny jaw for chewing.

Growth is fast; hind legs soon break through the skin just forward of the tail and fore legs develop later behind the head. By summer, fall or even the next year, depending on the species, the gills and tail (except in salamanders) are absorbed, the lungs become functional, and the young leave the water to become air breathing, terrestrial adults. Almost all tadpoles are vegetarians but some are carnivorous or even cannibalistic. All adult amphibians are carnivorous, the diet consisting of insects, smaller frogs, snakes, worms, mice and birds.

The Order Reptilia is composed of the lizards, snakes, turtles, and alligators. Their skin is covered by dry scales and, since fertilization is internal, they are independent of water (except for drinking) and can roam far and wide over dry country. Most reptiles lay eggs but many snakes and a few lizards are born alive. The young are small copies of adults, breath air and pass through no transitional stage as do amphibians.

The alligator is uncommon but widespread through most of the eastern half of the State. Due to their large size (to about 14 feet), heavy build, lizard-like appearance and aquatic habitat, they are easily recognized. Because they are aquatic, shy and nocturnal, very few people ever get to see one in the wild. They are strictly carnivorous, feeding on practically any animal of suitable size.

Turtles are easily recognized by the rigid, bony covering, and distinctive shape. Like most other reptiles, they lay eggs in moist places under logs or rocks or frequently in holes in sand banks dug especially for that purpose. Most land turtles are herbivorous while aquatic species are usually carnivorous.

Lizards are among the most inter-

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# the Outdoors Goes to School

by THERON D. CARROLL
Assistant Director
Information-Education Division

CONSERVATION EDUCATION PRESENTS a double-barreled challenge to the people of Texas.

The term itself puts the cart before the horse—conservation is basically "wise use." Education is the impartation or acquisition of knowledge, skill, or discipline of character.

Can it be possible to use our wildlife and other natural resources wisely before we know the facts and truths about them; before we become skilled in the application of management facts; or before our characters are disciplined to manage these resources for future generations as well as ourselves?

The legislators, which established the Game and Fish Commission as the agency entrusted with the official care of our wildlife resources, realized the importance of an informed public. They decreed that the Commission should make provision ". . . for the dissemination of information pertaining to the conservation and economic value of wild animal life . . ."

It followed that we must get the facts before they could be shared with the other citizens of Texas who are co-owners of all our wildlife resources according to law. Certainly, the many hours of scientific study conducted by the Commission's fisheries, game, and marine biologists are justified.

But no matter how many facts and truths are gathered by wildlife scientists, the people of Texas stand to gain very little unless this information gets into their hands. Even then, it must be understood and applied to be effective.

To carry out its obligations in informing the people of Texas about their wildlife resources the Game and Fish Commission has made several moves:

At first there were a few publications concerning hunting and fishing, seasons and bag limits, followed by literature designed to help the hunter and landowner to cooperate in producing more fish and game. These were the "crawl before you walk" measures that were not readily accepted by people who believed our wildlife resources were unlimited—besides, they said, there were already too many restrictions placed on the hunter and fisherman!

But Texas grew in a hurry, and as more people moved in the pressure on wildlife increased.

Far-sighted outdoorsmen clamored for more strenuous protective measures. Some of them demanded game refuges and preserves to save our endangered wildlife. Wildlife technicians, a rarity in those days, were sought to explain the plight of our game to sportsmen, civic, and industrial groups. Radio stations found an audience for their hunting and fishing programs and newspapers began to employ full-time outdoor editors. Still the emphasis was on the harvest—with little regard for the planting.

In some areas, where man's activities had all but eliminated the wildlife, people banded together and pledged to protect their game if the Game and Fish Commission would give them broodstock. TEXAS

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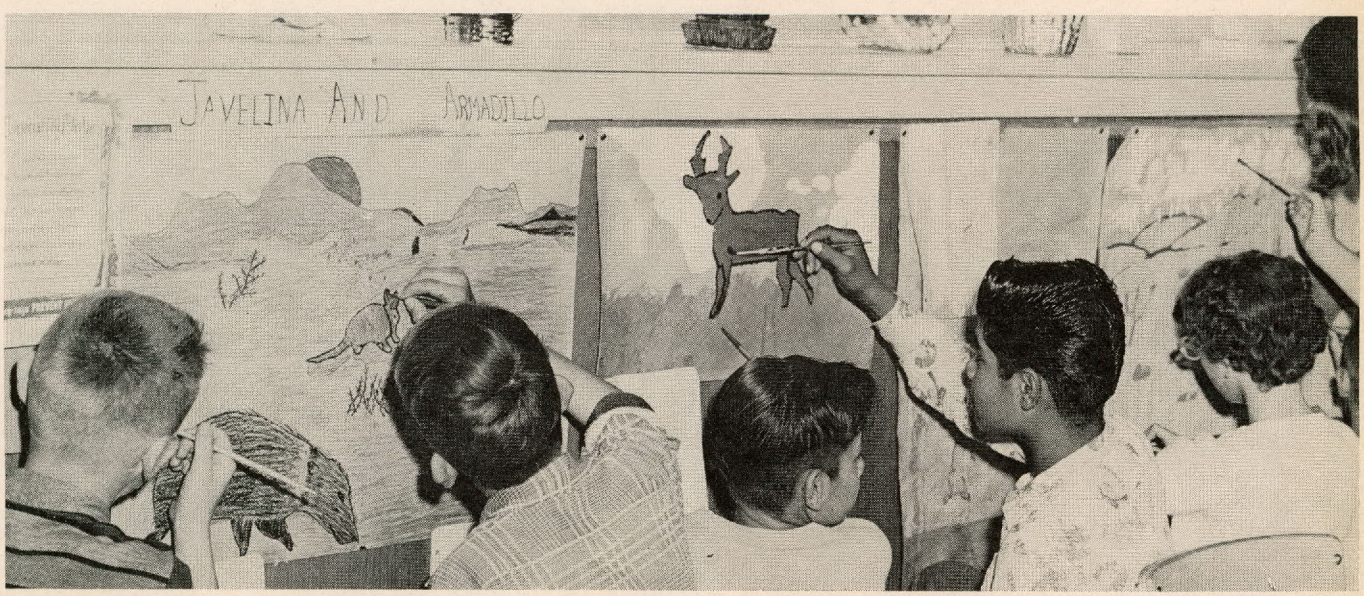


by GEORGE A. ROUNSEFELL and CHARLES H. LYLES
U.S. Bureau of Commercial Fisheries

PHENOMENAL DEVELOPMENT OF TEXAS FISHERIES within the past decade has brought the State from obscurity to acclaim as one of the leaders in the nation from the standpoints of both volume and value of commercial fishery products.

Going back to 1930, the total catch of under 16 million pounds at the low prevailing price of 5c per pound brought the fishermen only $780,000. When one considers the catch elsewhere in the nation, this was extremely low. The catch then was about 2/3 shrimp taken by beach seines and a few small otter trawlers in the inside waters. The other third was chiefly redfish, black drum, and speckled trout taken by gillnet and beach seine in the bayous and inside bays.

Shrimp, by far the most important species, accounted in 1957 for 54% of the landed weight, and 94% of the value. As late as 1940, 407 otter trawlers took but 14,780,000 pounds of shrimp. By 1957 this had risen to 76,830,000 pounds taken by 2,184 vessels. Despite this fivefold increase in the number of vessels the annual catch per vessel remained level, which might indicate substantial supplies.

**Texas commercial fishery landings (in thousands of pounds) and their value (in thousands of dollars)**

| | Red Snapper | Black Drum | Red-fish | Speckled Trout | Oys-ters | Men-haden | Shrimp | Total All Species | Value |
|---|---|---|---|---|---|---|---|---|---|
| 1930 | 930 | 1,052 | 873 | 1,043 | 1,157 | 0 | 10,189 | 15,693 | $ 777 |
| 1940 | 1,233 | 492 | 265 | 752 | 1,297 | 0 | 14,779 | 19,369 | 993 |
| 1950 | 1,233 | 708 | 567 | 582 | 125 | 47,191 | 45,812 | 97,251 | 11,265 |
| 1957 | 1,433 | 1,502 | 504 | 898 | 953 | 57,585 | 76,825 | 140,310 | 34,115 |

**Texas units of commercial fishing gear**

| | Gill Nets | Trammel Nets | Beach Seines | Oyster Dredges | Purse Seines | Otter Trawls |
|---|---|---|---|---|---|---|
| 1930 | 487 | 80 | 63 | 38 | 0 | 264 |
| 1940 | 293 | 41 | 0 | 86 | 0 | 407 |
| 1950 | 31 | 42 | 4 | 18 | 10 | 1,506 |
| 1957 | 39 | 63 | 10 | 107 | 14 | 2,184 |

However, this is only a portion of the story. During the early 1940s the entire Texas shrimp catch consisted of white shrimp, *Penaeus setiferus,* a very large share of which was caught in inside waters by vessels up to 40 or occasionally 45 feet in length. During the past decade the white shrimp have declined in abundance. This decline may have been either caused or accentuated by the long drought period of the late 40s and early 50s, drastically raising the salinities in many of our usually brackish water estuaries which the juvenile shrimp use as nursery areas.

As the white shrimp declined in abundance the dealers commenced about 1947 to market the brown shrimp, *Penaeus aztecus.* Because of the scarcity of white shrimp and the heavy demand, the browns were gradually accepted. This change from white to brown shrimp (the 1957 shrimp catch was 94% browns) caused a change in fishing habits. Brown shrimp move out of the protected inside waters throughout the summer and at a smaller size than the whites. To take large quantities of marketable size brown shrimp the fishermen now had to fish the outside waters of the Gulf. This meant longer trips, more ice, sturdier gear, and larger vessels. The large vessels of today range from 60 to 70 feet in length. Within the past three years the "double rig" has become common. This consists of two trawls, fished simultaneously, on both port and starboard. Although this has increased the catching power of the vessel, it also may have increased costs.

There has been some shift in shrimp landings at different ports. The Brownsville-Port Isabel area was of very minor importance during the heyday of the white shrimp. In 1940 the Cameron County production was only 123,000 pounds, worth $49,000. By 1950, with the market established for brown shrimp, the catch rose to over 17 million pounds, worth $3.8 million. Since then the building of larger vessesls that range as far as the Campeche Banks has raised the catch to over 30 million pounds, worth $14 million.

A menhaden plant which operated near Galveston about 1915 failed. The industry was revived in 1948, and two plants now operate at Port Arthur and Sabine Pass. Large vessels, 80 to 100 feet in length, tow the purse seine boats to sea, where the 500-yard seine is set and pursed by these smaller boats. The catch of these oil-rich, herring-like fish is then pumped out of the net into the larger vessel. Even though Texas laws have restricted the fishery to Jefferson County, the 1957 catch was 58 million pounds. Years ago the meal was used principally as fertilizer, but today the trips are kept short, the fish are landed in good condition and the protein-rich meal is used as the animal protein ingredient in poultry and stock feed. This is the second fishery in volume in Texas.

Production in the oyster industry, which was well established at an early date, fluctuated around a million pounds, worth $100,000. During earlier years the

heaviest production was in the Matagorda-Lavaca Bay area with lesser production from Galveston and Corpus Christi Bays. Between 1940 and 1950 production dropped from 1,300,000 pounds to 125,000 pounds, a tenfold decrease.

This decline in oyster production may be partially ascribed to the prolonged drought, starting in the mid-40s, which changed brackish-water bays into salt pans. Since the breaking of the drought, there has been considerable recovery. Corpus Christi Bay which had declined until production was nil began producing again, and Galveston Bay production increased so that the 1957 production was 953,000 pounds. Galveston Bay has been the most consistent producer because of the heavy local rainfall, even during drought periods.

Minor commercial fisheries exist for redfish, black drum, and speckled trout. The landings shown in the table are both those netted by commercial fishermen, and those caught by hook-and-line as sport fish, but sold commercially. The black drum is very abundant in many bay areas so that the catch is limited chiefly by the price.

The red snapper catch was formerly made by a small fleet of hook-and-line vessels fishing chiefly out of Galveston. Although this fleet has dwindled, the landings have increased slightly. This is partially due to occasional red snapper trips by shrimp vessels during off-season shrimp periods, and partially to the fact that since the shrimpers are now taking chiefly brown shrimp which range farther and farther offshore as they grow larger, the vessels are catching a few red snapper in their otter trawls.

A sizeable fishery for shrimp to sell for sport fishing bait is carried on at many points along the Coast. Because of the scattered localities, and numerous dealers this fishery has never appeared in the commercial statistics. In 1957-58 the U. S. Bureau of Commercial Fisheries assigned special agents in the Galveston area to gather data on this fishery. In the Galveston Bay area alone they found over 200 bait stands selling live and dead bait shrimp, to the amount of nearly 1 million pounds, worth $1 million a year. Considering the long coastline that was not canvassed, it would appear that this fishery for bait shrimp exceeds in value the fisheries for all the minor species.

Future of Texas' fisheries will depend to a large extent on what happens to the shallow protected bays, estuaries, marshes, and bayous. These are the nursery areas where the post-larval shrimp settle to the bottom and in a few short months make a phenomenal growth before departing on their seaward migration. Schools of menhaden, like the shrimp, spawn offshore, and the tiny post-larvae likewise enter the passes between the barrier islands into the shallow brackish waters where they spend their first summer. This offshore spawning of adults, with the young growing up in the shallow areas is also typical of mullet, tarpon, and red and black drums.

Persons interested in the welfare of our State fisheries must jealously guard these protected inside waters against pollution, and against changes in water circulation or water quality that will degrade their value.**

# Inner Sanctum of the Sea

by HOWARD LEE
director, coastal division

WITHOUT SOUNDING like the voice of doom, let us open the door to an eerie underwater sanctum and see very briefly what lies therein. Perhaps before entering this inner sanctum we should understand each other. Webster defines sanctum as: A sacred place; hence, a place of retreat, where one is free from intrusion. From the point of view of the creatures of the sea, particularly the young fry, these words would describe a relatively shallow bay where food is plentiful and intruders may be successfully avoided.

Most of the forms which are sought after by man depend upon the sanctuary afforded their young by the shallow bays as an important part of their life cycle. The young of trout, redfish, drum, croaker and shrimp spend the first few weeks or months of their life in water less than two feet deep. This inner part of the bay then is their Sanctum.

As the young develop and grow they move to deeper water and all will eventually return to the sea. Their place of retreat, then, is seen to change as they mature even as ours does as we move from juvenile to adult.

It is after leaving the very shallow nursery grounds that most of the forms begin to become apparent to man. We do not eat them while they are so very small so we assume they are not there. For this reason man apparently feels that shallow water is unproductive and worthless. Therefore, it either must be deepened or dried up. Either dredge it deep enough for man to sail a ship through or fill it up to he can build a house.

Our estuaries (or bays to most of us) serve many other useful purposes for both man and marine life. They serve as a mixing bowl for the fresh and salt waters—here those forms which cannot tolerate very salty water such as the oyster can find an intermediate range in which they thrive.

As a means of transport our bays connected by the intra-coastal waterway provide great savings for industries located along the shore. The water is used as a coolant in many of the same plants. It also serves as a source of raw materials for some chemical industries.

Buried beneath the bottom of the estuaries are many millions of dollars worth of fossil oyster shells (mudshell) which serve man in innumerable ways. Recently oil and gas developers have gone deeper to add those items to the list of products.

The cost to industry of otherwise disposing of wastes which now are entering the bays would be staggering. Fortunately for the fishes only those wastes which are not harmful are allowed to be disposed of in this way. However, human nature being what it is, there often is some toxic substance turned loose to upset the norm and to intrude on the sanctity of the bays.

In many ways and for many days man can continue to realize the full potential of our bays. However, only by careful planning can he be kept from destroying one of his most priceless possessions — the inner sanctum of the sea. **

# Grassroots Action

sportsmen's clubs

by JAY VESSELS, Sportsmen's Clubs of Texas

MAN FOR MAN, you won't find a more durable citizen anywhere than the bed-rock member of a sportsmen's club. He's the talkingest, fightin'est, yes, and maybe the stubbornest character in circulation.

Today some 200 organized clubs in Texas are dedicated to betterment of wildlife conditions. These clubs are made up for the most part of "average citizens" who are interested in hunting, fishing, bird watching, archery, conservation, or just following the hound dogs.

Their scope is as broad as all outdoors and their interest is most intensive.

Those who make up these clubs have put in a great deal of time and money in unselfish efforts to protect wildlife resources, to provide for additional areas and to bring about protective legislation. Thus they have been a direct ally with the Game and Fish Commission in its efforts to produce efficient management programs.

As an example, when it became apparent that rough fish were taking over certain impoundments biologists of the Commission began studies on methods to eliminate rough fish and restore the waters for game fish. This would have been next to impossible except for the support of local groups.

Sportsmen's clubs through the old Texas Wildlife Federation took the leadership in bringing about the first regulatory authority efforts. Now nearly half the counties of Texas are under such a program.

At present most of the sportsmen's clubs of Texas are organized under one group known as SCOT—Sportsmen's Clubs of Texas. With headquarters in Austin the group works as a federation to achieve results at local and State levels.

Many of the local clubs are very strong factors in their areas. Some spread their effectiveness beyond strictly local lines.

A typical example of this is the Valley Sportsmen's Club, with headquarters in Harlingen. The club, with 1,000 members, led in the fight to close the Cameron County portion of Laguna Madre to netting. Next it sponsored a badly needed public boat ramp at Port Isabel. It cooperated with the Commission in establishing the Valley whitewing refuges and an artificial reef.

There's the strong West Texas Game and Fish Association, with several hundred members currently stressing the need for water-access areas and water safety.

Galveston, the coastal show place city, has a hustling sportsmen's unit named Conservation and Restoration of Wildlife, Inc. The club has fought netting in closed waters since its inception and was instrumental in the GFC effort to close Galveston bay to netters. CROW worked with county commissioners to create several new boat launching ramps and went to court to fight an effort to close beaches to the public.

In the same general vicinity, Beaumont's Gulf Coast Rod, Reel and Gun Club was one of the first to buy its own spacious quarters. Always active, the club sponsored a bond drive for a desperately needed Beaumont sewage disposal system.

Fort Worth Anglers Club is an old-time, 1,000-member outfit. It sponsored the original universal fishing license bill. It was instrumental in having the Eagle Mountain fish hatchery enlarged to serve the Possum Kingdom area.

Down at Baytown there's the Bayshore Rod, Reel and Gun Club, actively fighting illegal netting. Currently B.R.R.& G.'s setting up a mammoth new youth conservation-training program.

San Antonio's Anglers Club is one of the State's oldest outdoor organizations, dating from 1937. It thus has pioneered in many of the standard approaches to wildlife conservation and always has stressed work with the youngsters in nature study, rifle training, fishing, and casting. It owns a fish pond and rifle range.

Contrasted with the larger organizations grass-roots groups play a vital role in selling the conservation message. Just like the Anderson County Wildlife Association at Palestine, plus such distinctive outfits as the Ale & Quail Club of Maverick County; Koon Kreek Club of Athens (where the celebrities prevail); Texas Game and Fish Club of Dallas (whose airborne members think nothing of catching a fish on another continent); the Texas State Fox and Wolf Hunters Association of Longview. In the Coastal Bend country Laguna Madre Fishermen's Association works for everything in the conservation picture.

# FISH FOR 9,000,000

by MARION TOOLE

director, inland fisheries division

FRESH WATER FISH HATCHERY OPERATIONS, management of our inland waters, and a research program based on need make up the tasks of the Inland Fisheries Division. Carrying out these duties are the hatchery section, the Federal Aid Program section, and the lake and stream management section. When the total population of Texas is considered—9,127,000 in 1957 and an estimated 9,601,000 for 1960—helping the supply of fish meet the demands looks like a big job. It is.

The Commission now owns 13 hatcheries plus the former Federal Hatchery located at San Angelo, which the U. S. Fish and Wildlife Service has deeded to the Commission.

These hatcheries and their addresses are Lake Diversion, Box 74, Kamay; Possum Kingdom, Graford; Eagle Mountain, Route 10, Box 626, Fort Worth; Lewisville, Box 68, Lewisville; Tyler, Route 2, Box 202, Tyler; San Angelo, Box 1626, San Angelo; Ingram, State Fish Hatchery, Ingram; San Marcos, State Fish Hatchery, San Marcos; Huntsville, State Fish Hatchery, Huntsville; Jasper, State Fish Hatchery, Jasper; Medina, Box 331, Devine; Olmito, Route 2, Box 537, Brownsville; and Sheldon, Route 5, Box 665, Houston.

The hatchery system reared and distributed 14,852,999 fish during the 1957-58 fiscal year. Waters available to public fishing received 62.68% of the fish and posted waters obtained the remainder.

Should fish be desired for stocking purposes a request for a fish application can be sent to the Game and Fish Commission, Austin, on a 3c post card giving name and address. An application card will be sent to the applicant by return mail. The applicant should then completely answer all information asked for on the application card, being specific as to the surface acreage of the body of water, and return the card to the Commission. If his lake is 10 acres or larger in size his request should be made before April 1. Requests for fish for lakes or ponds under 10 acres can be made until August 1.

After your application is received and recorded, the card is then sent to the hatchery responsible for stocking the district in which your water is located. The hatchery superintendent notifies you several days in advance of the shipment of your fish, telling you where and at what time you must meet the hatchery truck.

Every effort is now being made to utilize the hatchery production in the most advantageous manner. Vast amounts of research have repeatedly pointed out the fallacy of the practice of restocking fish as a "cure all" for a declining fishery.

Hatchery fish stocked in new waters or old waters, devoid of fish that have been reclaimed by chemical treatment or draining, exhibit an excellent survival and growth rate, but when they are stocked in waters already populated with fish their survival is practically nil. This is due to the fact that the hatcheries cannot begin to approximate the numbers of fish that can be replaced each year by natural spawns occurring in a pond or lake. The hatchery can only stock 200 bass fry per acre of water, whereas, the output from a normal complement of bass usually found in an acre of water will conservatively amount to 460,000 fry.

Which method has the best chance for some of the young to survive? In view of the foregoing, we are substantiated in our belief that fish used for restocking purposes can be classed as wasted fish. Ordinarily a declining fishery can be attributed to some other cause that can only be determined by a survey performed by trained fishery personnel.

Federal Aid in Fish Restoration became a reality August 9, 1950, with the passage by Congress and approval by the President of the Federal Aid in Fish Restoration Act. This Act provides for the collection of 10% Federal excise tax on sport fishing equipment which in turn becomes available for apportionment to the States and Territories annually under the general administration of the Fish and Wildlife Service.

The states are responsible for the selection, design, and execution of projects and expend their own funds for project operation. Upon presenting evidence of satisfactory progress or completion, the State is reimbursed to a maximum of 75% of the cost incurred. All projects submitted, however, must be approved by the U. S. Fish and Wildlife Service before reimbursement can become possible.

The apportionment of funds to the various states is based on area and on license holders. Texas always receives the maximum apportionment on basis of area but the lack of a universal fishing license keeps Texas from drawing the maximum apportionment on basis of license holders. As a result Texas ranks fifth on apportionments.

Although Federal Aid moneys became available on July 1, 1951, the Commission waited until June, 1953, to start work under the Federal Aid Act. By so doing enough money from apportionments was stockpiled

to insure ample financing for carrying out the necessary projects.

Texas has been divided into nine biological regions with headquarters located at Wichita Falls, Denison, San Angelo, Fort Worth, Marshall, San Marcos, Austin, Mathis, and Sheldon Reservoir near Houston. Each region has a senior biologist in charge who devotes 20% of his time to State work under lakes and streams management and 80% of his time as project leader of Federal Aid activities. All regions except Sheldon have assistant biologists who devote all of their time to Federal Aid projects. Each biologist has two field assistants to help him carry out his duties.

### Past Projects Performed

Since Texas has never had a complete inventory of its fishes made, the first projects consisted of making basic inventories of the waters in Texas, the fishes in those waters and the relative abundance of the various species of fishes present. The need for such information is obvious since it would be folly to attempt any management without such knowledge.

Now basic surveys of all public lakes, streams, and rivers have been completed with the exception of portions of the Rio Grande, the upper Brazos River, and several other minor streams. Resurveys of all public waters in the State are constantly being made to keep existing data current. Pollution studies have also been made in conjunction with these surveys. Creel censuses have been made on Caddo, Travis, Devil's, Corpus Christi, Inks, Nasworthy, San Angelo, Benbrook, Whitney and Medina Lakes to find out how many fishes are being annually harvested by the anglers.

Data accumulated in the research pin-pointed the fact that the lack of angling success could be attributed to faulty fish population composition.

Although any restocking attempted under such conditions would result in a dismal failure, removing the whole fish population and then restocking fish from the hatchery gains about a 90% survival rate of stocked fishes. The discovery of so many faulty fish populations caused the beginning of experimental research to find ways and means of disposing of or reducing the numbers of the undesirable fishes in order to build up the desirable fish population. Various chemicals have been tested and one of the biologists discovered what is now known as the selective kill technique, whereby shad, carp, drum and buffalo can be killed without injury to the bass, catfish, crappie, and sunfishes.

Public lakes that have been selectively treated are Medina, Walk, Inks, Possum Kingdom, Fort Parker, Moss Creek, Buffalo, Wichita, Diversion, Eddleman and Graham. Fish condition factor studies and creel censuses have been conducted for two years prior to treatment and for two years after treatment on Lakes Medina and Diversion to determine the effects of such treatments on the fish populations. These studies reveal that all fish show an increased growth rate and that angling success also is greatly benefited.

Where shad are not found to be a problem, but other rough fish species are present in such numbers as to present a menace to the fishery of a lake, more drastic treatments are used, namely that of a total fish kill followed by restocking from the hatcheries. Public lakes thus far so treated are Ascarate, Sealy, Murvaul, Fort Brown, Maxey, Bonham State Park, Champion Creek, and Belmont.

Development work being performed entails vegetation control. All such major jobs have been concerned with hyacinth control. Under this program, 1,800 acres of hyacinths have been practically eliminated from Caddo Lake. A thousand acres of hyacinths have been killed in Lake Corpus Christi. Smaller jobs were the eradication of hyacinths in Turtle Bayou, Lake Belmont, and other bayous in Jefferson County.

### Lake and Stream Management Section

### Past and Present History

As it now stands this section of the Inland Fisheries Division had its inception on September 1, 1939. It was staffed with one chief and two assistant biologists who conducted investigational surveys of lakes, streams, hatcheries and gave fishery management advice to citizens of Texas desiring help with their problems. After World War II this division was expanded until eight biological districts were created and the districts were continued after the commencement of the Federal Aid Section. The ninth district included in the Federal Aid Section was created after the purchase of the Sheldon Reservoir properties.

Because Federal Aid funds must be allocated to specific projects that are inflexible, the lake and stream management section is extremely necessary in carrying out other required state fishery work.

The formulation of fishing codes required by the regulatory responsibility acts must and has been carried out by this section. This job requires that necessary data be compiled and meetings attended in order to work out judicious rules and regulations.

Although the Federal Aid Section is making, or has made, a pollution study in conjunction with their inventory projects it is still necessary for a trained staff of aquatic biologists to be available to check on pollution outbreaks as they occur over Texas. Such investigations can only be made under this section.

Lake and pond owners throughout Texas are becoming more and more cognizant of the necessity of utilizing various fishery management practices in order to provide better angling in their waters. The aquatic biologists are therefore being called on constantly to make surveys of these private ponds and lakes and to recommend required remedial measures for solving any fishery problem found. This type of assistance can only be charged to the lake and stream management section.

Biologists working under funds available from this section also are on call from the hatcheries to make investigations of problems such as disease and weed control and to aid the hatchery personnel in applying necessary treatments. **

# Under the Surface

by B. M. COLLIE
director, sand-shell-and-gravel division

MANY PERSONS WONDER, and quite a few have asked, why the management and control of the sand, shell, and gravel in Texas waters was placed in the hands of the Game and Fish Commission. That was done many years ago for three reasons: I. It was necessary to protect, manage and control a natural resource belonging to all the people of the State; 2. the Game and Fish Commission with its many wardens patroling the State was and is the only agency with sufficient trained personnel to enforce the sand, shell and gravel laws; and 3. the Commission with its marine and coastal division is the logical agency to locate and preserve live oyster reefs and keep them from being harmed or destroyed by shell dredging.

Sand and gravel are classified as minerals by the Bureau of Mines of the United States Department of the Interior. Sand is used principally for engine sand, glass sand, molding sand, paving, railroad ballast, and construction. Texas, in 1958, produced 26,800,000 short tons of sand and gravel with a value of $27 million. Only 4.73% of this amount, however, came from public streams and the remainder from privately-owned dry-land-pits over which the Game and Fish Commission has no control. The Commission receives 7c per cubic yard for sand and 8c per cubic yard for gravel removed from public streams. Revenue from this source last fiscal year to the Commission was $68,521.29.

Oyster shell is not classed as a mineral but rather as a by-product of marine life. It comes from and is a part of the physical make-up of oysters. It is replenished only to the extent of the oyster crop. Last fiscal year there were produced in Texas waters 11,294,261 cubic yards of shell which had an economic value of approximately $12,423,687. The Game and Fish Commission received $1,106,036.88 gross revenue from the sale of shell and made refunds to cities, counties and State Highway Department of $299,150.36. About 75% of all shell produced in Texas waters comes from the Galveston-Trinity Bay area.

Principal uses of oyster shell are road construction, manufacture of lime and cement, manufacture of glycols (anti-freeze), humectants which keep such things as cigarettes, hand lotions, and printers' ink from drying out; in the manufacture of certain types of fire extinguishers, liquid window-washing compounds, chicken and cattle feed, and in drying natural gas.

It is the responsibility of the Game and Fish Commission to issue permits, audit reports and accounts, audit refund claims, sound shell barges, inspect dredging areas, enforce all laws with respect to the removal of sand, shell and gravel, and locate the State boundary line along navigable streams. Every individual, partnership, firm or corporation that removes sand, shell and/or gravel from the public waters must secure a permit from the Commission before any operations are begun.

Sand, shell and gravel as well as its control have proved themselves vital to every Texan. **

# $ Dollars Grow $ on Trees $

by E. R. WAGONER, executive secretary
Texas Forestry Association

TEXANS CAN WELL BOAST of their tree crops. Some of the best-managed and fastest-growing pine woodlands in America are to be found in East Texas. Forest lands of the Lone Star State supply the wood for more than 1,100 mills and factories that produce nearly half a billion dollars worth of forest products a year. Forests and their by-products account for a large percentage of the State's processing industry and require the services of about 10% of all persons gainfully employed in the manufacture of goods. Literally, wood is "big business."

The contribution of Texas' forest lands and wood industries toward making useful products, jobs, and new wealth is steadily expanding. Trees are now recognized as a renewable resource. After more than a century of constant use, Texas timber lands are today growing faster than they are being used. Moreover, the amount of forest land has increased in recent years.

Keeping company with industrial giants like petroleum, chemicals, textiles, and food processors, the lumber and basic timber products industries of Texas rank high among major manufacturing industries. The forest industries of the State furnish steady employment to 33,000 persons. Texas manufactures a great number of forest products. Toys to delight the young, cedar oil, butchers' blocks, air-conditioning cooling towers, coffins, coat hangers, venetian blinds, boats, furniture, beekeepers' supplies, barrels, handles, fences, crossties, poles, piling, fence posts, pulp, and paper are a few of the many products of Texas forests. Over a thousand different products are made from our wood.

A few crude sawmills were operating in East Texas as early as the 1830s. Following the extension of the railroads after 1880, the lumber industry expanded rapidly. Sawlogs are the chief timber product and lumber continues to be an overwhelmingly favorite material for Texas home builders. Although lumber production remains high, Texas lumber output is considerably below that of the 1940s. We are currently producing about one billion board feet of lumber per year.

There has been a sharp upward trend in the production of pulpwood in the South. Texas' 1955 pulpwood production was over 14% above the 1954 figure. Out-of-state mills also draw heavily on Texas timber for pulpwood. Approximately 40% of the pulpwood cut in Texas is shipped to Oklahoma, Arkansas and Louisiana mills. The 1956 pulpwood production for Texas amounted to over 1,450,000 cords.

Veneer and plywood consume appreciable portions of our wood. East Texas veneer production has risen in the last two decades. Production of fruits and vegetables in Texas has made heavy demands for veneer containers to pick, store, and ship Texas-grown fruits and vegetables. A large variety of containers are required for agricultural crops, including lugs, bushel and half-bushel baskets, quart and pint berry baskets, crates, boxes, hampers and lids for many of these containers. Texas also produces commercial veneer and plywood for such end products as radio and TV cabinets and other furniture items.

Desirability of wood over other types of structural material is probably nowhere shown to greater advantage than in the crosstie field. The railroads' need for wooden ties continues in an age of steel. No satisfactory substitute has been found for wooden ties. Standard gauge U. S. railroads require 3,168 ties per mile. About 3% of these must be replaced annually. The annual tie replacement for Texas alone amounts to more than 1,500,000 ties.

East Texas is a leading producer of southern pine poles and piling. There are 24 wood preserving plants, in or near the Pinywoods area, treating poles and piling. These plants also treat large quantities of lumber, crosties, fence posts, and other miscellaneous items. In 1954, nearly a tenth of the nation's preservative-treated fence posts were produced in East Texas. It is estimated that about 10 million fence posts are used in Texas annually.

With our abundant oil and natural gas resources, the use of fuel wood in Texas has been declining sharply. But the manufacture of charcoal has recently been revived. The use of this fuel for barbecue pits and in outdoor fireplaces has increased rapidly.

In addition to the forest products obtained, the 11½ million acres of commercial forest land in East Texas provide food and cover for wildlife and provide other recreational benefits. Equally important is the protection these forests provide for our watersheds. Forests help prevent erosion and costly silting of impounding structures. Forests retard water, releasing it gradually. Forests are the most efficient reservoirs known to man. Seven per cent of the East Texas forest area is in public ownership; 21% is owned by farmers; 27% is in industrial ownership; and 45% is in the hands of other private owners.

The future of the wood utilization industry is very bright. It is now known that wood, as a fiber and as a chemical storehouse, promises to be the foundation of a series of great, new industries based on the utilization of a natural resource which perpetually replenishes itself.

Wood scientists are continuing to develop new uses for wood. The steady growth of our population means greater need for wood and wood products. Texas forests will continue to meet this demand. **

From the 20th of April to the 20th of August there was no rain, and then but one or two showers. About the 29th the wet season set in but the crops were by this time ruined. The only corn in the neighborhood was raised by Andrew Robinson, and but for the game with which the country abounds the inhabitants must have perished for hunger. It was no uncommon sight to behold from four to six hundred deer on the newly burnt patches of the prairie; which together with turkeys, snipe, grouse, quails, partridges, and the endless variety of birds so common to the country, sustained them . . .

# From Plunder to Planning

by A. S. JACKSON
wildlife biologist

QUOTED FROM CONVERSATION with a member of Austin's first colony, this description of the season of 1822 appeared as an item of interest to Texas emigrants in the *Colorado Tribune,* July 12, 1852. The theme was to be repeated with endless variation throughout the records of early settlement for every region of Texas. Thus nearly a century later many a dry-land homesteader of the Panhandle-Plains would be enabled to feed his family despite drouth and grasshoppers, faring on antelope and prairie chickens long after these species had been wiped out in earlier settlements of the State.

Prodigal abundance of wild game was a natural asset of the Republic and later the State. Early settlers took it more or less for granted, alike with an abundance of good soils, water, and wood for housing, fencing, and fuel. Long after, when county histories were being written, it was this hunters' paradise-beyond-all-imagining which the oldest settlers would always dwell upon in nostalgic recollection. Records still extant prove reminiscense did not outrun facts.

Actual figures are furnished by prosaic invoices: From 1844 to 1853 a trader, George Barnhard, ran a number of trading posts in Central Texas when that section was still in the hands of Indians. From 1844 to 1847 Barnhard was almost alone at Trading House Creek, eight miles southeast of Waco. From this one post alone, invoices show that Barnhard shipped not less than 75,000 deer skins during the period from 1844-1853. During the three years, 1851-1853 the number amounted to 33,891 deer skins. Barnhard's suppliers were the Indians living in villages scattered along the valleys of the Brazos and Bosque Rivers.

Uncontrolled and, to a large extent, wanton slaughter of Texas game species occurred during the three decades following the Civil War. During that period a frontier society expanded, repeating arms and fixed ammunition were improved and placed in mass production. Market hunting to supply buyers in other states became a lucrative occupation. These were truly the days of the mighty hunter. Never again would a man be able to record that he had killed 12,000 big game animals, as did one Texas buffalo hunter. As the great southern buffalo herd melted, professional hunters turned to market hunting for deer, antelope, turkeys, and even prairie chickens and quail. Inevitably, the supply of these dwindled, and lean days for the Texas hunter seemed imminent. Now, where newspapers had earlier extolled the exploits of community hunters for their vast kills of game, county news items began to chronicle the killing of the "last" deer, antelope, or prairie chicken. This dubious honor seemed sought after; some times mobs turned out and pursued the doomed animal for days.

Game laws were passed long before there were funds or machinery for enforcement. For the survival of the larger game species during the long period when there was little or no law enforcement, too much credit cannot be given the far-sighted landowners and ranchers who carried out their own conservation program, and determinedly, in the face of community opposition, preserved badly needed nuclei for future herds.

Of the original fauna of Texas, the Texas grizzly and the passenger pigeon are extinct. The buffalo, the Texas bighorn, and the black bear are for all practical hunting purposes gone. The buffalo was never in a strict sense a game animal; no professional hunter ever claimed there was any sport in killing these ponderous and stupid animals. Neither the buffalo nor the black bear would fit into our present economy; the stockman would not tolerate them. A few token herds of buffalo are maintained in Texas by ranchers to whom aesthetics still rate higher than fences; contrariwise, a few black bear still exist in the mountainous parts of Texas perhaps despite the ranchers' wishes. Both the bighorn and the passenger pigeon had such low increase rates that it is doubtful if either could have withstood appreciable hunting pressure.

More recently, the greater prairie chicken has completely disappeared from its original range in Texas, and the Attwater and lesser prairie chickens are barely hanging on, with little promise that the kind of range they require can be restored with the present demands made on grazing range. All the above, the buffalo, the bear, the mountain sheep, the passenger pigeons, and the prairie

chickens are in a way symbols of something priceless and lost. All of us to whom, as to Hafiz, the breezes blow "a memory of the ancient time," feel the poorer for their passing. However, because of her diversity of soils, elevations, and climatic range, Texas remains rich in kinds and numbers of game species, and there is promise that most species are secure, at least as far into the future as we dare to look.

Today, about the only gameless areas in Texas are the vast wheat fields and irrigated farmlands of the north and south plains where crop production is so sought after that no foot of wasteland is left for game food or cover. Even in these sections, the playa lakes fill in rainy seasons and attract large numbers of waterfowl and shorebirds. The long Coast line of Texas attracts myriads of waterfowl and shorebirds each fall.

The following upland species provide the most bountiful harvest to Texas hunters (not necessarily in the order ranked) :

White-tailed deer, mule deer, antelope, wild turkey, mourning dove, white-winged dove, bobwhite quail, scaled quail, fox squirrel, gray squirrel.

In the history of the Texas Game and Fish Commission, one of the most striking accomplishments has been the restoration of the colorful white-tailed deer to most of its former range in the State. Nearly every part of Texas, with the exception of the High Plains, now provides some part of the great annual harvest.

Texas leads the nation in the number of its wild turkeys. These, too, have been restored to far-flung river systems where they were extirpated during early settlement. Only in East Texas have restoration attempts met with failure, and restocking may succeed here with the scheduled program involving introduction of the eastern turkey.

But it is the small game to which most Texas hunters look for their shooting sport. Quail, doves, squirrels, and the lowly rabbit (notwithstanding the latter's non-game status by legal definition) yield more man-hours of recreation, and provide far more meat for the table than do the larger species. The annual harvest of these species has not been determined. They occur in such numbers, and are so widely distributed as to be available almost everywhere. They have high reproductive potentials and correspondingly high rates of annual turnover, so that not to crop them heavily each season is to waste a large proportion of the annual yield. Too, the hunting of the small game species has not come under the shooting preserve system to the extent that has the hunting of deer, turkeys, and antelope, and access to privately owned lands for hunting them is much easier to secure. Finally, these small game species are holding up well in the Texas of today. It seems doubtful that as many bobwhites were ever bagged during any 10 years of the old "lawless" days of the market hunters, as were harvested during the six weeks season of 1958-59. Earlier, there were simply too few people, and these few had not enough money, leisure time, and transportation.

What of the future? Wildlife administrators and technicians do not minimize the hazards for wildlife inherent in a pyramiding human population, heavy industrialization, and the consequent emphasis on securing the maximum production from each acre. They can only hope that wildlife will be included in the desired production, and view with encouragement a trend in that direction. **

clusively in Texas, the golden-cheeked warbler. The black-capped vireo of the oak scrub and the cave swallow, found in about 16 limestone caves, are also specialties of this interesting area, which is now being denuded of much of its cedar.

The vast grassy plains of the Panhandle would make monotonous birding were it not for the lakes and the occasional deep canyons. For a change of diet from horned larks and other grassland birds, birders in Amarillo frequently go to Palo Duro Canyon south of the city. There in the broken country in this great geological gash and in the groves along the river may be found a surprising variety, and it is here that unusual birds from the West as well as stragglers from the East are frequently noted. On the Staked Plains, or Llano Estacado, which occupy most of the northern and western parts of the Panhandle and extend southward to the Edwards Plateau and the Pecos River Valley innumerable "wet-weather" lakes and water impoundments attract many migrant waterfowl and shorebirds. At Muleshoe National Wildlife Refuge close to the border of New Mexico, flocks of thousands of sandhill cranes make a spectacular display in migration and in winter.

Although quite a few western species may be found as far east as Central Texas, the Pecos River is the classic dividing line between East and West. Beyond this point many eastern species drop out and western birds take over. The Trans-Pecos is a varied area of desert and mountains and in the higher reaches of these mountains may be found many birds which reside no where else in Texas. Each mountain range has a somewhat different birdlife. In the high canyons of the Chisos Mountains in Big Bend National Park painted redstars, blue-throated hummingbirds, Mexican jays, colima warblers and many other specialties of the Mexican mountains reach their northeastern outpost, while in the fir groves on the crests of the Guadalupe Mountains certain Rocky Mountain species attain their southern limit. There are still new discoveries to be made in the mountains of the Trans-Pecos as indeed there are in many sections of western Texas. There is much to be done toward determining the status of species in the area from 30 to 34 degrees North and from 100 to 106 degrees West. As it continues to be explored the known ranges of certain birds will be extended. The Amarillo area is being well checked on by the local group there. So is the Midland area and also El Paso, but many of the big open spaces need attention.

Birds and all wildlife are necessary to healthy land and contribute to our happiness, our recreation and our standard of living. The fabulous bird life of Texas is one of the assets of the State and the conservation of Texas birds, particularly through the preservation of suitable habitats, should be a matter of concern to everyone. You should investigate the fascinating sport of birdwatching. Whether an earnest hobby or a casual observance, you will find in it both pleasure and knowledge. **



***Of Things that Crawl*** • Continued from page 32

esting forms of our Texas wildlife. The ONLY poisonous lizards in the WORLD are the gila monster and the beaded lizard of Arizona, Southern California, and Northern Mexico (NOT TEXAS). No Texas lizard is in the least bit harmful. In fact, lizards are beneficial because of their almost exclusive diet of insects. Most are daytime creatures but two South Texas Geckos are nocturnal and hide under rocks or other cover by day.

The recent "Field Guide to Reptiles and Amphibians" by Roger Conant gives good pictures, descriptions and ranges of all the forms in the Eastern United States.

Anyone who hunts or fishes can increase his enjoyment by learning more about the other kinds of wildlife, including the creeping and crawling kind. Pleasure in the pasture is based on knowledge of nature; fear is fostered by ignorance.**

by L. A. WILKE

# TEXAS SIZE FISHIN' HOLES

THERE WAS A TIME, MILLIONS OF YEARS AGO, when all of Texas was a huge lake or sea.

Right now if all the rain that falls on the 168 million acres of Texas each year could be impounded it would create a lake more than 2 feet deep.

While most of this rainfall heads into the Gulf of Mexico, or evaporates in the hot summer sun, enough remains to cover 2,448,640 acres, creating lakes for domestic use and fishing for more than 9 million Texans.

Another 3 million acres is covered by coastal waters along the 973 meandering miles between Port Arthur and Port Isabel.

Texas is bounded and slashed by rivers and streams which might remain dry beds much of the time, except for the scores of man-made dams that impound millions of acre feet of water.

Most of these lakes were built primarily for flood control. In addition some hydro power is generated, and some of the water is used for irrigation. All of the water has its recreational value, altho recreation wasn't considered when the lakes were built.

There are no large natural lakes, as such, in Texas. The nearest approach is Caddo, on the Texas-Louisiana border. It fills from East Texas flood waters that sweep down Cypress Creek. On the Louisiana side, however, there is a small dam which helps the lake keep its level.

Some refer to Sabine as a natural lake, but here again salt water from the Gulf of Mexico backs up to hold in the fresh water.

The great and historic streams of Texas include the Colorado, Brazos, and Trinity in Central Texas. The Rio Grande forms the western boundary of Texas, from El Paso to Brownsville. Tributaries of the Red River slash across the Texas Panhandle to make it the boundary between much of Texas and Oklahoma. The Sabine forms the eastern boundary of the State. The Gulf of Mexico gives Texas a crescent shaped coast line.

Each of these streams support good lakes. Perhaps one of the most important from a recreational standpoint is Texoma, impounded by the Denison Dam.

The Colorado supports the Highland chain of six lakes in Central Texas.

The Brazos has two large impoundments, Whitney and Possum Kingdom. The Trinity boasts of a half-dozen large lakes in the Fort Worth-Dallas area. Currently the only lake on the Rio Grande is the fabulous Falcon, 50 miles south of Laredo.

A listing of the major Texas lakes and their fishing and launching facilities has been prepared by the Commission and is available to the public in limited numbers. **

## Palettes of Posies

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known almost everywhere; skull-cap, so-called from the likeness of its calyx to a cap with a short brim, or "bill," and an overhanging crown. These and others are widely distributed and well known. Fox-glove relatives, including species of beard-tongue, Indian paint-brush, and mullein (another naturalized European immigrant) are spread over almost the whole State.

Composites, or *Compositae,* a very large group, are estimated to contain more than 20,000 species, considered by some to be one tremendous family. One of the most familiar representatives is the sunflower genus of which there are numerous species. Its outstanding characteristic is that what looks like a single "flower" is in fact a large number of "florets" (diminutive flowers) some of which (the ray florets) look each like a petal of an ordinary flower, the others (central or disk florets) being compactly clustered in the center. Considered as one family, or as more than one, the group is further divided into "Tribes" to each of which some prominent genus gives (the) name, as aster, sunflower, bitterweed and others. Only those that are abundant in the first half of spring will be mentioned.

The first such tribe is the asters. Representatives are the various yellow, blue or white "daisies," though that name is also applied to members of other tribes.

The sunflower tribe includes many others besides the sunflowers proper: coneflowers, Mexican hats, brown-eyed susans, Coreopsis spp. (both false and real) Engleman daisy, yellow Texas star, mountain daisy, and numerous species less well known. Collectively they present widespread, riotous color.

The bitterweed tribe comprises several species of helenium, the eastern bitterweed, and of actinea, the western bitterweed. Others are Indian-blanket, and thyme-leaf. Still other genera having no common names but abundant and colorful westward are Tetraneuris, Amblyolepis, Chrysactinea, Tagetes and Pectis. Almost all are yellow-flowered.

The dog-fennel tribe containing dog-fennel, millfoil and chrysanthemum is not generally well represented till summer.

The squaw-weed tribe, besides several widely distributed species of squaw-weed, has the Indian plantain as its principal spring representative with one species inhabiting the East Texas forest, another the Coastal Prairie.

The thistle tribe contains species of only two important spring genera: Circium, the widespread and prickly true thistle, and Centaurea, one species of which, the American star thistle, particularly abundant in Central Texas, is at once very showy and devoid of prickles.

The dandelion tribe is well represented in spring by the true dandelion (Taraxacum), the false dandelion (Sitilias), prickly lettuce or compass plant, lavender-flowered straw flower, and sow thistle. The group, set apart by having only ray florets, is considered the most advanced in development of all flowering plants.

Truly, early springtime brings a vast coverlet of vivid color to the Texas countryside. **

## Temptation of the Gulf

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Coon Island, and by the Houston Club on Carancahua Bay.

Redfish prospects look good for Shickie's Point in Carancahua Bay, Redfish Lake, and near the mouth of the Tres Palacios River.

### Freeport

Most of the fishing in this area is done in the Gulf. An artificial bank of 600 car bodies, constructed ½ mile inshore of the ESE lump, should be ready to provide good catches of mackerel and snapper. Because of the numerous natural banks farther out, snapper fishing is a popular sport here. Other Gulf species similar to those at Port Aransas may be expected in this area as well.

### Galveston Bay

A recent survey of the Texas sport fishermen disclosed that more fish were taken by them from this area than from some of the other more productive bays of our Coast. The reason is easy: more fishermen!

Fish catches in the area last year reached an all-time high, and there is good reason to believe this year will be just as good or better. Best prospects are those reefs marked with orange and white buoys. Drifting along the channel over the flats should bring good catches.

Early reports of a good crop of young trout in West Bay and redfish in East Bay might serve as an indication that fishing for those species might prove profitable. Many large drum were found earlier around reefs in East Bay.

A bumper crop of white shrimp can be expected this summer. These will provide much food for the fish and tend to keep them in the area.

### Sabine Area

Occasionally good strings of specks are caught in Sabine Lake by "chasing the birds." Some good reds are taken in the lake but seldom in large quantities. Best lake fishing is usually along the Louisiana shore.

Best propects here lie in the Gulf. Several oil rigs just off the Louisiana shore are very good spots for blue fish in the spring and specks, spade fish, ling, and sharks in the summer and fall. The snapper banks should pay off again this year.

No matter how one may choose to regard fishing from the personal point of view it nevertheless remains an art.Familiarity with the region, the proper use of bait, lure, and gear, and some knowledge of the habits of the fish themselves are important factors in achieving fishing success. And even when all is said and done, the fish simply may not be around. The odds are in your favor this year, Mr. Fisherman; so good luck! **

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GAME AND FISH, the official publication of the Game and Fish Commission saw a rise in circulation—people wanted to know the facts. More brochures, bulletins, pamphlets rolled from the presses to the homes of West Texas ranchers, East Texas farmers, businessmen, doctors, lawyers, teachers.

Misuse of the land coupled with drought and flood found other natural resource agencies with the same problems as the Game and Fish Commission. People wanted to know how to protect their soil, save their timber, and conserve their water.

By now, the scientist had learned that all natural resources were related and dependent upon each other. Why not pool their informational and educational efforts in developing a State-wide conservation of natural resources program?

Some of them were surprised to learn that the informational-educational materials produced had been for adult consumption only. What about our youngsters? After all, true conservation aims for the future, and our future is our youth.

In the mid-forties, informational-educational representatives from the natural resources agencies met at A. and M. College to lay the ground work for an over-all conservation education effort, with new emphasis placed on youth.

Colleges, universities, the Texas Education Agency, and public schools joined with the resource workers in teacher training programs. Conservation courses and workshops were supplied with informational - educational ammunition prepared by the resource agencies and industry dependent upon nature for their basic raw materials.

Some of the teachers had to relearn that toads don't make warts; forest fires may destroy more than timber; and over-farming or overgrazing can ruin the land. They also saw new teaching opportunities. They knew that most youngsters are interested in living things. Since plants and animals depend upon soil, water, minerals, air and light, why not help their students gain in knowledge and develop an inquiring mind by learning of the things in their environment?

Today, trained teachers are taking the lead. They know that conservation education is their program and their challenge.

Today, it is the exception, not the rule, when one enters an elementary classroom in Texas and finds no natural resource material displayed—and well used.

Each year the Game and Fish Commission distributes thousands of packets of wildlife materials to teachers and students throughout the state. School libraries are being supplied with educational bulletins, and many of them are now subscribers to TEXAS GAME AND FISH. More than half of the Commission's film bookings are to schools. Boy Scouts, 4-H Clubs, F.F.A. and other youth organizations are asking for help in conservation matters. They are some of our most welcomed customers for they usually live "close to the land."

One thing beats pictures, films, and words in teaching youngsters about wildlife—that's the observation of the live animal.

The Commission's educational exhibit of native wildlife has been touring the State since 1950.

The dissemination of conservation information through the medium of television has breached our last frontier. Now the entire family, in the relaxed atmosphere of the home, can see and hear of the work being done to conserve our natural resources. They learn of its importance and what they can do to help.

The acquiring and sharing of knowledge in wildlife conservation matters is being accelerated. Farmers and ranchers now find that wildlife, properly managed, can be a valuable crop. Sportsmen, with their ultra-modern tools for the harvest, realize that they must regulate their take and aid in the planting.

One thing remains—the discipline of character—which must guide us in our actions. There can be no selfish motive in a true conservation effort.

When those who acquire the knowledge and skills needed in resource use, show, by their actions, that they aim at "the greatest good for the most people for the longest period of time," we have reached our goal.

Education is the key which will change conservation from a program into a way of life! **

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where seed crops were planted.

For the first time, however, the conservation program began to spread. In 1932 the Commission undertook its first deer transplanting. The following year the Federal government was given permission to purchase land in Texas. By 1935 the Texas Wildlife Research unit with A. and M. College, the Bureau of Biological Survey, the American Wildlife Institute and the Game and Fish Commission cooperating, was put into being.

Through the intervening years rapid strides were made. The Pittman-Robertson Federal Aid in Wildlife Restoration Act was created. By 1940 wildlife was beginning to make a comeback.

The population had reached the staggering figure of 6 million. There were paved roads into every section of the State and the primitive area was all gone.

The war years were difficult. Manpower was hard hit.

The first complete regulatory responsibility was granted to the Game Commission in 1943, for the area west of the Pecos. Within a year it was possible to authorize the first antelope hunt in 41 years.

Changes were still in process. In 1945 the writer became executive secretary of the Commission. We had to pick up the scraps of the war. We bought our first land for a game restoration program, which now is included in the Sierra Diablo Refuge in Culberson County.

Young men were coming back from service. We organized the first game warden school in 1946 through the A. and M. College and began a program of conservation education.

We started the Marine Laboratory at Rockport in 1948 and the next year we went into the Gulf States Marine Fisheries Compact.

We built more fish hatcheries to provide the growing number of lakes and streams in Texas with stock. The number of farm ponds, built with government financial aid, were increasing daily and needed stocking.

Between 1950 and the present date we have bought many thousands of additional acres of land in various sections of the State for wildlife management areas.

We started treating impoundments to eliminate rough fish. We became interested in building up the oyster reefs along the Texas Coast. We began a control of illegal netting. We created artificial reefs to improve coastal fishing conditions.

We began an intensified program to provide additional cover for upland birds and built a bird farm at Tyler to grow the birds for release on farms and ranches.

We were able to reopen a season for shooting white-winged doves in the Lower Valley of Texas. We have joined hands with other states in research and development of other worthwhile programs.

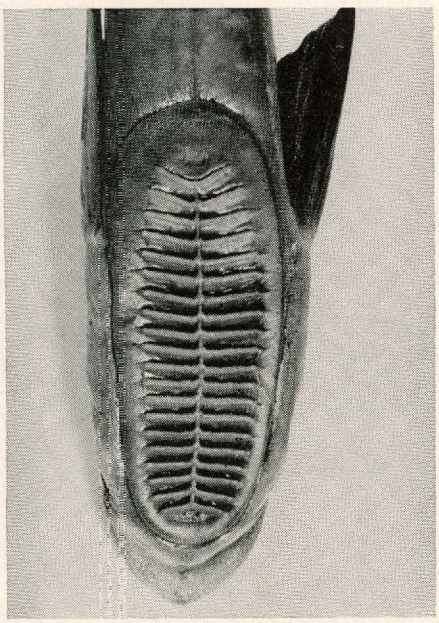
Hunters and fishermen have been appreciative and responsive to the program. Today with a population of more than 9 million, we have a strong, effective game department.

Today nearly half of Texas is under regulatory authority. We are selling 809,773 fishing licenses and 436,714 hunting licenses.

It's a big job that requires a great deal of help. **

# Junior Sportsmen

## What am I?



One of the strange animals in the sea is the remora. It has been equipped with an unusual tool, making it possible for the fish to cling securely to the side of larger fish, preferably sharks.

It is a fish with many names. Some of the most popular along the Texas Coast are "shark sucker" and "pilot fish." The remora is a poor swimmer, so, by using his laminated disc, or suction-cupped head, he zips up from his hiding place and hitchhikes a ride with a shark or other large fish, feasting on the leftovers.

The remora does have an ability to judge the sizes of his transportation. It will ride on a fish so long as this particular fish is the largest of all in the immediate area. Once a larger fish is spotted, the little pilot fish will drop off and zoom over and attach himself to the larger one.

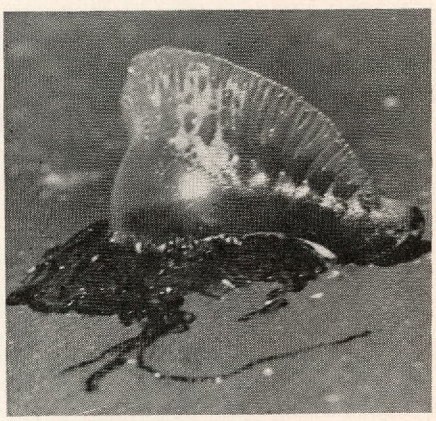
He's no sucker, that is, he doesn't place himself in a position where it's possible for the larger fish to grab him. He always chooses a spot out of reach of the jaws of his victim. He finds a nice, isolated spot and sticks to his business.

## Beautiful But Dangerous

This Portuguese Man-O-War has washed onto a beach. Each year these animals sail across the open seas and tumble ashore along our Texas Coast.

Trailing along behind this transparent "sail" are dozens of fiery tentacles sometimes stretching out as far as 50 feet. If one or more of these tentacles happens to drag across an unwary swimmer, thousands of stinging cells penetrate his skin and pour out their poison.

Many times intense stinging, swelling, and poisoning follow. The victim of this torture will remember the occasion for a long time. The Man-O-War is not equipped with these long tentacles for the purpose of stinging swimmers. They are used for protection and, most important, for the capture of small fishes which are eaten as food.



Man-o'-War

This treacherous creature of the sea is not one animal but many. At first there is only one. But later, it becomes a colony of polyps, tiny tube-like animals, attached to the original or parent polyp, which grows until it becomes as seen in the picture. Each Man-O-War has a large number of these polyps, each having separate duties to perform.

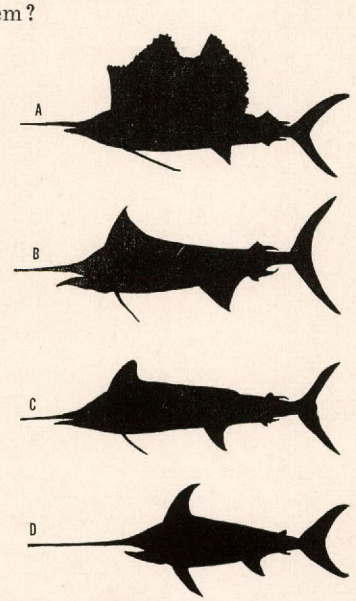
Thus, digestion is performed by the digestive polyps, reproduction by the reproductive polyps, swimming by the swimming polyps, and stinging by the stinging individuals. All of these go together to form the Portuguese Man-O-War, a silent drifter, with the most powerful stinging cells known to exist among sea creatures.

# FISH QUIZ:

Naming fish can sometimes be a difficult project. There are so many fish swimming in the waters of Texas that it would take quite a long list to cover them all. Fishes are identified by the proportions of their bodies, the number of spines and rays in the fins, the location of body parts, the scale counts, the teeth, the eye diameter, and the internal anatomy.

Color is not a reliable means of identification. Most fishes change colors rapidly while on the hook, when removed from the water, when dead, and some change normally while swimming around in their natural habitat.

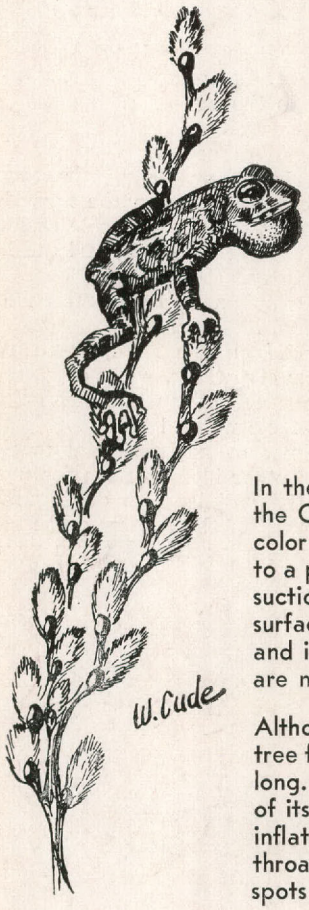
Many times even the special marks on fish and other identification features can be a little difficult to distinguish. See how many of the coastal game fish below look nearly alike. Can you name them?




Answers:

A. Sailfish C. White Marlin
B. Blue Marlin D. Swordfish

# Canyon Tree Frog


In the Trans-Pecos area of Texas, usually near water, is found the Canyon tree frog, Hyla arenicolor. Its gray or brown dark color is rapidly changeable, through distinctly spotted phases, to a pinkish or grayish unspotted white. With its well developed suction disks on fingers and toes it can climb even on smooth surfaces of rocks or trees. Its skin is rough with small tubercles and its head is broad, flat, and rounded in front. Its small eyes are metallic yellow or gray.

Although the Canyon tree frog is more clumsy and less colorful than the common tree frog, it can leap greater distances with its long legs. It grows from 1½ to 2 inches long. Like other tree frogs, it lays its eggs in a jelly-like mass in water but spends much of its time on vegetation surrounding streams. The canyon tree frog's call, given with inflated throat-sac in the case of the male, sounds like short bleats of a goat. The throat sac of the male is dark colored and large while that of the female is white with spots of dark. Both sexes give a sharp high-pitched cry when threatened.

Texas Game & Fish

Published monthly by

The Texas Game and Fish Commission

Walton State Building

Austin 14, Texas

POSTMASTER: If undeliverable, please notify at above address on form 3579.

To: