

Texas Game and Fish

OCTOBER

1950

TEN CENTS



PICTURE OF THE MONTH



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.

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COVER—By Orville O. Rice

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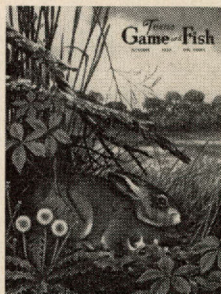
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ROBERT G. MAUERMANN
Editor



The Cover

The cottontail rabbit, pictured on this month's cover by Orville Rice, is a native Texan equally at home in the vast ranch country of South Texas and the wooded area of East and North Texas. Although the cottontail does not have the legal status of a game animal in Texas, he has provided many a hunter with his first hunting thrill. He is found in woody pastures, fence rows and in almost any area where grassy cover is available.

King and Clapper Rail

By GUS A. ENGELING

Wildlife Biologist

AMONG the least known of all game birds in Texas are the king and clapper rails, secretive marsh birds belonging to the family Rallidae. Many people know them only as "marsh hens" or in the inland areas

as "mud hens," and have no idea that they are seeing a game bird of excellent eating qualities.

The king rail is about half the size of a chicken, has long, strong legs and a long, slightly curved bill. The wings and chest are rusty colored and the sides are prominently barred. The

clapper rail is similar in appearance to the king rail except that it is slightly smaller and lighter colored throughout. In many cases the two species cannot be distinguished except on the basis of habitat. King rails are usually found associated with fresh water and clapper rails are always found in salt or brackish water marshes.

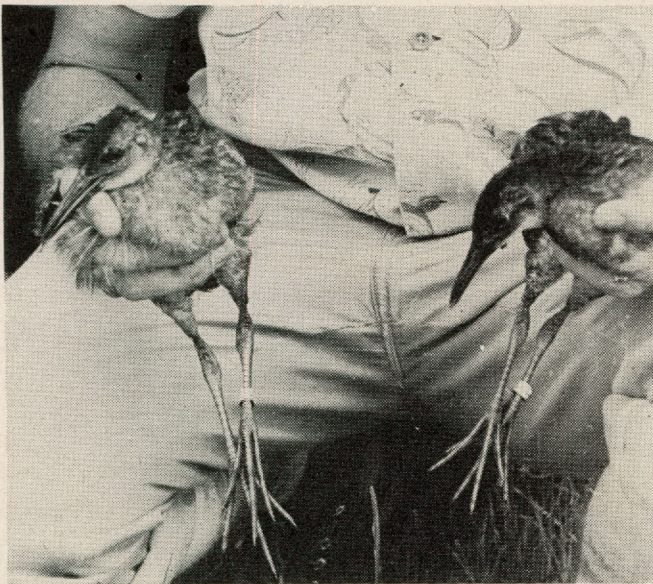
Rails are among the earliest breeding birds in the State. I have found their nests in Fort Bend County as early as February, and they continue nesting until September. Nests may contain from a half dozen to fifteen eggs, and are usually well concealed. Frequently rail nests are built in large clumps of grass and are completely hidden from above. The nesting birds tunnel underneath the sides of the dry grass clumps, work out a chamber in the interior of the clump and there deposit and incubate their eggs.

Rail nests are almost always built very near water if not actually built in vegetation over water. Nesting sites include roadside ditches, prairie ponds, rice canals, and salt marshes.

Young king rails are coal black and are commonly referred to as "mud chicks" by the colored people of the coastal prairies. They are easily caught when very young, but after reaching the age of a week or more are comparatively safe from human enemies. Their legs develop rapidly and they soon learn to run, dodge, and hide so swiftly that it is difficult for even three men to catch more than two or three out of a brood of six or more. A young king rail, three-quarters grown, is about the swiftest and most evasive bird that I know.

Last year during the months of June, July, and August we banded a total of 95 young king and clapper rail. In addition to these, 15 more have been banded during the past summer. As yet, we have not received a single return on any of these banded birds. Since little is known of the

*Co-Leader, Federal Aid Project 29-R.



Two young king rails, about half-grown.



A flightless grown king rail, apparently in wing molt. When in this condition, rail cannot fly.

movements of the king and clapper rails in Texas, hunters are urged to report any banded birds they kill.

Rails are very reluctant to fly and usually will not take to the wing unless hard pressed. When they do fly they seem to do so with difficulty and usually drop back into the marsh vegetation after flying but a short distance.

Rail hunting in Texas is not practiced by many sportsmen, and only the most experienced are assured of any degree of success. The great expansion of rice farming in Texas has created ideal habitat for king rail that formerly did not exist. I cannot say, however, that the overall rail population today is any greater than it was 10 or 20 years ago, since widespread drainage programs have eliminated many natural fresh water marshes in the coastal areas.

A factor definitely in favor of the king rail is the modern combine method of harvesting rice. Formerly, when the old reaper was used, the standing rice was cut close to the ground, bundled, and put into stacks to dry. Rails that inhabited rice fields were robbed of their cover and were gradually driven to the center until only a narrow strip of standing rice remained. It was then that men and boys armed with guns and clubs flushed out the birds and literally slaughtered them. Those that could fly were shot, and the flightless young were attacked with sticks.

Today, most rice is combined. The modern combine cuts only the tops of the rice stalks and leaves stubble from 9 inches to several feet in height. Rails are no longer driven to the center of the rice field as it is combined, but escape into the stubble during the combine operations. Some rail are shot by hunters that ride the combines, but the overall kill is not believed to be excessive.

The status of the king and clapper rails in Texas is a topic that needs more study. As long as we have rice fields and marshes we will probably have at least some rail. Is it possible to increase the numbers of these birds through management practices so that more sportsmen might enjoy the sport of rail hunting? This problem, I believe, is worthy of consideration.



Good king rail habitat is shown in the above photo taken near Alvin, Texas. It is standing rice on the edge of a cut swath. The second photo shows a typical rice field pond which king rail favor. Vegetation besides rice is smartweeds, sena beans and rice cutgrass. The lower photo is of a clapper rail nest built in salt grass.

Pheasants in the Panhandle?



By PAUL V. JONES, JR.
Wildlife Biologist

and

JESS FELTS
State Game Warden



PERHAPS no game development in the past two decades has so fired the imagination of sportsmen and landowners alike as has the irruption of pheasants in South Dakota and adjoining states. While pheasant shooting in South Dakota became a matter of national interest as early as 1926-27, real fuel did not reach the fire until the arrival of the era of prosperity associated with the recent war years. At that time, hordes of hunters from all over the nation flocked to the South Dakota hunting grounds by train, bus, plane and automobile. Pheasant kills reached near astronomical figures. And, Texas furnished its full quota of hunters.

In common with all other varieties of mankind, these Texans possessed the ability to see something of home in every environment they chanced to visit. This is pure human nature. Flushed with enthusiasm and starry-eyed with anticipation, they began to proclaim forthwith (and quite erroneously) the exact similarity between the plains of South Dakota and the plains of the Texas Panhandle. The immediate and logical conclusion produced by this frame-of-mind is obvious—"South Dakota has done it and so can Texas. It's a cinch, so let's get started." To their utter amazement and consternation they found they could arouse little or no interest among the Texas Game Wardens and Game Biologists. What a bunch of wet-blankets those guys turned out to be. What gives anyhow? In all fairness to the Texas Sportsmen, it is probably time to make a statement of the situation as field workers of the Texas Game, Fish and Oyster Commission see it. For the time being, let's limit ourselves to discussing the matter as it applies to the Texas Panhandle.

To begin with, it is probably a good idea to state it is now rather apparent that nobody anywhere is really in a position to give all the answers on pheasants. In spite of all the investigations and experiments carried out in the past twenty-five years in the United States, the answer to the prime question of what constitutes good pheasant range—on which the success of pheasants will be a certainty—is still unknown. The pheasant situation still operates on a more or less "gold is where you find it" basis.

For years we have said with a good deal of assurance that the pheasant is a bird of the northern climates and that hopes for his success in the more southern latitudes were dim indeed. Yet, we must admit at this point that somewhat encouraging populations of pheasants have been known to occur from time to time in irrigated portions of New Mexico, on the Upper Rio Grande Valley in Texas, at one point on the Texas Coastal Prairie, in Lower California, and in some of the downright tropical portions of the Hawaiian Islands. However, in none of these places has there ever been a sustained yield of birds that would permit a consistent and dependable harvest. It has also been quite popular in game circles to say that the limit of the southern extension of the pheasant range in the United States corresponds to that portion of the country once covered by glaciers during the ice age. But, that frog won't jump either. The unglaciated Sacramento Valley in California, particu-

larly the rice field area, is producing excellent crops of pheasants. And, of course, everyone knows that to have pheasants you must have cultivation, especially for such crops as small grains and corn; corn being the real key to the problem. That is, with the exception of an area of some 25,000 square miles in the sandhills of north central Nebraska where the pheasant thrives quite nicely, thank you, without even so much as a foot of cultivation or a grain of corn. All of which gets us nowhere and we are now right back where we started. Evidently, within reasonable limits, the pheasant has a knack for getting along where he wants to get along regardless of what you may or may not do for him.

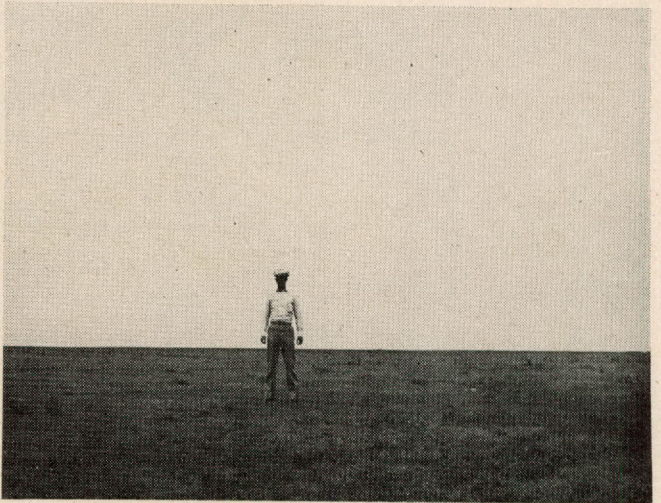
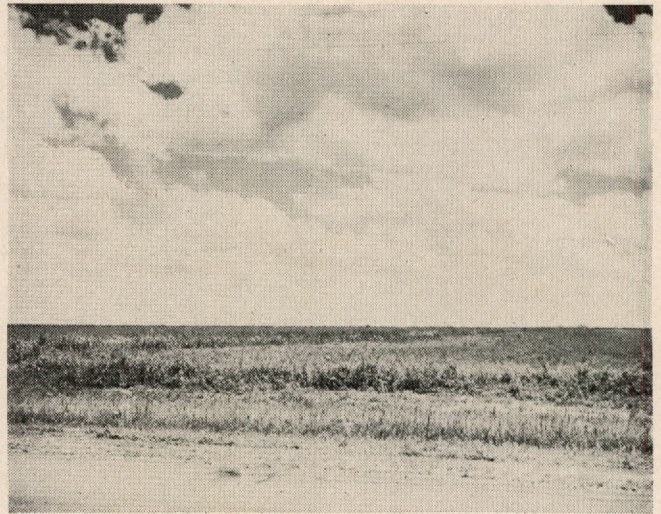
From the above it is clear that specific and dogmatic statements concerning pheasants are apt to be somewhat dangerous. Nicely propounded little theories and rules have a nasty habit of, in time, blowing up in one's face. Therefore, our statements must be limited to generalization into which a liberal dose of common sense has been mixed.

In general, then, what is good pheasant range? Since you have forced us to give an answer, we will say most cautiously, that it is made up a fertile soil which provides food through an abundance of grain and weed seeds by cultivation; and cover and water by the widespread intermixture of thickets, marshes, bogs, seeps, swales, and meadows.

Now, getting down to cases, where do you find these things or a combination of them in the Texas Panhandle? Unfortunately, for the most part, the answer is, you don't. It is true that the ideal set-up as we have pictured it occurs at isolated spots on very small areas in the Panhandle. But, taking the country as a whole, no. A fertile soil?—yes—no one will deny that. Given adequate moisture, the soil of the Panhandle will grow almost anything. But, where are the bogs, the swales, the thickets, the marshes, the meadows, and the like? Just what do we have in the Panhandle anyway?

We have three more or less completely different associations. There are the flat tightland plains, the rolling sandy soil pasturelands, and the cultivated lands carved from the preceding two. The flat tightland pastures were originally covered with short grasses and even in the virgin state when not grazed to the roots, possessed little in the way of permanent cover and food for upland game birds. And, surface water was always a problem. The rolling sandy soil pasturelands were originally covered with a combination of short grasses, tall bluestem grasses, weeds, and shin-oak. Today, much of this range is essentially the same except for a considerable reduction in weeds and grasses by a long period of heavy grazing. The cultivated lands are at present used for the production of wheat, grain sorghums, cotton, sugar beets, various vegetable crops, and alfalfa. Some of the cultivated lands are irrigated by deep wells.

And now, by the exercise of common sense, let us try to fit pheasants into these associations. First, we shall eliminate the remaining flat tightland range. Obviously, a short stand of pure grass offers little in the way of food and cover for so large a bird as the pheasant. As one man so aptly put it, "How can you expect something like



Top photo is of an irrigated alfalfa field in northwest Dallam county. There are very few pheasants in this vicinity due to the absence of permanent cover. There are many hundreds of square miles of short-grass prairie in the Texas Panhandle, second photo. Food and cover for pheasants and quail are non-existent on such range. Game Warden Calhoun Lovelace stands to show the shortness of the grass. The lower photo is of a grain sorghum field. Many pheasants have been released in this vicinity and many more have drifted from Oklahoma, but at the present time, the pheasant population is extremely small.



Shaded areas indicate where some pheasants are found in the Panhandle.

a pheasant to get along in a country where you can see a grasshopper crawl a quarter of a mile away?" Next we come to the rolling sandy soil rangeland. Superficially this range looks a great deal like the Sandhill Country of Nebraska where we know pheasants are doing well. Our hopes are raised until we discover that, unlike the Nebraska range, our sandhills are almost devoid of swales, bogs, seeps, meadows, numerous running streams, and the like. And finally, we come to the cultivated lands. Since we feel our chief hope for pheasants, if any, is on the cultivated lands, we shall discuss them separately.

With few exceptions, the pheasants we now have in the Panhandle are found in rather close association with the cultivated areas devoted primarily to the raising of grain sorghums, and to a lesser extent, wheat. While it is true the present stocks have managed to persist, in small localized areas for something over ten years, at no time have their numbers become great enough to be overly encouraging. On the whole, the Panhandle pheasant stock is extremely spotted in its distribution and consists of a drifting and very intermittent population. The distribution outlined on the map is intended to give an idea of where pheasants have been known to exist and where they may be expected to be found—at times. It probably does not include all known colonies of birds.

A considerable fluctuation in the numbers of pheasants has been noted throughout the ten year period by State Game Wardens. In some cases it has been observed that pheasant increases have occurred in the years following unusually heavy rainfall. For example, in the 1941 season, the Panhandle received 37 inches of rainfall—17 inches above the normal 20 inches. This brought about an exceptionally heavy growth of all range vegetation that carried over into the 1942-43 season during which a marked increase in the pheasant population was noted. Similarly, shortages have been observed in the dryer years (for example 1947-48). While the exact degree to which moisture may affect the pheasant population is undetermined, the inference is that in years of good rainfall just prior to the nesting season there is a greater survival of the hatch. Similar results occur following years of heavy rainfall that causes a considerable carry-over of rank range vegetation with its highly favorable food and cover qualities.

Quite logically, the next question that comes to mind is, "Where did these pheasants come from?" It is believed the major portion of the birds found at present is derived from stock which drifted in from Kansas and Oklahoma. This drift has taken place from both the east and north. It appears to have begun about 1939 or 1940 and to have

reached its peak during the three years prior to March, 1946. Then, too, considerable numbers of pheasants have been released in nearly every county of the Panhandle by private individuals. Pheasants now found along the Tierra Blanca Creek in Deaf Smith and Randall Counties are known to result from such releases. The same doubtless applies to some of the pheasants along Punta de Agua and Rita Blanca Creeks in Dallam and Hartley counties; in a considerable portion of the grain sorghum belt in Dallam, Sherman, and Moore Counties; in portions of Wheeler and Hemphill Counties; and along the Palo Duro Creek and the Prairie Dog Town Fork of the Red River in Randall County. The heaviest concentrations seem to be in a strip along the northern edge of Dallam, Sherman, and Hansford Counties north of the Canadian River and along the Tierra Blanca Creek in Deaf Smith and Randall Counties south of the river.

For a number of reasons, extremely clean farming is practiced over most of the Panhandle area. For example, on the perfectly flat lands, the crop itself runs almost to the fence lines and the turn-rows are kept clean and free from weeds to discourage various insect pests. It is widely thought that weeds and brush of any kind adjacent to cultivated crops offer a harbor and breeding ground for grasshoppers. On some farms, there are no fences whatsoever and the turn-rows extend to the public roads. It has also been pointed out that in recent years, during which crop prices and taxes have been at an all-time high, it has been essential to cultivate the very last inch of farmland in order to secure as high a return as possible from the soil. Furthermore, by one means or another, the fields and fencerows are kept perfectly clean throughout the year as well as during the growing season. In the fall and winter, cattle are frequently grazed in fields from which the crop has been removed and of course, in-between-times, the ground is plowed in preparation for another crop. Therefore, with the exception of the time during which the mature crop stands in the fields, the farms are for the most part barren to the point of desolation. The foregoing conditions are not quite so severe in the more rolling farmland districts where fields are traversed by ridges, gullies, dry streams, and the like. But, even there, cleanliness in farm practices precludes the existence of adequate game habitat.

The charge is frequently made by farmers interested in raising pheasants that road hunting poachers remove the birds about as rapidly as they are produced. There is probably a great deal of truth in such a statement. Also, the condition will persist so long as the only cover available to the pheasants is to be found growing in the barrow ditches along public roads. The only solution is adequate cover on the farms themselves, well removed from the roads.

And, at last we come to the sixty-four dollar question, "What can we do in order to have pheasants in the Panhandle?" In view of the discussion above, it is obvious that the first step will involve a revolutionary change in farm practices—not by just one farmer here and there, but by a considerable number of farmers whose lands adjoin. The following list of suggested improvements

might be beneficial. They are typical and would have to be adjusted and manipulated to fit the individual farm concerned.

1. Planting of some type of permanent cover, either in rows or in clusters along field fences. If cattle are grazed in the fields during certain periods of the year, the cover itself may have to be fenced separately until it is well started. Wild plum, pruned Chinese Elm, Russian Olive, desert willow, multiflora rose, or some of the evergreens such as arbor vitae might be used. Recent experiments with multiflora rose indicate it may be adaptable to the Panhandle and if so, it would undoubtedly be the most suitable. The maximum benefit of such cover plants is enhanced by permitting weeds and grasses to grow up among them.
2. Setting aside of waste and unused lands adjacent to fields by fencing off field corners is a valuable aid. Such corners need not contain over one-half acre to be valuable to game. Grasses and weeds that grow

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There are very few places in the Panhandle where conditions are fairly favorable for pheasants. Permanent cover, (the above photos,) is provided by wild chinaberry, willow, giant ragweed, hackberry, button-willow, sage and sunflower growing in clumps along the Palo Duro Creek in Hansford County. There are a few pheasants in this vicinity.

GAME PROSPECTS

HUNTING enthusiasts who take to the field this fall will find most game species more abundant this year than during the past few years according to reports from wardens and biologists of the Game, Fish and Oyster Commission.

Bobwhite and blue quail in most of their range in Texas are more abundant now than they have been in several years. Good rains which provided suitable food and cover during the early spring nesting season are probably responsible for this. Quail coveys may change their range before the hunting season, and fires or excessive grazing can reduce food and cover to such an extent that quail may disappear completely from an area where they are now plentiful.

Dove hunters may also look forward to a successful season. Nesting has been widespread and successful according to department fieldmen. The first state-wide mourning dove banding program was undertaken during the past summer in order to learn

more about the breeding and migratory habits of this important game species. *Hunters who kill banded birds are urged to return these bands to the Game Department in Austin.*

Game Department specialists, working in the whitewing area of South Texas reported that the whitewing population of this area was about the same as it was last year, although more hunters participated in the three-day hunt which was held on September 15, 17 and 19. The number of birds killed will be reported later.

Big game hunters may expect about the same conditions they found last year. However, competition will be greater since more hunters will be in the field than ever before. It has been estimated that the army of deer hunters will add about 10,000 recruits to their ranks this fall. Deer and turkey may be more abundant in some sections where more rainfall has occurred as in the Panhandle and Trans-Pecos. Range conditions indicate that animals in these areas will be in good condition.

For the first time in two years, pronghorned antelope in Trans-Pecos have been added to the list of big game animals to be hunted this fall. Biologists and wardens in this area found a sufficient increase in the antelope herds over last year's population to justify a controlled hunt. Approximately 600 permits will be issued to applicants for antelope hunting licenses. More than ninety percent of these hunters will succeed in bagging their antelope. Range conditions have been somewhat better than average in the Trans-Pecos, so hunters should get not only good trophies but good antelope steaks as well.

The prospects for black-tailed or mule deer hunting in West Texas is not quite as good as are other big game prospects. These fine big animals, often twice the weight of a whitetail, are not holding their own as well as the whitetail, found in most of the rest of the state. Landowners

and hunters who think that the introduction of a few mule deer bucks would increase the size of their white-tails are in for a disappointment. Mule deer and whitetails do not cross breed.

The most important factor limiting the increase of mule deer in the Trans-Pecos is domestic sheep. Competition for food is very great between these two species, and expanded sheep raising in the area has greatly reduced the range of mule deer. Recently developed trapping techniques, whereby mule deer can be moved to suitable ranges where this species was formerly found, and where sheep have not been introduced, are enabling biologists to help increase their numbers to a limited extent.

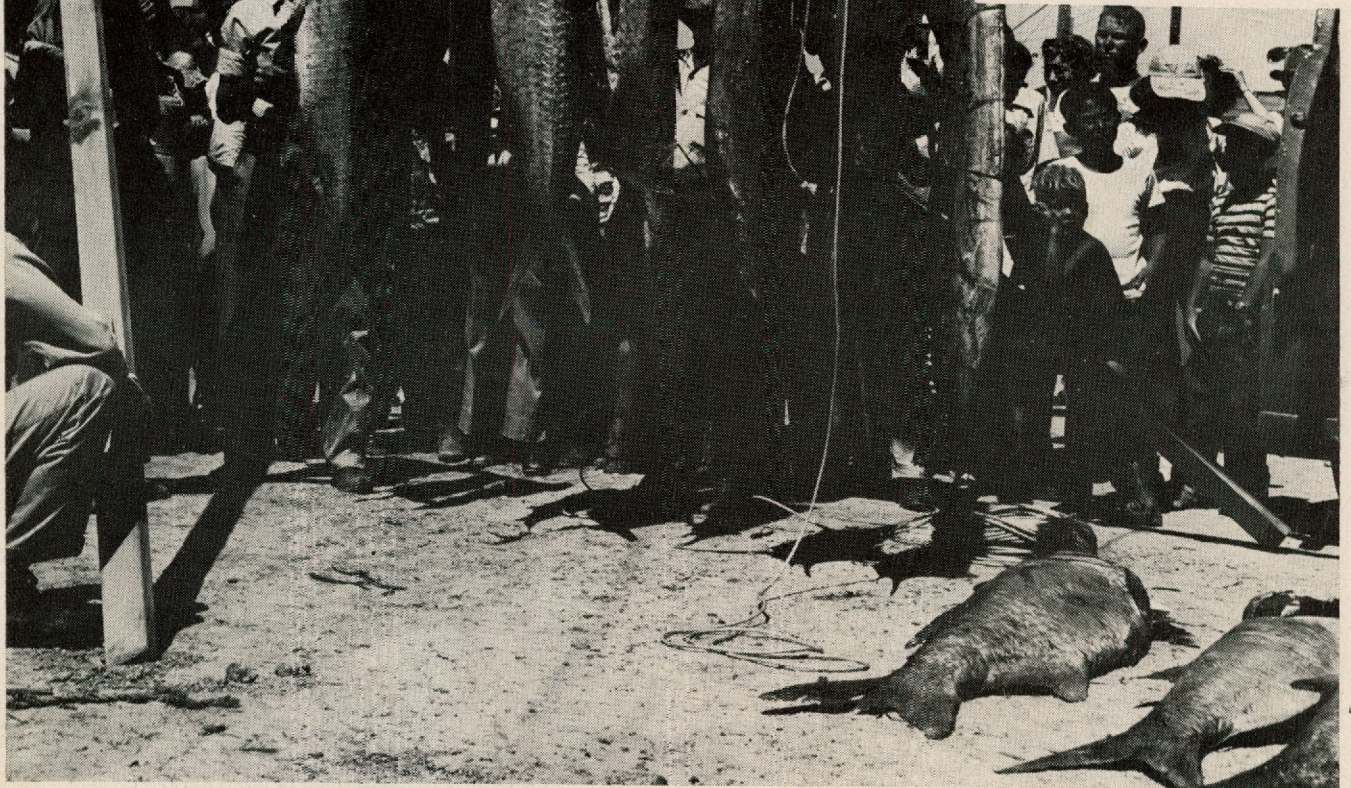
Turkey hunters in most of South Texas will find an increase in the numbers of these big game birds. Biologists, wardens and ranchmen in most of the hill country have also reported better than average nesting success

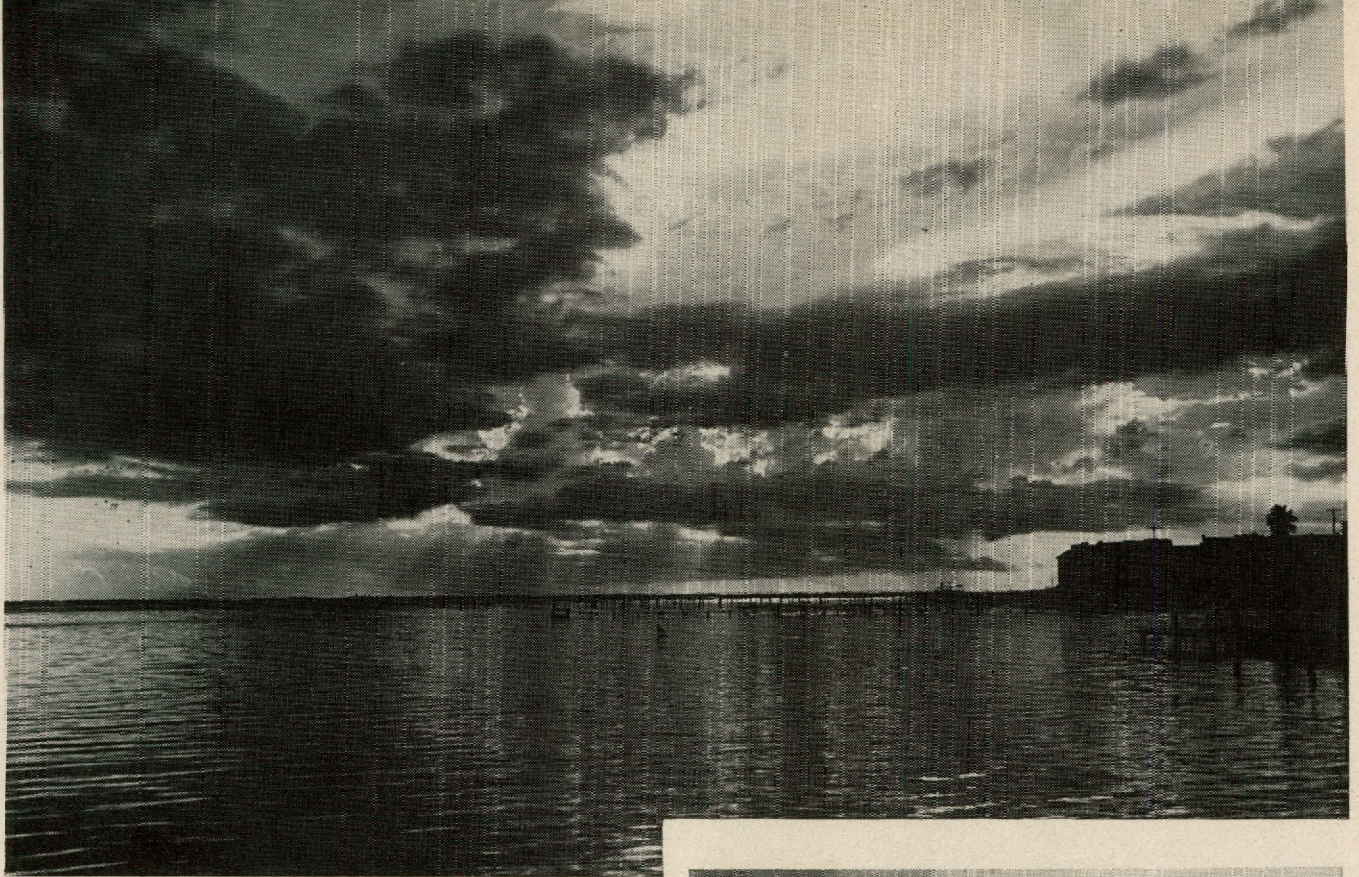
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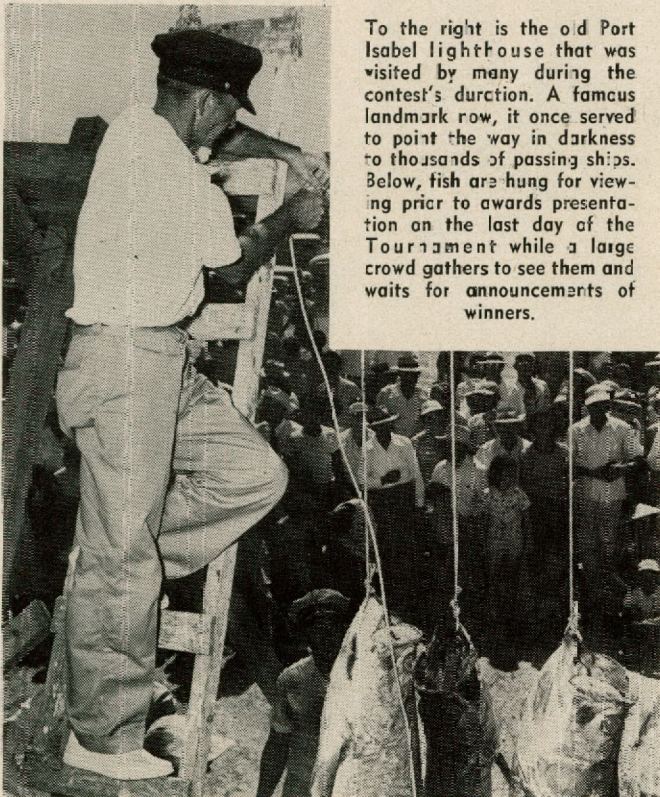
Coastal Classic

A record number of entries was set this year at the 11th annual renewal of the Texas International Fishing Tournament held at Port Isabel, Texas, from August 10 through 13. The entry register for the Tournament reached the 119 mark, giving encouragement to the future of this South Texas Fishing Derby that was inaugurated in 1934. Dock reservations were used by more than forty visiting boats, most of which came down the Valley's newest artery of travel—the Intra-coastal Canal. With San Antonio and Corpus Christi furnishing the majority of the sport fishermen from outside the Rio Grande Valley, other states also played important roles in making a bid for stiff competition, as evidenced by Illinois and Tennessee entrants taking some of the major prizes along with the state championship. Age seemed to be of little concern to these avid fishermen since entries ranged from a six-year-old San Antonio boy to a seventy-two-year-old great grandmother.





Opening-day contestants awakened to see this beautiful sunrise and were pleasantly surprised to note recurrences of similar ones each morning during the Tournament.



To the right is the old Port Isabel lighthouse that was visited by many during the contest's duration. A famous landmark now, it once served to point the way in darkness to thousands of passing ships. Below, fish are hung for viewing prior to awards presentation on the last day of the Tournament while a large crowd gathers to see them and waits for announcements of winners.





Left top: Sally Marie Burnell, daughter of Port Isabel's Mayor Burnell, stands proudly beside her double catch for one day. The fish, which helped her to win the Ladies Tarpon Division, weighed 104 and 58½ pounds and were 6 feet and 4 feet, 10 inches, respectively.

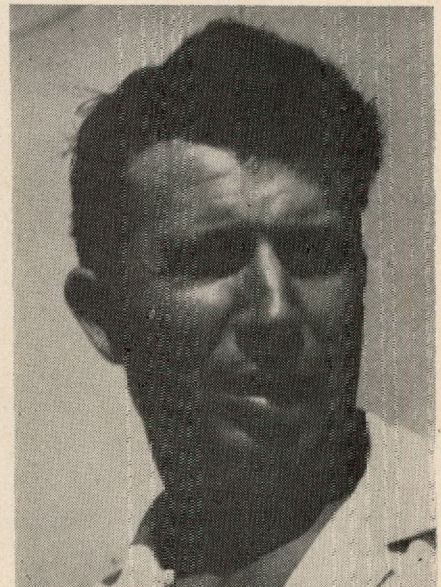


Right top: Arch M. Gaskill of Elgin, Illinois, stole the show by winning the Texas Grand Championship. He scored the greatest number of points in off-shore fishing, caught the largest King Mackerel, and the largest Jackfish.

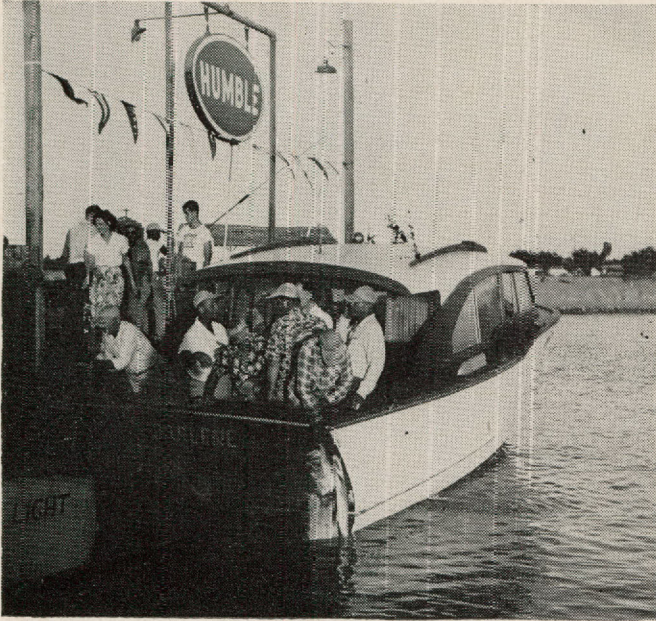


Right center: Using a calcutta pole much larger than herself, Margaret Gay of Port Isabel spent some time practicing for the Tournament.

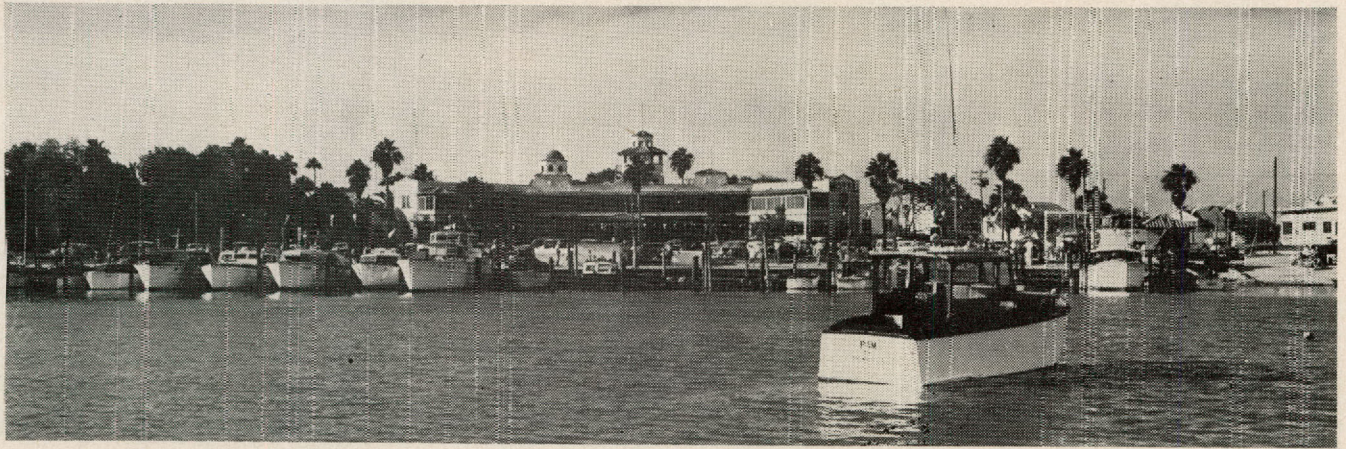
Left bottom: The first tarpon of the Texas Derby is proudly displayed by Jack Bryant and his son of Harlingen, Texas.



Right bottom: Bob Williams of Port Isabel, the winning boatman whose party scored the most points in off-shore fishing, enthusiastically accepted a \$100 bill for his efforts.



After a day's outing into the gulf, the Darlene of Harlingen, with its catch tied on the stern, stops at the gasoline pumps in preparation for the next day. As soon as a boat like this pulls in, a crowd gathers to examine the catch. "Great Grandma" Mrs. Clara Thomas of Alvin, Texas, is as active as any younger participant and says of her granddaughters in regard to gulf fishing: "I've never seen anybody fool around eating and drinking while they are fishing as they do." "Grandma" goes all day in an open boat with no food and very little water.



The central waterfront and the Yacht Hotel, pictured above, were headquarters for registration and most of the other activities connected with the 1950 Tournament. Located here are the dock facilities and sleeping accommodations for the majority of participants.



Mrs. Evar Huest, wife of the Tournament president, won first place in the Sailfish division. In the ladies division, she caught the largest Sailfish and scored the largest number of Sailfish-ing points.



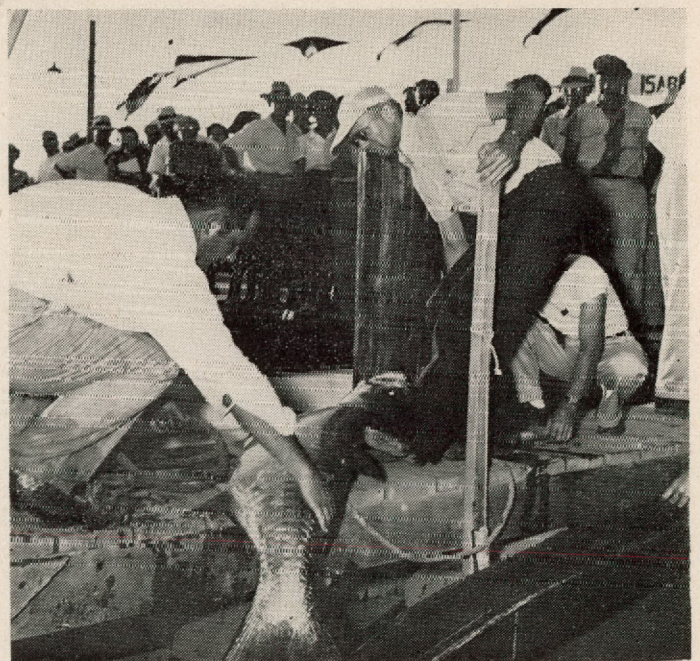
Happily displaying her silver platter trophy is Mrs. Charlotte Sewell, left, of Corpus Christi, who scored the greatest number of points in the ladies Offshore Fishing Division. To the right, Charles Urschel, Jr., of San Antonio, holds an armful of trophies won by scoring the greatest number of points on Sailfish, catching the first Sailfish, scoring the most points of any non-Rio Grande Valley Resident, and catching the largest dolphin. Representing the Junior Boys was Monroe Nowotny, Jr., below, of San Antonio. He scored the greatest number of points in the offshore division and the greatest number during the contest regardless of division in the juvenile competition.



A buffet supper at the Hockaday home was the order of the evening on the first night of the Tournament. The guests enjoyed good food along with the hospitality of their co-hosts, Dr. Hockaday and Mr. Bob Monlux, director of the Tourney.



G. A. Sauber obtains assistance from one of the onlookers as he unloads the tarpon from his boat, the Mar-Kay-Ann of Brownsville. From the dock, fish are carried directly to the scales, weighed and measured and this information, along with the weight line used, is registered.



Bicolor Lespedeza in East Texas

By DAN W. LAY *Wildlife Biologist*

BICOLOR lespedeza continues to be the best planting we know for bobwhite food in the eastern half of Texas. Trial plantings have increased from a few pounds of seed in 1945 to over 300,000 plants last winter.* Although testing will continue, the Game, Fish and Oyster Commission is ready to expand its distribution of planting stock as much as the public interest demands, up to the limit of supplies.

Demand has exceeded the supply of plants in the past but it is hoped that plants now being grown in Newton County will be enough to supply all requests. If not, efforts will be made to purchase additional plants for the free distribution program. Applicants must write the Austin office to request plants and they must pay the express charges when the plants are received.

Bicolor lespedeza is a perennial shrub legume which produces an abundance of seed that quail like. It grows to a height of about 10 feet under proper care and it comes out

*P-R Project 20-K.

every year without further planting.

However, it won't grow satisfactorily without fertilizer and cultivation the first year or two. Also, it must be fenced against livestock and deer. It will grow on a variety of soils, especially in the sandy regions. Its success on blackland has not been fully determined. It cannot withstand wet feet. Plants must be set by hand, as direct-seeding has not proven very satisfactory where tried.

Not all the trial plantings of bicolor made by cooperating landowners the past two winters have grown off satisfactorily. A survey made this summer

by Jack Inglis, Jr., revealed some important reasons for success or failure in growing bicolor. The first 55 plantings he inspected, in the region from Dallas and Houston east, were graded as 11 percent excellent, 27 percent good, 24 percent fair, and 38 percent poor.

The fair and poor plantings demonstrated the futility of setting the plants without following the directions given. With few exceptions, plantings that were not fertilized and cultivated made little growth. In all cases, lack of fencing against livestock resulted in failures. Wet sites caused many losses, even on apparently well-drained hillsides where there was a seepy condition. Some long strips

crossed such seepy spots and the contrast between growth on the drained and undrained parts of the strip were very distinct.

Another cause of failure was not setting the plants in blocks. Wherever plants were set in one or two rows or just scattered about, growth usually was unsatisfactory. Even with good growth, a scattered planting is of little use to quail. Most of the seeds fall in low-growing grasses where they are difficult to find. The best planting is 4 or 5 rows 300 to 400 feet long, with the plants thick enough to shade out other vegetation.

Competition of Johnson grass and bermuda caused some failures. This problem can be handled best by

thorough plowing and disking the site in the fall before the plants are set. After plants are in, it is practically impossible to do enough cultivating to control these grasses.

Some plantings failed because no ground breaking was done before planting. Scalping the soil and setting the plants with a shovel just won't work. Bicolor can't compete at first with native plants.

The good and excellent plantings found by Inglis were scattered throughout the region. They resulted from proper planting and cultivation more than from any other factor.

Some of the owners of plantings which have been graded excellent by Inglis or other Department men are: Pat Higgins, Wilson County (32 miles east of San Antonio); Joe Perkins, Van Zandt County; Henry Mast, Nacogdoches County; Josh Strickland, Rusk County; Dr. Griffin Roff, Rusk County; and Brinson Parker, Panola County.

Several plantings which graded "good" in Grayson and Brazos Counties indicate the western limits of the plant are somewhere beyond these and the above localities.

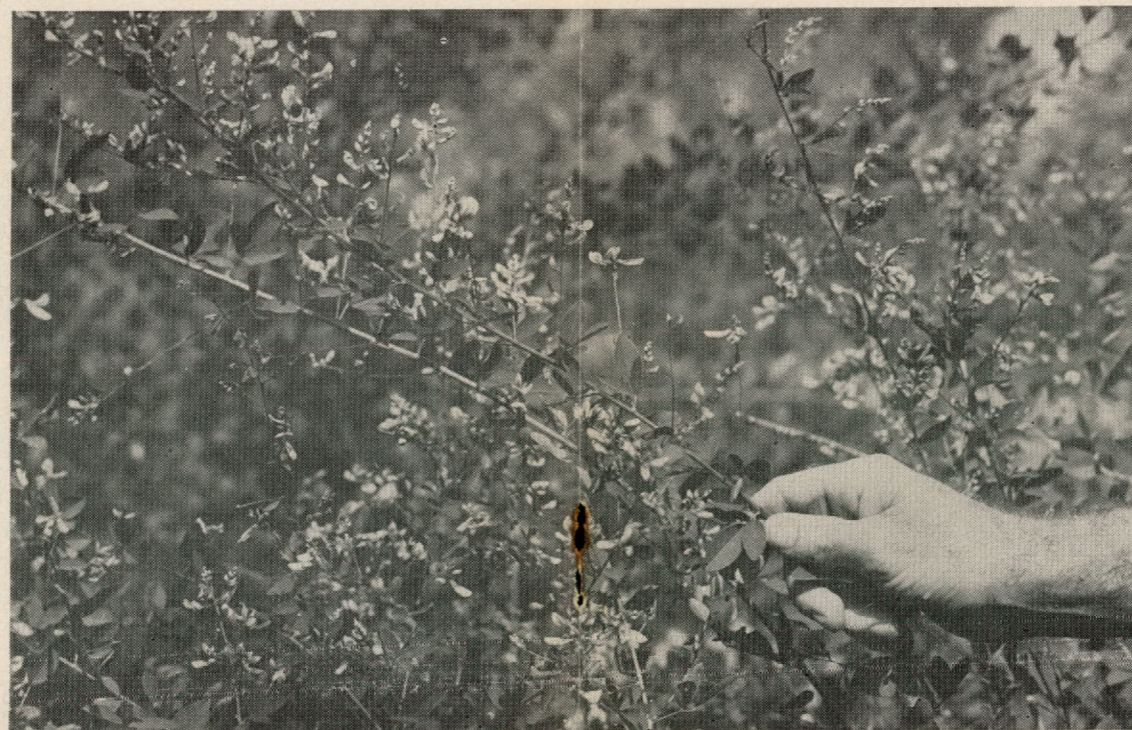
The plantings which graded "excellent" averaged about 6 feet in height with a maximum of 10 feet, and the survival was over 80 percent.

Distribution of plants will start in December this year. Those interested in increasing quail food where more food is needed, which is almost everywhere, may get on the shipping list by writing the Austin office indicating they will take proper care of the plants as indicated above.

A rigorous stand of bicolor lespedeza nursery stock in Newton County. The Game Department plans to distribute these plants in its quail management program.



Close up of bicolor lespedeza flower clusters.



Bicolor lespedeza strip fenced to exclude livestock. This planting provides both food and cover for quail.



The Life

argument; i. e., in both gulf waters and back bays. These stations were checked once each month with nets designed to catch very small fish. Several designs and lengths of nets were tested. The best results were obtained with a 100 foot, one-fourth inch mesh, drag seine which had a 10 foot sack attached to its center. By using a net of this type, nearly any location could be tested; the number of drags made was usually determined by the size of the area to be covered.

It was decided to cover as much territory as possible in the vicinity of the three passes to the Gulf of Mexico, namely, Aransas Pass, Cedar Bayou Pass, and Pass Cavallo. Aransas Pass is the only jettied pass and



Seining for larvae and eggs. Mr. Dewey, of the Copano Research Foundation, and Capt. Santo Pulido, of the Game Department, use a cheese cloth seine in which very small trout and eggs are taken.

FOR the past ten months an investigation of the life history of the speckled sea trout, *Cynoscion nebulosus*, has been carried out in cooperation with the Marine Laboratory of the Texas Game, Fish and Oyster Commission. This study was begun on September 15, 1949, and will continue until enough pertinent data have been collected to establish certain facts about this interesting and important salt water fish.

Original groundwork on the life histories of the sea trout and the red fish was done in 1926 and 1927 by John C. Pearson of the U. S. Fish and Wildlife Service. His work dealt with all the sciaenid or croaker family of the Texas Coast, including speckled trout, redfish, black drum, golden croaker, and flat croakers or spots.

The present investigation covers only trout and redfish, primarily because of their importance to both commercial and sport fishermen as food and game fish. Up to the present time this study has dealt chiefly with the collection of young trout and redfish in order that their habitats, move-

ments, and food preferences could be determined.

Before any true picture of the problem could be gained, it was necessary either to prove or disprove that speckled trout spawned largely in the back bays away from the passes leading to the Gulf of Mexico, or that a partial spawning occurred in the open waters of the gulf. It was also necessary to determine if redfish spawned only in the open Gulf of Mexico, or if part of the population spawned in lagoons and bays away from passes to the open Gulf. Up to this time, all evidence gathered by Pearson indicated that redfish spawned only around the mouths of passes to the Gulf or in the open Gulf itself. To determine this point, it was necessary to set up definite stations corresponding to both sides of the

This is the first of a series of two articles by Mr. Miles and deals with the speckled trout. A second article on redfish will follow in the near future.

DEWEY W. MILES

links Redfish Bay, Lydia Ann Channel, and the Intracoastal waterway with the Gulf of Mexico. Cedar Bayou Pass is a natural pass between Mesquite Bay with the Gulf. Pass Cavallo is an unjettied pass, dredged at intervals to keep it open to navigation. This pass links Matagorda Bay with the Gulf, and subsequently with secondary bays such as Barroom and Espiritu Santos. After preliminary tests in Aransas, Copano, Redfish, St. Charles, Mesquite, Matagorda, Espiritu Santos, Barroom and San Antonio bays, plus Powder Horn lake, a small body of water adjacent to Matagorda Bay, and several locations near the mouths of the three passes, sixty five stations were set up to be covered once each month. These stations were chosen because they offered suitable habitats to trout or redfish.

At each station, air and water temperatures, water depth at time of testing, salinity of the water in parts

History of the Sea Trout

per thousand, nature of the bottom over which the nets are worked, the types of vegetation present, the species and numbers of other fish and marine organisms present in the area being tested, and the standard lengths in millimeters of the small trout and redbfish, are preserved for future work such as stomach analysis for food content and scale study for age and growth rate determination.

At a later date, a fish tagging program was undertaken. A fish trap was installed at Cedar Bayou to capture fish moving to and from the Gulf of Mexico. Ernest G. Simmons, Marine Biologist of the Game, Fish and Oyster Commission was placed in charge of this program and is tagging

Marine Biologist
THE COPANO RESEARCH FOUNDATION

mature trout migrating to and from the Gulf. The author, meanwhile, tags small trout taken in the seine hauls

at any of the sixty-five stations. Most trout tagged in the field have been from six to seven inches in length. All tags are monel and bear a number, the letters G.F.O.C., and the address, Rockport, Texas. They vary in size, but every one of them is clipped in the same place in the corners of the fishes' mouths.

Although September was rather late to obtain much information on breeding habits, because spawning generally ceases around the last of that month or during October, young trout of the year were fairly plentiful. Eighteen and twenty millimeter fish were taken at most of the locations in the back bays with successively larger trout being found nearer to the mouths of the passes. The modal lengths of trout taken during September and October was 30 to 40 mm. The maximum lengths of the class ran from 95 to 130 mm. (25 mm. equal 1 inch.)

A plotted growth curve based upon the length-frequency method of age determination shows us that the small trout grow at a rate of 3.4 to 3.8 mm.

per week for the first two or three months, depending upon the time of spawning. This tends to slacken off during the colder months, but accelerates again with the return of mild or warmer weather. This means then that a trout hatched in April of a given year will have attained a length of 190 to 197 mm., or 7½ to 8 inches, by the end of March of the next year.

A small trout 1/3 of an inch in length actually looks like a trout. It is readily distinguishable by the jutting lower jaw, long tapering head and the brownish-yellow stripe which runs from the snout to the beginning of the caudal fin; the upper half of the fish is a yellowish-green dotted with bright brown splotches. Small fish of this size, approximately 1 week old, are found in back bays such as Copano, St. Charles, San Antonio, Espiritu Santos, Barroom, and Powder Horn Lake which lies adjacent to Matagorda Bay. Consistent and intensive efforts to locate any of these small post larval trout near the mouths of passes failed. In every case, the

A catch of about 500 small shrimp and 50 immature trout.



A heavy catch of small trout. The net also contains plenty of food for them.





A flounder and tagging equipment; pliers and tag.

the period from March to June 30th. This was due, however, to the locations in the various bays, and does not necessarily mean that small fish could not live in waters below or above this salinity range. It was interesting to note that a range of 22.8 to 25.3 ppt produced most of the post larval forms found at the various stations.

Many different species of small fishes are always found living along with small trout. Among these are silversides, *Menidia beryllina peninsulae*; one of the favorite foods of larger trout, pig fish, *Orthopristis chrysopterus*; pin fish or perch, *Lagodon rhomboides*; moharra, *Eucinostomus gula*; striped anchovy, *Anchoviella epsetus*; threadfin herring, *Opisthonema oglinum*; glut herring, *Pomolobus aestivalis*; and several other species which do not appear as frequently as those above mentioned. The silver perch *Bairdella chrysura*, is sometimes found in large numbers in May, June and July with post larval and other young trout. It is important to note that areas which produce small trout also produce large numbers of small grass shrimp and larval forms of the commercial shrimp species. The *Palemonetes* and *Tozeuma* genera of grass shrimp under 10 mm. in length seems to afford a staple diet for these very young trout. Many have been found with large copepods in their stomachs and frequently a number of small green annelid worms, *Nerina agilis*.

Some of the young trout were found to have eaten other small fish which for the most part could not be identified accurately.

A 12 mm. lizard fish, *Synodus foetens*, was found in the stomach of 42 mm. trout. The same species was found occasionally in the stomachs of large trout during a former stomach analysis project. Small isopods, *Lavonica* spp., were found in 2 to 5 mm. sizes in the stomachs of many of the small trout. This is the same isopod which occasionally imbeds itself parasitically to the gills of a trout, redfish, and frequently is found in the gills of black drum. A small 36 mm. trout contained a 1 mm. jingle shell, a small attractive mollusk,

smallest post larval forms were in remote back bay regions. A small net lined with cheesecloth, with less than 1 mm. apertures, was used to collect these in thick grass on the bottom of the bays and lake. Favorite vegetation was found to be *Ruppia maritima* grass, which provides excellent camouflage for the small fish. These must be hunted carefully in order to distinguish them from the grass itself. *Ruppia* grows thickly in all the bays named above, and is especially plentiful in Copano, St. Charles, and Espiritu Santos bays. The usual depth at which these small fish abound will run from 2 to 5 feet. We found that the very small fish from 7 to 22 mm. in length were usually found in ones or twos, seldom occurring in schools.

After reaching a length of 75 to 100 mm. they are frequently found in schools of from 15 to 30. We noted especially, while wading, that whenever we reached a very cool pool, small trout were usually caught.

Water temperatures of 20° to 28° C. were found to be favorable for the small fish but higher temperatures in the range of 31° to 33° C. seldom produced any small trout from the area being fished. Optimum bottom conditions appear to be firm to semi-soft mud and sand, with plenty of vegetation available for cover. Shell bottoms with sand patches harbor the larger trout of 75 to 140 mm. Trout from 7 to 32 mm. standard length were found only in waters with a salinity range from 21.3 to 27.3 ppt for

found in the bays and Gulf. Several of these shells in large sizes were found in the stomachs of adult trout. Small mojarras, of which there is an abundance from April to December, have been found in immature trout stomachs, but they were not as common as in mature trout. These seem to augment their diet with these small silvery perchlike fish during the early part of the winter, when a single fish may contain from 10 to 40 mojarras. However, very small shrimp, both grass and commercial species, seem to be the most sought after food item of small trout. Small trout do not tend to cram their stomachs to capacity as do the larger ones. A stomach of a small trout under 100 mm. was usually filled to about one-fourth capacity.

Plankton tows for microscopic organisms have been made at all of the stations tested and their contents examined for copepods, diatoms and small molluscan larvae which make up the basic food supply of our marine fishes. Stomach examinations of small trout did show some of the larger copepods, (crustacean animals) but generally they were digested too far for positive identification, other than their order. The abundance of plankton varies greatly from area to area and station to station as the seasons change. However, enough correlation has not been made to determine any effect of the presence or absence of certain planktonic forms in relation to the amount of fish of a given species present in an area.

Good samples of small trout were collected up to the middle of January at which time modal lengths for the 0 year class were running around 95 mm. Minimum lengths were running around 45 to 50 mm., indicating spawning as late as October of the same year. Maximum sizes of the 0 year class were running 130 mm. indicating that these were trout spawned in May and June of that year.

The mild winter of 1949 was responsible for the collection of very small trout up to January. Colder weather would have forced them into deeper water where they could not be easily obtained. During April and May, large trout were collected with a trammel net in order to examine them for developing roe and milt.



Biologist Miles tags a nine-inch trout.

Many running male trout were found early in April but ripe females were not found until the early part of May. An 18 inch female trout which was taken in Espiritu Santos Bay contained 514,740 eggs by ratic and proportion count. The two ovaries weighed about $\frac{1}{4}$ pound. The average diameter of trout eggs will run from .77 to .98 mm. This is considerably less than $\frac{1}{25}$ of an inch in diameter. The eggs are probably buoyant immediately after release but sink to the bottom within a few hours. It is because of this demersal quality that trout eggs are difficult to obtain after having been expelled. Pelagic or floating eggs would be much easier to collect.

At the end of May, large trout were observed to be coming in from the Gulf to the bays, while 7 to 8 inch trout were observed going toward the Gulf. This may support the theory that the peak spawning period in the

bays occurs sometime between the middle of July and the middle of August, based upon the quantity of small trout from 20 to 30 mm. in length, collected in September.

Attempts are being made to artificially hatch speckled trout. No success has been attained yet, but this has been partially due to the large number of male trout collected in comparison to the small number of ripe, running female trout. Sufficient aeration was not available at the time the females and males were stripped which also may be the serious limiting factor. It has been determined that milt from the male trout will remain active for 72 hours in unaerated water, at an average temperature of 70° to 75° F.

No suggestions as to conservation measures can be made concerning the speckled sea trout until more data have been accumulated and accurately analyzed.

Message to the Wardens

By D. W. BOWERS
State Game Warden

THERE is one disease if you ever get, you are a gonner for sure; it's "radioitas." I know for I've had it for about eight years, in fact since the start of World War II.

The first time I ever really began to realize the need for closer contact between a game warden and some central point where he could be contacted, was about two years ago when I first started working for the game department. I was being broken into this business of game law enforcement in Kerr County by my supervisor, the late Capt. T. T. Swanson. During the hunting season in Kerr County, game wardens are pretty thick. Most of the time there are three

or four wardens all within twenty-five to fifty miles of each other. Most of them camp out or stay in small camp houses without phone service. It seemed to me as I began to get acquainted with some of the law enforcement problems in this area that a two-way radio would be a great help to wardens and that radio communications would take a lot of the luck out of hunting violators.

One of the best examples of how closer communication could have helped solve an enforcement problem happened last summer when a warden left home to try and break up some night-hunting in his territory. He told his wife he would be back home the next morning. The warden

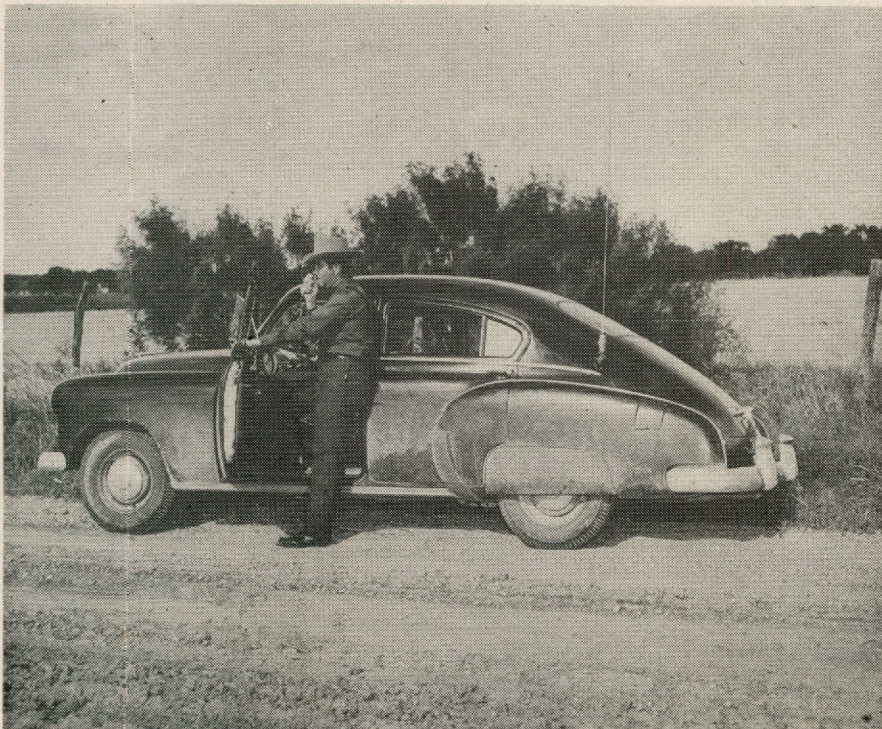
camped at his best observation post and watched all night for head lighters with no luck. All was very quiet and peaceful. At least, it was quiet in his immediate vicinity. The next morning, tired and hungry, he drove the thirty-three miles back home thinking of that hot coffee and nice soft bed. However, his wife met him at the door and told him that one of his cooperators had been calling him all night! The ranchman had told the warden's wife that night-hunters had been operating nearby all night.

How he felt when he heard the news might be best described as a warden's lowest moment, because he had been within four miles of that man's ranch all night long. It doesn't take much imagination to see how efficient a two-way radio would have been in this case. Almost every warden in the state has had an experience like this which backs up the need for better ways of being in several places at the same time, which of course, can't be done. But two-way radio communication will get field men to the scene of the trouble in short order.

Checking on licenses of cars is one of the problems a warden has to handle. Equipped with a two-way radio, a warden can report a car license to his station and ask his operator to call the auto license office for the information. The operator can call the officer back in a flash and report the information to him.

The more I thought about a two-way radio, the more I realized just how much help it would be to have a station in my home and one in my car. It would solve the biggest problem a warden has, and that is how

A two-way radio helps "Blackie" Bowers to be in two places at one time.



to patrol parts of his district and at the same time be in a position to accept messages and know what is going on in the other parts of his district. With a radio, I would be in direct contact with anyone who might reach my home by telephone and likewise, anyone could contact me if he had a phone. And now-a-days, most ranchmen have phones.

I hadn't said anything to anyone about my hope of getting a two-way radio, because things like that take a lot of money. I couldn't even buy the box that radio equipment comes in! What really started the ball rolling was a conversation I had with the late Johnnie Barns, on the Barns ranch near Lake Buchanan. He asked me how I liked my new district and what I needed. Well, I started talking about radio. Mr. Barns had been a flyer for many years and knew the value of radio communication. One thing brought on another and by the time the day was over, he was so determined to see me get a system set up in my district that he proposed that ranchers in my district buy the whole thing.

Soon there were about forty San Saba County landowners signed up wanting to pay their part of the new radio system. The whole thing developed before I realized it. I had to get busy and get an OK from the game department. It did not take long to get to Austin where I showed the plans to my bosses. The radio idea was not a new one by any means because Capt. F. M. Cowser, the director of law enforcement, had been working on it long before I ever thought about being a game warden. The first thing Captain Cowser wanted to know was what did my wife think of my big idea? And would she be willing to stay home and operate the contraption day and night? One of the main difficulties about two-way radios is that an operator has to be on hand most of the time to make it fully effective. Captain Cowser remarked that my wife would surely be able to keep track of me, which was certainly the truth. I assured him that my wife was more than willing to cooperate in the plan. Captain Cowser got all the papers fixed up with the Federal Communications Commission, and we were



Mrs. Bowers stands radio watch for her husband. He says she is prouder of her radio operator's license and the responsibility that goes with it than she would be of a new Easter outfit.

ready to start looking for some radio equipment.

I knew about what we needed as the result of my experience with radio during the war. I spent about two years in radio schools and radio work during my time in the Army and knew that I had to have some good heavy equipment that would withstand the rough roads it would be subjected to. Another problem we had to solve was just how successfully would FM radio work in the hills around San Saba? During the war we effectively operated FM equipment with a range from sixty to one-hundred miles over open water but FM on rough land is a lot different. To work out that problem, Captain Cowser arranged a demonstration with the Victoria Radio and Sound Company at Victoria, Texas. They showed me how FM would work in the Victoria area which, of

course, is not as rough as the country I would have to work in. We were afraid to buy equipment we were not sure of, so the Victoria Radio and Sound Company installed their test station in San Saba County in order for us to find out how FM would work in the rough hill country.

It worked out better than we expected. The game department officials gave their approval of the project and in a short time, the first two-way radio station handled by a game warden was in operation.

The most credit for the success of my radio operations goes to my wife who stays home almost all the time to stand radio watch. I believe that she is prouder of her radio operator's license and the responsibility that goes with it than she would be of a new Easter outfit. Of course, it

• Continued on Page 25

Fishes of Texas

The Suckers and Buffalofishes

By MARION TOOLE
Chief Aquatic Biologist

MANY members of the sucker family, *Catostomidae*, occur in Texas. At least twelve species and sub-species are known to reside within the borders of our State and several other species should and could be among those present. All that is lacking to definitely list these other species as those fishes occurring in Texas is an authentic report.

Fishes listed under the *Catostomidae* family are the buffalofish, Missouri suckers, carsuckers (not the European carp), chubsuckers, spotted sucker, and redhorses (not the minnow).

All of these fishes will be discussed in the future, but in the present issue, all discussion will be confined to the buffalofish.

The largest members of the sucker family are the buffalofish. Three kinds of these fishes are found in Texas, namely: the big-mouth buffalo, *Megalostomatobus cyprinella* (Valenciennes); the small-mouth buffalo, *Ictiobus bubalus* (Rafinesque); and the mongrel buffalo, *Ictiobus niger* (Rafinesque).

All three species are capable of great growth. The big-mouth buffalos frequently reach a weight of fifty pounds and a length of three feet. The mongrel buffaloes grow even larger, reaching a weight exceeding fifty pounds and length of three and one-half feet. The small-mouth buffaloes generally do not grow as large as the other two species. Their aver-

age weight is twenty pounds and their length two and one-half feet, but on one occasion the writer weighed one small-mouth that turned the scales to the seventy-nine pound mark. Undoubtedly, the others have some giants among their kinds.

All buffaloes are found throughout the Mississippi Valley and consequently occur in Texas. The big-mouths and small-mouths are found in our larger streams and in some of our lakes. The mongrels are not so widespread. Mr. Gordon Gunter, in the Number 2 issue of *Copeia* for 1938, states that he collected some by seining in rice canals near Palacios, Texas.

The spawning habits of all the buffaloes are similar. One of the first accounts of their spawning is to be found in the Bulletin of the United States Fish Commission for 1885. In a letter to Prof. S. F. Baird written by Mr. A. A. Mosher, the following is offered. "In experimenting with the common buffalofish, which is very common here (Spirit Lake, Iowa) and grows to weigh as much as sixty to seventy pounds, I found no difficulty in propagating them. I took several of both sexes, when about ready to deposit their eggs, and put them in a small sunken place about fifteen feet square and eighteen or twenty inches deep, gravelly bottom, with cane-grass growing all through it. I paid no attention to them except to take them out after spawning. In the

fall I found thousands of small buffaloes about 1½ inches long, notwithstanding there were two large black bass there all the time. I write this to show what can be done with this fish. I do not consider the buffalo a good edible fish, it being generally coarse and oily. They could be propagated advantageously, and serve as food to be given to game or edible fishes."

"When the water begins to grow warm, after the ice goes out, these fish are around the shores in immense quantities; they are in bunches of from three to seven or eight, the female is in the center, and when she sinks to the bottom to deposit her eggs, the males crowd around and under her, pushing her to the top of the water, until their tails and fins are out, then they make a tremendous rush, causing the water to foam, and with a noise which can be heard on a still evening a mile. They go ahead for a few rods, they sink, and the same performance is done over. The people call it 'tumbling'; in fact, it is a sight which once seen will never be forgotten."

Lee E. Yeager in the 1936 issue No. 4 of *Copeia*, offers An Observation on Spawning Buffalo Fish in Mississippi. The spawning activities of a school of black (mongrel) buffalofish were witnessed by Mr. Yeager on April 21, 1930. The spawning occurred in a swamp during a rise of the water level, resulting in the flooding of the bush-grown shore. He states that he first noticed the spawning buffalofish at 10 a. m., at which time several hundred individuals had assembled. This school of fish did not break up until 4 p. m. He further states that at the time he didn't recognize that spawning activities were being observed. Three days later, Mr. Yeager returned to the spawning site and found that the water had receded one foot, and masses of drying spawn were exposed. During the spawning, it was recognized that the fish were in a state of excitement. The observer notes that many fish swam half out of water and when jumping occurred, the movement was a short, arc-like glide, in which the fish seldom cleared the water surface. During the six hours that spawning was in progress, the fish were oblivious to all outside

interference. Large gar attracted to the scene slashed out after the unwary fish, which paid no particular attention to their predatory enemies.

It will be noted that from the latter account that April 21 was the date of spawning. From all data on the subject, this seems to be the average spawning date for buffalofish. Some spawn earlier in April and others spawn in May.

The food of the buffalofish generally consists of aquatic plant seeds, algae, aquatic insects, mollusks, and small crustaceans.

Buffalofish are seldom taken by hook unless a dough bait is used. Dough bait can be made by mixing equal portions of corn meal and flour with enough water to work up a sticky dough. The dough is then rolled into balls and dropped into a pan of boiling water for a few minutes. Another method is to work cotton into the dough and place a little rat cheese in the center of the ball. The ball is then placed on the hook.

Most of the buffalofish are taken with nets, such as gill, hoop, or trammel nets.

As Mr. Mosher pointed out in his letter, the flesh of the buffalofish is coarse and not highly flavored. Small bundles of bones are also present in profusion, which does not help their rating as an epicure's delicacy. Notwithstanding, they have always been a good market fish. In 1936, dressed buffalofish sold for about five cents a pound and now wholesale fish dealers are paying the commercial fishermen 16 cents a pound for the same kind of fish.

Buffalo may be baked, boiled or fried. They are probably best when smoked.

Distinguishing the three species of buffalofish is simple. If you should catch one with a large mouth, very oblique, and the upper lip about level with the lower margin of the eye, then you can feel sure you have a large-mouth buffalo. However, should the mouth be small and not very oblique, with the upper lip far below the lower margin of the eye, then you have caught either a small-mouth or mongrel buffalo.

Differences between the mongrel and small-mouth buffalofish are slight un-

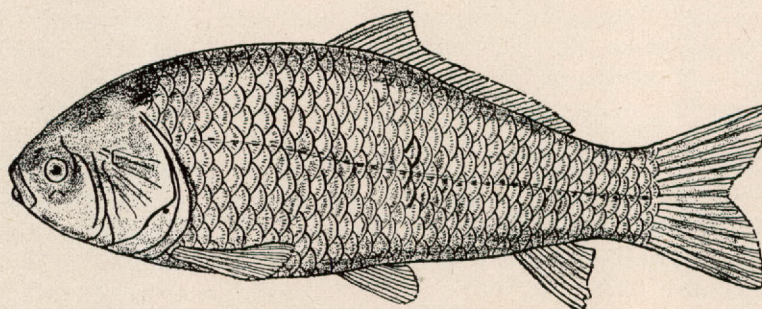
til they reach their adult form. Adult mongrels have a rounded back and adult small-mouths have a highly-arched, sharp back. The body of the mongrel buffalo is always more elongate than that of the small-mouth.

Buffalofish can easily be distinguished from the carp since they have no spines in their fins and don't have any barbels present on either sides of their mouths.

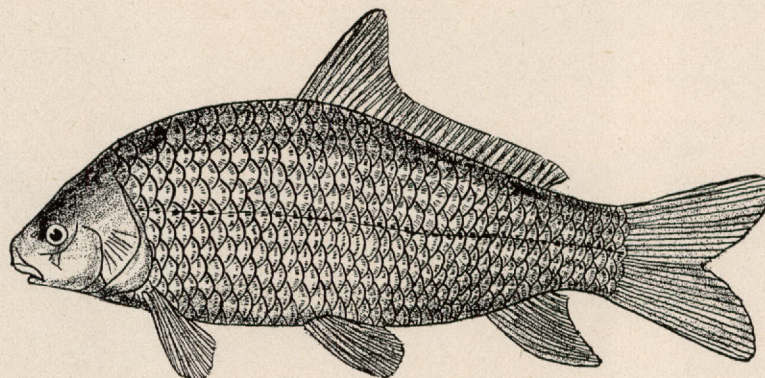
Forbes and Richardson in the *Fishes of Illinois* state that "the name

'buffalofish' refers to the bull-like hump at the nape in old individuals."

Their common names are many. The big-mouth buffalo is also known as a redmouth buffalo, gourdseed, roundhead, bull-mouth buffalo, bull-head buffalo, and white buffalo. The mongrels also go by such names as round buffalo, black buffalo, blue rooter, and rooter. Some of the other names for small-mouth buffalofish are razor-back buffalo, sucker-mouth buffalo, humpback buffalo, and river buffalo.



BIG-MOUTH BUFFALO



SMALL-MOUTH BUFFALO

The Marine Fishes of Texas

THE TIGER SHARK* *Galeocerdo Cuvier*

By J. L. BAUGHMAN

Chief Marine Biologist

THIS large and active shark is worldwide in its distribution mainly inhabiting tropical seas. Nevertheless it has been recorded from as far north as Iceland (Faber, 1829), and from as far south as New Zealand (Phillips, 1927). Garman (1913) states that it ranges approximately 20° on either side of the equator.

This is one of the most numerous of the larger sharks throughout the West Indian-Caribbean region, where it is to be expected anywhere at any time, and, apparently is one of the most numerous sharks in Texas. During the summer of 1949 the fishing crew at the Marine Laboratory caught over 100 of them in a little over a month's fishing.

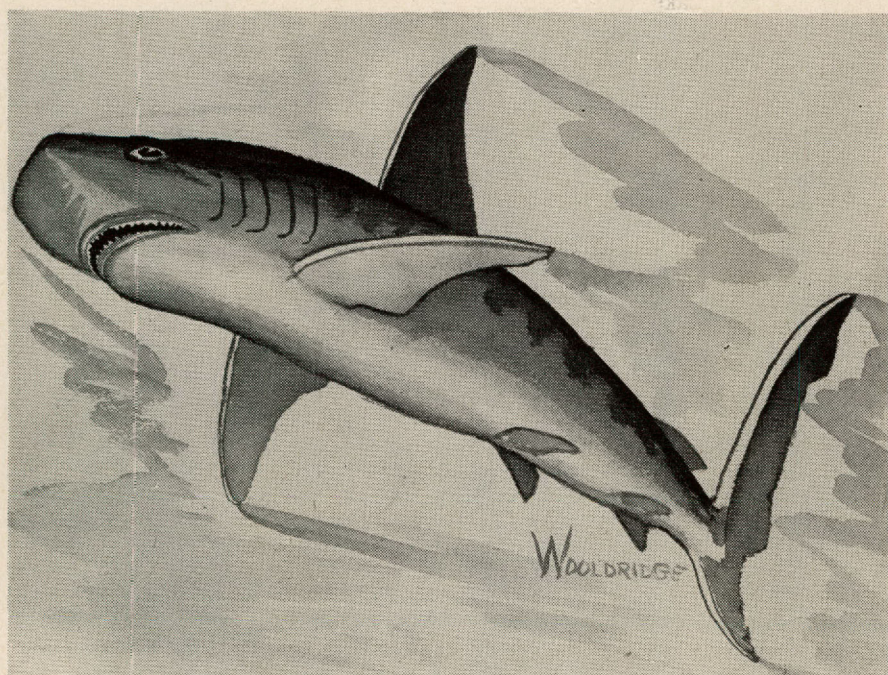
* This article is abridged from Baughman, J. L. and Stewart Springer, Biological and Economic Notes on the Sharks of the Gulf of Mexico. Amer. Midl. Nat. May, 1953.

They are generally gray or grayish brown above; a paler of the same below; small specimens up to 5 or 6 feet long are more or less prominently marked with darker brown spots, often fusing irregularly into oblique or transverse bars; these fade with growth, large ones often being but faintly marked or even plain colored.

While only 18 to 20 inches at birth, this is one of the larger sharks at maturity with adults averaging about 12 to 14 feet. They may be expected to weigh 700 to 850 lbs. at 11 to 12 feet, 850 to 1,300 at 12 to 13 feet, and 1,000 to 1,400 lbs. at 13 to 14 feet, depending on fatness and (for gravid females) on the stage of the development of the embryos.

This shark is found indifferently far out at sea and close inshore, even on mud flats in very shallow water.

Except when pursuing food, the species is sluggish, but when in action it is one of the most vigorous and strong-swimming of the family. Tiger sharks will eat almost anything that they can get. Porpoises, dolphin, turtles, fishes of all kinds, crabs, squid, and shellfish have all been taken from their stomachs. They are scavengers occasionally (Beebe and Tee Van, 1941), and cannibals frequently, Coles (1919) having taken chunks of hammerhead, sharp-nosed and ground sharks from the stomachs of tiger sharks. Bell and Nichols (1921) found portions of *Mobula olfersi*; whip-rays, and several shad in specimens they examined. Andre (1784) figures a section of jaw from one in which a stingray's spine had been so long embedded that the normal teeth had disappeared and were replaced by an abnormal and malformed set. Radcliffe (1914) has seen them eat one another, and Longley and Hildebrand (1941) speak of a man-o-war bird removed from the stomach of a three-meter specimen. Coles (*op. cit.*) found a diving bird in one, while Springer (1938) has obtained cormorants and small migratory birds, such as warblers, from individuals taken in Florida. Swordfish form part of their bill of fare (Goode, 1884), and a 400 mm. octopus came from a Pacific specimen. Others contained feathers, a sea lion pup, shearwaters, an iguana, and a specimen of *Diodon* which had not (*vide Darwin*) eaten its way out through the abdominal wall of its host. On the west coast of Florida, where the horse shoe crab (*Limulus*) is abundant, this item forms a considerable part of the diet. Among the keys, most stomachs contain one or



• Continued on Page 27

is all voluntary on her part as there are no provisions to pay radio operators. But she says that if it helps to make my work more effective and satisfies the people of my district, then she feels she is being paid for her work.

You would be surprised at the uses of the radio other than law enforcement. Long distance telephone calls may be made, word may be gotten to a rancher about a grass fire, accidents on the highway may be reported, and then there is that good feeling you have when you are out at night and know that if you have a wreck, get sick, or the car breaks down, you can get some help if needed. Why the little wife can even let you know when a meal is ready or when one of the kids is sick and you are needed at home! In fact, a two-way radio has as many uses as scotch tape.

One of the important results of the two-way radio system is the psychological effect it has on would-be violators. A lot of people can keep pretty good tabs on a warden, but if any rancher or farmer can get in touch with you at once, it makes a fellow think twice before violating the law even if he knows where the warden is.

There is a score board at our radio station that has some twenty-five or thirty scores. Each one represents either a game law violator brought to justice or something of importance such as reporting a grass fire, highway accident, or maybe getting a doctor out to a country home which is without a telephone, none of which could have been accomplished without a two-way radio.

Someday when the whole state is covered by radio network for the game department, we'll think of Johnnie Barns and all the other San Saba County landowners who financed this radio experiment, and the never ending effort of Captain Cowsert who has been constantly working on the idea.

The success of our experiment has justified Captain Cowsert to order other radio equipment for wardens in districts where they will be especially useful, and, of course, where these wardens' wives or someone else is willing and capable of acting as their operators.

Park Heads To Visit Texas

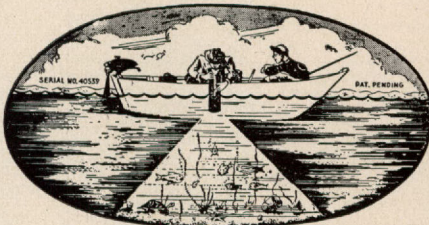
THE wide open spaces of Texas will get national attention when the United States Conference on State Parks holds its annual meeting here in October.

The distinctiveness of the Lone Star State was set out in a formal invitation presented by Governor Allan Shivers: "Texas, with its hills and plains, its valley and mountains, its rivers and arid regions, its coast lands and its interior, its dairy and agricultural lands rich in cotton, corn and wheat, and its oil fields, will undoubtedly impress you as being truly a land of contrasts."

Gordon Shearer, Director of the Texas State Parks Board, said more than 150 executives representing forty-seven states and the federal government will attend. These delegates will represent more than 3,500 state and national parks.

One of the highlights will be a visit to the Big Bend National Park on the Mexican border in Brewster County, where a dedication ceremony has been planned.

The convention opens October 4, with registration in Austin and in Bastrop Park, one of the 45 state parks in Texas. There will be an inspection of the Lower Colorado River Authority in Austin, and visits to Longhorn cavern and Inks Lake State Park. On the tour southward toward the Big Bend, stops will be made at the old San Jose Mission in San Antonio, at Garner State Park, Fort Clark and Judge Roy Bean's pioneer day headquarters at Langtry.



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of turkeys. However, some areas of the hill country which failed to get their share of early spring rains, or which for some other reason had poor cover conditions during the main nesting season, may be short on young birds. Unpredictable changes in the abundance of food, cover and water will cause some turkey flocks to change their range. Thus, areas now not carrying turkeys may have birds on them by the time the season opens in November. And, of course, some areas that now have high turkey populations may be a blank by mid-winter. But in general, if your hunting place had a good supply of turkeys last season the chances are you will find them again this year.

Squirrels over the state in general were on the increase last year. However, a poor mast crop set them back in some areas. Pecan bottoms in East and Central Texas should produce good bags of squirrels for the hunter. The abundance of mast regulates the squirrel population, so if your hunting territory has a good crop of acorns, pecans, walnuts, or hickory nuts, you will find your share of squirrels.

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Disease Kills Doves in Alabama

Extensive losses of mourning doves from disease have been reported from Alabama, according to the Wildlife Management Institute. The most serious outbreak was discovered in Autauga County and specimens of infected doves sent to the Patuxent Wildlife Research Refuge were found by Carlton Herman, U. S. Fish and Wildlife Service pathologist, to be infected with trichomaniosis.

This disease is caused by a microscopic animal which caused a canker-like growth in the mouths of infected birds. In its advanced stages, the disease may affect the eyes, and a swelling in the neck usually is evident. The disease is transmitted by birds eating food contaminated by diseased doves. It is not infectious to humans.

Sportsmen finding birds showing the above symptoms should notify their state game and fish departments.

Ivory-Billed Woodpecker Is Still With Us

The ivory-billed woodpecker, already tentatively listed on the roster of exterminated species, still survives, according to the Wildlife Management Institute.

Two of the big woodpeckers, almost removed from the American scene by the destruction of the primeval forests, recently were discovered by an expedition led by Whitney H. Eastman, Minneapolis business executive and amateur ornithologist. The survivors were found in Florida, according to the National Audubon Society. None of the ivory-bills have been reliably reported since 1947. The pileated woodpecker is frequently mistaken for the ivory-bill and the close resemblance between the two birds has confused the status of the rare species.

Another Dust Bowl Brewing in the Southwest

Drought conditions in the Great Plains this spring created the worst soil-blowing conditions since the late 1930's, the Wildlife Management Institute reports.

The Department of Agriculture recently disclosed that, for the second consecutive year, blowing of soil in the central and southern Great Plains, has spread. Of the 35,695,000 acres of winter wheat seeded there last fall, 8,428,000 or 23.6 per cent had been abandoned by May 1. This meant not only loss of crops but also loss of much protective soil cover. As of April 1, 1,126,000 acres were injured by blowing, and an additional 7,965,000 acres were in a condition that made it susceptible to wind erosion. Farmers who stuck with their land through the droughts of the 1930's, for the most part, have learned by hard experience the wisdom of protecting their soil with permanent grass cover and by stubble-mulching plowed lands. The problem arises from the many non-resident farmers and newcomers who never have experienced the dry terror of a dust storm and who are willing to risk continued seeding of wheat on sandy soils in hope of making a quick profit by exploitive farming practices. The Department of Agriculture warns that only prompt regrassing of large areas which do not have adequate wheat stubble or other trashy material can prevent severe wind erosion during the first four or five months of 1951. Rainfall deficiencies were serious this spring in the southwest wheat lands. In the New Mexico portion, the total rainfall was only .71 inch. A continuation of this deficiency can germinate the seeds of another dust bowl. The wheat speculators already have sown the seeds.



5044

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more opercula of the horse conch (*Fasciolaria gigantea*). At least two specimens from the waters of that state contained parts of men. These were caught in 1943, one on the east coast, one on the west, and while there is no way of knowing whether the men were alive when eaten, MacCulloch (1926) has noted such an attack in Australian waters.

The stomachs of all our Texas specimens contained substantially the same miscellaneous hodge-podge.

The varied diet of this shark occasionally leads to an accident in which the jaw or teeth become malformed. Gudger (1937b) notes several instances of this kind.

Tiger sharks are extremely prolific; Young and Mazet (1934) mention 57 obtained from one mother. Springer (1940) examined three gravid females, one of which contained about 34 eggs in an early stage of develop-

ment. This fish was caught in May, as was another female which contained 37 embryos, 21 males and 16 females. Another large tiger shark, caught in March, contained 18 embryos, of each sex. Early and late embryos were also taken in March, and very early ones in June. Springer (1938) did not believe that there was any specific period during which this species was born. However, in 1940, he stated that tiger sharks were present in the waters off Englewood, Florida, throughout the year, mating there. Since then additional information points toward a spring breeding period.

From a commercial point of view, tiger sharks are of considerable value, contributing largely to the catch of the shark fisheries. The skin is tough, having a tensile strength six to ten times that of ox hide (Norman and Frazer, 1938). The liver yields from 60 per cent to 80 per cent of oil,

which yields about 35 units of Vitamin D and up to 5000 U.S.P. units of Vitamin A per gram of oil (Springer, 1944). Mr. Springer states (1938) that there is a correlation between the liver oil content of this and other Atlantic sharks and the development of the young. A high oil content is present when there are ripe ova in the oviducts, and a low oil content is found when nearly full term embryos are present. It would be most interesting to know if the seasonal variation of oil and vitamin content noted by Byers (1940) in Pacific sharks also depends upon their breeding season.

Tiger sharks are eaten in the West Indies. Fowler (1915) notes a four-foot specimen in the fish market at Trinidad. The meat is similar to that of the Nurse shark, and good either fresh or salted. In 1945 tiger shark meat commanded a price of 8 cents per pound from Florida dealers for all that could be obtained.

Pheasants in the Panhandle?

● Continued from Page 7

up in such unused corners will provide not only excellent cover areas but some food.

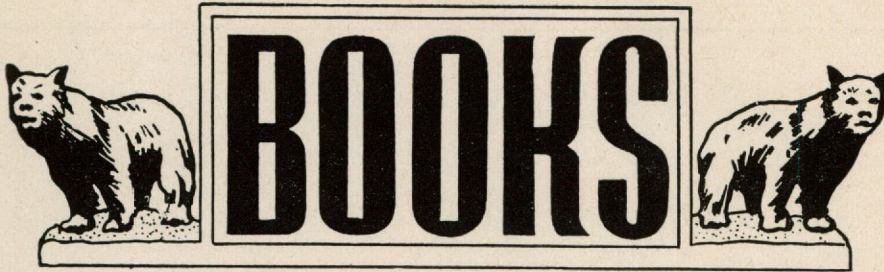
3. Provisions for water. In most fields or in small pastures nearby, there are windmills. Suitable water spots for pheasants can be created at such mills by fencing up a very small enclosure through which overflow water from watering tanks can run. Grass and weeds growing up in such places will afford pheasants a protected place at which to water.
4. On irrigated farms, the question of water is solved for a good part of the year. However, cover is usually a critical problem since irrigated farms are among the cleanest. It is suggested that the main irrigation ditches be fenced on either side so that their banks may grow up in adequate cover. Such situations are an asset to all game birds.
5. Provision for additional food may be made by leaving a good number of shocks of feed in the fields adjacent to the cover recommended above. Or, several rows of feed next to such cover may be left uncut. Any feed provided must be protected from livestock.

On the face of it, there is considerable doubt that farmers will consider such changes and practices economically feasible. For example, one farmer recently asked to have his farm examined with the view of improving it for pheasants. When told what he would have to do, his reaction was that it was not economically sound to try

to raise pheasants on land for which he had paid \$125.00 an acre. He felt the sacrifice of revenue involved through maintenance of the improvements and loss of land to cultivation would be too great. This simply resolves the matter to a question of how much a landowner can afford to invest in pheasant production. In this connection, it might be pointed out that the present practice of spending several hundreds of dollars a year in raising and releasing pheasants on the farms as they now exist is an absolute waste of money. Such spending is quite common and no benefit is derived.

In our opinion, the outlook for the future of pheasants in the Texas Panhandle is anything but encouraging so long as the present and generally accepted land use program continues. We believe the two chief limiting factors now operating to prevent the increase of pheasants on the cultivated lands are the absence of any kind of good permanent cover and the scarcity and poor distribution of surface water. Of the two, cover is probably the more important.

Obviously, the whole problem is actually in the hands of the landowner, within limits imposed by economic conditions. There is little that the sportsman or the public agencies such as the Texas Game Department can do by way of solution. We cannot change pheasant habitat requirements. Neither can we transform the face of the Panhandle in the interest of desired pheasant populations.



BOOKS

HOW TO WIN FIELD TRIALS by Horace Lytle. 229 xv pages. Illustrated with 13 half-tones. Introduction by William F. Brown. Published by the D. Van Nostrand Company, Incorporated, 250 Fourth Avenue, New York City 3, New York; 1950. Price \$3.75.

Field trials are the proving grounds for sires and dams of the hunting dogs of tomorrow. Dogs that are unable to stand the competition, and which do not have the stamina to keep ahead of the field or possess the nose and bird sense needed to find coveys before others, drop from the stud lists. Moreover, the field trial is gaining in popularity as a sport. It offers many thrills for the true sportsman who derives more delight from "seeing the dogs work" than he does from stuffing a game pocket. The season is a long one, extending from September through April. Aside from skeet and trapshooting, it is the nearest kin to field shooting and contains the element of competition lacking in most field sports. More and more amateurs, owners of promising bird dogs, are becoming interested in entering their setters and pointers in trials. This book, written by one of the great dog handlers, field trial judges, and dog editors, tells how winning dogs are bred, how they are run in trials, and the points on which they are judged.

To illustrate his points, Lytle used the career of a great national champion as the basis for his material. By tracing the career of this dog from its whelping through its early handling and training to its successes in many trials and then by following the early careers of two of its offspring, the author points up the problems facing the dog handler. The book makes fascinating reading. While every conceivable difficulty which the handler might encounter is covered in the text, the author uses an interesting narrative style in relating his own personal experiences in the field.

All bird-dog owners will enjoy reading this book, and if they are interested in helping a promising pup up the rungs of the ladder toward the national championship, it should be in their libraries.

BEGINNER'S GUIDE TO FRESH-WATER LIFE by Leon A. Hausman. 128 pages. Illustrated with more than 250 pen-and-ink illustrations by the author. Published by G. P. Putnam's Sons, 2 West 45th Street, New York; 1950. Price. \$2.00.

This is a companion piece to Dr. Hausman's earlier hand guide, "Beginner's Guide to Salt-Water Life," published last year. The format, size and arrangement follow the same pattern. Each of more than 250 common forms of aquatic life are covered both in the text and in the illustrations.

It takes much more than water to make a pond, stream, or marsh, yet few but the initiated realize the tre-

mendous variety and wealth of life that exists in a cubic foot of water and mud at the edge of a favorite stream. A single scoop of a sieve net in such a spot may unearth tens of thousands of living creatures. With a book like this and a little observation, one suddenly realizes that a lake or stream actually is a living, breathing organism. Like Dr. Hausman's former popular works, there is nothing technical about the new field guide and it can be used to identify all common species of aquatic life by anyone who can read.

Although this book was intended as a guide for those interested in pursuing a hobby of nature study, the angler will be able to find many practical uses for it. The food of favorite game fishes can easily be identified, the reason for "blooming" of lakes can be determined, and the best fishing spots sometimes can be located by making comparisons between the abundance of life in one lake with that of another. The book will have its greatest application, however, as the author intended it to be used—as a means of satisfying a burning curiosity and for developing a new and fascinating hobby that requires practically no equipment and which can open new horizons to anyone who can find a swampy spot, a lake, or a stream.

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Season and Bag Limits For Migratory Game Birds

"OPEN SEASONS—Except on State Game Preserves, Statutory State Wildlife Sanctuaries, U. S. Wildlife Sanctuaries, and on public roads and highways within the state, the open season for taking each of the herein named migratory game birds in the State of Texas or in that portion of same later referred to herein shall be as follows:

"Ducks, Geese, Brant, and Coot: November 3 to December 17, both days inclusive; except shooting on November 3 shall not commence until 12:00 o'clock noon; shooting hours on other days shall be from one-half hour before sunrise to one hour before sunset. No open season on black-bellied ducks.

"Rails and Gallinules (except Coot): September 1 to October 30, both days inclusive; shooting hours shall be 12:00 o'clock noon on opening day; other days one-half hour before sunrise to sunset.

"Mourning Doves: In Val Verde, Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, Williamson, Milam, Robertson, Leon, Houston, Cherokee, Nacogdoches and Shelby Counties, and all counties north and west thereof, September 1 to October 15, from one-half hour before sunrise to sunset; in remainder of State (but not including Cameron, Hidalgo, Starr, Zapata, Webb, Maverick, Dimmit, LaSalle, Jim Hogg, Brooks, Kenedy, and Willacy Counties), October 20 to December 3, from one-half hour before sunrise to sunset; in these latter counties, September 15, 17, and 19, from 4:00 P.M. until sunset, and thereafter October 20 to November 30, from one-half hour before sunrise to sunset.

"White-winged Doves: There shall be an open season only in Cameron, Hidalgo, Starr, Zapata, Webb, Maverick, Kenney, Dimmit, LaSalle, Jim Hogg, Brooks, Kenedy, Willacy, Val Verde, Terrell, Brewster, Presidio, Jeff Davis, Culberson, Hudspeth, and El Paso Counties, September 15, 17, and 19, from 4:00 P.M. until sunset. No open season in rest of the State.

"Woodcock: There shall be an open season only in the counties of Shelby, Nacogdoches, Angelina, Trinity, San Jacinto, Liberty, Chambers, and all counties south and east thereof, December 23 to January 21, 1951, both days inclusive; shooting hours shall be from one-half hour before sunrise to sunset. No open season in rest of the State.

"BAG AND POSSESSION LIMIT: For the first day of the open season, a person shall be permitted to possess only one day's limit of the species of game taken on such opening day.

"Ducks: Daily bag limit on ducks (except American and Red-breasted Mergansers) is 5 in the aggregate of all kinds, including in such limit not more than one wood duck. Any person may possess not more than 10 ducks in the aggregate of all kinds, including not more than one wood duck (but not including American and Red-breasted mergansers).

"American and Red-breasted Mergansers: Twenty-five singly or in the aggregate. No possession limit, except on opening day.

"Geese: The daily bag limit on geese and brant is 5; provided such limit shall not contain more than two Canada geese or its subspecies or two white-fronted geese, or one of each. Possession limit is one day's kill.

"Rails and Gallinules (Except Sora and Coot): 15 in the aggregate of all kinds, and any person may possess not more than 15 in the aggregate of all kinds.

"Coot: 10, and any person may possess not more than 10.

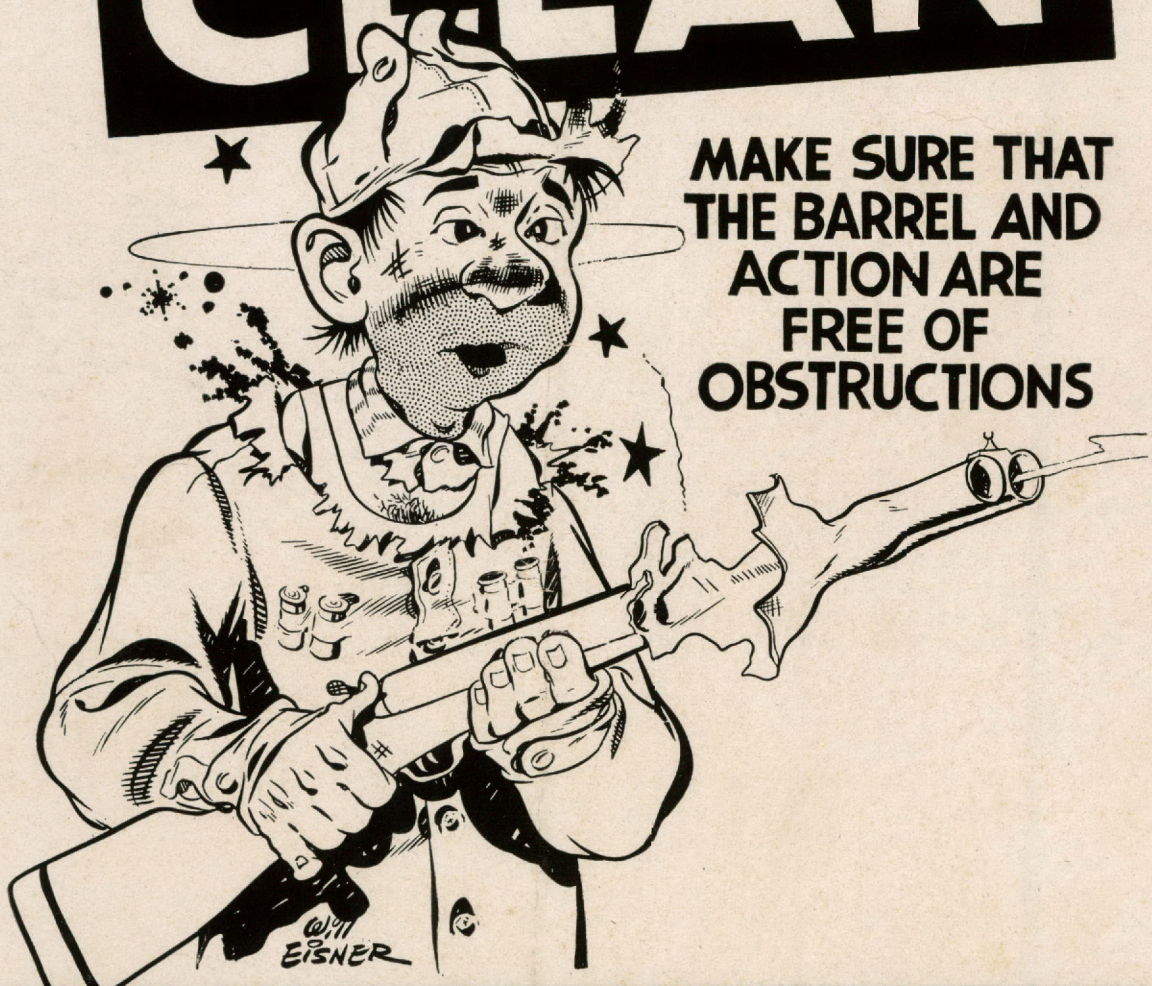
"Sora: 25, and any person may possess not more than 25.

"Mourning or Turtle Doves and White-winged Doves: 10 in the aggregate of either or both kinds, and any person may possess not more than 10 in the aggregate of both mourning and white-winged doves.

"Woodcock: Daily bag limit is 4; possession limit is 8.

"RETENTION LIMITS: Under Texas State Law, a person is required to place his game birds on storage within three days after the close of the season for the species that is being stored. No limit is provided for retaining same. Federal regulations provide that migratory game birds may not be retained for longer than ninety days after the close of the season for the species of migratory game bird that is being held.

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