

Dallas Public Library

NOV 14 1951

Dallas, Texas

Texas Game and Fish

OCTOBER 1951 TEN CENTS

Dallas Public Library

NOV 15 1951

Dallas, Texas



This swift animal—the pronged-horn antelope—is a much sought after prize among Texas big game hunters. It will be the legal target for 536 hunters during a limited early October open season West of the Pecos. The hunt is closely supervised to spare the females and to otherwise safeguard the herds. This buck antelope aptly reflects the main distinguishing marks—longer and pronged horns and a black spot at the angle of the lower jaw.



Texas Game and Fish

A MONTHLY MAGAZINE DEVOTED TO THE PROTECTION AND CONSERVATION OF OUR NATIVE GAME AND FISH; AND TO THE IMPROVEMENT OF HUNTING AND FISHING IN TEXAS.

★

TEXAS GAME AND FISH is published monthly by the Texas Game and Fish Commission. Subscription price \$1.00 per year. Single copies 10 cents each.

TEXAS GAME AND FISH regrets that it cannot continue subscriptions beyond date of expiration. 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 postoffice 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.

Members of the Game and Fish Commission: W. Scott Schreiner, Kerrville, *Chairman*; Gene Howe, Amarillo; V. F. Neuhaus, Mission; Walter Lechner, Fort Worth; Richard M. Kleberg, Kingsville; Herman Heep, Buda; Frank Wood, Wichita Falls; W. T. Scarborough, Kenedy; J. W. Elliott, Mexia; H. D. Dodgen, *Executive Secretary*; W. J. Cutbirth, Jr., *Assistant Executive Secretary*.

Directors of Divisions: F. M. Cowser, Austin, *Law Enforcement*; Marion Toole, Austin, *Inland Fisheries*; W. C. Glazener, Austin, *Wildlife Restoration*; Joe Marks, Austin, *Hatcheries and Engineering*; V. E. Skaggs, Austin, *Chief Clerk*; J. L. Baughman, *Marine Biologist*; Everett T. Dawson, Austin, *Departmental Publications*.

Manuscripts should be addressed to Editor, TEXAS GAME AND FISH, Walton Building, Austin, Texas. All manuscripts should be accompanied by photographs. TEXAS GAME AND FISH always is interested in pictures of game and fish catches, unusual hunting and fishing scenes, bird dogs, and in group pictures of hunting and fishing organizations. Photographs used in TEXAS GAME AND FISH will be returned after publication.

★

Editor Dorothy Minten
Chief Photographer Lon Fitzgerald
Associate Photographer Gene Plummer
Circulation Department

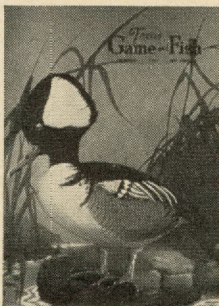
Mary Ann Holcomb
COVER Sidney A. Wooldridge
TEXAS GAME & FISH invites republication of material since the articles and other data comprise factual reports on wildlife and other phases of conservation.

★ In This Issue ★

October, 1951 • Vol. 9, No. 11

CONTENTS

Fish Gills, Bellows of Life	2
By RICHARD WILLIAMSON Oxygen in . . . carbon dioxide out, gills are marvelous precision instruments of Nature.	
Wildlife and Water	4
By EVERETT F. EVANS All animals and plants depend upon water to some extent, with the amount of dependence varying greatly among the different species.	
Texas Natural History—One Hundred Years Ago	6
By J. L. BAUGHMAN Last in the series of articles concerning the state's natural history one hundred years ago which serves as a basis of comparison for conditions today.	
What Is It?	10
By W. C. GLAZENER The author discusses the pros and cons of State Game Preserves.	
Land Use and Wild Turkeys	12
By EUGENE A. WALKER What comprises good turkey range? What must you look for in order to determine whether or not restocked turkeys may have a chance to increase and provide sport for hunters?	
Hunting Costs Analyzed, Meat Comes High	17
By JAY VESSELS Those fine deer horns and wild turkey trophies in terms of dollars and cents are analyzed in this article.	
Texas Waterfowl	20
By J. L. BAUGHMAN The birds of the Texas Coast are a never-ending wonder, from the tall and stately herons to the tiny jewel-like wood ducks.	
A Texan on Tour	22
By GEORGE CHRISTIAN An account of a trip through American and Canadian national parks as made by a Texas sports writer.	
The Highland Chain	23
By JOHN BABCOCK The Highland Lakes offer sandy beaches, mysterious canyons, vast stretches of rocky cliffs, and over 300 miles of rugged shore line to explore.	
Why Wildlife Conservation Is Needed in Texas	26
By JERRY SNELL "To succeed in rehabilitating wildlife in this state it will be necessary to employ the basic principles of natural production and to control the application of these principles over a considerable period of time."	
Fishes of Texas	27
By MARION TOOLE Twentieth in the series about Texas fish.	
Let's Go Fishin'	28
By KENNETH C. JURGENS Have you been overlooking a big fishing thrill? Try angling for the "rough" fishes.	
Marine Fishes of Texas	29
By J. L. BAUGHMAN Eighteenth in the series about the marine fishes of Texas.	
Letters	30
Books	32



The Cover

One of our most beautiful waterfowl, the hooded merganser, is portrayed on this month's cover by Sidney A. Wooldridge. Because of its tree-nesting habits and shy-retiring disposition, the hooded merganser may be found anywhere in wooded timberlands which surround ponds and streams. This duck winters in Texas; however, it is little valued as a game bird because its flesh is sometimes strongly flavored.

Fish Gills

BELLOWS OF LIFE

By

RICHARD WILLIAMSON

NATURE has done a marvelous job in constructing the gills which enable fish to obtain supplies of oxygen which are necessary to sustain life even in creatures which live in the water.

In lay language, the gill of a fish is an organ composed of a thin membrane through which blood inside the gill discharges carbon dioxide into the water which passes through the gill and which at the same time makes it possible for the blood to absorb oxygen from the water.

This discharge of carbon dioxide and intake of oxygen are possible because the membrane of the gills contains capillaries, which are minute blood vessels. It is through the walls of these capillaries that the interchange between the blood of the fish and the water in which it lives takes place.

The belief that a fish draws quantities of water into its gill cavities through the gills, absorbs the oxygen, and then discharges the water through the gills is not wholly accurate. Actually, the fish takes quantities of water into its mouth, then closes the mouth and forces the water out through the gills.


It should be noted, incidentally, that some species of fish do not take water into their bodies through their mouths. Some kinds of sharks, for example, draw water through organs called spiracles, which are holes in their heads, located near the eyes.

The flow of water through the gills is continuous—as is the breathing of an animal or a human being, who discharges carbon dioxide and takes in fresh supplies of oxygen from the air which is breathed into the lungs, where membrane containing capillaries performs the same function as the membrane in the gills of a fish.

Nature has not equipped fish with any organ to break water into its elements and separate the oxygen which they need. In other words, fish can use only that oxygen which is what scientists call free or dissolved in the water. Cold water and water which is tumbled over riffles—a process called aeration usually contains a maximum amount of oxygen, and fish thrive in it. Water that is warm or stagnant may contain a minimum amount of oxygen. Fish usually thrive and are active in clean, cool, running water but die in stagnant or polluted water in which dissolved oxygen has been depleted.

Surface activity of fish may be observed often when the water temperature is high or in slow-moving water. There is a logical reason for this. In all water the oxygen content is higher near the surface, where the water is in direct contact with the air.

In streams where conditions are ideal for fish life the oxygen content of the water is sufficient at all depths, and there is no need for fish to seek out those more heavily charged upper levels of water in their efforts to keep alive. *Pennsylvania Angler*



Gills of a fish are located at a point where the body joins the head. The picture below shows the construction of the gill, through which the blood of the fish discharges carbon dioxide and takes in oxygen from the water which passes through the organ.

WATER is always going somewhere. Year after year and century after century it moves from earth to air and back to earth through the unique process which we call the water cycle. Let's see how that process affects the relation between water and wildlife.

Water has a triple form, existing as a liquid, gas, or solid. It may be changed from one form to another without altering its chemical nature. From the viewpoint of the chemist and physicist, water is indestructible; but the opinion of a fish on this question probably would be unprintable. As far as wildlife is concerned there is no immediate difference between destroying the availability of water and destroying the water itself.

The total amount of water in the world changes very little, if any; it is the distribution which changes. Control of water to make it available wherever and whenever needed is a basic principle of conservation. Water may be the number one resource problem in Texas and other states in the Southwest.

Nature apparently rates water very high, because the oceans cover seven-tenths of the earth's surface. If the whole world were leveled, water would be more than a mile deep. (Remember that next time you complain about walking uphill.) There are two other little "if's" which save the day for man and other creatures on Mother Earth: (1) much of the plant and animal life would drown, and soon, if the soil could not absorb great quantities of water; and (2) all living things would perish if the earth could not give up some of its moisture.

All animals and plants depend upon water to some extent, with the amount of dependence varying greatly among the different species. For example, bobwhite quail can satisfy their moisture requirement with dew; but fish require a complex water habitat which involves a harmonious relationship of soil, plants, and stream life. Land animals are concerned mainly with the available supply of surface water, while water dwellers must have an adequate volume of water of the quality which produces plants for food and cover. This is where the plot thickens, for aquatic vegetation makes the most satisfac-

tory growth when the water has a fairly constant level throughout the year, and is reasonably free from pollution.

Many practices which are designed to control water also improve soil and create more favorable conditions for wildlife. Watershed management is one of the best examples of this

lation of wildlife which it can support. The number of fish or other aquatic animals in a stream or lake cannot long exceed the supply of food and cover. Improving the fertility of a watershed tends to improve the carrying capacity of the stream, lake, or pond which receives the runoff.

Wildlife AND WATER

By EVERETT F. EVANS

principle. A watershed is a drainage basin from which a stream receives runoff, and as tributaries merge into larger channels a greater drainage area is formed. Because water does not respect property lines, the efforts of some landowners to follow good land-use practices may be ruined by the negligence of their neighbors.

A watershed acts as a sponge, absorbing water until the saturation point is reached. The capacity of land to absorb and hold moisture is one of the most important factors in controlling runoff. Good soils can absorb the water from moderate rains for several hours before runoff begins. Naturally, we do not expect the earth to take in all of the water which falls. None of us wish to stop all runoff, because this would destroy lakes and streams.

The condition of land determines the quality of the water which it yields. A watershed with a thick cover of healthy plants produces a regular flow of clear water. Overplowed, overgrazed and deforested land produces rapid runoff of muddy water during rains and dry stream channels during dry weather. Nature protects watersheds by clothing them with grass and trees. While protecting soil and streams, grass provides forage for livestock and forests produce tree crops. Both grass and trees provide food and cover for wildlife. This is multiple land use at its best.

Water, like land, has a carrying capacity which determines the popu-

Prevention of silting is one of the most important and difficult problems in stream management. Silt interferes with the growth of plants by reducing the depth to which sunlight penetrates water. Clogging of stream channels by silt and debris lowers their capacity to carry runoff. Good erosion control, such as the maintenance of grass and forest cover on watersheds, is the best protection against silting. Vegetation should be well established on the drainage area before a lake or pond is created. In other words, soil, water, plants, and wildlife must be considered simultaneously.

Regularity of stream flow is an essential habitat requirement for all water animals and plants. Spring-fed streams are the best sources of water, but most of the rivers and creeks in Texas do not receive their flow from springs. This gives added importance to the maintenance of grass and trees on drainage areas.

Pollution is another factor which complicates the management of water in relation to wildlife. The principal sources of pollution are sewage, industrial wastes, oil, and silt. Bacteria require oxygen for the chemical breakdown of sewage, and the lack of oxygen may kill fish in polluted water. Because rivers and lakes must be used by many people for many purposes, it is not possible to prevent all pollution. That is one price which we must pay for the growth of cities

and industries. The only alternative is to manage all water resources for the purposes for which they are best adapted, including the conservation of wildlife.

Flood control measures contribute to wildlife conservation. Streams at flood stage carry fish and other aquatic animals out of their established habitat, and silt deposits bury fish eggs. When the flood waters recede, fish perish if they are unable to get back to the stream channels. Silt and debris may ruin good fishing waters. Floods interrupt stream vegetation by causing frequent changes in the water level.

The brighter side of the picture is that flood control measures are beneficial to wildlife. Grasses and trees

planted on steep land to control runoff provide food and cover just as they would if they were planted for the specific purpose of improving the habitat for game. Restoration of vegetation on large watersheds also improves the regularity of stream flow and the quality of the water. Some flood control dams create artificial lakes suitable for fish and waterfowl.

Ground water management is indirectly related to wildlife conservation. Both problems have been influenced by the growth of population, intensive agriculture, overgrazing of range lands, irrigation, overcutting of forests, and drainage of wet lands. Over much of the United States the water table has been lowered from ten to forty feet in the last one hun-

dred years. As the ground water reserves have declined there has been a gradual reduction in soil moisture. This in turn has affected plant growth, the source of food and cover for wildlife. In some places the lowering of the water table has reduced or stopped the flow of spring-fed streams.

Irrigation sometimes improves the habitat for game by creating a food supply on arid land. This advantage may be offset by intensive farming which does not permit the establishment of permanent vegetation.

This is only a small part of the story of wildlife and water, a story which can never be completed as long as man uses the land.



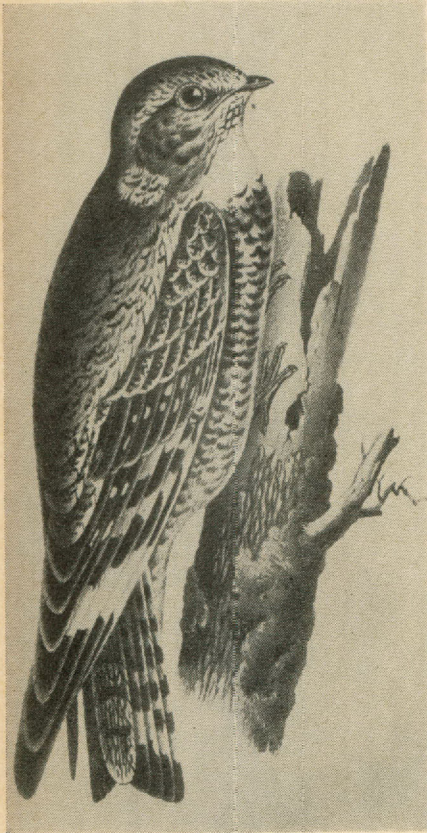
Soil, water, and wildlife occur in a harmonious pattern in their natural setting.

TEXAS NATURAL HISTORY

PART III

IN discussing the results of the trip in his "Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, Etc.," Bartlett says:

"In the mountains and along the water-courses, where there are more or less forest trees and shrubbery, both quadrupeds and birds are found in greater variety. Among the former may be mentioned the leopard, cougar, ocelot, lynx, panther; the brown, black, and grizzly bear; the fox, antelope, and various kinds of deer; the large wolf (lobo), and the coyote, raccoon, skunk, marmot, weasel; a great variety of moles, rats, and mice,



Texas night hawk

which harbor in the ground; hares, rabbits, squirrels, Rocky Mountain sheep, etc. These several animals, of course, have their particular localities. The elk is not found south of the Gila. The beaver is still met with on the Pecos, the Rio Grande, the Gila and its northern tributaries; and within a mile of El Paso I saw evidences of his labors. In the Copper Mine region, which is in the Rocky Mountains, almost every animal that I have named may be found; bears in particular are extremely abundant.

"But while the parched and desert plains are so destitute of quadrupeds and birds, they abound in reptiles and insects in the greatest variety. Lizards of every size and color, from one and a half to eighteen inches in length, are found here all of which are harmless. Then comes the family of 'horned frogs,' which are allied to the chameleon and lizard. Of these harmless little creatures, all covered, as a means of defence, with sharp horny projections, there is also a great variety. Next to these, come the poisonous reptiles. First is the horrid tarantula, with his hairy body as large as a pigeon's egg, and with legs as long as one's finger, striding over the ground and nestling under one's blankets at night. His sting, or bite, sometimes causes death. His habitation is in the ground, the opening of which he covers over with a trapdoor. There are other large spiders that also harbor in the earth, and protect the entrance to their abodes in the same manner. Next are the white and black scorpions, the former of which are very abundant. These are from one and a half to two inches in length. The sting of the black variety is sometimes fatal. The white ones were often found in the boots of the men, into which they crept at night, and were not discov-

ered until they stung the foot. A sharp pain was the consequence for a few hours, or perhaps a day, when it passed off. These creatures were sometimes found in our beds in the morning.

By J. L. BAUGHMAN,

"But perhaps there is no more hideous-looking reptile infesting the plains than the centipede. These are from three to ten inches in length, and are exceedingly poisonous, sometimes fatal. Then there is the venegron, as the Mexicans call it, a black insect about two inches in length, also very poisonous; and lastly, the alacran, a species of scorpion, the most venomous of all. These last, fortunately, are chiefly confined to the city of Durango; where, owing to their numbers, and the fatality which attends their sting, a bounty of six cents is given by the government for every one killed. We close this catalogue with the rattlesnake which needs no description. This creature is found every where, from the Gulf of Mexico to the Pacific, alike in grassy, rocky, and desert regions. Hundreds of them were killed by our party; yet I am not aware that any of us were bitten. Two horses that were bitten died. All the other reptiles and insects of which I have spoken are found throughout the countries contingent to the Boundary, and were seen almost daily. Thus has nature adapted a numerous class of animals

One Hundred Years Ago

for the otherwise solitary desert, where they enjoy undisputed sway. These plains also abound in moles, rats, mice, rabbits, and other burrowing animals; sometimes to such an extent, that it is dangerous to

far as we could see over the plain, their habitations extended, standing out in bold relief in the little hillocks they had raised with the earth brought from their subterranean abodes. Their habitations are usually about ten yards apart, and the hillocks contain from one to two cart-loads of earth each. Some have one entrance, others two, which incline at an angle of about forty-five degrees. To what depth they extend I could never learn, and only know that the frequent attempts to drown the animals out by pouring large quantities of water in them, have rarely succeeded.

"A well-beaten track extends from one to the other of these hillocks, showing that a close intimacy exists between their occupants, or perhaps a family connection. We supposed this community, or 'dog-town,' as it is called, extended at least sixty miles, as we traveled at that time twenty miles a day. As to its width, we could not form a decided opinion, but presuming it to have been only half as wide as it

was long, an idea may be formed of the vast number of animals it contains . . .

"Rabbits often burrow with these animals, or, what is more probable, they occupy habitations made by the latter. The habits of a rabbit lead him to places where there are more shrubs, and not a bare plain. It is probable, therefore, that the rabbits seen among the prairie dogs are merely wanderers, who have strayed away from their proper abodes, and finding comfortable quarters already provided, without the labor of burrowing themselves, have driven away the weaker animals and taken possession of their dwellings.

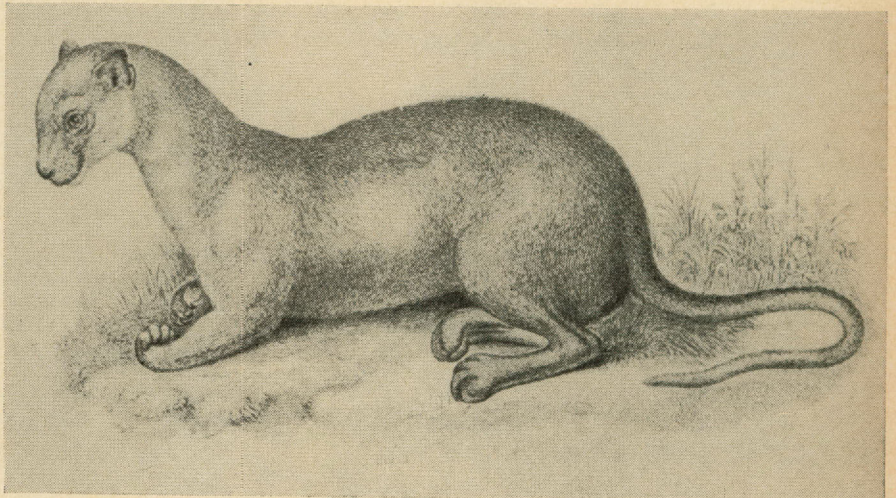
"A small brown owl also resides with the prairie dogs, and is almost always found standing on their hillocks, acting perhaps as a sentinel, for which the community has to pay dear. He is undoubtedly an interloper; as, from the known habits of this bird, one of which is its fondness for ground mice, moles, and other small quadrupeds, it doubtless seeks the habitations of the prairie

Chief Marine Biologist

pass over them with horses and mules. Many specimens of the lesser mammalia were brought home by the Commission, as well as a collection of reptiles and insects. Of reptiles, a very large number was discovered which are entirely new. This collection is now in the cabinet of the Smithsonian Institution at Washington.

"One of the most interesting animals met with on the prairies and high table-lands, is the 'prairie dog,' which is in fact no other than a marmot, having no character in common with dogs. Its look and habits are totally different. The Canadian trappers used to call it a 'petit chien'; and this, together with the noise it makes, which however, is more of a chirp or yelp than a bark, has caused it to receive the name of 'prairie dog.'

"The first community of these little creatures we met with was in Texas, near Brady's Creek, a branch of the Colorado of the east. This was the largest we ever saw, nor have I ever heard of one as extensive. For three days we travelled through this colony, during which time we did not lose sight of them. On either side, as



The eyra occurs along the Rio Grande and is shown here as drawn by one of the expedition's artists.

dogs to feed on their young. The parent dogs can have little courage to permit a diminutive bird like this to prey upon their offspring.

"But the most serious interloper in the dog-towns is the rattlesnake. I had often heard that this reptile was found among them, and thought it must be accidental, until I witnessed how frequently it occurs. On one occasion I saw several of these revolting creatures enter a single hole in the very midst of a dog-town. No one can believe that any friendship exists between animals of such opposite natures; and it cannot be doubted that the rattlesnake takes up his abode among them for sinister purposes. They cannot drive him

away, and are therefore compelled to give him quiet possession of any habitation he may enter, and allow him occasionally to feed upon the junior members of the fraternity.

"I have seen the prairie dogs in Texas, New Mexico, Chihuahua, Sonora, and California.

"During our various journeys we encountered numerous herds of antelopes on the plains. Several were shot and found to be excellent eating. They are more timid than the deer, and a good deal of strategem is necessary to secure one.

"The antelope is considered a more beautiful animal than the deer. Its legs are more slender, and its body of different colors, light and dark

brown, red with a white belly, spotted, and sometimes pure white. Their horns are quite short and consist of a simple curved stem without branches. Catlin, I think, in his "Wild Sports of the West," speaks of the curiosity of the antelope's disposition, and of a method resorted to by hunters to entrap or shoot it. This is to affix a piece of red cloth to a pole and insert it in the earth. The animals see it as they bound over the prairie, turn from their course, and timidly approach it, some venturous buck leading the way. The rest of the herd follow him in single file, after the old established custom of the prairies. In the mean time the hunter has concealed himself in the grass, so that, when the herd approaches, he selects the fattest for his mark. It sometimes happens that several are thus killed from a single herd. One of the members of the Commission tried the experiment of lying in wait for a passing herd. As they approached he shot one. The frightened animals ran a short distance, and then stopped and turned round to see what the mysterious noise was that had so alarmed them. They even returned to the spot where their dead comrade lay. A second shot brought another to the ground. The herd, again startled at the report of the rifle, loped slowly away a short distance, and once more returned to the fatal spot, when another was brought down. The sportsman now rose from his place of concealment and secured his three animals. How long they would have continued to return, I know not. He had but three bullets with him.

"In some parts of Texas deer are so abundant that it ceases to be a sport to kill them. Neither skill nor ingenuity is required, and even the usual caution of the practiced sportsman is unnecessary. Such is the case on the lower road from San Antonio to El Paso, at a stream called Turkey Creek. Here the train stopped one day to rest, when twenty deer were killed and brought to camp.



☆

On the return journey from El Paso, the wagon train was attacked by Apache Indians. The upper two figures in the photo to the left show the male and female of the broad-tailed hummingbird; the lower, a male black-chinned, both of which occur in Texas.

☆

After leaving the Rio Grande we found none until we reached the Rio Mimbres, where again they became numerous. Beyond that we found them in the mountains and along the bottomlands of the Gila, but not in large numbers . . .

"In noticing the distribution of animals over the desert regions which occupy so large a space of the interior of our continent, it will have been observed how beautifully nature has adapted them for these districts. Here man, the terror of all animals, cannot live; for there is no soil that he can cultivate, no water to slake his thirst, no wood to supply him with fuel; nor can the domestic animals so necessary to him exist. But while these inferior animals have such undisputed sway unmolested by man, their lives are, nevertheless, attended with other dangers. It might be supposed that the venom of the tarantula, the centipede, the scorpion, and the rattlesnake would effectually preserve them from all enemies. But such is not the case. A most voracious bird is found here, called by the Mexicans the "pay-sano," and by the Americans the 'chapporal cock,' which feeds on these hideous creatures. He even ventures to attack the rattlesnake, and, as if aware of the latter's venom, protects himself from its fangs by using his wing as a shield. Many instances have been related to me by eye-witnesses of contests between the rattlesnake and this bird, in which the latter always came off conqueror. His aim is to seize the reptile by the back of his neck, when he may be considered as vanquished. With the exception of this bird and the hog, every animal has an instinctive dread of rattlesnakes, and will fly at their approach. The hog eats them with impunity. Other dangers attend these reptiles from crows, buzzards, and hawks; while the serpent tribe get their living on the lizards and frogs."

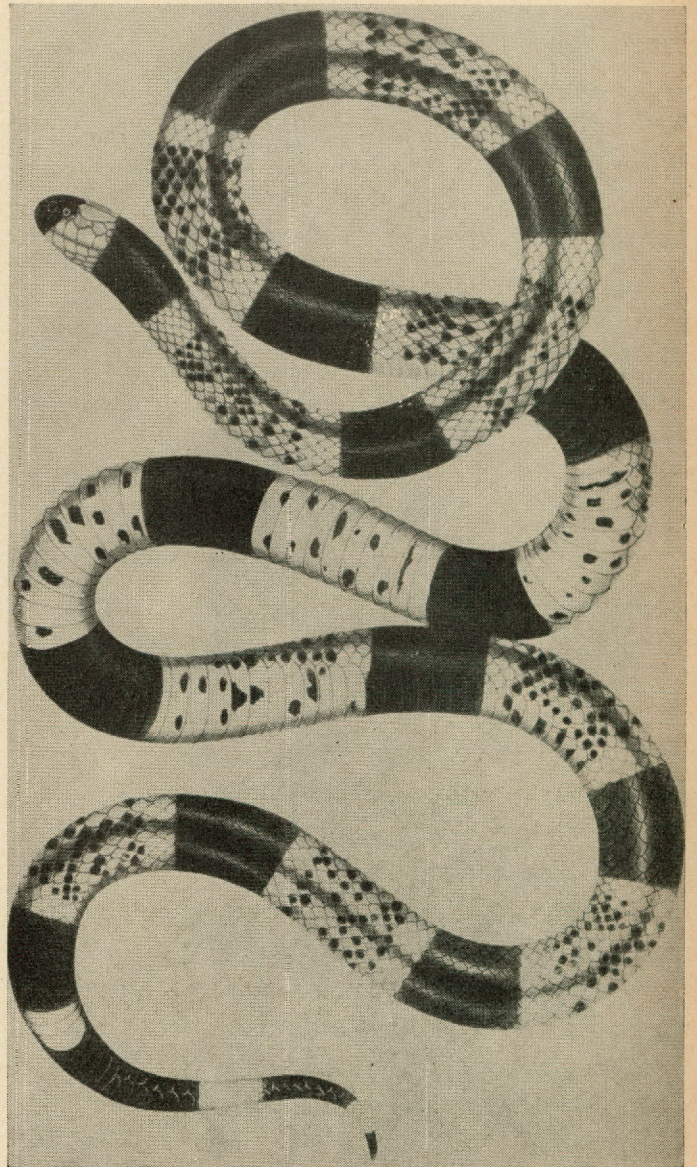
Truly, Texas was different in those days from what it is now.



☆

Bartlett traveled from Ringgold Barracks (or Rio Grande City) to Corpus Christi across a vast and rolling prairie where there were herds of wild horses, antelope and deer. This picture (above) shows a herd of wild horses stampeding the animals of the wagon train. Coral snakes (right) occurred along the path of the expedition.

☆



WHAT IS IT?

By W. C. GLAZENER

Director, Wildlife Restoration

IT WON'T reduce your taxes. Neither will it correct your game problems. As a matter of fact, there are now some serious questions as to just what good it does at all.

The accompanying photograph shows the official type of marker used in designating a State Game Preserve. One such sign is usually placed on each gate or entrance to a preserve. Others may be located at fence corners.

More than 25 years ago, the Texas Legislature enacted a bill providing for the establishment of State Game Preserves. Rigid protection of shrinking deer herds was a relatively new idea, and landowner control of hunting on his premises needed an extra boost.

Preserves are established only on the approval of the Game Commission. The trend now is to reduce their number because the day of their need is largely past, along with the horse and buggy. The desired results can best be achieved by other and more positive methods.

In theory the State Game Preserve was supposed to create an area on which unmolested game would develop a high population and spill over on to adjoining lands to provide good hunting there. Also, there was a provision authorizing the Game Commission to trap surplus game from the preserves for use in its restocking program. In some cases these objectives materialized, particularly in the early days of the program. More recently, however, beneficial results have been more restricted.

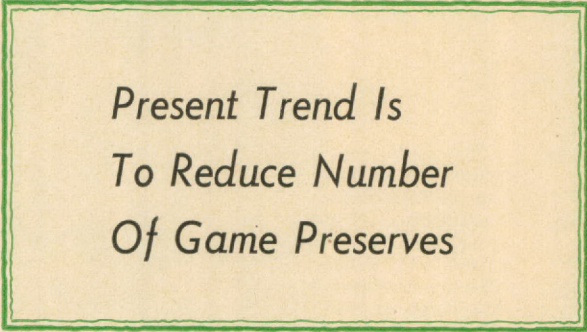
The passing years have brought about numerous changes since State Game Preserves were first authorized. Enactment or reasonable seasons and bag limits, together with sensible control of hunting pressure, led to better adjustments between the available game supply and the amount harvested. A majority of landowners in good game regions learned to act in unison on protective problems. An improved Game Commission program assumed its share of delegated responsibilities, including warden patrol and law enforcement.

As a result of these factors, many small tracts of land have, under normal circumstances, served the original purpose of State Game Preserves. At the same time, they were not hampered by the ten-year no-hunting terms of the State Game Preserve contract. When a good game population built

up, they could harvest the surplus by hunting.

In the past decade, overly long closed seasons for some game species have shown marked weaknesses. Several resident wildlife species show rapid rises and falls under natural conditions, usually at intervals of less than ten years. Because of this, harvestable surpluses on State Game Preserves frequently cannot be properly utilized and are lost to the hunting public.

Under the currently effective trespass law, there is little or no advantage to be gained through a game preserve status. Local resident cooperation and court support apparently offer more effective results in most cases.



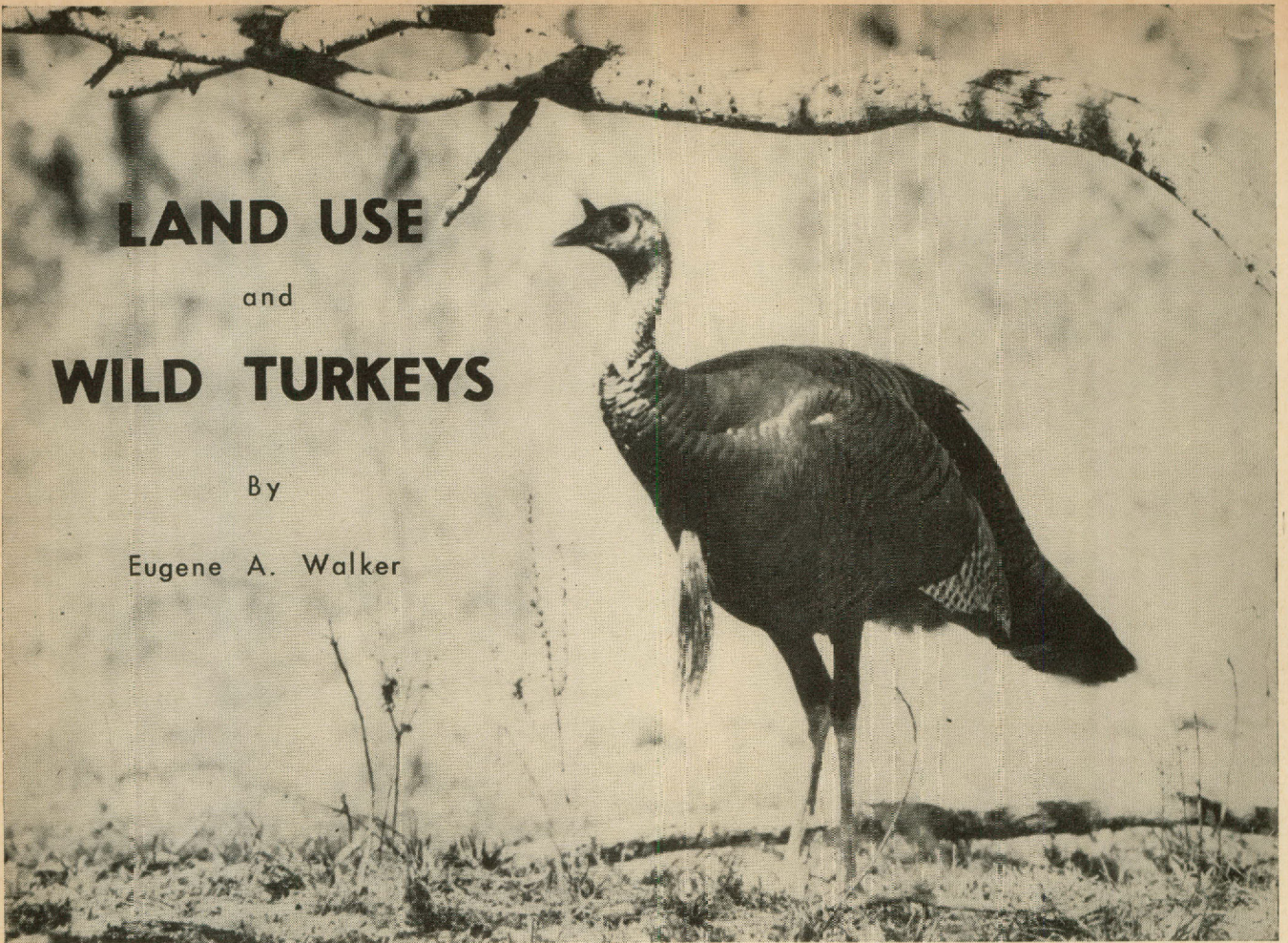
*Present Trend Is
To Reduce Number
Of Game Preserves*



LAND USE and WILD TURKEYS

By

Eugene A. Walker



EACH year the Texas Game and Fish Commission receives numerous requests for broodstocks of wild turkeys. These requests are from landowners, sportsmen, or sportsmen's organizations who are interested in restoring or transplanting wild turkey on their own lands or on lands upon which they hunt.

Although not generally recognized, it is true that much more suitable range is necessary to successfully manage wild turkeys than is required for white-tailed deer. Practically all of the high quality turkey range in the state is already inhabited. Those areas remaining, ranges of lesser quality, must be examined with care before turkeys are released in an effort to build up shootable populations.

What, then, comprises good turkey range? What must we look for in order to determine whether or not restocked turkeys may have a chance to increase and provide sport for hunters? To answer these questions we must know something about the kind of country turkeys prefer, their

life history, and food and cover requirements.

To begin with, suitable turkey habitat must include both summer range and acceptable winter range. The wild turkey is such a versatile bird that suitable habitat in various portions of the state may appear very dissimilar. However, most suitable range includes a good supply of oak trees, interspersed woodland and grassland and abundant water. The quality of the habitat depends upon the amounts and arrangement of these elements, together with the presence or absence of other factors which may either improve or detract from the range from the standpoint of wild turkeys. These other factors may take the form of natural foods in addition to the acorns supplied by the oak trees, abundant suitable nesting cover, or acceptable and well located escape cover. In addition to a suitable supply of trees and grassy openings, permanent water must be available, preferably in the form of creeks, springs, or earthen reservoirs.

Concrete stock watering troughs, if allowed to spill over and form small puddles, have been found acceptable to turkeys in the western portions of the state. Water is rarely a problem in eastern Texas.

Food is seldom short in supply during the summer months. At this time turkeys consume large amounts of grasshoppers, beetles and other bugs, and a wide selection of domestic grains when they are available. The seeds of such grasses as the panics, grammas, dropseeds, paspalums, and a variety of fruit and berries such as blackberries, dewberries, and wild grapes, are also taken with relish. One weed seed eaten in great quantity in South Texas is that of the goat weed, sage weed, or croton. Another reason for the presence of an abundance of food during spring and summer is that turkeys are thinly spread over more range at this season than at any other time during the twelve month period. For example, a flock of turkey which may winter in a 5 mile radius, have been known to spread out as far

Mr. Walker, wildlife biologist, based his article on work conducted under FA project 37-R.

as 18 to 20 miles to raise their young and spend the summer. This characteristic of the bird makes it necessary to include from 30,000 to 50,000 acres in an area where turkey restoration is contemplated, in order to give the turkeys year-round protection on both summer and winter range.

Studies by Game Department field men have disclosed that the higher the quality of the range, the less the annual spread from wintering grounds to spring and summer nesting and rearing areas. This simply means that in sections where the turkey habitat is of good quality, 15,000 or 20,000 acres may be sufficient for the yearly range of a given flock, while on poor or marginal range where the quality of the habitat is inferior, 50,000 acres may be required to support the same number of birds.

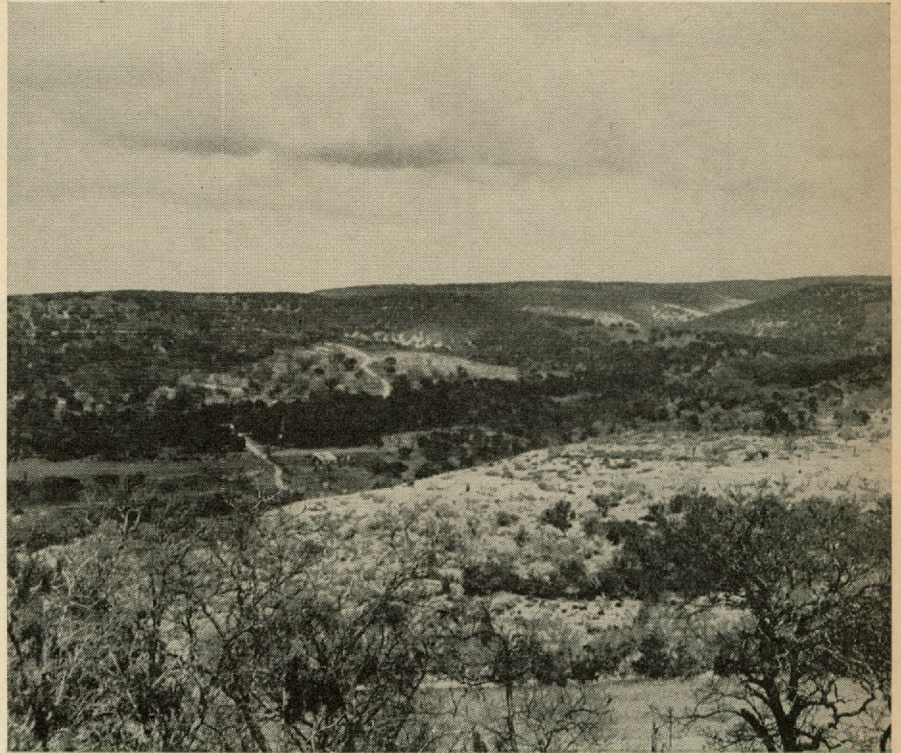
Food and cover requirements of the winter range are apparently more rigid than those of the summer range. Good winter range should include several species of oaks, suitable roosting sites in protected locations, permanent water, preferably at or near the roosting sites, and sufficient foods to carry the turkeys through the critical portions of the winter months.

Wild turkeys feed largely on acorns during the fall and winter months, although they take many other foods according to their availability. Turkey foods at this time have been found to consist of acorns, seeds of the rough-leaved elm, fruits of at least two sumacs, and insects, including both beetles and grasshoppers. The fruits of the hackberry, pecans, grass seeds, weed seeds, green forage such as oats, wheat and spelts, winter grasses, and green weeds, berries of the cedar, fruits of tassajillo cactus, fruits of the prickly pear, and many other items are also taken when they are present. As mast is one of the most important foods of the winter diet, it is easy to see why some of our best turkey country occurs in the Edwards Plateau where at least five species of oaks are present over considerable areas. Here, too, small grain, farming, cedar brakes, and both tassajillo cactus and prickly pear provide food and cover.

The taking of the fruits of tassa-

jillo cactus, prickly pear, and cedar berries appears to be more or less regulated to the last portion of the winter from December 15 through March 15 of each year. Usually by mid-December most of the acorns are gone. At this time the turkeys turn to cedar berries and cactus fruits as a source of food; not by preference, but of necessity. If the food supply is exhausted in one locality the turkeys will leave that particular range.

prickly pear bunches, or other places protected from livestock grazing. The seeds of both the short and tall grasses are important as sources of turkey food, and tall grass cover is heavily utilized in nesting activities. Insects are usually more abundant in rangeland which supports a healthy variety of vegetation than an overgrazed pasture. Some species of livestock, including sheep, goats, and hogs, very actively compete with wild



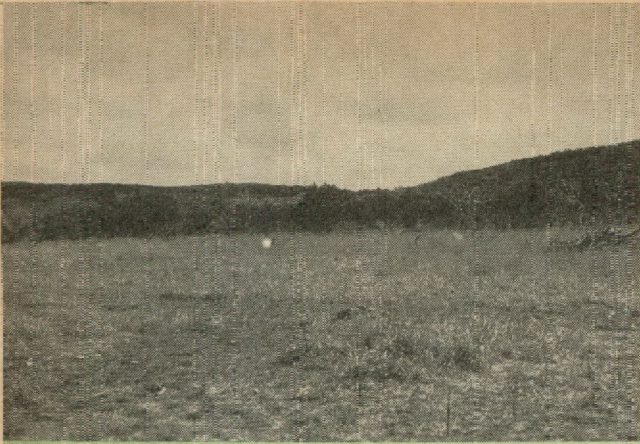
In these rugged cedar covered canyons of the upper Frio River watershed, turkeys have wintered in large numbers for many years. Even here clearing operations are endangering some of the last preferred winter range in the region. (Photo by author.)

Therefore, the period from December to March not only determines whether or not turkeys can live on a given area, but the number which can survive. This is the time of year when a little supplemental feed frequently influences the birds to remain on a range, when otherwise they would leave.

What does land use have to do with wild turkeys, did you say? In the first place, good pasture management is required before grasses can mature and produce seed heads. On overgrazed ranges, seedling reproduction of range vegetation is greatly retarded and is largely dependent upon small amounts of the better grasses which are able to reach maturity in brush tops, catclaw motts,

turkeys for acorns and other foods. Heavy stocking with any one or combination of these species has been found detrimental to wild turkeys. In this category, the white-tailed deer is also a competitor, and there are sections of the state where deer are so numerous that they consume by far the greater portion of the mast crop each year.

Studies by the writer in the Texas Hill Country from 1941 to 1950 have shown that wild turkeys have a decided preference for lands under good management over lands under poor management. Heavy grazing pressures eliminated ground cover to the point where turkeys were forced to nest in highway rights-of-way within a few feet of paved roads, or in



Blocks of virgin cedar brakes like this one (left) in southwestern Kerr County have become favored wintering areas for both deer and turkeys following the clearing of surrounding areas. Here food, cover and water are present, and here, also, the gobbler and the buck have a good chance of eluding the hunter. Thousands of acres which were occupied by an oak-cedar forest a few years ago and were favored wintering grounds for turkeys have been returned to grassland like this area (right) on the divide between the Fric and Guadalupe rivers in Kerr County. (Photos by author.)

other exposed locations. Acorn supplies were exhausted early by livestock and deer and the lack of sufficient food resulted in the total abandonment of much range which would have supported turkeys had the pastures in question been well managed under a carefully controlled grazing program.

There is no rule of thumb for determining just how many sheep, goats, cattle, hogs, and deer, or combination of these, can graze on a specific area without detriment to the wild turkeys which live there. No two landowners operate their holdings exactly alike and the condition of adjoining pastures may vary from excellent to very poor as the result of different grazing practices. In country which supports the necessary mast bearing species, range conditions are usually favorable to turkeys when they are also favorable to a sustained yield of beef, wool, and mohair, as the case may be. In some sections of the state, where a few turkeys can live under favorable conditions, an average stocking rate of 10 animal units per section may be required to maintain the range in good condition or allow it to improve, while in other sections where soils are more fertile, and food and cover more abundant, the stocking rate may be increased to 50 or 75 animal units per section without undue damage to turkey populations.

As was pointed out earlier, turkeys show a decided preference for pastures where the stocking rate is low

enough to insure a supply of mast, berries, and grass seeds during winter, and tall grasses in at least some localities through the summer. This preference becomes more pronounced during late winter when the natural food supply is exhausted on surrounding areas as the result of competition with domestic livestock and deer.

The improvement of pastures in turkey range enables more turkeys to live on a given area, provided an adequate supply of food and cover plants are assured. Straight grassland is deficient in foods and escape cover for wild turkeys. Range betterment may take any one of several forms. Reducing grazing pressure, clearing of brush and trees to allow more grass growth, terracing, contour plowing, pasture reseeding and spreader dam and earthen reservoir construction, are all practices commonly used in different sections as means to range improvement.

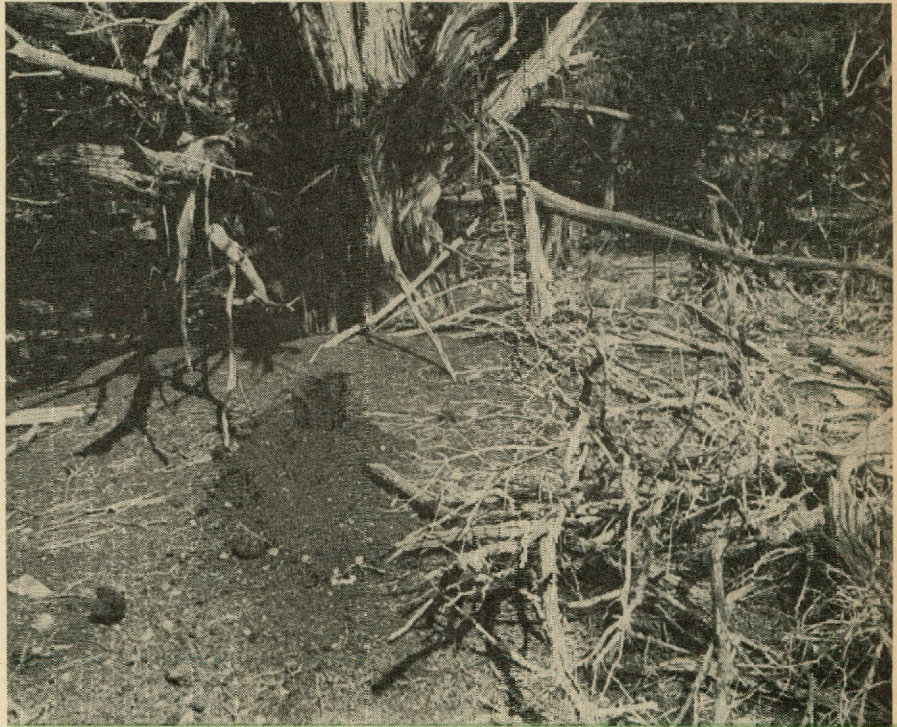
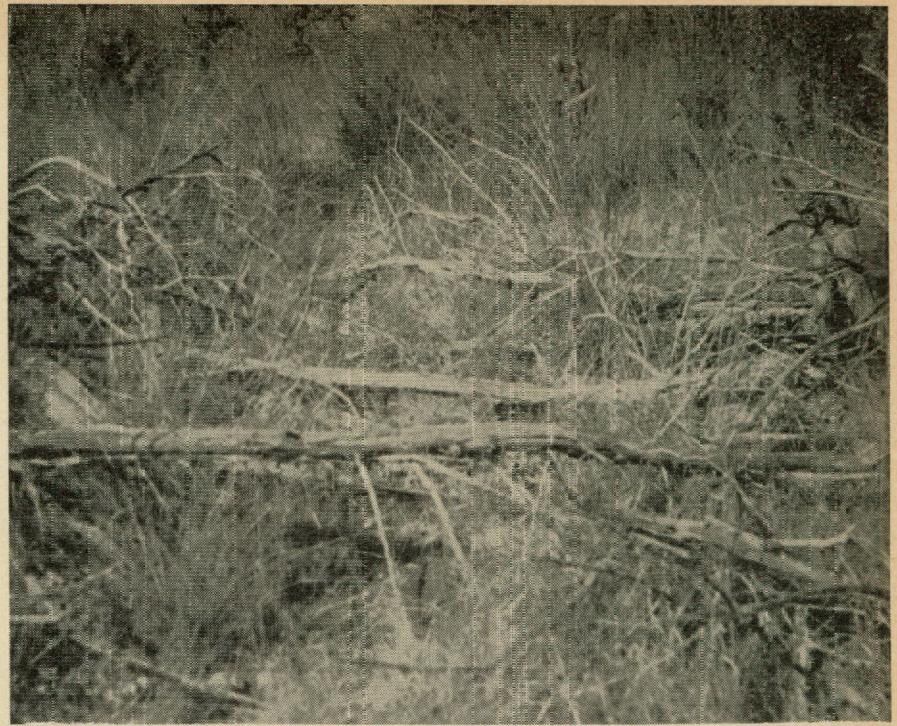
Probably the practice which can affect turkeys most adversely is that of pasture clearing. Large areas of turkey range in the Hill Country of Texas have been bulldozed or chained or otherwise cleared of cedar, shin oak, blackjack oak, Spanish oak, and other species. The purpose of these clearing programs are primarily to produce more grass for livestock consumption. In many cases, the degree of clearing recommended from the standpoint of livestock production is not the amount most advantageous to turkeys.

In some sections, in the cedar infested areas of the southern and eastern portions of the Edwards Plateau, extensive clearing operations have progressed for at least 20 years. Although early clearing was by ax cutting followed by burning, most acreages in recent years have been cleared by bulldozing and chaining. Many of the cedar brakes of the Edwards Plateau country were very thick and some were rather extensive. Clearing of spots here and there, as usually occurred under the ax cutting method, was beneficial to the wild turkeys of the region because it provided openings and grassland in forested areas. As the clearing program gained impetus, larger and larger tracts were totally cleared of cedar, prickly pear, tassajillo cactus, and in some cases, oak scrub. This extensive clearing resulted in more grass for livestock but lowered the carrying capacity of the range for wild turkeys, due to the loss of the much needed winter foods consisting of cedar berries, prickly pear apples, tassajillo fruits, acorns, and others. Loss of the protective cover of the cedar brakes was also important in reducing the numbers of both turkeys and deer. Such heavy cover saved thousands of deer and wild turkey from hunters' guns each year, and in the rough canyon country, the dense stand of cedars formed a renewable source of soil fertility for rich bottomlands below along the stream courses. Cleared areas in some sections have become so large that turkeys do not utilize

any portions except the margins. Much of the former winter habitat in the cedar forested canyons and adjacent uplands of the Edwards Plateau has been removed, forcing the turkeys into rougher terrain. This reduction in suitable winter range also limits the number which can find sufficient food and cover to carry them through the winter. Chaining of extensive blocks of turkey range has been observed to eliminate many of the important winter turkey foods. It is true that wild turkeys may utilize some parts of the cleared area as summer range but generally speaking, large blocks of cleared land are poor turkey habitat.

The present trend of wide scale clearing in the state should be examined critically. It has already been demonstrated that drastic reductions in numbers of both turkey and deer on Edwards Plateau ranges have occurred where extensive clearing of oak and cedar has taken place. After the supplies of food and cover afforded by cedar, oak, hackberry, rough-leaved elm and oak scrub, have been removed, turkeys have been observed to desert the area and deer populations to die down to the number which can exist on the greatly reduced supplies of food and cover. To offset this trend, there are many instances where farsighted ranchmen who have been conservative in their clearing programs, have been able to increase production of both livestock and game.

In other sections of the state similar results have come to light. Clearing of river bottom lands in South Texas has been unfavorable to turkeys, as such lands include their winter range along the Nueces, Leona, Frio, Atascosa, and other streams. In this section, turkeys spend the winter along the streams and fan out over the brushland in the spring and summer to raise their young. The river bottoms with their big timber of live oak, pecan, western hackberry, and in some cases, large mesquite; and bordered by brushland containing cactus, catclaws, and other food plants, provide favorable winter range. However, the total number of turkeys is primarily determined by the amount and availability of winter foods. In Texas, as in other states,



Little bluestem, silver bluestem, side oats grama, and curly mesquite grasses reach luxuriant growth in this location (above) where cedar was ax-cut in about 1944 and left on the ground unburned. The accumulation of 11 inches of humus under this old cedar (lower photo) on a slope of approximately 15 degrees, demonstrates the loss of valuable plant food when such cedar brakes in rough and sloping land are cut and burned. (Photos by H. C. Hahn, Jr.)

it has been found that predation and hunting pressure do not appear to be nearly so important in limiting turkey numbers as does the destruction of habitat.

The effects of clearing programs on turkeys in the Post Oak Belt are

not so well known to the writer as those in the Edwards Plateau. This region of the state contains very few turkeys today, although the pioneers reported that many were present 75 to 100 years ago. Attempts to restore the bird in this region have met with



Within a few hours the winter haven for deer and turkeys on the right was transformed into the area on the left which will be almost devoid of food and cover for a long period. (Photo by H. C. Hahn, Jr.)

very limited success and many efforts have resulted in complete failure. "Deadening" by girdling of trees on limited areas in heavy wooded sections of the Post Oak Belt could conceivably improve the range for turkeys, as tall grass nesting cover and an increase in the supply of berries, grass seeds, insects and other foods usually results. Bulldozing and chaining of trees and brush in this section have been observed to result in some instances in "blow-outs" of the sandy top soil, beginning in the holes left where the roots of the trees were pushed out of the ground by the machinery.

Regulated cutting of pine forests in East Texas, in some cases, increases the carrying capacity for turkeys, as grasses, berries, and oak shrubs, haw and other food plants commonly occur in cut-over land in this section. These plants are largely shaded out by mature stands of pine timber. Present practices of girdling of the oaks in our East Texas Pine Belt result in reduced acorn supplies

Although total clearing of large areas has been found to be detrimental to turkeys through habitat destruction, some clearing in heavily wooded areas can be advantageous. The point at which clearing should cease in any specific section of the state has not been determined. The answer will need be worked out for each section of the present turkey range. Proper pasture management in sections where wild turkeys are now present can result in increased pounds of beef, mohair, wool, mutton, and wild turkeys, provided the needs of the birds are recognized and provisions are made in the livestock program. The turkeys on such ranches constitute an additional crop of the land, and should be considered as such in the planning of any range management program. Some ranches have purposefully left heavily wooded areas for winter protection of livestock and as food and protection plots for game. Such blocks allow a limited number of turkeys to remain through the winter.

As most of the present turkey range in the state is located in ranch country, the burden of producing the wild turkeys which the sportsmen hunt each year is primarily borne by the livestock producers. If these men are to include the wild turkey's needs in their range programs it must be realized that there is a tremendous economic as well as aesthetic value in wildlife, and that proper pasture management techniques will insure increased harvests of both livestock products and game.

Texas presently produces more wild turkeys than any other state. If we are to retain this distinction, it is essential that greater care be exercised in the manipulation of game habitat. Suitable turkey range cannot be created over night. In some sections where nature worked 75 to 100 years or more to produce a favorable mixture of oaks, underbrush, and grassland, thousands of acres are rendered unfit for turkeys in a few days' time by the use of heavy machinery.

MOURNING DOVE

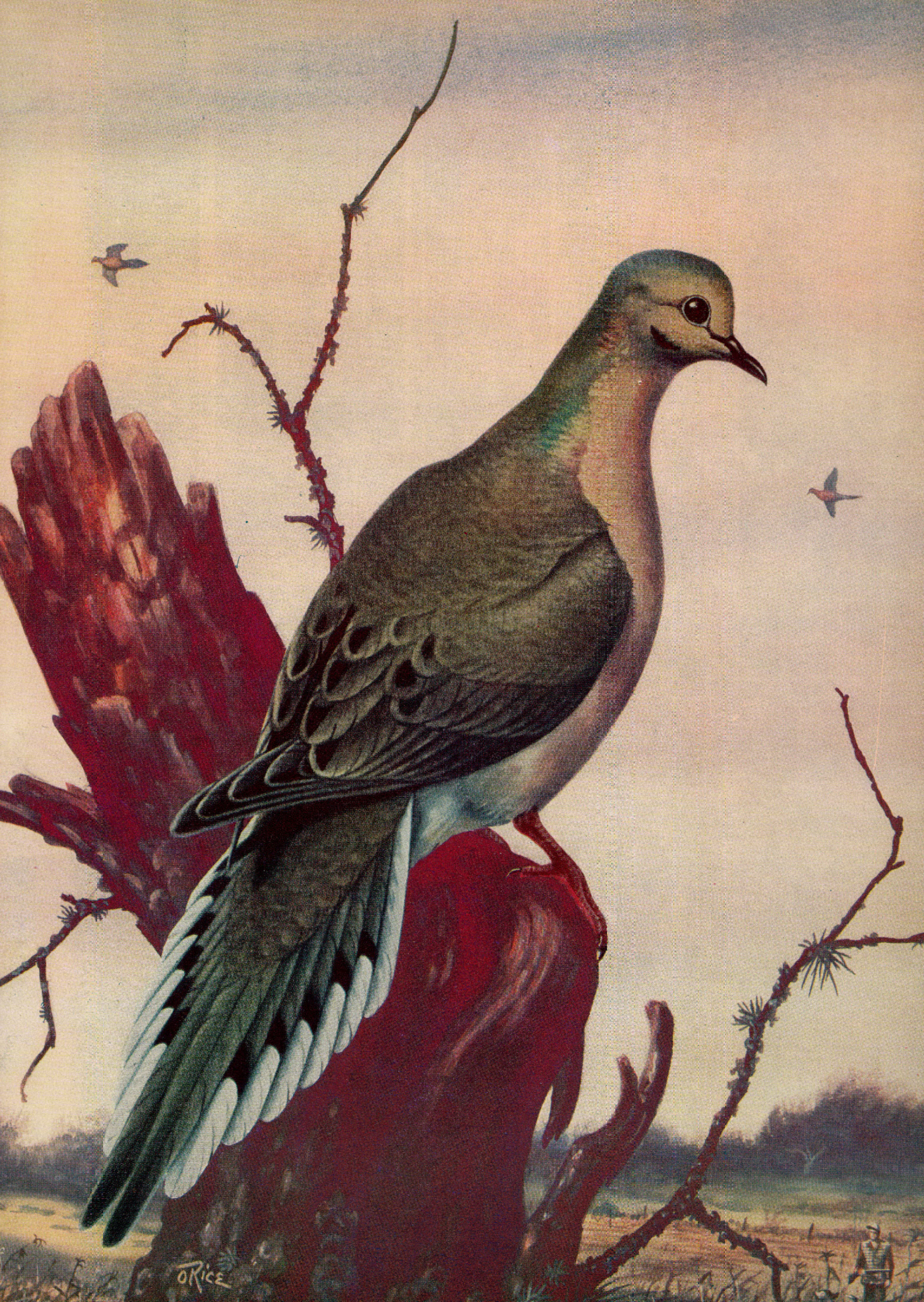
The mourning dove, one of the most widely distributed of all the game birds of America, is found in every state of the Union and nests in every county in Texas. This dove is brownish-slate in color, with white-tipped feathers in its long, sharp tail, and with black splotches on its wings. Both the male and female have red feet and black bills. Doves are migratory since many of them that spend the winter in Texas are hatched in some other state. Some of those that nest in Texas fly south for the winter.

Mourning doves build flimsy nests of sticks and twigs in trees and overhanging limbs along field borders, pastures, and roadsides. The eggs hatch in about fourteen days. The baby birds are awkward and helpless at first and remain in the nest to be fed by their parents until they are able to fly. Parent birds may raise two or more broods each year.

The mourning dove's food consists of seeds of many plants, such as goatweed, sunflower, Johnson grass, foxtail grass, cowpea, corn, rye, wheat, sorghum, feterita, and maize. It seldom eats insects. Gravel is eaten often as an aid to the digestion of food, and water is important and must be available for daily use. The dove is different from most birds in its manner of drinking water. It takes what it wants in a number of gulps, and the bill remains in the water until the bird has finished drinking.

Sharp-shinned and Cooper's hawks often catch doves; bluejays, shrikes, rats, crows, snakes, and certain kinds of ants prey upon the eggs, and sometimes the nestlings. The fact that doves naturally move to those areas where food and weather are favorable often accounts for poor dove hunting in certain sections of the state.

The dove is highly appreciated as a beautiful wild creature by some people. It is a symbol of peace to others, and still others depend on dove hunting for their early fall sport. As a weed seed destroyer the dove is surpassed by few other birds.



O'RICE

Wild Meat Comes High

By JAY VESSELS

Assistant Director, Departmental Publications

HEAD hunting, Hill Country style, can be rather expensive for Texas sportsmen.

The dollar-and-cents angle of those fine deer horns and wild turkey trophies is shown in an intriguing analysis by Henry C. Hahn, Jr., of Kerrville, wildlife biologist with the Game & Fish Commission.

The study was aided by 14 biologists and six game wardens. The Edwards Plateau, or Hill Country, was selected for the investigation because it has become one of the most productive big game areas in the United States.

The survey included a random probe into the private shooting affairs of sportsmen in a four-county area, comprising Mason, Llano, Gillespie and Kerr counties. Two hundred fifty hunters and the same number of land owners were checked.

Now, nimrods, get set for the pay-off:

The total spent by the average hunter for hunting in 1947 was \$271.97. The minimum annual expenditure per hunter was \$2, cost of a resident hunting license. The maximum expenditure was \$3,618.50.

The cost to harvest one wild turkey gobbler was approximately \$186.98. Ditto for one legal buck deer.

Hahn points out that some hunters covered by the study paid for the field costs of family members. Others financed shoots for business associates and prospective clients. Those items ran up the totals submitted as individual expenses by some sportsmen.

By the way, the poll showed that 54.4 per cent of hunters taken from a cross section were successful in killing deer in the four-county test area. Only 14 per cent were successful

in harvesting wild turkey gobblers. Weekly lease hunters reported the highest kill, with 84.2 per cent of them bagging bucks.

Seventeen per cent of these hunters reported that they wounded and lost deer, turkey, doves and squirrels. The number of deer wounded and lost amounted to 19 per cent of the total kill.

Here's how the \$271.97 spent by the average hunter was broken down:

Supplies and equipment, \$107.48; transportation, \$51.72; hunting lease, \$37.34; food, \$22.61; miscellaneous (camp cook, labor, insurance, etc.) \$16.84; refreshments and amusements, \$12.77; hunting dogs, \$10.68; mounting and tanning, \$3.88; game storage and processing, \$2.66; hunting lease elsewhere in addition to one on Edwards Plateau, \$2.59; lodging, \$1.91; telephone and telegraph, \$1.49.

Another major item was for hunting clothes. Approximately 54 per cent of the hunters purchased game bags, hunting jackets, trousers, shirts, caps, boots, or some type of clothing to be used primarily for hunting in 1947. The average amount spent per hunter was \$9.78.

The average hunter drove his automobile approximately 500 miles during the 1947 hunting season. Some of the mileage was made prior to the hunting season in completing negotiations for hunting leases and in reconnaissance of the hunting area.

One particularly painful item felt by a few, but spread over the average hunting costs, was the total of \$6,071 in fines and court costs paid in 1947 for violations of game laws in the four-county survey area.

Approximately 35.7 per cent of the total hours spent by hunters in the field were devoted to pursuit of deer

or turkey. These hunters, when interviewed, reported that they would have killed either a deer or a turkey, whichever offered them a chance. Therefore, the average cost to kill one buck or one gobbler was \$169.75. However, most of the time reported to have been spent jointly at deer and turkey hunting was probably spent hunting deer. Hahn said the time cannot be divided equally between deer and turkey for the following reasons:

A majority of the hunters prefer to kill a deer but will kill a turkey if offered a chance; the average hunter is armed with a high powered rifle which is not the best turkey hunting gun as it requires a high degree of marksmanship to kill a turkey with a large bore rifle; the average hunter's chances of killing a turkey gobbler are slim as compared to the chances of killing a buck because the wild gobbler population is much smaller than the buck deer population; wild turkeys are not distributed generally over the Edwards Plateau as are deer; methods of hunting turkeys differ from deer hunting in the Edwards Plateau Region.

Turkey hunting is often done from blinds which are built well in advance of the open season.

Feeding stations located near turkey roosts offer the hunter the best opportunity for killing turkeys.

Some hunters ambush the turkeys on the roost in the late afternoon and early morning hours. The number of hunters who kill turkeys in this illegal and unsportsmanlike manner are, fortunately, in the minority.

Hahn reports a hunting club law passed by the Texas Legislature allows landowners to sell hunting privileges on their property. Landowners who

sell hunting privileges are required by this law to register their property with the Texas Game and Fish Commission and purchase a shooting club license which costs \$5.00. The operator is required to record the name, hunting license number, and complete address of each hunter who hunts on his property; also the number of days spent hunting and the total number of game animals killed by each hunter, including the landowner, members of his family, guests and paying hunters, are required to be recorded by the provisions of the shooting preserve law.

Approximately 45 per cent of the landowners in Mason, Kerr, Llano and Gillespie Counties purchased the shooting preserve license and sold hunting privileges to sportsmen in 1947.

The poll revealed that the average landowner controls 831 acres including 771.2 acres in pasture and 59.8 acres in cultivation. Seventy-eight per cent of the landowners live on the land while 22 per cent live in urban areas.

Landowners asked about damage game animals caused, reported that the average amount of damage to garden and field crops by deer, wild turkeys and squirrels, and losses resulting from over-populations of deer in competition with domestic livestock on the representative farm in the Edwards Plateau was estimated to be \$37.92.

About 14 per cent of the landowners reported that deer damaged their corn, tomato, strawberry, hegari, oat, maize, barley, pea, peanut and watermelon crops, but they could not accurately estimate the monetary value of the products destroyed.

Several farmers reported that they have ceased to plant peanuts, peas, corn and tomatoes because of continuous predation by deer, raccoons and squirrels. One farmer hung lanterns and tied his dogs in his pea patch, but in spite of these precautions deer ate the peas.

One landowner reported to Hahn that deer were literally running the people out of the country. Another rancher claimed that deer caused

\$3,000.00 worth of damage by over-grazing his range. It was this operator's contention that he could have raised that much more beef that year if the deer were not present.

A farmer reported that wild turkeys tolled his tame turkeys away from home and he has not seen them since. Another landowner said that he would like to see all of the deer in the County poisoned or killed in some manner since they were not good for anything.

About 4 per cent of the landowners voluntarily reported that they would like to see the deer population reduced and controlled. Many landowners, however, expressed a desire for more game on their land.

Hahn emphasizes that the production of game is not all clear profit to the landowner as many people are prone to believe. It requires nearly a thousand pounds of range forage to support one adult deer for one year. Deer in many of the farming districts have become a nuisance and a source of serious crop damage. In areas where high deer densities occur, the small percentage of deer harvested annually under the existing buck law does not materially reduce the population, and in a short time the range becomes overstocked. This condition accelerates range impairment which eventually leads to a high rate of mortality among the deer. No one gains when this situation occurs.

A landowner in Kerr County told Hahn that the \$1,500 he receives each year for the hunting privilege on his 3,300 acre ranch compares with income from livestock under normal conditions. He related that the value of deer has not fluctuated over the years and that he has a greater demand for hunting leases than he can supply.

Often game, in relation to range, is not considered of major importance and proper provisions are not made in the range program to benefit game. Consequently, in recent years serious die-offs have occurred among the deer in areas of high population, according to Hahn's findings.

In areas of high deer population

the small percentage of deer harvested annually, in compliance with the existing buck law, does not materially affect the population or compensate the landowner for boarding the large deer population. These factors are not favorable to good game management. Land operators would probably take a greater interest in game production if they could harvest more game at a reasonable profit.

Game population studies conducted in Gillespie County revealed that approximately 10 to 15 per cent of the total deer population is harvested annually. Considering the fact that the presence of game is more or less incidental in many sections of the Edwards Plateau, Hahn states, it is encouraging to consider what the income from game production could be if properly managed.

The economy of the Hill country is dependent principally upon agriculture but the production of game is one phase of agriculture which has not received the attention it deserves. Game, the most valuable natural resource of the area, if produced and harvested with the same amount of know-how devoted to domestic livestock, would provide a cash crop second to none.

Hahn concludes that the aesthetic value of game, an item which he did not undertake to appraise, amounts to untold wealth to the people of the Hill Country and elsewhere. Monetary value cannot be placed on the benefits received by thousands of tourists and health seekers who flock to the Hill Country each year. Inestimable value is received by old and young alike in observing wildlife in its native haunts. Hahn emphasizes that the Hill Country affords an excellent place for nature study by students and campers. Many training camps for teen age boys and girls are located throughout the region. In recent years the National Audubon Society has conducted nature study classes in the Hill Country. The abundance of game animals provides an excellent opportunity for students to study the relationships existing between wildlife and range management.



Here's a head hunter's paradise—a taxidermist's display room where the bucks are mounted for the supreme edification of the lucky hunters



Texas Waterfowl

By J. L. BAUGHMAN

Chief Marine Biologist

THE BIRDS of the Texas coast are a never-ending wonder, from the tall and stately herons to the tiny, jewel-like wood duck.

Each morning, when I leave my home, I travel the half-a-mile road along the shores of Little Bay, at Rockport. Sometimes the water is blue and clear; at others it is rippled by the wind until it looks like watered silk; again it may be gray and angry with storm. Most beautiful of all its faces, however, is that exhibited just before sunrise on a spring morning,

when the gray of the sea reaches out to meet the gray of the sky, and no man can tell where the two of them meet. Then the water, like grey glass, stretches, serene and clear, a mirror for the birds.

Mostly these are members of the heron tribe. There are dignified blue herons, dainty snowy egrets, graceful black and white stilts, reddish egrets, clownish Louisiana herons, and half-a-dozen others, all engaged in getting breakfast.

Far out in the bay they loom

blackly against the first flush of dawn, dark silhouettes cut from black paper. Nearer at hand, however, so motionless do they stand that their images lie unruffled on the water's surface and you see not one bird, but two, like birds on a Japanese print. Withal there is a ghostly, silvery quality to the whole scene, so that Little Bay seems like some opalescent, fairy lake, where stand the avian hordes of a dream.

If a fish shows up near one of them, the picture changes. Great blue



Roseate Spoonbills

herons that have stood unmoving and statuesque for hours dart out their javelin-like beaks, generally coming up with a silvery mullet in their grasp. These they swallow head first, and then, with a satisfied squawk or two, return to patient immobility, waiting for the next. Along the margins of the bay, snowy egrets mince coquettishly, alert for smaller fry, and black-and-white stilts, like gentlemen in evening dress, keep up their ceaseless search for food.

Louisiana herons, smaller and more active than their great blue cousins, make sudden ludicrous dashes, racing madly across the shallows; killdeers run rapidly along the shoreline and, occasionally, a reddish egret will dance a mad pas seul from sheer joy of living.

Equally interesting are the gulls and terns. These airy wanderers occasionally rest on the sand bars of Little Bay, awkward and ungainly in repose, but marvels of grace when they softly spread their wings and, after a few running steps that a ballet dancer might envy, float up and up into the heavens, white snowflakes against the blue Texas sky.

They are consummate fliers, masters of the wind. I remember one perched on the railing of Copano Causeway which, when I approached, gently spread his pinions and without a single wing beat rose smoothly on the winds. At Corpus Christi seawall, where the southeast trade winds end their long race across the Gulf of Mexico and the Caribbean Sea, an upsweeping river of air pours over the crest of the rampart. On this the wise

white gulls float with motionless wings, graceful and lovely, their eyes following the antics of the human mob below.

Gulls must have marvelous eyes. Often, when far offshore on a shrimp boat, I have looked carefully, as the nets started in, to see only one lone bird, so far off as to be almost indiscernible. Yet within a few minutes after the catch had been dumped on deck, the boat was surrounded by clouds of them, coming from all quarters of the sky, screaming, crying, and surrounding us so closely that they jostled one another in the air, their feathers rustling softly as wing met wing.



Tree Ducks

Each year these hordes of the heavens settle down, during May, June, and July, to the serious business of housekeeping. In company with pelicans (both brown and white), roseate spoonbills, glossy ibis, black-and-white shearwaters, and many others, the airy armies descend on the islands of the Texas coast to hatch their young.

Vingt-Un Island in Galveston Bay is one of these nesting places, as are the First and Second Chains in Mesquite Bay, Lydia Ann Island near Rockport, and Big and Little Bird, Pita and Green Islands in the Laguna Madre. To one who has never seen these nesting grounds, it is an interesting and majestic sight.

Of course these are the birds that

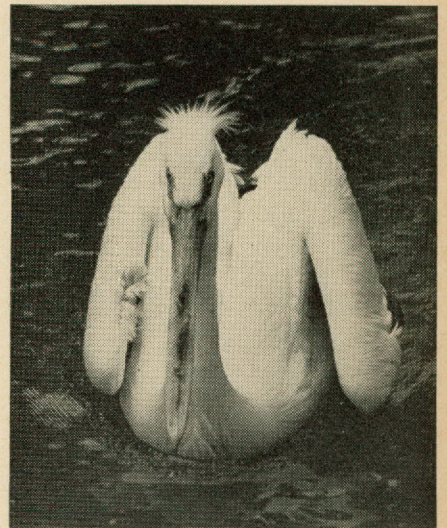
are always with us, permanent inhabitants of our coast, but there are others, migrants, that we see only when winter's cold grips the northlands where they have their summer homes. There are great whooping and sandhill cranes, whose story is a saga in itself; the snows and the blues (geese that summer around Hudson's Bay in Canada); great Canadian honkers, an occasional wandering black brant from California, and a multitude of ducks.

Then Little Bay takes on a different appearance. The herons and egrets are still there, but along with them are great rafts of pintails and other ducks. These, safe in this sanctuary from hunters' guns, squawk in the shallows, sociably discussing their long flight south.

Offshore, in the deeper bays, are the diving ducks, like redheads and canvasbacks, and in the Rio Grande Valley one of the loveliest of all, a veritable jewel of a bird, the wood duck, spends its winters.

The male of this species is the Beau Brummel of all our waterfowl, and no other duck can match its splendid iridescent plumage. The combination of delicately graduated mottlings offset by bold dashes of white against a background of darker, but exceedingly brilliant colors, is magnificent.

Lovers of secluded pools and the swamp-bordered streams, they flash through the trees like feathered gems, adding a grace and beauty to our Texas wildlife given by few other birds.



White Pelican

A Texan on Tour

By GEORGE CHRISTIAN

MOST wild creatures, when brought into close fellowship with man, retain a certain dignity that seems to suggest subjugation with conditions; i.e., we'll go along with you, but only up to a point. Not so with the black bear. He'll go along all the way, provided enough food is shoved his way to allow him a life of semi-retirement, interrupted only by trips to the soup line to satisfy an appetite that grows more ravenous as his waistline expands.

My wife and I saw numerous examples of this bearish attitude on a tour of American and Canadian national parks in the West this summer. Yellowstone's bears are, of course, famous for their genial mooching of anything edible that happens to be in the tourist's car. But they're pikers compared with their cousins in the two great parks on the eastern slope of the Canadian Rockies, Banff and Jasper.

These two wildlife refuges teem with big game. Rocky mountain goats and bighorn sheep gaze down upon the roadways from the heights. Moose feed in the swamps a stone's throw from the road. Elk herds loaf in the mountain meadows, undisturbed by photographers so long as they keep a proper distance. Scores of mule deer come to the very edge of Jasper Townsite to browse at sundown. And the bears—well, you're likely to meet the beggars anywhere: peering in your kitchen window wondering what you had for breakfast, nosing around the town garbage dump, standing hopefully in the middle of the highway and waiting for the cars to jam up so there'll be a better chance that somebody in the crowd will have some grub.

Like all the other suckers, my wife and I carried an ample supply of goodies to feed the bears, though the park rangers and others with good sense frown upon such practices. Among our bear baits were some cookies manufactured by Betty's mother a week or ten days before. They had lost their freshness before

we'd even escaped the hot Texas sun. I tried to feed one of them to a mule deer and he politely refused to bite down; he just rolled it on his tongue for a minute, dropped it and stalked off. I retrieved it and later fed it to a cinnamon bear, who tried to crawl into the car for a second helping.

"It's people who make them this way," Betty decided one day as she divided stale breakfast rolls among a mama bear and her three cubs lined along the highway. But she had no explanation for the fact that all the other park animals—with the exception of chipmunks and ground squirrels—keep a proper distance from humans and take food only when it's forced upon them. They haven't been reduced to begging.

(Editor's note: George Christian writes a weekly outdoors column for INTERNATIONAL NEWS SERVICE. One regular assignment is to cover Game and Fish Commission activities.)

Maybe the bruins are smart. Their particular brand of welfare state has made them as fat as killing hogs. I am reminded of one paunchy fellow we saw loping past our kitchen window one morning, doubtless following the scent of frying bacon somewhere. A small dog in our camp spotted him and gave chase, barking furiously.

The bear, seeking the easy way out, took to a tree. But so ponderous was he that he barely made it to the lowest branches before he slipped back and landed hard on his bottom with an exasperated grunt, like a fat man who'd sat down and missed his chair.

I think that injured whatever dignity he had left. At any rate, he ambled off in a huff and we never saw him again. It wouldn't have done him any good to revisit us. Betty had a standing policy of withholding the choice rations from the fat, sleek bears and saving them for those more undernourished, though this variety was in the minority.

A chap who worked in Banff dur-

ing the summers told us of one half-grown cub which met the Banff-Lake Louise bus every morning at the same spot in the road. The driver would let him aboard and he would ride with the passengers for ten or twelve miles, mooching his breakfast. Then the driver would put him off, knowing that the bear would be back at the same spot down the road the next morning, regular as clockwork. If the truth be known, Brother Bear probably hitched a ride back with somebody else to save him the ten-mile hike.

Naturally, park officials try to discourage bear feeding as much as they can. There are two dominant road signs in Canada's playgrounds: "Please help prevent Forest Fires," and, "It Is Dangerous to Feed the Bears."

But knowing the habits of people and bears, the rangers are practical men and strive not to become too disturbed unless a certain grouchy bear develops a reputation for cuffing tourists' ears or chewing up fingers. Then the offending animal is loaded into a pick-up truck and taken to some remote section of the park where he'll be safe from temptation.

Fishermen and campers do not look upon the bears in the same light as the motorists. It isn't very amusing to be awakened by a bear licking sleep from your eyes. Neither is it a happy moment when you find your mess of rainbow trout, fruits of a day's fishing with the mosquitoes eating you alive, has been gobbled up by a bear while you look for the frying pan.

Do the bears eat anything but what they can beg or steal? The question is open to debate. We once saw a big fellow giving chase to a herd of elk. But it looked like a half-hearted effort, and the elk didn't think it worthwhile to run very far.

"Don't be deceived," a Canadian friend told us. "He's only amusing himself. He's so full of cookies and lump sugar he couldn't relish another mouthful."

THE HIGHLAND CHAIN

By JOHN BABCOCK

Development Supervisor, Lower Colorado River Authority

LAKE Buchanan, the largest in the Northern Highland Lakes region, is 32 miles long, with a maximum width of eight miles. The massive dam, one of the largest of its type in the world, provides a depth of 131 feet, a sail boater's delight, and a fisherman's dream lake. One filling of Lake Buchanan would take care of the water needs of Dallas for 17 years.

Inks Dam, three miles below Buchanan, forms a small tranquil lake. These two lakes provide almost any type of water recreation a person could desire. Hundreds of public vacation cottages sprinkle the shore lines. Boats and fishing equipment are available everywhere.

Granite Shoals and Marble Falls, the two newest units in the system, completed this past summer, offer the sportsman a number of vacation de-

velopments. These four reservoirs form an integral part of the Lower Colorado River Authority's flood control, irrigation, and power system.

As the waters of the Colorado pour through Marble Falls Dam, they enter the "narrows" and on into the steep canyoned confines of Lake Travis which is the first lake in the Southern Highland Lakes region. One filling of this lake would supply Houston with water for 36 years, in accordance with its present water needs. Shaped like an oriental dragon, Lake Travis twists and winds its way 65 miles downstream, where it is abruptly halted and contained by the massive Mansfield Dam, one of the chief attractions of this region. A drive across the dam, which is over a mile long and as high as a 25 story building, offers a breathtaking view.

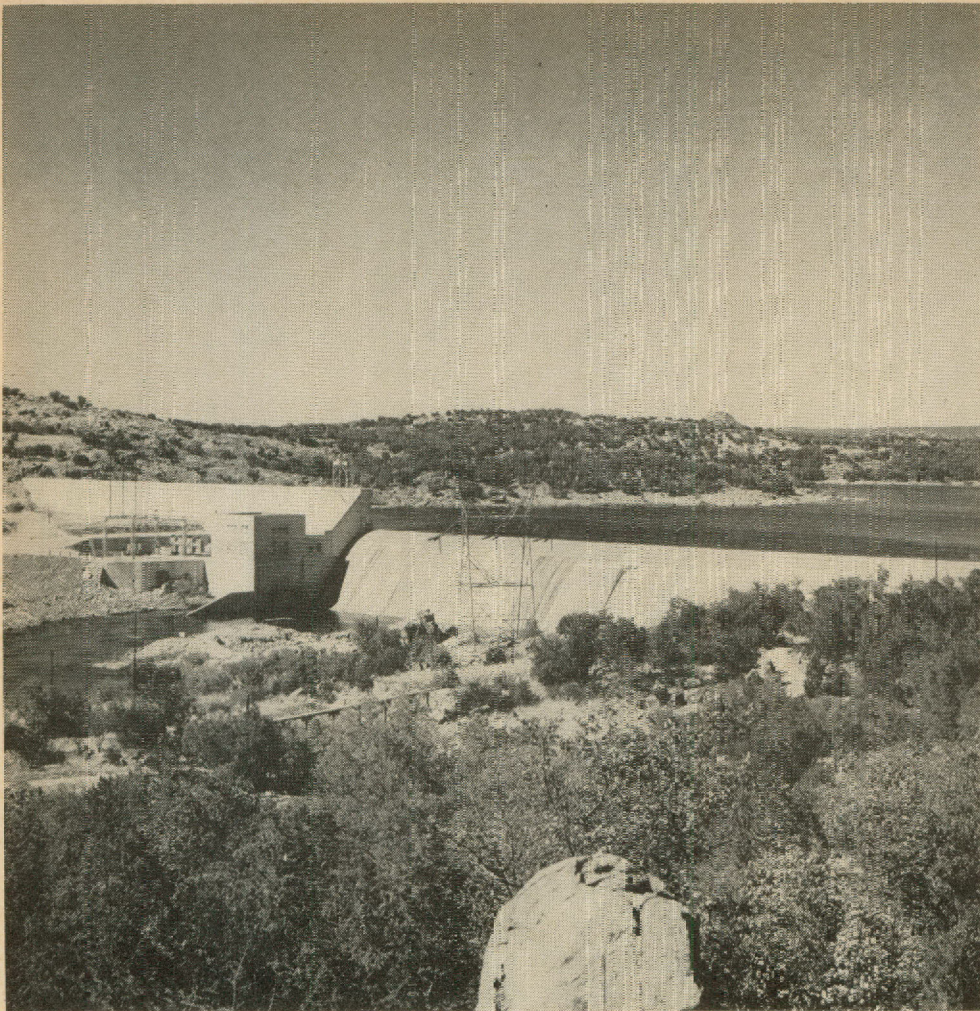
From Lake Travis, the Colorado enters Lake Austin, 21 miles long, the most historic of the Highland Lakes. It dates from 1893, when the old paddle-wheel river boat "Ben Hur" carried sightseers up the lake from Austin. Even today, a stern-wheeler makes chartered cruises from its docks near the Tom Miller Dam.

These lakes offer sandy beaches, mysterious canyons, vast stretches of rocky cliffs, and over 300 miles of rugged shore line to explore. The surface area of the six lakes is 76,040 acres. The water impounded is 3,301,000 acre feet which is equivalent to 139,712 gallons of water for every man, woman and child of Texas.

The most modern tourist accommodations await the guests' choice beside cool little coves or nestled in the deep wooded hills. Hundreds of tourists



Buchanan Dam



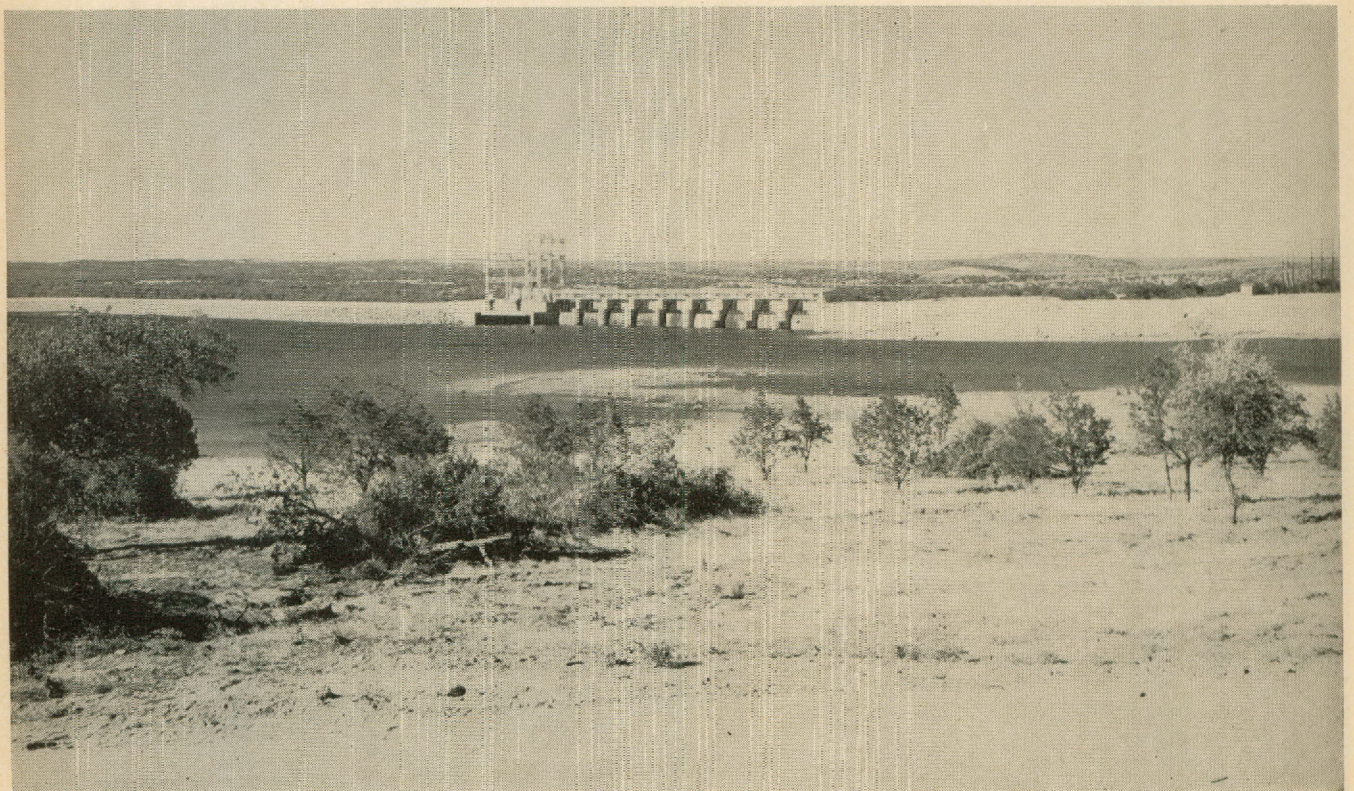
Inks Dam

who once came just to visit have returned to make it their homes.

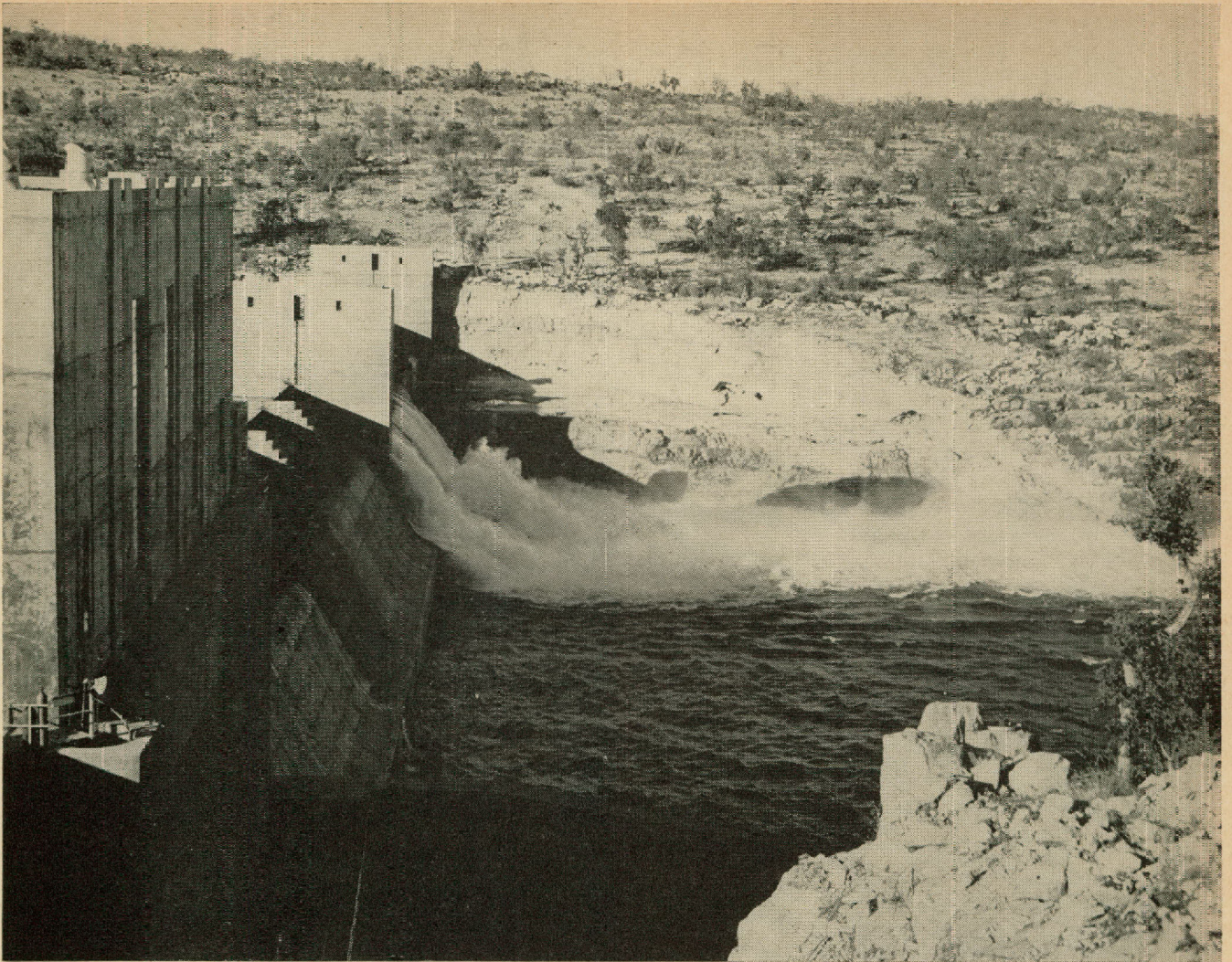
The anglers of this region brag of the fighting black bass, others like crappie, bream, or bluegill—and of course, ten to 50 pound blue cats are common. The sailor will find ideal water for small skiffs to cruisers—the windjammer can count on some frisky sailing, and Lake Travis boasts of yachts up to 50 tons.

If you like to sit and soak up the sun's rays or glide through the clear blue water, either of these lakes are good for swimming. Hunters will find in the hills near these lakes some of the best deer and turkey hunting in the country. Fox hunting is good sport in this region also.

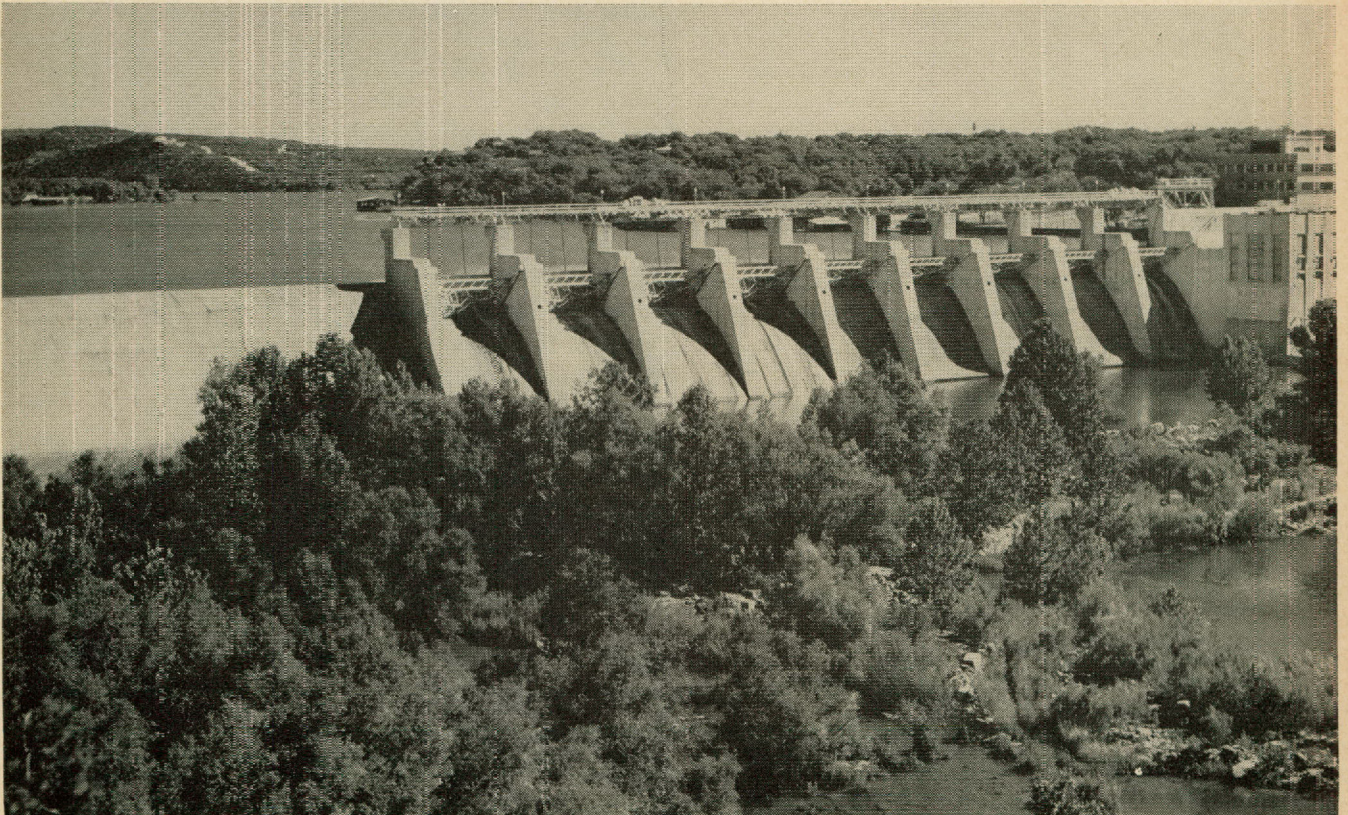
Whatever your desires, the most demanding vacationers' wishes can be fulfilled at the Highland Lakes.



Granite Shoals Dam



Marble Falls Dam is pictured above with the Tom Miller Dam below. Mansfield Dam, fifth in the system, is not shown.

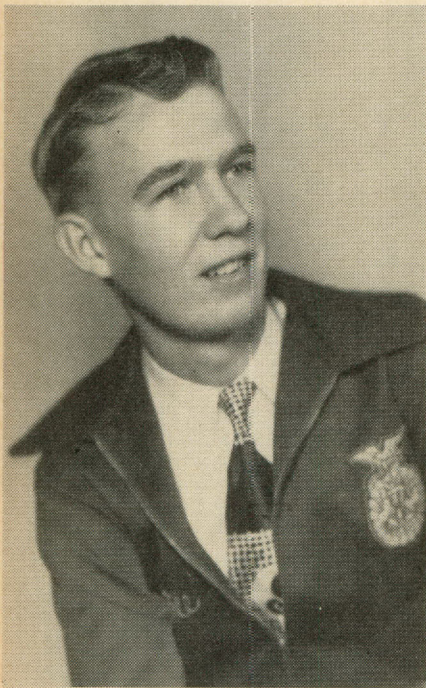


Why Wildlife Conservation Is Needed in Texas

By JERRY SNELL

(Editor's Note: Presented by Jerry Snell, Jasper, Texas, at the twenty-third annual state convention of the Future Farmers of America, July 11-13, Houston, Texas. Jerry is the 1951-'52 state vice-president of the organization.)

THE subject which I have chosen to speak on today, Wildlife Conservation, one of the gravest problems facing the sportsmen of Texas, is of vital importance to the health, happiness, and enjoyment of future generations. In order to better understand the need for wildlife conservation we need only to look at the past history of our nation. When our forefathers first came to Texas, they found a vast, wonderful wilderness, teeming with wildlife and untouched by the hand



Jerry Snell

of civilization. The woods of tall virgin timber and rolling plains of tall grasses abounded with deer, wild turkey, squirrel, and many more species of wildlife. These all thrived together along with the mountain lion, the lobo wolf, the wildcat, the rattlesnake, and other wild creatures in a vast natural home provided by Mother Nature. Here indeed was the true picture of the balance of nature. The streams and rivers were full of fish. Here also

these pioneers found deep fertile soil unplowed and properly held in place by binding roots of natural vegetation.

As these pioneers settled down and began to clear the land, till the soil, bring in their domestic animals, and set up their life in the virgin surroundings, this balance of nature was interrupted. As time went on, the settlers began spreading out and taking more and more game.

As the white man spread out and built his railroads, the game was forced to move out of the vicinities where it had survived for centuries. Then came the meat hunters and the city hunters who rode the trains to slaughter the buffalo for their hides and tongues. The ducks, deer, and other game also suffered immensely. From then on Texas wildlife and wildlife throughout the United States has been dwindling lower and lower. No one dreamed of it then, but now those large herds of buffalo are gone; the passenger pigeons are completely extinct as well as the great auk and the king eider duck.

At the present time the wild turkey and Bob White quail are very scarce and have been destroyed in much of their former range. The American grizzly bear is decreasing rapidly. The West Texas antelope has recently been saved from destruction, and the attwater prairie chicken is fighting a losing battle because of modern land practices. The fox and especially the grey squirrel have been reduced in number greatly. Wild geese and ducks reached their lowest ebb in 1934 when authorities estimated a total of only thirty million in all North America.

As you can see our game is going fast. The same thing can be said about our fish. Before the industries came to Texas, people did not fish much. As a rule the only time the people fished was for community fish fries which were held after crops were "laid by." But with the coming of the machine age and the eight hour working day the workers had extra time on their hands and naturally many of them turned to fishing as a leisure activity. This soon constituted a need

for the development of lakes and improvement of streams. To meet this demand, the Texas Game and Fish Commission responded by establishing fish hatcheries throughout the State and furnishing millions of fingerlings for stocking public and private water. These hatcheries reached an all time high in 1947 by producing twenty million fingerlings in eleven hatcheries throughout the state.

And thus, as the public mind slowly and haltingly moved up the scale of appreciation for wildlife and its proper use, the state Legislature responded by passing the first Game Law in 1861. At the turn of the century still more important and far-reaching laws were passed putting a five year closed season on antelope, mountain sheep, and deer, and forbidding the sale of these animals or parts thereof. In 1907 the Game Department was added to the office of the Fish & Oyster Commission with the first hunting licenses being sold two years later. By 1925 one hundred game wardens were employed and in 1929 The Texas Game, Fish & Oyster Commission came into existence and by 1936 a Research Department was added. This was the beginning of a period of concerted action on both the game and fish law enforcement fronts and in the field of active and planned wildlife restoration and game management.

To succeed in rehabilitating wildlife in this state it will be necessary to employ the basic principles of natural production and to control the application of these principles over a considerable period of time. This will involve the cooperation of the farmer, the rancher, the hunter, the fisherman, and the majority of other persons who participate in using wildlife resources. To solve this problem it will be necessary to set out the basic needs of wildlife and provide definite ways to get this information to the people. The proper agency to do this job is the public school. Because when boys and girls learn the truth about wildlife and its welfare, then and only

Fishes of Texas

Miscellaneous Catfishes

By MARION TOOLE

Chief Aquatic Biologist

THE more important species of catfishes have been discussed in previous issues of the TEXAS GAME & FISH. These catfishes were the yellow, channel and bullhead catfishes. This present article will deal with catfishes that are so small throughout their lives, they are insignificant to the average angler and are presented merely to complete the discussions on the fresh water catfishes found in Texas.

These little catfishes are the madtoms, *Schilbeodes*. Two species of madtoms are found in Texas; the tadpole madtom, *Schilbeodes gyrinus* (Mitchill) and the freckled madtoms, *Schilbeodes nocturnus* (Jordan and Gilbert).

When a Texas madtom attains a length of five inches it can be considered a giant among its kind.

The madtoms have poison glands present. Forbes and Richardson

(1920) writing about the tadpole madtom in their "Fishes of Illinois" state that "Like the other species of this name, it is provided with poison glands, placed just beneath the epidermis surrounding the spines of the pectoral and dorsal fins, and the wound from either of these spines is little less painful than a bee's sting. These glands are ductless, and the poison which they secrete is only liberated when the epidermis of the spine is torn."

The best characteristic for identifying the madtom is that the adipose fin, which is the fleshy fin on the back of the fish, is continuous with the tail fin. Where the two fins join there is never more than a slight notch. The other catfishes have a definite break between these two fins.

The tadpole madtoms are flesh colored and the freckled madtoms have small flecks of black covering all their

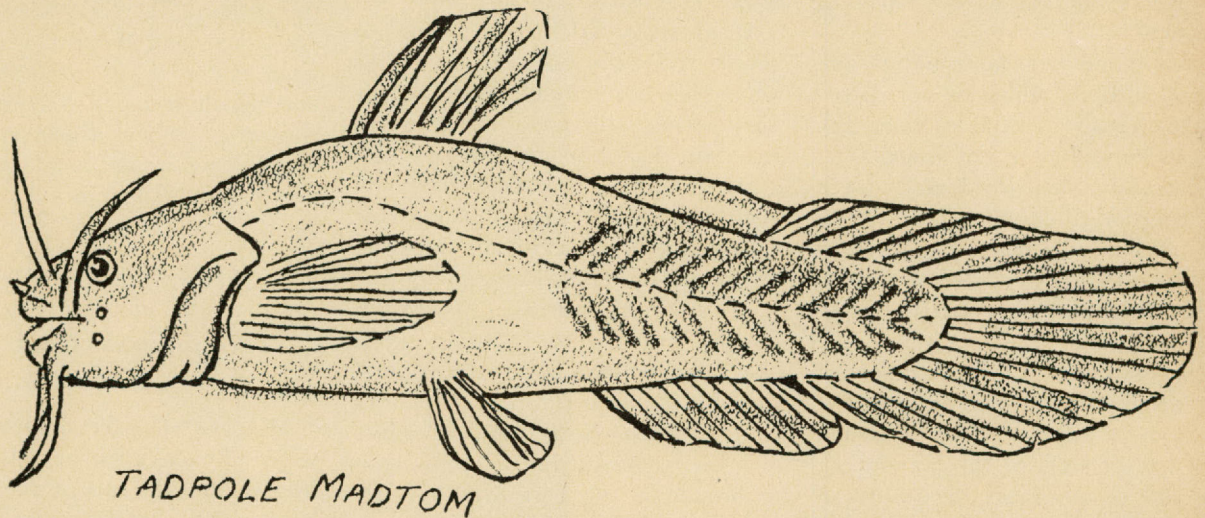
body except their breast and belly.

Tadpole madtoms are found in lakes, rivers and creeks. They like muddy bottoms, sluggish currents and weeds. Freckled madtoms like either rocks or weed to hide around.

Forbes and Richardson (1920) report their food "consisted almost wholly of amphipod and isopod Crustacea, various forms of Entomostraca (Water fleas) and of insect larvae (caddis worms, day flies, and gnats) of kinds likely to be found on the bottom." They further state "A single specimen had eaten a small fish, and another a planarian worm."

Spawning probably occurs during April and May.

These little catfishes have no economic importance except they are occasionally picked up by bait seiners and are used for bait.



TADPOLE MADTOM

Why Wildlife Conservation?

then, can a proper support of a program of conservation be expected. A few of our schools and colleges have already made wildlife conservation a part of their program, but in most places little has been done in placing this problem before our young citizens. This has to be done if future generations are to enjoy wildlife as it has been enjoyed. Since most of the land in Texas is privately owned, we

will want to know what we, as individuals, can do to conserve our supply of game and enjoy better hunting. The first basic rule we should consider is, "Do not permit out of season hunting, and over hunting." Other rules landowners can observe may be summed up by providing the basic requirements of life for game, desirable food, sufficient cover, water and protection.

In the final analysis we must remember that wildlife protection is a co-operative activity. When the conservation practices I have mentioned are carried out by every citizen, landowners, sportsmen, law makers, game wardens, and others; then and only then will our wildlife begin to rebalance and will we be able to enjoy our natural resources of game and fish.

Let's Go Fishin'

By KENNETH C. JURGENS

Aquatic Biologist

MANY people, beginners as well as experienced fishermen, complain that fishing isn't as good as it should be or isn't as good as it used to be. They all want to go out and catch a big mess of fish but most of the time they go home frustrated and disappointed. They didn't even get a nibble. Why?

The factors which could answer this question would fill several volumes and cannot be taken up in an article as short as this must be. However, since this series of articles is intended by the editors to provide fishermen with tips on how and where to catch more and bigger fish, it seems appropriate to make the following statement.

Many of our large lakes and streams abound with fish which are not classed by the average person as game fish and, as a result, are not fished for.

These fish, which incidentally are a lot "sportier" than most people give them credit for being, are allowed to multiply without any control such as the fishing pressure which the ordinary fishermen could exercise over them. The result is as can be expected. The fish population soon becomes out of balance and these "rough" fish soon make up the bulk of the population.

In one of our lakes the results of netting collections, made by fisheries biologists, showed that carp, carp-sucker and buffalo made up approximately fifty per cent of the total weight of all fish taken in nets during the past year. This is positive evidence that the fish population in that lake is out of balance and that the "rough" fish have the upper hand.

Isn't it a shame that with all these fish present only a comparatively few fishermen have tried to fish for them?

Recently, in central Texas, "carp fishing" has become more and more

popular. People are suddenly realizing that they have been overlooking the source of many a fishing thrill. They are finding that a big carp, carpsucker or buffalo, when hooked, will put up the kind of a battle that is a challenge to the fishing skill of any fisherman, no matter how expert he is.

Some of these battles go on for as long as thirty or forty minutes before the fish is finally brought to gaff. Some have said that they would as soon hook into a thirty-pound carp as they would a red fish on the coast. Apparently many of us have been missing the boat on our fishing trips and could, if we wanted to, get in on some "reel" sport fishing.

Incidentally fishing for "carp" is simple. The only difficult part of the whole sport is found in landing the big ones on light tackle. Believe me, some of them are "tackle busters." Here are some of the things that you'll want to do when and if you decide to try your hand at this up and coming brand of sport fishing.

A lot of carp fishermen have taken up the practice of "baiting out a hole." They have used corn, alfalfa, stale bread, meat scraps, cotton seed cake, cotton seed meal and a variety of other baits. All that is necessary is to broadcast the bait over a fairly small area in the vicinity of a boat dock, point or in the head of a slough. If you allow a short time to pass before you start fishing, there should be no difficulty in concentrating a number of these fish.

When you actually start fishing for these fish, you'll need a hook about size 1/0 baited with dough bait. Some people use a light sinker on the line, just heavy enough to carry the bait to the bottom. No float is necessary because you'll want to be able to feel them bite. Since their bite is light,

you'll want to keep your eyes on your rod tip so that you won't miss that tell-tale nibble. Then a good jerk on the line will set the hook and you'll have a battle on your hands.

I won't promise that the fish will "break water" for you but you'll have your hands full if it's a big one. Incidentally, the average size of these "carp" is a little better than two pounds.

Some people have found these "carp" so strong that they have gone in for fishing for them with heavy salt water rigs.

Seems as if the only thing that hasn't been mentioned is a recipe for dough bait. There are a lot of different recipes and in experimenting with your own you will probably produce one which you will like better than the one given here. However, if you've never tried your hand at making dough bait here's one to give you a start.

4/5ths cup cornmeal
1/5th cup flour
1 tablespoon sugar
1 teaspoon vanilla

Mix the ingredients with enough water to make a stiff dough. Separate into small balls, about the size of a large marble (1/2 inch in diameter). Dip dough balls on the tip end of a spoon in hot grease just long enough to form a tough crust on the outside. When finished the dough balls can be stored in a jar indefinitely or may be used immediately.

One last word of encouragement—remember that every "carp" that you catch not only will give you a lot of fun but will make room for more of the game fish which all of us prize so highly. Here's hoping that you will go out and "slaughter" 'em.

Marine Fishes of Texas

Thresher Shark, Fox Shark, Sea Fox*

Alopias vulpes

By J. L. BAUGHMAN

Chief Marine Biologist

A large pelagic shark of the temperate seas, *Alopias* is known from Formosa to Natal and from England to the Cape of Good Hope. On American coasts it seems to be fairly common, and has been reported from as far north as the Atlantic banks and the Bay of Fundy. It is also found in the Mediterranean and Adriatic Seas.

At least one of these sharks, and possibly more, have been caught off the Texas coast.

The back and upper sides of this shark vary from bluish or slaty gray to almost black, shading to white below, but with the lower surface of the snout and of the pectorals sometimes as dark as the back. The belly is sometimes more or less mottled with gray.

Threshers are only 3 or 4 feet at birth, but probably mature at about 14 feet long, including the tail. They commonly grow to 16 feet and occasionally to 20 feet. Recorded weight from 300 to 320 pounds at 10 feet to about 500 pounds at 14 to 15 feet, with a maximum of perhaps 1000 pounds.

Threshers feed mostly on schooling fishes such as herring, shad, pilchard and mackerel. One taken in the Firth of Forth had half a bushel of garfish in its stomach. Descrip-

tions of the feeding habits of this fish and the use of its long and flexible tail have been given. In general it may be stated that it uses this organ to frighten the fishes of a school into a compact mass, swimming round and round them, threshing the water until the smaller fish are closely jammed, when it dives into them with open mouth. A pair of threshers will sometimes work together in this fashion "herding a school."

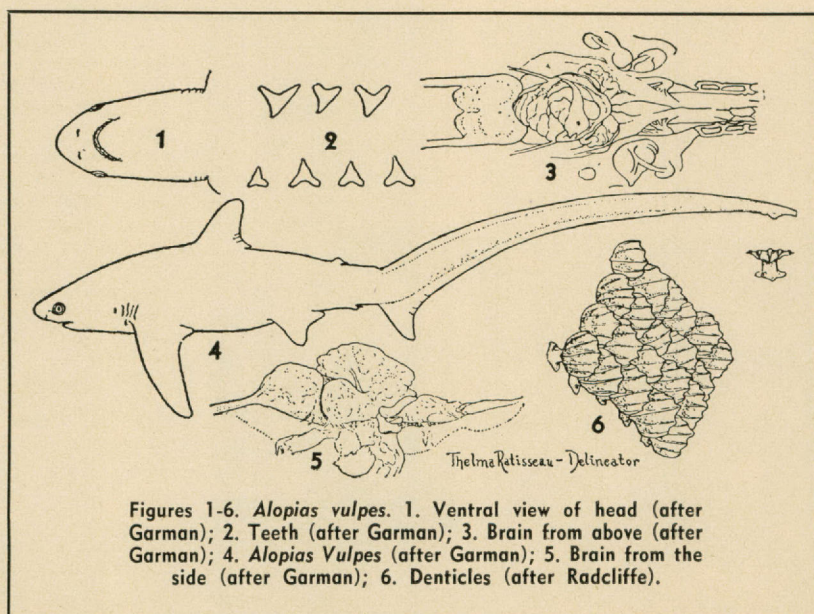
Threshers do not attack and eat whales, despite the long established myth to that effect. The many stories of thresher sharks and swordfish acting in unison to smite the leviathan may be put down to poor observation and the normal human failing of making much out of little. In all probability, such attacks may be attributed to a mammal, the orca, or killer whale.

An 18-foot specimen of this shark, taken off Cuba in January, 1933, contained 2 embryos, each 28 inches long to the tip of the caudal fin.

The thresher is probably the commonest of the large sharks seen in the fresh fish markets of southern California. The Japanese and Chinese also make some uses of this fish as food and Couch states that the Greeks ate it. Moreover, Fr. Joannus Caius (John Keys) says in his work "De Canibus Britannicis," that the fish is not unlike salmon, but that it was "not quite as agreeable to the palate as that fish."

In other parts of the world it has not been looked on with favor. It was called the sea fox in some places, because of the length of its tail and the musky smell of its flesh, which is not unlike that of the fox. In the Adriatic where these sharks are occasionally

taken, Faber states that large sharks were the food of the poorer classes, possessing a most disagreeable odor when opened. He does not specify as to the edibility of this species. Storer considered them almost valueless, saying: "Its liver, however, contains a small quantity of oil, and when an individual is accidentally taken, this is preserved and sold with the oil from other species."



Figures 1-6. *Alopias vulpes*. 1. Ventral view of head (after Garman); 2. Teeth (after Garman); 3. Brain from above (after Garman); 4. *Alopias Vulpes* (after Garman); 5. Brain from the side (after Garman); 6. Denticles (after Radcliffe).

* Abridged from Baughman, J. L., and Stewart Springer, Biological and Economic Notes of the Sharks of the Gulf of Mexico, Amer. Midl. Nat., July, 1950.

Letters

Dear Editor:

... in my opinion this magazine is one of the most important periodicals in the state concerning conservation. Through it, Texas nimrods and anglers may certainly add to their knowledge of wildlife movements and their protection.

The beautiful covers attracted me before I even looked inside the magazine the first time I saw it. Mr. Rice is to be commended for rare artistic ability in the way he captures the beauty of his subject and puts it down in paints.

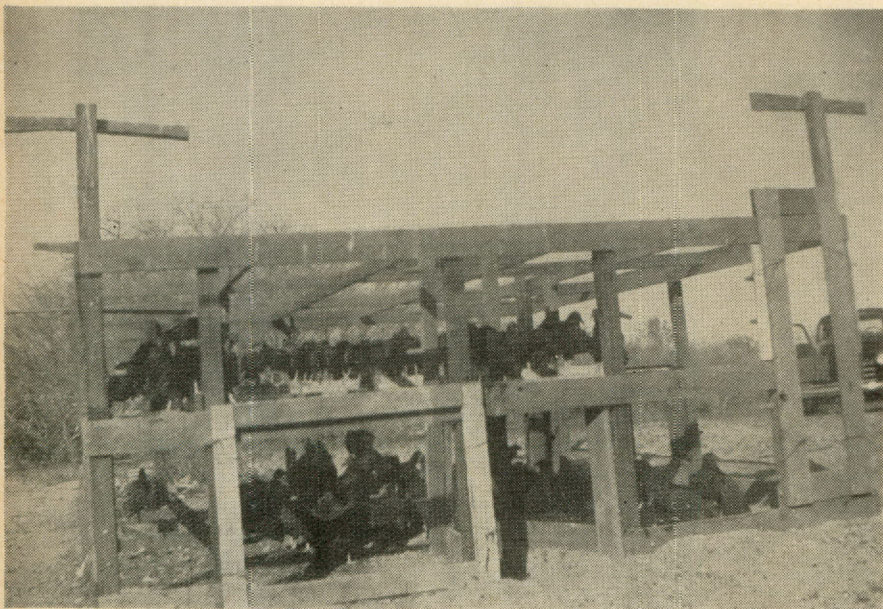
BILL ENGVALL,
607 E. 13th,
Georgetown, Texas

Dear Editor:

I am enclosing a kodak picture (below) of the buzzards trapped and disposed of along the shores of Lake Corpus Christi at Mathis. I made and placed three of these traps on the Wade Ranch, which borders the lake, and in 90 days trapped 1610 buzzards. Each trap cost me \$50.

The Game and Fish Commission, in my opinion, ought to encourage the use of these traps to rid the country of these disease-carrying vultures. Our Game Wardens could supervise the operation.

ED WRIGHT,
Mathis, Texas



Dear Editor:

... you are to be congratulated on this truly excellent publication, TEXAS GAME AND FISH, which is a real aid to conservation.

I wish to add that the quality of your magazine is only equalled by the recent film, "The Outlaw of the Cameron," which was enjoyed by my children, as well as myself, recently at Barton Springs.

J. D. MALKEMUS,
1115 Taulbee Lane,
Austin, Texas

Dear Editor:

In the August issue of TEXAS GAME AND FISH, on page 5, there is a picture of a humming bird feeder. Please advise where I can buy one, or where I can get the plans to build one.

MRS. MARY McDONALD,
434 Funston Place,
San Antonio 9, Texas

(The humming bird feeder photographed for the magazine was a homemade device. However, several firms have these feeders on the market. It is suggested that you write AUDUBON MAGAZINE, 1000 Fifth Avenue, New York 28, N. Y., for literature from which you may make a selection for your needs.)

Dear Editor:

Enclosed is a picture of the nine gaspergou and two catfish that my friends and I caught while fishing at Sheldon Reservoir recently. The gaspergou weighed between two and three pounds each. My friends in the picture are, left to right, Albert Franzmeier, myself, and William Walton.

ALFRED M. GERSTENBERGER,
1204½ Brooks,
Houston, Texas



Dear Editor:

... I thought you might be interested in the sound, color, and "smell" combination of "Outlaw of the Cameron" when I showed it to the San Antonio A & M Club here.

We have our own picnic grounds known as Aggie Park on the outskirts of town, and about 400 attended the annual family wiener roast. At the precise moment when the skunk sequence was flashed on the screen, a live one conveniently made his presence known. Everyone remarked that the game department had really done something when it included "smell" in movies.

DR. FREDERICK H. WESTON,
115 Broadway,
San Antonio 5, Texas

Naturalists Fight to Save Unique Swamp

A quiet but firm fight is being waged by a group of naturalists in New York to preserve a unique natural area from exploitation by commercial interests, according to the Wildlife Management Institute.

The area is Bergen Swamp, covering approximately 2000 acres of open marl bog surrounded by a belt of forest and thickets, which lies about twenty miles from Rochester in Genesee County. It is within easy reach of centers of higher education and is a living museum of incomparable value to students of botany, ornithology, ecology, and other fields of natural science. For at least a century, naturalists have studied some of New York's rarest plants in the swamp; some plants found there are native to no other part of the state. The area is characterized by a highly varied vegetative pattern and more than a thousand species of plants are found in it. Bird life is also varied. The easy

accessibility of the swamp to naturalists, however, makes it equally accessible to development. The dense white cedar thickets which bound the area are prized as fence posts, and much cutting already has been done.

A group of conservationists, disturbed by the invasion of the swamp by commercial interests, banded together to form a protective society known as the Bergen Swamp Preservation Society, Incorporated. The organization was chartered by the Board of Regents of the State of New York in 1936 with the objective "to preserve inviolate for all time in their natural state, the lands known as Bergen Swamp; to conserve the flora and fauna of the lands owned by or under the control of the Society; to

offer to schools and colleges and other properly accredited students or groups of persons access to the swamps and forests of the Society for the purpose of observation and study; to publish from time to time scientific and cultural information covering the biology and wildlife of the areas controlled by the Society."

The group has made an excellent start toward preserving the area; about 350 acres have been purchased to date. In 1948, the society was awarded the \$1200 Founders' Fund of the Garden Club of America. Society officers, who serve without pay, estimate that \$20,000 will be needed to carry out the objectives. Mr. H. E. Clements, 116 Sibley Tower Building, Rochester 4, New York, is treasurer of the society.

Texas Waterfowl Season

TEXAS got a break on the waterfowl hunting dates and there seems to be a good quantity of ducks and geese. So if the weather will cooperate, Texas hunters may have one of the best fall shoots in recent years.

The season on waterfowl opens November 9 and closes December 28.

But dates, birds and all will go for naught, as all veteran sportsmen know, unless the weather is right. And the elements have some advance preparations to do to take care of such items as the scorcher condition of coastal marshes.

Some of the best shooting in South Texas is provided in the inland parts of the coastal areas but the prolonged drought dried them up. But now rains are beginning to restore them.

Of course there are other problems. Texas is such a large state that the weather has to concentrate to keep all areas happy. The hope now, with the season set for 50 consecutive days, is that the cold must be severe enough in the northern states to send the ducks southward in time to provide shooting for the Panhandle and other parts of North Texas.

The theory is that North Texas gets

the better hunting during the early part of the season and the southern part benefits during the latter stages.

However, this does not always work. In fact it seldom does. And the Game and Fish Commission tried to get a zoning system to benefit both north and south. The split season plan was tried and proved unsatisfactory.

Thus great hopes are held for the liberal 50-day season for 1951.

Bag limits for ducks are five per day and ten in possession; for geese, five in the aggregate per day and five in possession. The geese bag shall not contain more than two Canada geese or its subspecies or two white-fronted geese, or one of each.

The limits on rails and gallinules are 15 in the aggregate; coot, 10, and sora, 25.

The waterfowl hunting hours will be from half an hour before sunup to an hour before sunset, except on the opening day, November 9, when the shoot will start at 12 o'clock noon.

The usual restrictions concerning size of guns, limit of three shells, baiting and means of taking waterfowl prevail.

DOG PAD

GUARANTEED FOOT CONDITIONER



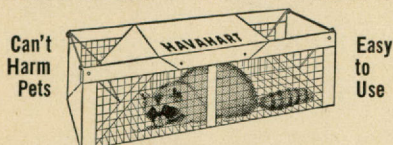
(Reg. U. S. Pat. Office)

HELP TOUGHEN YOUR VALUABLE DOG'S FEET WITH DOG PAD. A proven toughening remedy, guaranteed to help WORN, CUT, BRUISED, BLISTERED, THRED and SWOLLEN feet, joints and muscles. Before and after running, apply to their feet, using handy cotton dauber attached to bottle cap.

8 OZ. BOTTLE, POSTPAID, \$3.00

DOG PAD COMPANY, ALBANY, TEXAS

AMAZING NEW TRAP!



Trap for fun, profit, or rodent riddance. Guaranteed HAVAHART trap catches them alive, protects pelts. No springs or jaws. Rustproof. Sizes for all needs. For free booklet, mail coupon today.

HAVAHART, 49-A Water St., Ossining, N.Y.

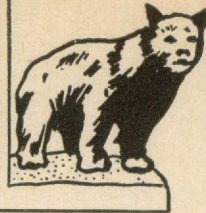
Please let me in on your trapping secrets.

Name _____

Address _____



BOOKS



WATER—OR YOUR LIFE by Arthur H. Carhart. 312 pages. Published by the J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania; 1951. Price \$3.50.

Nothing between the covers of this new book will detract from Art Carhart's reputation as a crusading conservationist. For a number of years now, he has been swinging away at the same targets—the haphazard administration of vital natural resources, the politics-as-usual attitude of elected representatives toward matters touching on the national survival, inter-agency feuds and jealousies among the conservation agencies, and public apathy toward the whole conglomerate mess. Carhart has connected with many left hooks in the form of articles and speeches. This time he has thrown a mighty uppercut.

In the foreword, Jay N. Darling says: "One of the great troubles with our highly mechanized living in the U. S. A. is that the average citizen's curiosity about water resources ends at the bathroom faucet." Few ever stop to think of the importance of water in their lives beyond the obvious daily needs associated with kitchen,

bathroom, laundry, and possibly the lawn sprinkler. The fact that water is an integral part, or plays an all-important role, in the processing or manufacture of every single item they eat, wear, live in, or see seldom occurs to most people. Carhart begins by tracing the history of past civilizations that have become paragraphs in history books and curios in museums because their water supplies failed; then he applies some of the lessons to our own economy. He attacks what he calls "colossal, gigantic, stupendous, Man's-Mastery-over-Nature schemes," devised by the Bureau of Reclamation and the Army Corps of Engineers, with some convincing counter material on the cost of these projects to the American taxpayers. These figures form the most convincing arguments in favor of immediate reform of national water administration that have ever been printed.

The book is thought-provoking throughout, frightening in spots, and, best of all, is written in a style which makes it as thoroughly readable as it is significant.

AMERICAN WILDLIFE AND PLANTS, by Alexander C. Martin, Herbert S. Zim, and Arnold L. Nelson. 500 ix pages. Illustrated with numerous charts, tables, range maps by Katherine C. Tabb and thumb-nail sketches by Walter A. Weber, John W. Brainerd, Oscar Warbach, and Robert W. Hines. Published by the McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 18, New York; 1951. Price \$7.50.

Each wild bird and mammal has rigidly restricted food requirements upon which survival depends. Around this theme, this new book was written. A highly authoritative treatment of the feeding habits of all wildlife native to the United States compiled by three of the leading biologists of the U. S. Fish and Wildlife Service, it contains three parts. The first gives interesting material on plant-animal relationships; Part II provides data on the diet of all our birds and mammals with notes on the distribution of each; Part III covers all American plants and their use to wildlife.

Although the volume entailed many years of scientific research, the authors have avoided technical jargon and discussion in favor of a simple, concise treatment. By the use of a code system showing the percentage of use of a plant by a particular species of animal and a similar method to designate the diet of the animal, a tremendous amount of information has been condensed within a small space, and the cost of the book has been kept at a minimum. On the other hand, some may find the use of symbols to designate percentages somewhat confusing until the key, provided in Part I, is fully understood. This unique book should prove a classic reference in its field. The only complete published record of the food requirements of American birds and mammals, it will have tremendous and permanent value to all who are interested either professionally or as a hobby, in wildlife.

FIVE WHOLE YEARS

\$5.00

or

*Subscribe
Now!*

ONE YEAR

\$1.00

Clip and Mail This Blank Today!

TEXAS GAME AND FISH, Publications Department
Walton Building, Austin, Texas

I enclose \$ _____; Send me **TEXAS GAME and FISH**
for _____ years, starting with your next issue.

Name _____

Street and Number _____

City and State _____

New _____, Renewal _____

(You may expect to receive your first issue of *Texas Game and Fish* approximately six weeks after sending in remittance.)

AN EDITORIAL

Take Some, Leave Some!

Game dinners will grace the tables of most of the estimated half million Texas hunters this fall.

There will be quail, mourning dove, big game and waterfowl portions for the sportsmen. There will be a generous sampling of squirrels and a taste of antelope.

Reduced to practical proportions, the 1951 hunting quota will represent harvesting of a legitimate share of the state's game so that adequate brood stocks will remain.

Modest bags thus are assured all around. But the "TAKE SOME, LEAVE SOME" slogan will appeal to the wise Texan holidaying in the forest and in the fields.

That is the sober slant; the sane slant. On the other extreme, if all the game laws were to be repealed, Texans could have one great big shooting spree this fall. There would be enough loot for even the greediest gamehog—for one short season.

Certainly, the sizeable bird and animal stocks speak well for the state's wildlife resources, especially when compared with some other states. The fact that there will not be promiscuous gunning naturally reflects Texas' ironclad protection for the assorted species.

Significantly, Ira N. Gabrielson, the celebrated conservationist, recently admonished Texans to be alert to the danger of wildlife exhaustion. He cited trends of rapidly growing population in the Lone Star State, vastly increasing the demand for utilizing land and water. In ten years, he wrote, the number of hunting and fishing licenses have doubled.

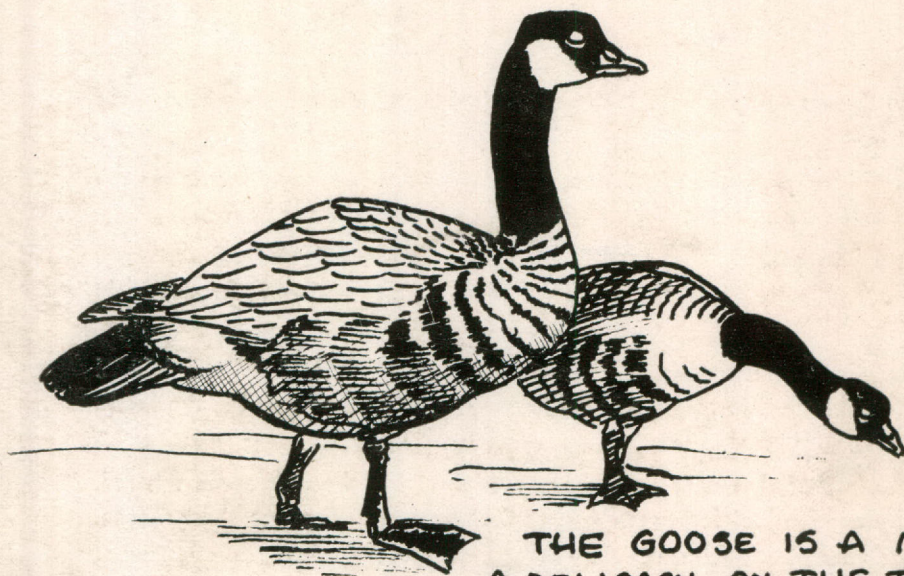
Gabrielson reported "it is difficult to find anywhere more startling and widespread demonstrations" resulting from "the accentuated demand for fish and game and a continuing decrease in the habitat available to produce it."

This warning comes as a needless but grim reminder to the besieged forces of conservation. It might well become a byword for far-sighted Texans.

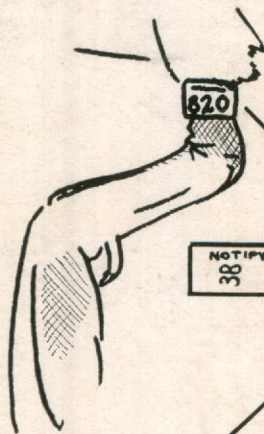
The sportsman, as always, will be guided by his conscience; not the bag limits. Indeed, TAKE SOME, LEAVE SOME.

JAY VESSELS,
Assistant Director, Departmental Publications

CONSERVATION



THE GOOSE IS A MAJESTIC BIRD,
A DELICACY ON THE TABLE THAT IS
WORTHY OF THE HUNT.



NOTIFY FISH & WILDLIFE SERVICE
WASHINGTON, D.C.
820014

"NOTIFY FISH & WILDLIFE SERVICE
WASHINGTON D.C."
OR TEXAS GAME & FISH COMM.
SEND YOUR BANDS IN WITH THE
INFORMATION WHEN AND WHERE
YOUR BIRD WAS KILLED.

S. Woodrigger



THE BAG LIMIT ON GEESE DEPENDS
UPON THE SPECIES. THIS IS
DIVIDED BETWEEN THE BLUE AND
SNOW GEESE IN ONE PART, AND THE
WHITE-FRONTED AND CANADAS IN
THE OTHER. THESE SPECIES OF
GEESE MAY BE SIMPLY AND EASILY
CLASSIFIED BY THE COLOR OF THEIR
FEET; THE BLUES AND SNOWS WITH
VARIATIONS OF PINK AND RED, AND
THE WHITE-FRONTEDS AND CANADAS
WITH YELLOW AND BLACK.