

Texas Game and Fish

MARCH

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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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ROBERT G. MAUERMANN
Editor



The Cover

The road runner or *Paisano* as he is known along the Rio Grande is one of the most colorful birds of South Texas. On this month's cover, Orville Rice has portrayed the *Paisano* feeding on one of his favorite foods. Road runners are thought to destroy ground nesting birds, but their main diet consists of lizards and snails.

MENHADEN OPERATIONS

By JACK BAUGHMAN

Chief Marine Biologist

THE effects of menhaden operations on other fisheries has long been a point of argument, particularly among fishermen who know little about the menhaden fishery. Many exceedingly misleading statements have been made about the matter.

Most sportsmen and many commercial fishermen are wrongly convinced that menhaden fishing is harmful to the spawning grounds of commercial and sporting fish and shrimp; that menhaden fishing destroys large numbers of commercial and sporting fish and shrimp; and that menhaden fishing destroys the food of large numbers of commercial and sporting fish.

On the basis of present research, these statements are almost entirely incorrect.

Briefly, the menhaden fishery has little or no effect on the spawning grounds or the spawning of any of the common game or food fishes, or on commercial shrimp.

Speckled trout and drum spawn in shallow grassy bays where purse seines are never used. Redfish spawn offshore in October and November, after the menhaden season is over. Spanish mackerel eggs are very tiny, having a diameter of from 1/22 to 1/28 of an inch. When discharged from the parent they rise to the surface, where they float at the mercy of wind and tide until hatched, hence any net would have little effect on their number, especially as one female may discharge in excess of 1,500,000 eggs. Sheephead spawn along sandy shores of the Gulf during the summer, and the eggs are no more affected by the menhaden fishery than those of the Spanish mackerel.

Shrimp, both red and white, spawn offshore, during the entire summer, and their tiny eggs, smaller than grains of sand, immediately sink to the bottom, where they are untouched by

(Editor's Note: The Menhaden Fishery in Texas has been an undeveloped resource until the recent action of the Texas Game, Fish and Oyster Commission which gave two companies limited permits to use purse seines for the purpose of catching these valuable off-shore species. Biologists of the Game Department have supervised these operations to determine the effect of purse seines on game and commercial fish. Their findings and other research conducted by the Marine Laboratory at Rockport, concerning this controversial subject, are the basis for this article.)

purse seines as they are generally used. Furthermore, the fact that one of our shrimp spawning grounds off Aransas Pass is being constantly disturbed by nets of shrimp fishermen, with no apparent harm whatever, would point to the fact that such disturbances cause little damage.

The assertion by many fishermen that the very small shrimp frequently seen on the webbing of shrimp trawls and other nets are the young of the commercial species is incorrect. Microscopical inspection will disclose, in most cases, that these tiny quarter-inch shrimp have egg masses on the outside of their bodies. They belong to the genus *Acetes* which carries its eggs in this manner. The commercial shrimp does not spawn at this size,

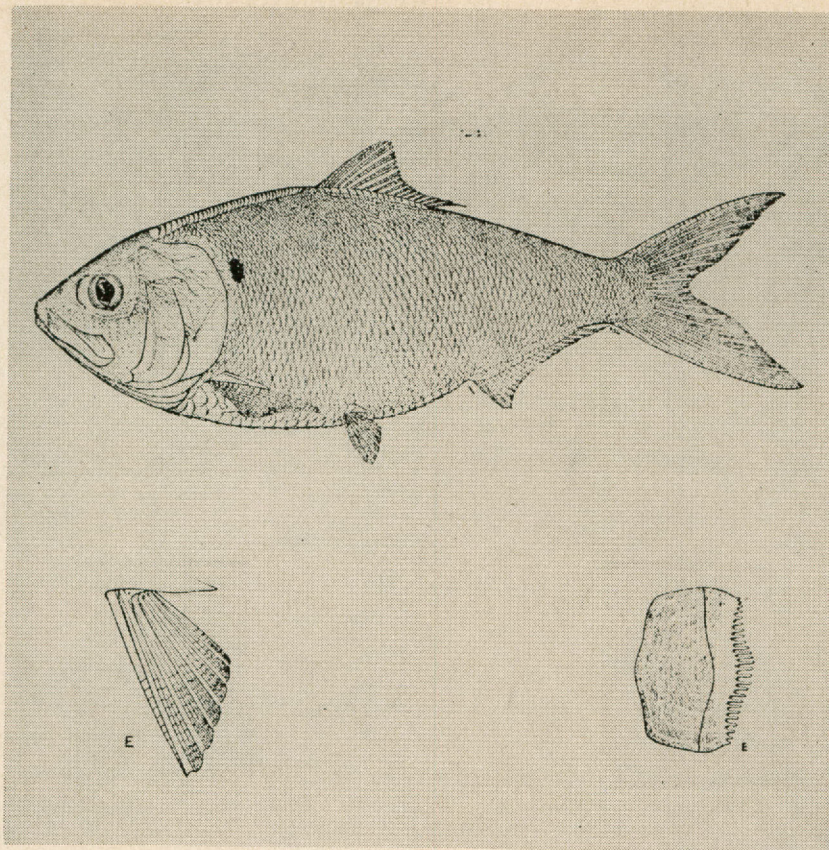
and it carries its eggs within its body.

Interest in the effect of menhaden fishing on the adult population of commercial and sporting fish and shrimp has always been keen, as can be shown by an examination of findings from various locations where purse seining for menhaden is a common fishery. Space does not permit more than a brief review of this research at this point. Smith (1896) found that in 1,078 sets of a menhaden purse seine, far less than one-half of one per cent of the fish taken were either food or game fish. Greer (1915) saw only eight mackerel and ten bluefish taken in one day's fishing in which 240,000 menhaden were caught. Filipich (1947) made surprise visits to various menhaden operations in Mississippi. In one boat which unloaded 70 tons of menhaden, *there was not a single game or commercial fish*. Eight boats inspected by him and a group of sportsmen had no game or commercial fish. Two boats unloading 70 tons of menhaden had one mackerel and six sand trout. Therefore, out of a total of eleven boats inspected, only one mackerel and six sand trout were taken.

Simmons (1949) saw, in 62 days, during which 59 hauls of a purse seine were made, 42 bluefish, 3 drum, 7 flounders, 1 redfish, 77 sand trout, 107 mackerel, 2 speckled trout and 7 whiting. During these same sets 2,500,000 menhaden were taken.

Breuer (1950) saw, in 95 days, during which 143 hauls of a purse seine were made, 205 mackerel, 304 bluefish, 3 speckled trout, 242 sand trout, 8 whiting, and 5 flounder.

DOES THE USE OF PURSE SEINE



The Bay Menhaden, *Brevoortia gunteri* (Hildebrand). From a 270 mm. specimen taken in Aransas Bay, Rockport, Texas. A scale and ventral figure are shown below.

Certainly such small catches of these fish are insignificant.

Moreover, actual attempts to utilize the purse seines along the Gulf coast as a means to catch game and food fish, especially Spanish mackerel, have resulted in failure. This was tried unsuccessfully at Galveston, a short time before the war, and a similar attempt was made at Grand Isle, Louisiana, in 1945. The Grand Isle attempt resulted in over \$6000 loss to the operator (Gowanloch, 1949).

In the shallow water of the bays, which are the nursery grounds of most of our game and food fish, purse seines cannot be operated. In deeper water, where a set can be made, it has been observed that game fish enclosed in the net sound and escape below the lead line before the seine can be

pursed.

Since the "History of the American Menhaden," by G. Brown Goode, published in 1879, and republished in 1880, there has been little comprehensive material published on the menhaden. Goode's work was an enlargement of manuscript notes left by Professor Baird, based upon opinions and information elicited by means of circulars to fishermen, manufacturers, customs officers, light keepers, etc., supplemented to some extent by observations of U. S. Fisheries agents, but not upon a scientific study.

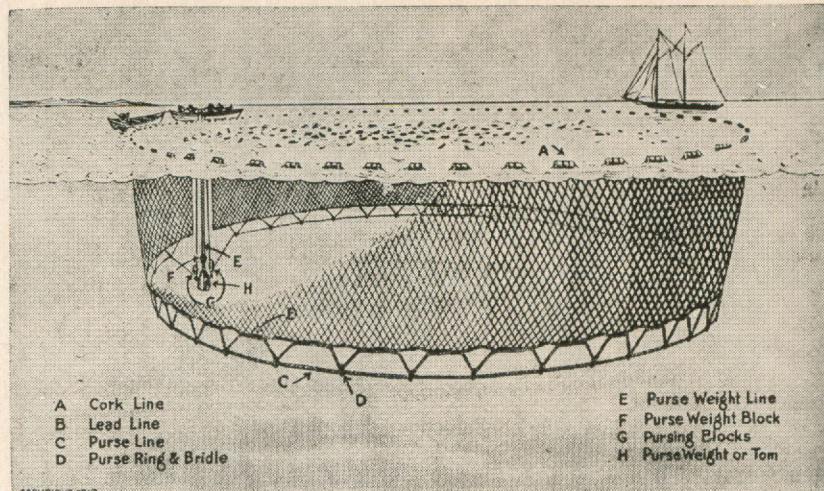
Goode himself admitted that it was found necessary to make allowances for many inaccuracies of statement on the part of his correspondents, and that some of them, having been unable to obtain exact information, had

ventured to guess at what they did not really know from experience or research.

It is these theories of Goode and his correspondents that have in many instances been repeated by the uninformed and that have taken the place of actual knowledge until this day. This is particularly true with regard to the use and importance of menhaden as a food by other fish.

The list of fish enumerated by Goode (who has been quoted by Jordan and Evermann and the Encyclopedia Britannica) as destructive enemies of menhaden does not comprise all the species that at times eat menhaden, and it includes some not known to feed upon them at all. The assumption that they do is made partly from the fact that they are built on

AFFECT OUR FOOD AND GAME FISH?



(Picture Courtesy Linen Thread Company, Inc.)

the model of predaceous fishes, and partly because they are sometimes caught on menhaden bait. The first part is to some extent justified, since it is safe to assume that a species which to any extent eats other fishes will eat menhaden if it can get them; but it is not safe to infer that it eats enormous quantities, as its habits may be such that it is not brought into contact with such numbers of menhaden, or food which it prefers may be present at the same time and hence taken instead of these fish. That a fish is caught on certain kinds of bait or that the bait is the most successful to use does not signify that it is the principal food of that fish. Certainly fresh water black bass do not subsist on artificial flies and plugs, yet great numbers of them are caught on these baits.

Neither is it justifiable to assume that all of the predaceous fishes listed by Goode feed exclusively and daily upon menhaden, even during the time they are concurrently on the coast. Among fishes concerning whose habits we are well informed, it is known that they change their diet from time to time, and that there are periods of days when they do not feed at all (Kendall, 1910).

When the Texas Game, Fish and Oyster Commission undertook the

present survey of the food of fishes, reference was made to earlier published scientific reports from this coast. There were only two of these.

The first of these was made by John C. Pearson of the U. S. Bureau of Fisheries. In his results, based on 14 months of continuous field observations, he does not list menhaden as forming any portion of the food of either trout, redfish or drum, the three main food and sporting fishes of the Texas coast.

Gunter (1945) did not find menhaden in the stomachs of either redfish or drum. He found trout eating menhaden in small quantities.

The third survey, that of the Texas Game, Fish and Oyster Commission, extended from June 7, 1948 to September 1, 1949. During this survey 26,005 fish were opened, and their stomachs analyzed. From these stomachs, only 581 menhaden were taken.

Included in the above total were 13,288 speckled trout, 3,137 redfish, 3,428 Spanish mackerel, 2,237 kingfish, 26 sailfish, 204 dolphin, 1 wahoo, 25 pompano, 77 ling, 28 jackfish, 27 bluefish, 9 jewfish, 1 warsaw, 374 redsnapper, 46 sheephead, 111 flounder, 75 tarpon and 647 gaff-topsail catfish. The balance were fish of neither commercial or sporting importance.

Space does not permit a complete breakdown here of the stomach contents. However, roughly speaking, 67% of the food of all fish was shrimp; 30% was scrap fish of the kind generally taken in shrimp trawls; 3% was menhaden.

Shown below is a list of the more important stomachs analyzed and the numbers of menhaden found in them.

Species	No. Analyzed	No. with Menhaden
Trout	13,288	361
Redfish	3,137	9
Spanish mackerel	3,428	30

Due to the construction of the purse seine and the method by which it is used, purse seine operations cannot materially harm game and food fish in waters deeper than the maximum depth of the seine. Numerous investigations of all types have shown that these seines do little harm to food and game fish populations. It is likely, by the same token that they do little good as a control for sharks. Seining operations have not materially lowered the level of the menhaden population. The production figures over a period of years, show a continuous and substantial yield, although it is possible that the catch per unit of effort may have dropped slightly because of the increased number of boats now in operation.

A total of 26,005 fish stomachs have been analyzed. Of these, 13,288 were speckled trout (*Cynoscion nebulosus*), 3,137 were redfish (*Sciaenops ocellata*), and 3,428 were Spanish mackerel (*Scomberomorus maculatus*). The balance were various species from the Gulf Coast of Texas. These fish were caught over a period of 15 months, from June 1, 1948 until September 3, 1949, during which period 3 separate stomach analysis projects were carried forward. The results tabulated from the three projects were in close accord with one another, and with

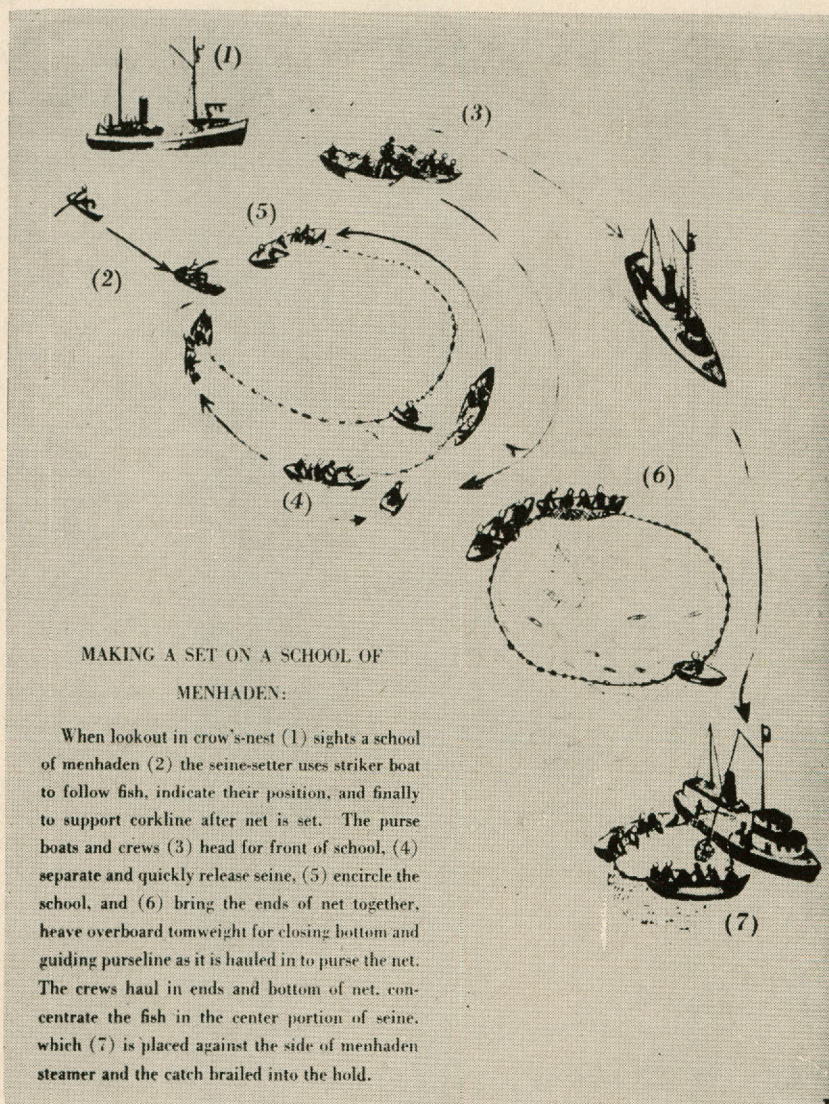
the findings of two previous investigations.

Of the 19,583 fish examined belonging to these three species, 12,505 contained food, including the remains of 400 menhaden. The percentage of the 6,433 individuals of other species, besides the three named, that had included this species in their diet was roughly the same. They had eaten 181 menhaden.

In all five investigations dealt with in this article, shrimp were found to be the preferred diet of the three favor-

ite food and game fishes. The work of Knapp and his associates, of Miles, and of Kemp, established that, during their investigations, shrimp had been eaten by 60 to 70% of all fish examined.

The fact that these projects covered and overlapped all seasons of the year is significant as establishing a positive trend in the diet of the species discussed. Trout, redfish, and Spanish mackerel do eat menhaden in small quantities, but do not necessarily search for them as they do for shrimp.



(After Walford)

Raising Catfish

ALL channel catfish production in Texas is confined to rearing the southern channel catfish. Some of the hatchery superintendents attempt to propagate the flathead catfish, but such attempts are successful only occasionally.

Brood Fish

Originally the brood stock was obtained from our lakes and streams,

but now most of our brood stock is reared in our hatcheries from the select young that have been produced in the hatcheries. At most of our twelve hatcheries a few ponds are used for experiments with farm-pond stocking, and the catfish are obtained as a by-product from these experiments.

As channel catfish are subject to several types of parasites, such as

Ichthyophthirius, leeches, Argulus, and flukes (*Ancyrocephalus*), the brood stock is split up and held in several holding ponds to prevent the entire brood stock from being destroyed by an epidemic.

While being held, the brood fish are fed fish chopped into 1-inch cubes. These food fish are obtained from the Gulf Coast and consist mainly of whiting. Some superintendents sup-

By MARION TOOLE

plement this diet with chopped beef heart.

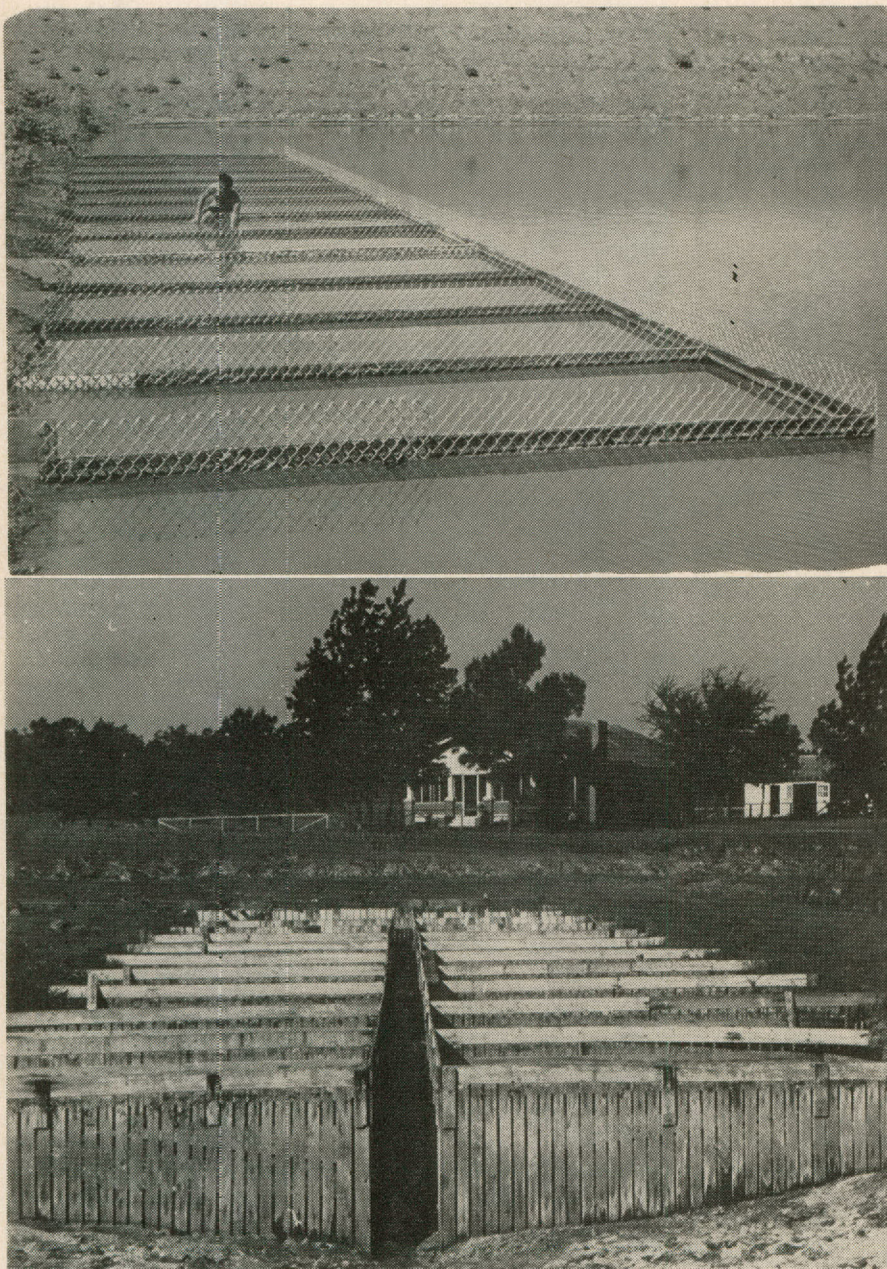
At one hatchery it was found that in order to insure a spawn from the brood fish, they must be held in a raceway of swift flowing water several months before being paired. The exercise of swimming apparently stimulates the development of eggs.

The Hatching Pond

One of the hatchery ponds is arbitrarily chosen as the future catfish hatching pond, and pens are then built.

Figure 2 shows a pen constructed from wood. As the maintenance of the wooden pens required a great amount of labor, other types of material were tried. The heavy cyclone fence wire shown in figure 1 has proved the most satisfactory. One item in the construction of the pens should be noted: whether lumber or wire is used, the walls of the pens should extend down into the pond bottom at least a foot to prevent the catfish from digging out.

Figures 1 and 2. Hatching pens made of heavy cyclone fence wire in upper left photo. Below, wooden hatching pens.



n Texas

It is necessary to number the pens because records on the progress of spawning must be made from day to day.

Stocking the Pens

At all hatcheries, the hatching pond is filled with water about the 15th of April. The catfish brood stock is then collected and placed in holding troughs. During this operation the fish are carefully scanned for leeches

Chief Aquatic Biologist

and parasitic copepods. Should some be found—and they usually are in the mouth of the fish—they are removed from the fish with forceps or tweezers.

The job of sexing now begins. Figure 4 shows very clearly the difference in external characters of the urogenital opening of male and female. It may be seen that the male opening protrudes. Occasionally the sex of fish being checked does not show clearly. When this happens, a broom straw is rubbed back and forth longitudinally over the vent, as the straw will always hang on the vent of a male. The swimming catfish in figure 3 are the same fish seen in figure 4. It will be noted that the male has a much broader head. Practically all our hatcherymen are able to sex their catfish correctly.

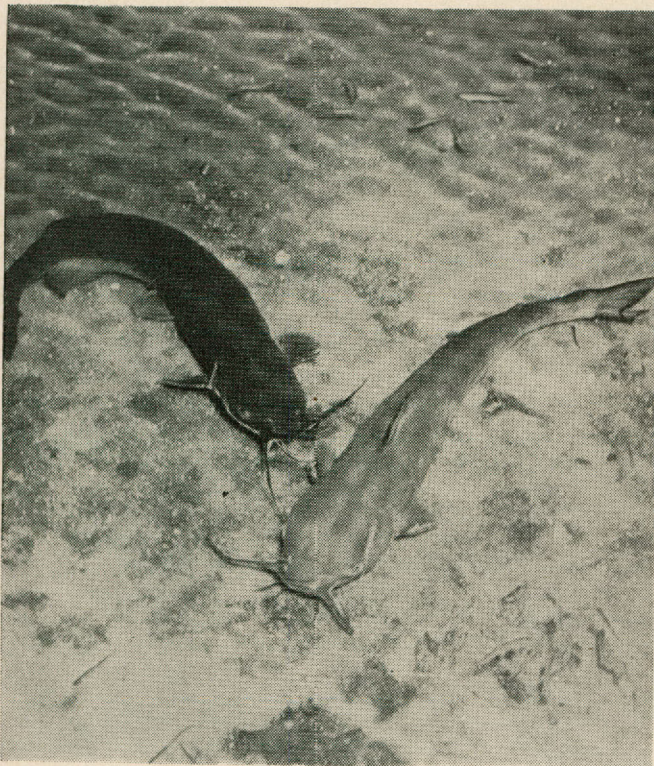
After the males and females have been separated, the fish are paired off. At this stage a most important matter must not be overlooked. In the

Texas system of catfish cultivation, the male is used to tend his eggs and see that they are properly fanned. After spawning, the female will try to get to the eggs and eat them. Consequently, the male must be a larger fish, able to fight off the female. If the male is paired with a larger female, invariably the male will be killed and the spawn eaten. Therefore, the male must be paired with a smaller female in each of the pens. Male catfish may be used more than once; some of the males in the hatcheries have successfully hatched three spawns.

Spawning Receptacles

Originally 10-gallon milk cans (see figure 5) were used for spawning receptacles. Millions of catfish were

Figures 3 and 4. Photo below shows male (right) and female catfish. To the right, same male (left) and female catfish.



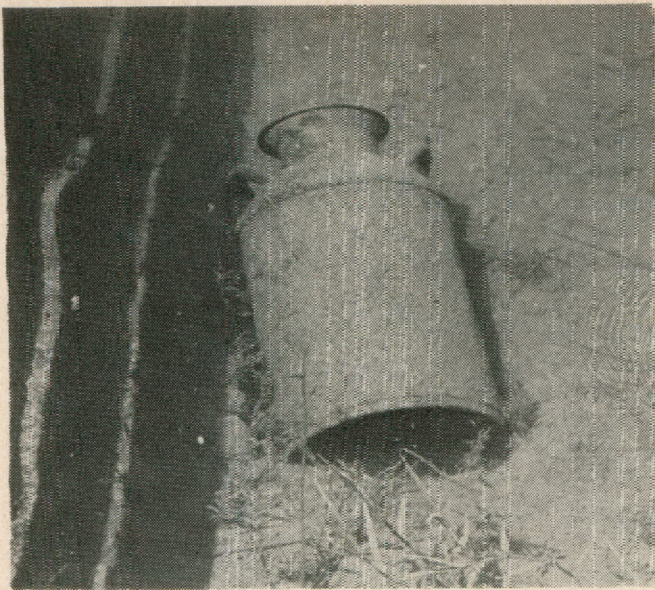


Figure 5
Milk can originally
used for spawning
receptacle.

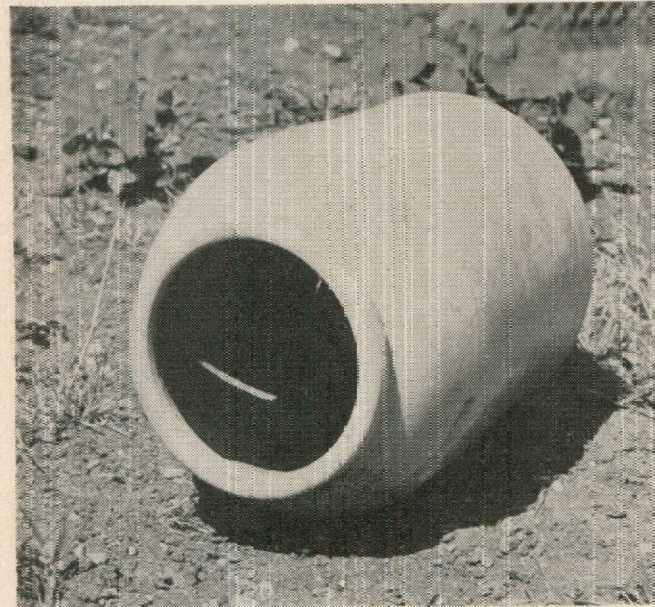


Figure 6
Crock jar substituted
for spawning recep-
tacle.



Figure 7
Jar with fry being
removed from pen.

hatched successfully in these milk cans, but crock jars (see figure 6) were substituted for the cans because they rusted very badly. These jars are made to specifications: height, 22 inches; diameter, 9½ inches through the body; diameter of the mouth opening, 8 inches. Holes for handles are placed near the jar top, as shown.

The jars or cans, whichever are used, should be placed in the pens as in figure 5. If cans are used, a nail hole should be punched at the top of the body part of the cans and the cans should be set so that the nail hole will be the highest point of the can. When jars are used, one of the hand holes should be placed in the same position. These holes are necessary in order to effect the release of all trapped air, as it has been found that trapped air will cause the spawn to spoil. Holes are located near the top of the receptacles to prevent the fry from running out of the can or jar when the container is removed from the water. The holes in the jar or cans should be placed 8 to 10 inches under the water surface, and the bottoms should be about an inch lower.

The Hatching Process

Careful records should be kept on the progress of each pen, and each pen should be examined at least once a day. If the pond water is clear, as in figure 5, it will be possible to see what the brood fish are doing. If the water is murky, the jars must be run by feeling inside to determine whether the males are inside. As a nesting male can be vicious and will bite a hand thrust into a jar, a piece of rubber hose or an old glove is usually stuck into the jar first. If the catfish is in the jar, he will either bite the hose or glove and be pulled out or he will leave the jar of his own accord. It is safe then to examine the bottom of the jar with a bare hand. Should eggs be found, the female is netted out of the pen and placed over the pen wall into the pond, and a note is made that the pen has eggs. The pens with eggs need not be run until the fifth day after the spawns are laid. After that, the jars should be examined daily (in the same way just outlined) until fry are felt in the jar.

When the fry are found, the jar is lifted out (figure 7, carried to the holding trough, and laid down in it with the mouth of the jar facing the incoming water. Some hatcheries build screen boxes (figure 8) to set the jars in; other hatcheries do not use the boxes. The purpose of the boxes is to keep the fry confined and make it possible to remove them from the trough with less chance of injury when they are ready to go to the rearing ponds.

Figure 9 shows some newly hatched fry. As soon as they absorb their yolk sacs, the fry are placed in a rearing pond. Ponds that are fourteen-hundredths of an acre in size are stocked with one spawn, ponds one-half acre in size are stocked with two spawns, and ponds an acre in size are stocked with three spawns.

In Texas the first spawns are obtained by the 15th of April. Spawning continues until the first part of August. The eggs hatch in 5 to 10 days.

Feeding the Young

After the young fry are placed in rearing ponds, artificial feeding is begun. The fry are fed ground meat scraps or tankage until they are delivered from the hatchery.

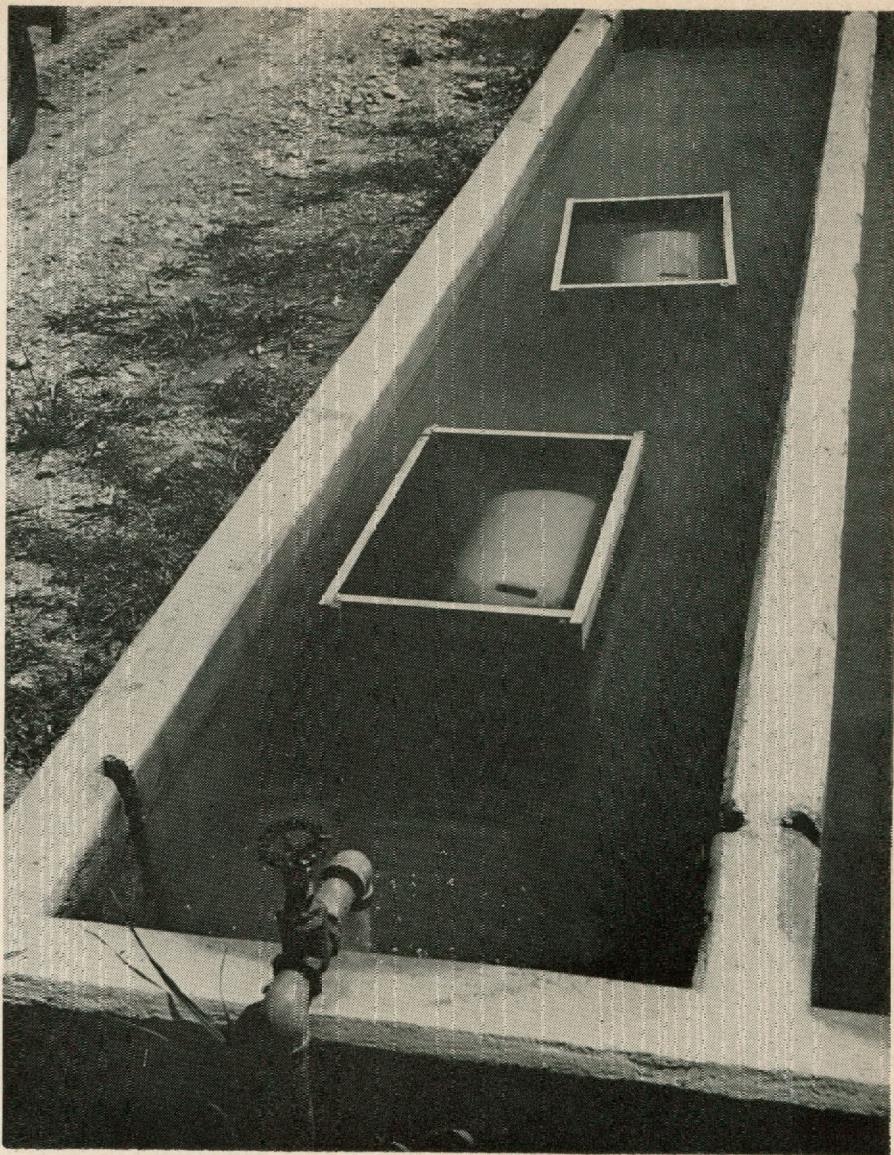
The young should be fed sparingly at first and, if possible, in about the same spot. At the start, about a 1-gallon bucketful of meat scraps is used for an acre of water. Within a week or two, the young catfish will "top" or surface when feed is cast on the water. After they begin topping, it is easier to judge how much feed to give them. They should be given all the feed they will clean up.

Should the fish stop topping for several days, trouble—such as an outbreak of ichthyophthirius—may be brewing. An outbreak of a disease usually indicates that the young have been underfed.

Two spawns of catfish in a half-acre pond require about 3,500 pounds of meat scrap over a period of three and one-half months. This breaks down to roughly 34 pounds of feed per day, but considerably less than that is fed at the start, and more and more feed is given as the young fish grow.

Figure 8. Jars set in screen boxes (top right) open ends toward incoming water.

Figure 9. Newly hatched fry.



CHANNEL CATFISH PRODUCTION OF FOUR TEXAS HATCHERIES, 1949

Hatchery and Pond	Pond Size (Acres)	Spawns Stocked	Date Stocked	Food Consumed (Pounds)	Date Taken	Number Taken	Average Weight per 100 Taken (Pounds)
Ingram:							
No. 4.....	0.33	2	6/3	2,700	9/22	19,400	1.5
No. 6.....	0.59	2	5/14	2,508	8/31	3,500	2.0
No. 12.....	0.38	2	5/13	3,540	9/13	15,840	1.5
No. 23.....	0.45	2	5/30	3,258	10/13	29,800	3.0
No. 28.....	0.48	2	5/20	3,678	10/4	17,500	2.0
San Marcos:							
No. 36.....	0.28	1	5/10	*	11/14	21,300	2.18
No. 41.....	0.14	1	5/18	*	11/16	11,241	3.6
No. 42.....	0.15	1	5/18	*	11/7	12,795	3.5
No. 43.....	0.15	1	5/28	*	9/26	13,675	3.5
No. 44.....	0.15	1	6/6	*	11/17	10,899	4.6
No. 45.....	0.13	1	5/16	*	10/16	23,095	2.5
No. 46.....	0.13	1	5/10	*	9/12	6,627	6.24
San Angelo:							
No. 13.....	0.80	2	5/30	1,400	9/2	5,064	1.0
No. 15.....	0.75	1	6/10	900	7/26	3,286	1.12
No. 16.....	0.34	1	4/26	1,600	9/3	2,532	1.5
Huntsville:							
No. 6.....	0.48	2	5/21	*	10/6	20,200	1.24
No. 16.....	0.30	1	6/1	*	10/25	10,250	1.5
No. 19.....	0.62	3	5/27	*	12/19	28,375	3.24
No. 35.....	1.76	4	6/10	*	12/2	33,400	3

* Quantities not recorded; meat scraps fed daily.

Multiple Pond Use

The State hatcheries use their hatchery ponds for at least two fish crops per year, owing to the fact that catfish are hatched later than black bass. All bass hatching ponds are drained about the first of May; as the later spawns of catfish occur, the catfish are stocked back into the bass hatching ponds. Other ponds at the hatchery are first stocked with bass fry, which are drained early (as No. 1 fingerlings) to make room for the catfish fry.

Meat scrap or tankage usually has a large percentage of ground bone, which is not eaten by the catfish. As a result, catfish ponds will usually be extremely fertile the next year and therefore excellent for rearing bass.

Texas Hatchery Production and Stocking

By using the foregoing method of hatching channel catfish, the hatcheries that attempted to produce these

fish were able to rear and distribute 973,900 channel catfish for the fiscal year ending September 1, 1949—a production which amply takes care of all the stocking requirements.

The table is included to show the 1949 channel catfish production data from four hatcheries.

In stocking farm ponds, channel catfish are used either by themselves or in combination with bass and redear sunfish. When used with bass and redear sunfish, 50 channel catfish are stocked with 100 black bass and 100 redear sunfish per acre. When stocked alone, 75 channel catfish per acre are used.

The writer has received verified reports stating that several pond owners, 9 months after stocking their unfertilized ponds at the rate of 100 fingerling catfish per acre, were able to catch channel catfish that measured approximately 15.75 inches long. A better growth rate has been obtained, however, by stocking fewer fish.

Ponds smaller than one quarter of an acre usually are stocked with catfish alone because it is felt that catfish will give the pond owner a maximum yield of food fish.

We also like channel catfish for stocking purposes because these fish seldom reproduce successfully in ponds and, as a result, fail to overpopulate the ponds as do many other fishes.

—*Progressive Fish-Culturist*,
January, 1951.

See also:

Canfield, H. L.

1947. Artificial propagation of those channel cats. *Prog. Fish-Cult.* 9 (1): 27-30.

Lens, Gerhard

1947. Propagation of catfish. *Prog. Fish-Cult.* 9 (4): 231-233. (Reprint from *Outdoor Nebraska* 25 (1): 4-6, 1947).

Morris, A. G.

1939. Propagation of channel catfish. *Prog. Fish-Cult.* 44: 23-27.

Brownwood High Sportsmen's Club

THREE years ago, when the Brownwood High School Sportsmen's Club was organized, it had only 12 members. Now it boasts a membership of more than 60 young sportsmen. The club was originally organized under the sponsorship of L. W. Vineyard. The present co-sponsors are Clyde Dean and Bruce Place.

Objects of the club are to teach the members the principles of sportsmanship and an appreciation of the outdoors. Eight new rods and reels were recently purchased by the club for use in teaching the art of casting. Future plans call for the purchase of more equipment and a program to include school golf and archery teams. Members shall also study the hunting and fishing laws of the state and union.

Below are officers and sponsors of the club. Left to right, they are Clyde Dean, sponsor; Gail Crump, president; Elmer Wells, vice-president; Bobby Kennedy, secretary; and Bruce

Place, sponsor. In the bottom photo, members learn the principles of casting. Clyde Dean is shown at the right. (Photos courtesy the *Brownwood Bulletin*.)



Wildlife Restoration

EVERY day is open season for wishful thinking about wildlife restoration. Requiring no license, equipment or money, and with no limitations, is a common and very popular pastime. Older sportsmen call on their memories for stimulation. The younger ones take their bearings from stories passed down, with additions, from great grandfather and great-uncle. The general trend is to picture birds, animals, woods and prairies as they were in the "good old days."

The ardent sportsman daydreams about his favorite hunting place. He visualizes it as overflowing with every kind of game bird and animal, and crossed by clear flowing streams literally alive with fish. With a covey under every bush, a buck behind every tree and a grouse in every glade, he can even ignore a treetop full of squirrels. Furthermore, his dreams show enough such places for each and every hunter and fisherman; no one is left out.

To the men bearing responsibility for wildlife restoration programs, nightmares are more common than pleasant dreams. They know too well the history of soils, waters, forests, and wildlife—what happened to each down through the decades of American history. They know the general status of those resources today, the limitations involved and the demands on them. This includes the number of hunters in 1950 as compared to the number when great grandpa was a youngster with a muzzle loader.

Current wildlife restoration and management actually represent a conflict between divergent interests; sometimes these are bitterly opposed inter-

ests. To many people, land is the immediate and only source of income. With high living costs to meet, they must extract a high rate of return from their land. Anything that interferes with this rate of land return has a serious economic bearing and they quite naturally oppose it.

Non-landowning or non-land-dependent hunters are not of necessity so conscious of the above problem. In general, they see the beauty of nature, and feel the thrill of the hunt without realizing what it takes to produce and maintain the things they enjoy. Costs of crop damages or damage control, the chore of guarding against poachers, and the livestock losses resulting from hunter carelessness—these are only things they hear about. If wildlife is so great a pleasure to them, they think it should be equally regarded by the man on the farm or ranch.

A somewhat different perspective develops back home in town under certain conditions. However, it is usually the hunter's wife who voices the complaint. For instance, armadillos tear up spots in a carefully tended lawn and uproot some very special flowers. Sometimes, it's squirrels that harvest a prized backyard pecan crop. Again, it may be a colony of noisy beavers keeping lakeside city residents awake. When wildlife commits such misdeeds, it is not even popular in town.

Now consider the wildlife technician. As a rule, he is an idealist at heart. As much as anyone, he would like to have maximum numbers of every kind of game. Among other things, such a situation would be quite a feather in his cap if it came about as a result of his plans and efforts.

Furthermore, much of the criticism he now gets would be eliminated. His nightmares could become relatively peaceful dreams.

Idealism is a fine quality, although not accorded the high esteem it once was. Nowadays, it needs tincturing with realism, to put it in closer step with modern life. Wildlife technicians must be realists in spite of their ideal-

By W. C. GLAZENER

istic leanings. They have to work with things that *are*, rather than with conditions they *wish* existed. Their rate of success depends largely on the degree to which they observe this point in connection with each problem.

Because of these influences, wildlife planning is complicated, and execution of plans is difficult. In general, the immediate objective is the production of a reasonable amount of game on every suitable piece of range where it is desired. At the same time, this production must result in little or no reduction in the supporting cash income from the land. Such a program naturally calls for a minimum of time and effort from the land operator, too. Otherwise, he will reject it promptly and finally.

To the fervent hunter this appears a compromise, and it finds no favor with him. He is interested in maximum numbers of game for his bag, and is satisfied with nothing less. A certain type of "idealism" is again

WHAT OF IT?

involved; it also needs a shade of realism for the mutual benefit of sportsman and land operator.

The objectives of a valid wildlife restoration program go far beyond better hunting and fishing for today. There are other considerations that transcend all the recreational values concerned, as important as they are. The basic and ultimate aim is to

Director, Wildlife Restoration

assure the future of America. In this responsibility, wildlife workers represent one of numerous related agencies whose efforts have a common goal.

These agencies strive for the welfare of America through the welfare of its land. Since wildlife resources also depend directly on the soil, the relations are all tied closely together. This emphasizes the urgent need for a widely applied policy of land use that will improve and perpetuate our soil's productivity. Under such an applied policy, wildlife would share in the benefits.

In a properly balanced picture, wildlife has a definite place. Most frequently it occupies only a minor niche, but in some cases it tends to "take over." In that event, reduction rather than stimulation is in order. Overly abundant deer can damage range just as surely and as severely as can too many domestic livestock. Under this circumstance, a harvest of the *surplus* deer eliminates damage that may re-

tard the range for many years. This protection of the range, in turn, safeguards the future of deer as a species.

A given wildlife technician needs a rather thorough familiarity with the land use program of the locality where he works. Lumber production in East Texas, rice culture on the coastal prairie and beef production in the Trans-Pecos are examples of some wide variations that influence the game picture.

In each type of use, the technician faces the problem of "fitting" game into the existing program. In a farming community, he will need to rule out deer completely. If the range is over-run with free ranging hogs, he must forego supplemental feeding, except in hog-fenced enclosures. In a locality specializing in domestic turkeys, the introduction of wild turkeys would be a serious error.

A land operator must be thoroughly convinced of the validity of a management method before he will undertake it. He must be further assured that it will not conflict with his interests. Therefore, the technician must first reveal his thorough understanding of the entire problem, including a sound and sympathetic knowledge of the production and management of timber, rice or beef cattle, as well as of game. Another requisite is unquestioned proof of his competence and personal integrity. Thereafter, he must demonstrate his proposals in operation. Then, if the operator has reason to want more game, progress is possible.

What then, can technicians do? What are they doing to restore wildlife in Texas? Their efforts in connec-

tion with the various wildlife species may be summarized as follows:

(a) Census work to determine numbers and distribution, as indications of whether each species trend is up or down, and as basis for recommendations on hunting regulations, in regions where the Commission has regulatory discretion.

(b) Investigations to determine factors responsible for decrease or increase of a given species, including diseases, predators, food shortages, cover deficiencies, etc.

(c) Trial management to test promising methods of improving habitat under different vegetative conditions.

(d) Application of tested methods to demonstrate their feasibility and effectiveness.

(e) Trap and transplant surpluses of species with which such work is practical and beneficial.

Does the State of Texas conduct an extensive habitat improvement program without obligation from the landowner? It does not. That is considered as the prerogative and responsibility of the landowner. Many free governmental improvements useful to wildlife may be seen in Texas and other states that are useless because of neglect. The neglect stems either from lack of original desire or subsequent interest, or both.

Currently, the program calls for testing and demonstrating. Extensive application on private premises, for private benefits, appears to be a private matter; not one that the State can or should assume.

THE Mockingbird, prince of all song birds, is the state bird of Texas and of several other southern states. There are two kinds in this state: the eastern mockingbird and the western mockingbird. It is strictly an American bird of the family of thrashers (*Mimidae*) and is known to ornithologists as *Mimus polyglottos pologlottos*. Most mockingbirds are tropical birds and more of the birds are to be found in Mexico than in any other country.

They are about ten and one-half inches in length, or about the size of the robin. They are more slender

and feathers. It is lined with rootlets, cotton, or other soft material. It may be found in low bushes or on the lower branches of large trees, and may contain from four to six eggs of a bluish green color, heavily splattered with shades of brown. It breeds throughout the South and sometimes as far north as Massachusetts in the East and Nebraska in the West.

Mockingbirds prefer a warm climate and lowland country, but Fred J. Rogers reports seeing a pair of the birds 100 miles north of Manitoba, Canada. The bird's chief foods are insects, berries, and fruits. The low-

ing a single call.

The mocker has many interesting personality traits. He is a graceful bird and his movements are easy, rapid, and elegant. He is a great student of the science of sounds. He may sit quietly in some more or less secluded place meditating and listening carefully to what is going on around him. He listens to the songs of other birds, to the meow of a cat, the yelping of a dog, the clatter of a guinea hen, the squeaking of some old gate, the call of the bobwhite, or to any sound which may be near him. He may listen quietly for an entire afternoon and

The Mockingbird

By C. E. CHAMBERLIN

than the robin and have a longer tail which is ash-gray above, white below with white outer quills. The sexes are much alike in color. The female is smaller than the male and a little paler in color. They are gray above, wings brown-gray with white spots on the outer edges. The breast is grayish white and the bill and feet are black. When the eastern mockingbird is in flight, its white wing patch and the white on the outer tail feathers are very conspicuous.

The mockingbird ranges from Maryland, Ohio, southern Iowa, southern Wyoming, Nebraska south to the Gulf Coast and southern Mexico, but they may be found as far north as the Great Lakes. The western mockingbird, which is a little paler and more buff-colored than its eastern cousin, ranges in the southwestern United States and northern Mexico. A few of the eastern mockers nest in central Illinois. I have listened, many times, in the middle of the night to an old mocker perched on the lightning rod on the top of our house, pouring forth his midnight love song. Very few of the birds, however, nest in that part of the country.

The nest of the mocker is loosely made of leaves, grass, small sticks,

land country furnishes constant food in the berries of cedar, myrtle, holly, smylax, and gum. Generally, this food is there in abundance. Mockingbirds are also very fond of figs, and may be a nuisance to the fig growers, since they seem always to select the finest fig, take one good bite out of it, and then leave the rest to spoil. They feed upon and destroy many winged insects.

The mockingbird has exceptional vocal powers. It may sing a long series of rich melodies and imitations. There is no other American bird with the repertoire of the mocker. During the silvery stillness of a moonlight night he may leave his sleeping quarters and alight upon a house chimney or the limb of some nearby tree and pour fourth his tender love song. If he should be in a different mood, he may sing his "mocking" song until he has aroused many of his fellow singers and a song-fest may be heard for many hours throughout the neighborhood. Like some other song birds, individuals differ in singing ability; one individual may be a vocal juggler, while another retains his fascinating individual notes. It has been claimed that the bird has been known to give the calls of 32 different kinds of birds in two and one-half minutes without once repeat-

then in the evening, fly to his singing perch and bring forth those same sounds, cries, and cheeps with such exact imitation as to deceive even those quite familiar with such songs and sounds. The mocker not only imitates the songs he hears, but may improve on their quality and rendition. His song reaches its greatest beauty during the mating season, before he becomes wearied with his homemaking duties. He sings with ecstasy and bubbling joy, and gets so enraptured with his own singing that he may leave his singing perch, fly up in the air and go through the little "flip-flops" and peculiar antics that only the mockingbird can perform.

Joseph Grinnel declares that he attracted a mocker to a graphophone and that the bird later produced the music even to the piano notes. I have heard them do some mighty fine imitations but I am wondering if Mr. Grinnel did not do some "wishful thinking" about those piano notes.

The birds are brave, energetic and very parental in their nature. The singer helps his mate in her nest building and in all her homemaking duties. They will drive all enemies from their homes, and will fearlessly attack dogs,

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Don't Throw

Gran'pa Back

By CLARK HUBBS

Department of Zoology
University of Texas

FOR many years conservationists of all kinds have been preaching, "Do not kill your unwanted fish." The author believes that this doctrine has outlived its usefulness and should be replaced by others based on sound, scientific information.

In 1858 Charles Darwin proposed his theory of natural selection. The conservationists mentioned above apparently have not read his famous treatise or have not been aware of its significance to fish conservation. It is well known that the fish of a single species in a single lake or stream grow at different

rates. Since fishermen understandably prefer to take home the larger fish, they frequently discard those of smaller size. The constant removal of the larger-sized fish before they have lived out their life span prevents them from producing their natural number of young. The slower-growing fish, however, are carefully removed from the hook by the ardent conservationist and returned to the water to breed and breed. Their young are therefore much more abundant (although of smaller size) than those of the faster-growing fish. It then becomes more and more difficult for the fisherman to catch fish as large as

he formerly did because of the superabundance of small fish.

This condition is more pronounced among the pan fish than among the majority of other fish. One reason is that pan fish are usually of smaller size than most other game fish so that many of the fish which are taken are so small that they do not have enough meat for the pan. A large number of the fish are therefore returned to the water to produce small and undesirable young.

A second and more important reason is that some groups have several closely related species. The sunfish, or perch, illustrate this point excellently. These fish are so closely related that the majority of fishermen frequently have difficulty telling them apart. This group of related species is here considered as the members of the genus *Lepomis*. Within this genus there are nine species which have been reliably reported from Texas. Of these nine species only two—the bluegill, or bream (*Lepomis macrochirus*), and the redear, or shell-cracker (*Lepomis microlophus*)—reach nine inches or more. Only three of the remaining seven species—the green sunfish, (*L. cyanellus*), the red-breast sunfish, (*L. auritus*), and the long-ear sunfish, (*L. megalotis*)—are frequently found to exceed seven inches in total length. The remaining four species are listed as being six inches in total length or smaller. It must be remembered that the sizes listed are near the maximum and that most of the fishes taken by the fisherman are much smaller.

This great discrepancy in size among the species of the genus *Lepomis* would not be of extreme importance to fish conservation if the species occupied different habitats. Recent research in northern and eastern states has tended to show that the various species of the genus *Lepomis* may compete with each other for food at some stage of their life history. Recent unpublished work by K. C. Jurgens of the Game, Fish, and Oyster Commission, done while at the University of Texas, indicates that at least two of the species compete with each

other at certain life history stages. Collections made in the San Marcos River below the icehouse dam in San Marcos contain both the bluegill and the spotted sunfish, (*L. punctulatus*), which is one of the smaller sunfish. An analysis of the stomach contents of these two species indicates that they have similar feeding habits.

Since the bluegill and the spotted sunfish live together and have approximately the same feeding habits, they may be considered to be in competition with each other. The ardent conservationists who fish in the stream may readily catch either species. If they catch a bluegill, it probably will be of sufficient size to be kept. If they catch a spotted sunfish, however, it is almost certain that the fish will be very small and will be released in the river. The breeding stock of the bluegills is constantly being removed by fishermen, while that of the spotted sunfish is taken from the hook and returned to the stream. The fisherman is acting in good faith and hopes that the fish will grow to a larger size so that he may catch it later. The fish which he releases, however, may have attained its maximum size and will merely produce a large number of young which will likewise be too small to be retained by the fisherman. Since the adult bluegills are removed from the breeding population when caught and the adult spotted sunfish are not, each year will see a larger and larger percentage of young spotted sunfish produced. These young will grow up to produce still more spotted sunfish. After a few years the fine bluegill fishing spot will be filled with undesirable, small spotted sunfish.

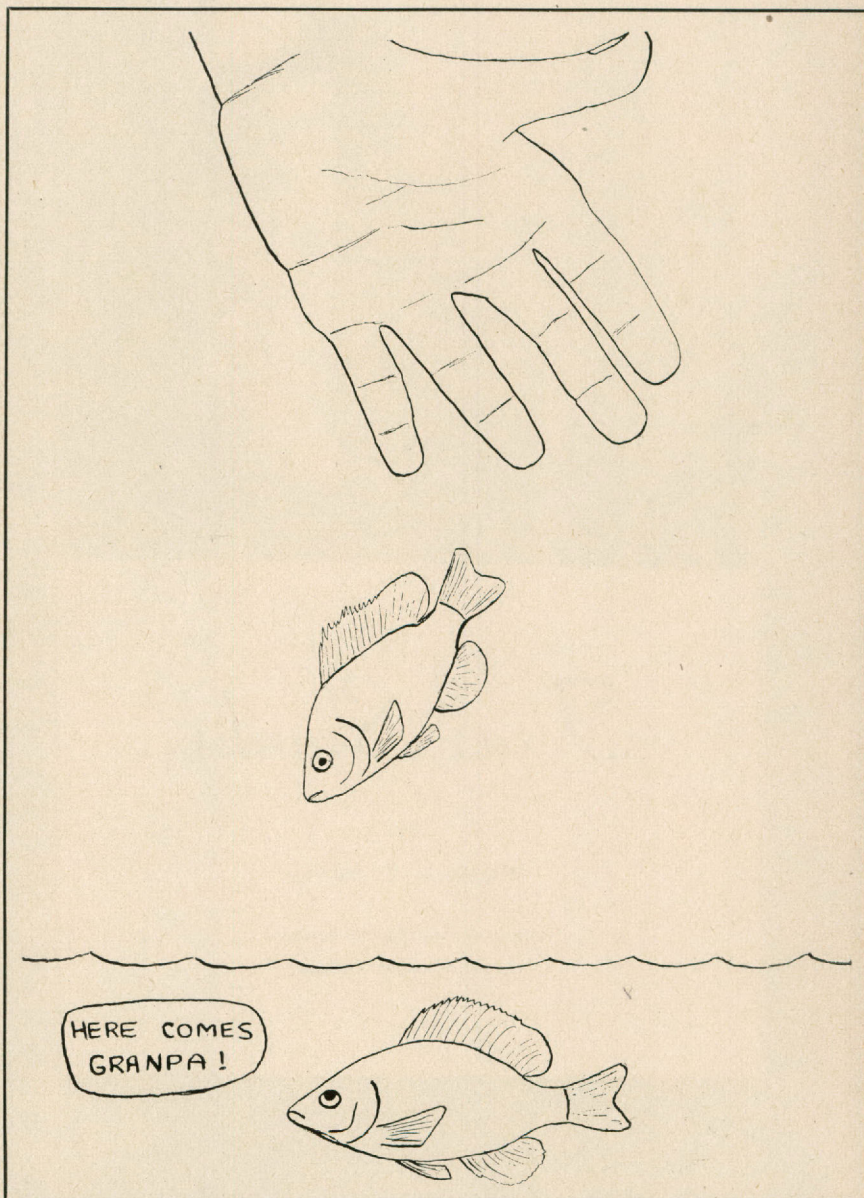
When the sportsman finds that his favorite perch fishing hole has only small sunfish, he will probably request that the area be stocked. If hatchery fish are added, they will join an already crowded population. The native inhabitants will already be eating most of the avail-

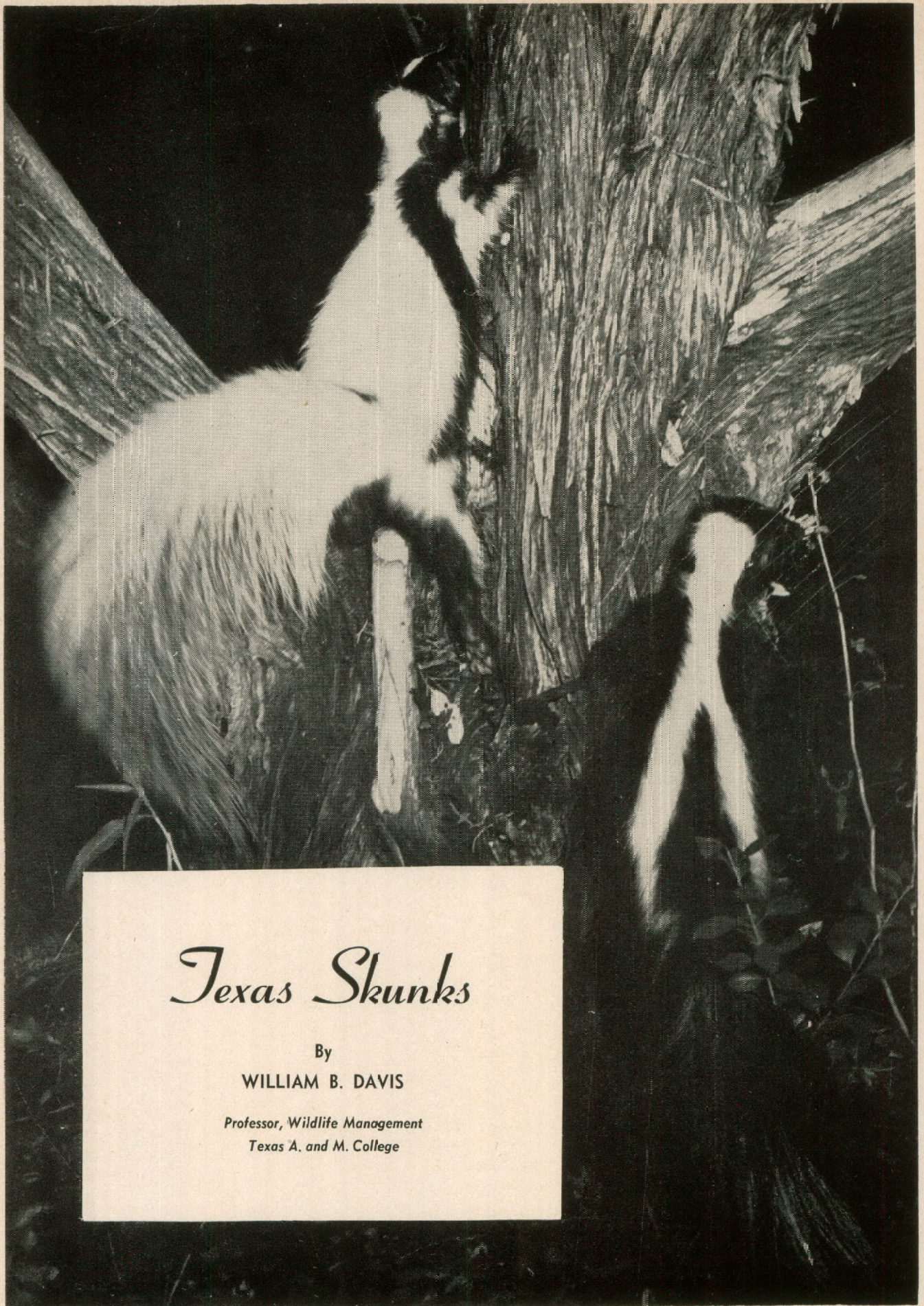
able food. The addition of the hatchery stock will merely increase the number of fish present per unit of food. With the reduced food supply each individual has less to eat and naturally grows more slowly.

In order to prevent this disaster it seems advisable to modify some of our old doctrines of conservation and to adopt some new ones. First, since the policy of returning the small fish to the water tends to form populations of small-sized fish in the water, the small fish taken on hook and line should be *killed* and then, if not desired for eating, returned to the water. Second, since

natural production of young is adequate in most waters in Texas, stocking of game fish should be approved by competent biologists.

The author wishes to emphasize one or two points which may be misinterpreted. First, he is discussing only those waters subjected to sports fishing by hook-and-line methods. Secondly, the specific recommendations are based only on results of work on sunfish and are applied to these fishes alone. Whether or not these suggestions are to be restricted to sunfish or whether they should include all game fishes has not been definitely established.





Texas Skunks

By

WILLIAM B. DAVIS

*Professor, Wildlife Management
Texas A. and M. College*

THE striped skunk *Mephitis mephitis*, is a medium-sized, stout-bodied skunk with two white stripes on each side of the back. These stripes join each other in the neck region and extend forward onto the head and continue backward as separate stripes on each side of the tail. The tip of the tail is black. There are two large scent glands at the base of the tail which produce the characteristic skunk musk. The ears are short and rounded and the eyes are small. Striped skunks have five toes on each foot. The front toes are armed with long claws. The fur is long, coarse and oily. Both sexes are colored alike but the males are usually larger than the females. The weight varies from three to fourteen and a half pounds, depending on age and the amount of fat. This skunk is widely distributed and is the most common skunk in Texas. The so-called narrow striped, short striped, broad stripe and black skunks are color phases of this species.

This species lives in wooded or brushy areas and is frequently found around farm and ranch headquarters. Rocky ridges and outcroppings are favored refuge sites but when these are absent, they seek out the burrows of armadillos, badgers, foxes and other animals.

Striped skunks are largely nocturnal in habit, seldom venturing forth until late in the day and retiring to their hideout early in the morning. I have seen striped skunks abroad in mid-day only twice, and in each instance a female was trailing her family of third-grown youngsters in single file across a meadow to a patch of woodland beyond.

In late fall they become exceedingly fat in preparation for winter when they become relatively inactive in the northern part of their range. Skunks never exhibit the characteristics of true hibernation but they do hole up and sleep during prolonged periods of adverse weather. Females are reported to hole up for longer periods than males. In Iowa they are largely inactive from early January to about mid-March. In Texas, however, they are active throughout the year and seemingly are more active in winter than in the heat of summer. They are social creatures; several of them often occupying a well-situated winter den. Observers in the Texas Hill Country report that they have removed as many as ten striped skunks from one den during the winter. These may have constituted family groups.

These skunks are not choosy in their food habits. In Texas, their season food is about as follows: *Fall*—insects, 76%; spiders, etc. 24%. *Winter*—insects, 52.3%; spiders, 5.3%; reptiles, 1.6%; small mammals, 18.3%; vegetation, 22%; birds and millipedes, making up the balance. *Spring*—insects, 96%; reptiles, 1.6%; small mammals, 2%; vegetation and small birds making up the balance. *Summer*—insects, 88%; spiders, 4%; reptiles, 1.5%; small birds, 3.5%; centipedes, small mammals and vegetation making up the balance.

Breeding begins in February or March. After a gestation period of about 63 days three to seven young are born. In Texas, most of the young appear in the first half of May. There is some evidence that two litters may be born to certain females, but one litter seems to be the general rule. The nursery is a cavity under a rock, a burrow, or a thicket of cactus or other protective vege-

tation. Usually a nest of dried grasses and weed stems is provided for the reception of the blind, helpless young. The young ones remain in the nest until their eyes are open and they are strong enough to follow their mother on her excursions.

I have found these skunks to be interesting pets (after having their scent glands removed), but mine never became really tame. They never failed to reprimand me for approaching them hurriedly, by slapping first one forefoot and then the other on the floor or ground and assuming a defensive stance with tail up-raised and their ineffective twin guns trained on me. Others have reported considerably more success in taming them. Their fur is the most valuable of all the skunks. They are easily reared on fur farms, but the relative low value of their furs does not make such a practice economically worthwhile.

The hooded skunk, *Mephitis macroura*, is superficially



Note the distinctive and progressive markings of the five young skunks.

like the common striped skunk, but differs in having longer, softer fur and a distinct ruff of longer hair on the upper part of the neck. There are two distinct color patterns: (1) upper-parts chiefly white, frequently with two narrow short white stripes on the side behind the shoulder and the under parts black or mottled with white; (2) upper parts black, except for the two short narrow white stripes low on the sides, and the under side of the tail frequently white. Occasionally the tail is wholly black, but the bases of the hairs are always white. In the white-backed phase, a broad white band begins between the eyes and covers most of the back and upper surface of the tail. The white stripe is never divided as it is in the common striped skunk. A narrow white stripe may be present on the snout, but it is often absent. It differs from the hog-nosed skunk in having much finer and longer fur, a smaller snout, smaller general size, and a much longer tail. Adults weigh from two to four pounds. This species occurs only in the Trans-Pecos section of Texas and at present is known only from Brewster and Jeff Davis counties.

Its habits are little known, but they are thought to be similar to those of the common striped skunk.

The eastern spotted skunk, *Spilogale putorius*, is our smallest skunk. It is relatively slender and has a small



Above is the broad-stripe or hog-nosed skunk.

white spot, seldom as big as a dime on the forehead and another in front of each ear. The latter spot is often joined with the middle white stripe of the back. There are six distinct white stripes on the anterior part of the body, the lower pair beginning on the back of the fore leg, the middle pair at the back of the ears, the narrow uppermost pair on the back of the head. The posterior part of the body has two interrupted or broken white bands; one white spot on each side of the rump and two more at the base of the tail. The tip of the tail has a small tuft of white hairs and the rest of the body is black. The ears are short and low on the side of the head. This eastern spotted skunk has five toes on each foot and his front claws are more than twice as long as the hind claws. Males weigh about one and a half pounds (heaviest recorded, 1 lb., 6 oz.). This skunk occurs in eastern Texas, east of the Hill Country and in the upper part of the Panhandle.

These small slender, spotted skunks are much more active and alert than any of the other skunks. They occur largely in wooded areas and tall-grass prairies, preferring rocky canyons and outcrops when such sites are available. They are rare in the short-grass plains and in the low-lying deserts. Altitudinally they occur commonly from sea level to about 6,000 feet, rarely up to 8,000 feet. In areas where common, they have a tendency to live about farm yards, often denning under buildings or in them.

In Southern Texas they are known as "hydrophobia cats" and feared as carriers of rabies. This fear is largely unfounded, although during the mating season the males appear to be rabid, run amuck, and attack humans sleeping on the ground. Four unprovoked attacks on humans in Texas and one on a family of wild wolf pups in an underground den are on record. None of these four persons suffered any serious effects. A few authentic instances of death from hydrophobia following the bite of these little skunks are on record, however. Nevertheless, they should be no more feared on this account than any of the carnivores, and certainly less so than the domestic dog.

Their den sites are varied. In rocky areas they prefer cracks and crevices in the rocks or a burrow under a large boulder. Rock fences appear to offer ideal denning sites. Since they are expert climbers, they occasionally den in hollow trees or in the attics of buildings. In

settled communities they frequently live under buildings, in underground tile drains, and in underground burrows. I once saw the decayed bodies of two animals that had been caught in traps set for muskrats in about three inches of water at the mouth of a burrow that opened under water. This proves that they enter water and suggests an unusual den site. They are almost entirely nocturnal, seldom being seen in the daytime.

Their food habits are largely beneficial to the agriculturist, although they can do considerable damage to poultry once they develop a taste for such food. Their seasonal natural foods consist of: *Winter*—cottontails and corn; *Spring*—native field mice and insects; *Summer*—predominately insects, with smaller amounts of small mammals, fruits, birds and birds' eggs; *Fall*—predominately insects, with small amounts of mice, fruits, and birds. We know they are excellent rat catchers and can soon rid a barn or house of these pests.

Mating occurs in late winter and their three to six young are born in May or June. The exact gestation period is not known, nor are their marriage relations. At birth the young are blind and helpless, weigh about nine grams each, and the body is covered with fine hair. The black and white markings are distinct. Their eyes open at the age of 30-32 days; they can walk and play when 36 days old; emit musk when 46 days old; and are weaned when about 54 days old. When three months old they are almost as large as adults.

Although their fur is in wide demand, the price paid is usually so low that few trappers take the trouble to save the pelts of those that accidentally enter their traps. Like other skunks, rearing them on fur farms is not economically feasible. They make interesting pets when captured at an early age and "de-skunked," a feat that can be accomplished easily by snipping off with a pair of sharp scissors the ends of the two musk ducts, which open just inside the vent on each side. This will cause the ends of the ducts to seal over and prevent the emission of musk.

The western spotted skunk, *Spilogale gracilis*, is much like the eastern species but is readily recognized as different. The color pattern resembles that of the eastern skunk, but the white markings are more extensive, the black and white stripes on the upper back being nearly equal in width. In the eastern species the black areas are much more extensive than the white. The dorsal pair of white stripes begin between the ears or just posterior to them. They have a white area on the face which extends nearly from the nose pad to a line back of the eyes and covers more than half of the area between the eyes. The under side of the tail is white for nearly half its length and the tip extensively white. The weight of the males is about one and a half pounds while the females weigh about a pound. This is the spotted skunk of the Hill Country, Western Texas, and much of South Texas. Its habits are similar to those described for the Eastern Spotted Skunk.

The inland hog-nosed skunk, *Conepatus mesoleucus*, commonly known as "rooter skunk" or "rooter," has one broad wide stripe from the top of the head to the base of the tail and because of this is also called the "white-backed skunk." The tail is long, bushy and white all over

except for a few scattered black hairs underneath. The rest of the body is blackish brown or black; the nose pad is relatively long and about three times as large as that of the common striped skunk. The nostrils are ventral in position and open downward. The fur is relatively long and coarse, differing in this respect from most of the other Texas skunks. Adults weigh from two and a half to six pounds and sometimes as much as ten pounds, depending upon age and the amount of fat stored in the body. This skunk occurs in central, southern and extreme western Texas. Formerly a small population occurred in and about the Big Thicket in eastern Texas but it is probably completely killed out by now.

The habits of these white-backed skunks are generally like his relatives. He inhabits the foothills and partly timbered or brushy sections of their general range, usually avoiding the hot desert areas and heavy stands of timber. The largest populations occur in rocky, sparsely-timbered areas, such as the Edwards Plateau section of central Texas, the Chisos, Davis, and Guadalupe mountains of Trans-Pecos Texas, and the isolated mountain ranges in eastern Arizona and New Mexico. Their presence in an area usually can be detected by the characteristically "ploughed" patches of ground where the skunks have rooted, overturning rocks and bits of debris, in their search for food. This hog-like habit of rooting has led to the adoption of the common name rooter skunk, by which it is known to most people in Texas.

Although largely nocturnal, they are not strictly so. In mid-winter in central Texas, many of them prefer to feed during the heat of the day, in this respect reminding one of the habits of the armadillo at that season. They are seldom as abundant as common striped skunks in any part of their range. Like other skunks, they are relatively unafraid of man or beast, nor do they hesitate to defend themselves with their powerful musk if unduly molested. In the Guadalupe Mountains of western Texas I watched one at close range at night with the aid of a flashlight for nearly thirty minutes as it rooted about in search of food. Whenever I approached too close, I was given fair warning as the skunk elevated its tail and maneuvered to place me in the line of fire. By heeding the warning and backing off a few steps I was able to forestall the otherwise inevitable barrage.

As mentioned previously, these skunks prefer rocky situations when available because of the numerous cracks and hollows that can serve as den sites. Not only do the skunks winter in such dens, but they also use them as nurseries for their young. Unlike the striped skunk, this species is more or less unsocial. Usually only one individual lives in a den. A trapper in central Texas reported that he has found one winter den occupied by two rooters.

Their food habits make them valuable assets in most areas. Based on analyses of stomachs and other viscera of animals from central Texas, their seasonal foods consist of: *Fall*—Insects, 52%; spiders, 4%; vegetation, 38%; reptiles, 6%. *Winter*—Insects, 75%; spiders, 12%; small mammals, 9%; vegetation, 3%; with reptiles and mollusks making up the balance. *Spring*—Insects, 82%; spiders, 12%; reptiles, 6%. *Summer* — Insects, 50%;

spiders, 9%; small mammals, 3%; vegetation, 31%; snails, 5%; reptiles, 2%.

The breeding season in the United States begins in February and most females of breeding age are with young in March. The fact that the female has only six teats, as compared with twelve to fourteen in the striped skunk, suggests small litters of young. Of six records I have available, three females contained three embryos each; the others, two each. J. D. Bankston, a reputable trapper at Mason, Texas, reports that he had never seen more than four young with a female. The young are born in late April or early May, indicating a gestation period of approximately two months. Jenison records it as 42 days, but the fact that he gives the number of young as 6-10 indicates that his data apply to some other skunk. Nothing has been recorded on the growth and development of the young, but we do know that they can crawl about in the nest before their eyes are open and that at that tender age they can emit a drop or two of musk. By the middle of June they are about the size of kittens and weigh about one pound. By August most of them are weaned and are rooting for their living.

The pelt of this skunk is inferior in quality and never commands as high a price as that of the striped skunk.

● Continued on Page 31

This skunk is ready for combat if the occasion arises.



Conservation in the Schools of Texas

By EVERETT T. DAWSON

Supervisor, Conservation Education

IT IS common knowledge that all living things depend upon natural resources for existence. The history of man is a story of a hungry animal seeking food. The rise and fall of nations in the Old World can be traced to first the abundance and then the depletion of natural resources.

The settlement of Jamestown, the first successful colony in the continental United States, was made possible by the discovery and use of natural resources. In like manner the first colonists of Texas found an abundance of natural resources which made it possible for them to build from a vast wilderness one of the greatest states in the greatest nation in all the world.

When Stephen F. Austin with his first colonists settled on the Brazos River in Austin County in 1822, they found a countryside with all of the things they needed to begin life as pioneers in a great wilderness empire. We can imagine what these early settlers saw in the bright light of the first morning in their new home—tall grass waved in the breeze stretching to the horizon across the prairies; virgin soil on the hills and in the valleys beckoned to the tillers of the land; mature forests along the water courses and virgin pines to the east offered abundant building material. The streams were deep and clear and together with many sorts of lakes and

ponds provided easy-to-get fish and fowl. Wildlife flourished in this favorable environment. Birds of many kinds and colors carried on the natural life processes; great herds of antelope and thousands of buffalo roamed the prairies to the west. Deer, bear, squirrel, wild turkey, quail, prairie chicken and other game birds and mammals by the thousands lived along with the mountain lion, the jaguar, the timber wolf, the bobcat, the rattlesnake, the black widow spider and all the other wild creatures in a great natural wildlife community governed by nature's basic law of the wild, "survival of the fittest." This was truly a picture of the balance of nature.

As these pioneers set themselves to the task of clearing the ground and plowing the land, the interruption of this primitive balance was begun. They brought cattle, horses, hogs, sheep, goats, cats, dogs and ducks, all of which found sustenance derived from the environment formerly used by native wildlife, which moved back deeper in the more remote areas and gave way to the newcomers. They took larger and larger quantities of game. A few years later the railroads came and opened up the West in 1869. With them came the hunters from the cities, towns and hamlets, lured by the price of a few cents for a buffalo tongue or a dollar or two for a hide. They slaughtered the buffalo in great

numbers and left the carcasses to rot where they fell. Likewise deer, antelope, waterfowl and other game animals suffered at the hands of market hunters and the careless game killers. In the meantime the corn grower, the cotton farmer, and the cattleman flourished. Immigrants poured in from eastern and southern centers of population. The new Texas came to be noted for its rich soil and abundance of wild game. In about 1885 barbed wire came into use and landowners fenced or claimed the last foot of the public domain and the famous Texas frontier passed into history.

From the time of the coming of the first colonists, exploitation of the natural resources continued without regard to the impairment of the basic elements of the countryside. This process is still going on. Society has kept pace, expanding its activities and raising its level of living at an ever-increasing rate. But during the last few years there are signs on every hand indicating that some of these seemingly inexhaustible resources are running low in both quality and volume. Researchers tell us that we have lost a large portion of the fertility of our soil. We have a continued lowering of the water table over most of the state. We have been using our forests faster than we have been producing timber. Our good native grasses have

*What Has Happened to Our Wildlife and Other Resources
in the Last 129 Years?*

been destroyed in many parts of the rangelands. Our minerals are in short supply in some categories. And the once abundant supply of wildlife has shown a steady decline in volume amongst most species, deer being a notable exception.

Briefly, we might sum up the wildlife picture in these words. Worth many millions if we had them back were the unbelievable flights of the passenger pigeon whose extinction is charged to guns in the hands of American citizens. The last individual representing that noble species died in an Ohio zoo in 1914. Sixty million buffalo roamed the Texas prairies and western plains of the United States. The last wild specimen in Texas fell to a hunter's gun near Midland in the

(Editor's Note: This is the first of a series of articles on the basic needs for conservation of our wildlife and other natural resources.)

fall of 1885. The antelope of West Texas has been recently snatched from the brink of destruction by management techniques. The prairie chicken is now fighting a losing battle against modern land-use practices. The wild turkey and bobwhite quail have declined in much of their range. The gray and fox squirrels have suffered great reductions in population. Wild geese and ducks reached their lowest ebb in 1934 when authorities estimated a total of only thirty million in North America. That is what has

happened to our wildlife and other resources in the last 129 years.

Do not these facts pose a problem? Do they not actually threaten to lower the standard of our high level of living? Are they not sufficient reason for an intensive conservation education program—a plan whereby all the people can be informed and acquire the understanding for the production and wise use of these resources? Would it not be good business to include the boys and girls in the public schools in this plan?

In the light of these facts it is timely that the Texas Game, Fish and Oyster Commission has set up a division of wildlife conservation education. The law says in the first line in the game and fish statutes, "All wild animals,



The sixth grade pupils of the Pease School, Austin, Texas, are briefed by their home room teacher, Miss Catherine Cook, in preparation for a field trip to study soil, water, plants, animals, and minerals.

wild birds, and wild fowl within the borders of this State are hereby declared to be the property of the people of this State. (Art. 871a, P. C. 1925.)" Since the people own the wildlife, it follows that they want to know the facts about what they own, and they want to find out the best ways to use these wildlife resources. To provide this information and present plans for wise use of this heritage is what this division of wildlife conservation education proposes to do.

The accompanying pictures of school children going into the field and studying wildlife and the other natural resources at first hand present a picture story of conservation education in action as it is being carried on by the Austin Public School in its school camp program at Friday Mountain Camp.

In the next issue will be "Conservation Education—The Remedy."

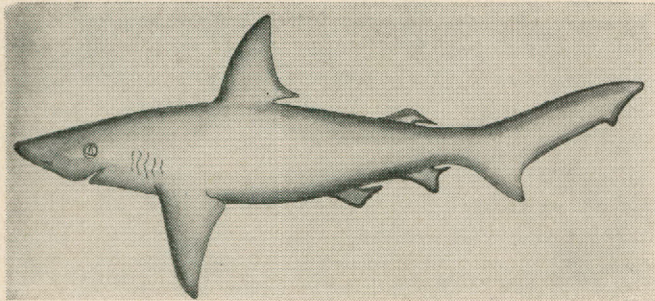
The group cooperates with Everett T. Dawson, right, wildlife conservation education supervisor of the Game, Fish and Oyster Commission, in the study of plants in relation to wildlife. Below, the class studies the importance of water, soil and plants in relation to fish. D. Richard Bowles, Principal, extreme right, lends his help and moral support.



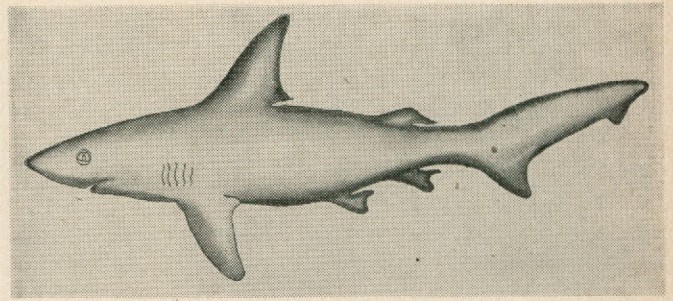
Marine Fishes of Texas

By J. L. BAUGHMAN

Chief Marine Biologist



Small Black-tipped shark* *Carcharhinus limbatus*



Dusky shark *Carcharhinus obscurus*

THE small black-tipped shark is commonly distributed throughout the tropical waters of the Atlantic, straying as far north as Wood's Hole, Massachusetts. Nichols (1929) states that it makes up the bulk of the shark population on tropical and warm temperate shores. Fowler (1936) has recorded it from a number of West African locations, while Meek and Hildebrand obtained specimens from Chaime Point and Panama City on the Pacific side of the Isthmus of Panama. It is common in Brazil, around the Bahamas, off southern Florida and in the northern part of the Gulf of Mexico.

Texas specimens have been caught in Aransas Bay, the Laguna Madre and at Galveston.

In color it is generally dark gray, dusky bronze or ashy blue above; white (pure or yellowish) below, with a band of the dark upper color extending backward along each side, and with the pale hue of the lower parts extending forward. In the adult, the pectorals are conspicuously tipped with black. In young specimens the dorsals, the anal and the lower lobe of the caudal are also tipped with black.

Maturing at 4 to 5 feet, adults average about 5½ to 6½ feet. Few

grow longer than 7 feet, with 8 feet about the maximum. Recorded weights are about 4 pounds at 28 inches, about 20 pounds at 4 feet, about 42 pounds at 5 feet, and 68 pounds at about 5½ feet.

An active, swift shark often seen in schools at the surface, and frequently leaping clear of the water, the food of *limbatus* is generally fish, and Nichols (1917) mentions a specimen in which two stingray spines were imbedded about the mouth.

This shark is commonly used as food by the poor in Puerto Rico (Evermann and Marsh, 1900) and Brazil (Nichols and Mowbray, 1917). Mr. Nichols, who has eaten it, says that the flesh is beautifully white and decidedly palatable. The hides are small, and thinner than are desirable for the American trade, but would be useful as a specialty leather. The fins are not so good as those of other species, generally grading No. 2. The potency of the liver oil varies, that of Florida specimens ranging up to 25,000 U.S.P. units of Vitamin A per gram (Springer, 1944).

Two other species of this genus are so little known that no data can be given here, the only descriptions being highly technical. They are *Carcharhinus natator* and *Carcharhinus springeri*. The first occurs here, the second probably does.

The dusky shark ranges along both sides of the Atlantic, in tropi-

cal and warm temperate waters, and from southern Massachusetts to southern Brazil off the American coast. *Obscurus* has often been confused with other species, but it is certainly common throughout the year off the east coast of Florida where large ones are often taken on set lines. It is probable, too, that it occurs generally throughout the West Indies and Caribbean, for it has been reported from the Bahamas, from Trinidad, from British Guiana, as well as from Brazil. To the northward, young ones often range as far as southern New England in summer.

Several of these sharks were caught off Port Aransas in 1949.

Generally duskies are bluish or brownish or leaden gray above, grayish or pure white below, except that the lower surfaces of the pectorals are grayish and sooty toward their tips.

They are about 34 to 40 inches when born, and grow to a length of 10 to 14 feet.

About all that is known of its habits is that it is taken both close inshore as well as farther out at sea and that it is a fish eater. In Floridian waters, groupers and various other reef fishes, as well as portions of other sharks, have been found in its stomach.

Present indications are that it produces young throughout its geographic range and over a long season.

* 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, 1950.

National Wildlife Restoration Week Announced

For March 18-24

THE fourteenth annual National Wildlife Week this year falls in the week having the first day of Spring. The observance of this week is sponsored by the National Wildlife Federation and its affiliates in 40 states representing from two to three million nature lovers, sportsmen and conservationists.

National Wildlife Week is dedicated to the sensible management and use of wildlife to the mutual benefit of the public, sportsman and natural resources, both animate and inanimate, of our country.

Since its inception by Presidential proclamation in 1938, National Wildlife Week has been used as a symbol to point up the urgency of conserving, protecting and restoring our fast diminishing store of natural resources. For decades, we have been digging deeper and farther into our storehouse of natural resources. Four billion tons of soil are being washed away each year; our forests are being cut down fifty percent faster each year than we grow them; our waters are getting more and more polluted and the drain on other resources is equally appalling.

This year, with a national emer-

gency upon us, the need for a carefully planned program of wildlife protection is doubled. As the keystone to this program, we find conservation education. For too long has an apathetic public smiled tolerantly, sympathetically and discouragingly whenever a professional conservationist begins to tell of the far reaching values of conservation. This attitude is fostered to a very large extent by a complete misconception of the aims of conservationists. All too few have paused long enough to hear the true story of a balance between nature and man—between animals and forage areas—between forest land and flood areas—yes, between supply and demand as a business man would describe it. This then is the true aim of conservation—So to balance the supply of wildlife that it will neither grow so abundant as to destroy itself by impossible demands on space and forage nor to allow the demands of thoughtless hunters, business men, farmers or just plain you and me to reduce any of our Godgiven heritage to the point of annihilation.

National Wildlife Week is dedicated to spreading this information to all

walks of life. To point out how conservation, or its lack, has its effects on all people—city dwellers or country folks—on the dust bowl in Texas or the flood zone of the Mississippi.

In order to finance this educational program, the National Wildlife Federation produces each year a sheet of Wildlife Conservation Stamps. This year the stamps have been painted by three of the nation's foremost nature artists, Roger Tory Peterson, Francis Lee Jacques and Leslie Ragan. Mammals, birds, fish, trees, wild flowers and insects make up the 36 Conservation Stamps in beautiful natural colors. In the previous 13 issues, the Federation has reproduced 484 different species of American Wildlife, thus bringing the total to 520—a veritable pictorial encyclopedia of our out-door wildlife friends.

A sheet of these full color stamps may be obtained for a contribution of one dollar or more, and they are distributed from the headquarters of the National Wildlife Federation, 3308 Fourteenth Street, N. W., Washington 10, D. C. Details relating to Wildlife Week activities may also be obtained at the above address.

Weeds Help Build Soil

A patch of ragweed in a suburban backyard may incur the wrath of hay-fever sufferers, but on the farm it may have some unexpected value. This is the gist of a statement made by Dr. Firman E. Bear, head of the soil department at Rutgers University, before the annual conference of fertilizer manufacturers.

Ragweed and lamb's quarters, Dr. Bear pointed out, are excellent accumulators of zinc and materially

assist in rebuilding soils deficient in this necessary minor element. The deliberate cultivation of these plants for this purpose is not an unforeseeable possibility for the future. Dr. Bear's talk before the conference emphasized the need for returning more organic matter to the soil in a wider variety than is the current practice.

"Weeds" are generally misunderstood members of the plant family which have values not always apparent to human eyes. A pioneer stand

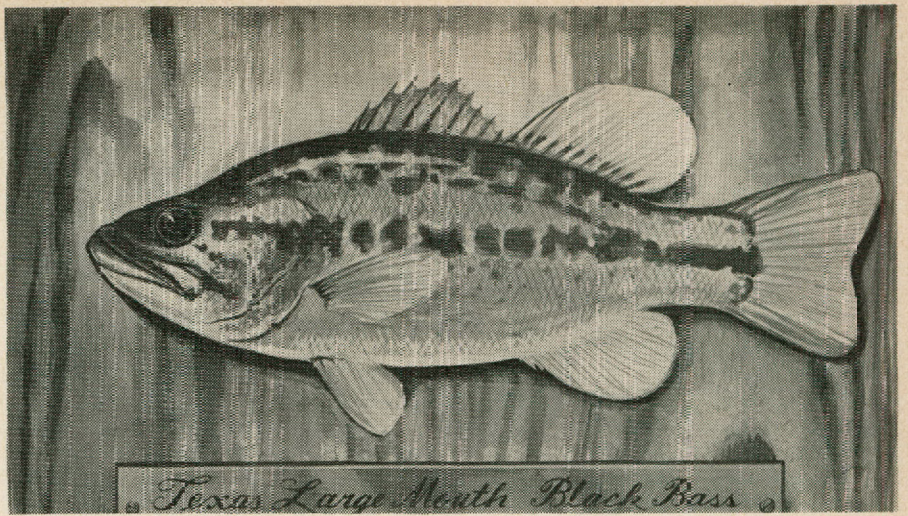
of such "pernicious" weeds as plantain or crab grass on a barren hillside can prevent the serious loss of soil and the siltation of nearby waters while the plants attempt to undo the destructive work of man. The same plants in a lawn, golf-course green or cultivated field become weeds in the usual sense of the word while the finest lawn grass becomes a weed in the truck garden. A weed is a plant out of place. In its proper place it can be a thing of value.

Fishes of Texas

Largemouth Black Bass

By MARION TOOLE

Chief Aquatic Biologist



THE largemouth black bass, *Micropterus salmoides*, one of the most important fresh water fish of Texas, has a range from the Great Lakes Region on the north, to Florida and northern Mexico on the south. It has been found to weigh as much as twenty-two pounds and four ounces and to reach a length of thirty-two inches. The largest of the species is found in Florida. The high weight in Texas runs from seven to ten pounds with some specimens reaching an occasional weight of slightly over twelve pounds.

It is a large carnivorous species depending entirely upon smaller fish, minnows, small turtles, flies and other moving insects and animals for its existence. For years it has been blamed with the decline in the ability of an impoundment to provide good fishing, due to the fact that many people think because it is a carnivorous species, it eats up all the small fish in a body of water. Within recent years aquatic biologists have come into existence and they, not being content with the old sayings, decided to check into the subject and see just what was occurring. They found that bass are very poor predators and that these fish are unable to consume enough young forage fish to keep the fish population in balance in a body of water and that this fact causes the decline of good fishing. In fact, in order to maintain good fishing, the black bass must be given a helping hand by man to thin out the other fishes present.

The largemouth black bass is extremely variable in color. Apparently, the turbidity of the water determines the color. Bass, which are taken from clear lakes are dark green and black in color, while those taken from muddy waters are a light green. The largemouth black bass usually has a more pronounced dark lateral streak from head to tail than any of the other black basses. Sometimes this streak becomes obscure with age. The fish in question has a larger mouth from whence it gets its name, than any of the other basses. If the edge of a card is held vertically from the corner of the mouth to the eye and the corner of the mouth extends behind the black border of the eye it can be assumed that the fish is a largemouth black bass. Another characteristic used by taxonomists is the lack of scales extending up between the rays on the soft dorsal and anal fins of the largemouth black bass, whereas, the other group, composed of the spotted and smallmouth black bass, do have these scales present. The dorsal fin is the fin on the back of the fish while the anal fin is found on the belly of the fish near the tail or caudal fin.

The largemouth black bass spawns from February in the Rio Grande Valley until the latter part of May elsewhere in Texas, depending upon the temperature of the water in which it lives. Water temperature at spawning time is usually in the low sixties of the Fahrenheit scale, and if the water temperature drops to the low fifties before the eggs are hatched

after having been laid, they usually spoil and fail to hatch. Because of temperature changes many of the black bass lose their spawn in Texas since the early part of the spawning season is a period of unstable weather conditions.

The largemouth black bass spawns in water from eight inches to two and one-half feet in depth. The shallowness of the water cuts down spawning efficiency because water at that depth is susceptible to rapid temperature changes. Excessive rises during spawning season sometimes causes fish to leave their nests which results in spawning failures. The largemouth black bass lays from 8,000 to 25,000 eggs. The male prepares the nest with the location rather than the materials being the main consideration. He will choose either gravel, mud or pond weeds for the nest. After the nest is prepared, he finds a suitable female that is enticed to the nest. She is driven away after she expels her eggs. The male guards and fans the nest until the eggs are hatched. Hatching time is from five to fourteen days depending again upon the temperature of the water. The male fish continues to guard the newly-hatched fry for an indefinite period, generally not longer than a month.

The largemouth black bass is the favorite game fish of Texas and is fished for with live minnows, casting baits and flies. Its vicious strike and the spectacular fight it puts up, when hooked, can well be compared with that of trout or pike.

Letters

Dear Sir:

Your article in the December issue of TEXAS GAME AND FISH on the subject of quail impressed me. It is a modified version of the often asked, never answered, sixty-four dollar question, "Where did the quail go?" There are thousands of them in August and hundreds in December. And after reading this I still do not know the answer.

Dove season in September is the main factor but why does everyone whom you approach with the subject always deny that dove season has anything to do with the abundance of quail during the quail season? I have studied this question for years and each year I am more convinced that I am right. Last year I gave some doves to one of the noted dove hunters about whom I had my suspicions, and sure enough, I found the birds in a trash can in the alley five hours afterwards. And the next day this man was out in the field in quest of more doves. But he did not go to the water hole I told him about which was thirty miles closer to his house than the field he went to. As I had hunted in this part of the country several years I know that no doves are ever found in large numbers in this area. This is only one of the many cases of this kind that I have conducted on my own for the past several years.

Every year I am out in the field on the first day of bird season and almost every year I find birds that have been shot weeks before. In some cases there may be old wounds, but I am sure that some are not. I am not sure that I can tell a last year's bird from an early hatch, or just how old the wound is; but in a case of two birds killed 250 miles apart, this year, both had been shot with No. 6 shot and the wound had not healed good. These birds were near a pond and I think that duck hunters instead of dove hunters were responsible. Also, the size of the shot would be a factor in determining this.

Another thing that causes many quail to vanish so fast is the fact that so many have to be downed before one has enough to eat. In this case, a dog should be used to hunt crippled and dead birds. I'll wager my pet quail gun that I can take my dog behind some certain dove hunters I know and find crippled and dead quail.

I will be glad to send you some wings off the birds that I kill for the rest of the season if you are still interested after I tell you the reason why the greater part of old

birds killed are the males. In your part of the country I would not know until I had a chance to look it over, but here it goes back to the dove hunting again. I look over the birds twelve months in the year and have found many things in July to add birds to my sack in December. I watch them from mating to nesting and on to mature birds. During the nesting period everyone knows who has ever found a quail's nest that she will not fly away from it but will flutter along the ground for a time before flushing into the air. I meet few people who know a hen stays with her brood for the most part, and in time of dove season if this covey is flushed, nine times out of ten she will be the first one to come up and the first one killed.

Since 1945 I have been allowed to hunt on a certain large ranch in Texas that is closely guarded and there is slight or no difference in the birds as to amount from August. Several times, though, I have noticed that a covey would seem to vanish from a spot from which they had not moved 500 yards all year. Yet later, less than half a mile from where I lost that covey, I would find another covey that was supposed to have fifteen or sixteen birds with thirty or more. I have seen this happen twice with a covey of blue and bobs which I consider to be very rare. But all said and done, it is my opinion that the dove season will have to be closed or moved up to quail season or you will find the birds are still going to run off, and you will keep on missing that old hen that got up to lead her brood out of the way of the "early bird out to get the worm," and you will not get her wing to check on, I'll betcha.

T/SGT. FRANCIS G. LANKFORD
3750th Medical Group
Sheppard Air Force Base, Texas

Dear Sir:

You have voiced the oft-repeated contention of quail hunters that dove hunters thin out the quail before December 1 when the quail season opens. It is probable that this does occur on some heavily shot dove areas; but some basic natural processes produce similar results in areas with no dove hunting. In other words, the question is how significant is pre-season loss of quail taken by illegal hunting?

Biologists who work with quail agree that neither hunting nor natural mortality are as significant as habitat in determining the density of quail.

They have learned that neither closed seasons nor protection from all hunting on individual ranches increase quail density, except in severely over-shot range. On the other hand, they can point to many changes in density that have resulted from changes in the habitat caused either by man or by climatic factors.

The annual turnover in an un hunted quail population is the same as in a hunted population, approximately eighty percent. Expressed another way the December 1 population contains eighty percent birds hatched in the previous summer regardless of hunting pressure. With this rapid turnover in the population a surplus production of young each summer is expected and a high rate of loss is necessary if the density is to remain compatible with food and cover supplies. Thus, mortality is normal and necessary.

The Fall decline is necessary whenever Summer production exceeds Fall and Winter carrying capacity and this is the usual case. On the Newton County study area where there is no hunting (and very few doves or dove hunters in this region), the greatest number of quail occurs about the first of September. From then until December the population dwindles almost by half. This loss is normal because the summer range is at least twice as good as the winter range.

Hunters who are concerned about the Fall decline of quail should consider the advantages of opening the quail season earlier rather than blaming the dove hunters. As shown above the annual population curve reaches its peak in September and declines until the hatching season commences in June. It is obvious that earlier quail hunting would make more birds available and would bag some birds that would die by other causes before December 1. This is the biological basis for earlier quail hunting. Against this must be balanced the disadvantages of bagging some smaller birds, hunting when dogs can't do their best work, and changing a long-established precedent of hunting quail in Texas from December 1 to January 16.

Your explanation for increased mortality of adult hens (over adult cocks) probably would be correct if natural predation were included with the illegal hunting described.

Certainly crippling loss must be considered with hunting and many workers agree that this is normally one-fourth to one-third of the bag.

MARINE SEMINAR

THE spring session of the Marine Laboratory Seminar has been scheduled for March 22-25, inclusive, under the sponsorship of the Game, Fish and Oyster Commission. The Seminar will be held at the marine laboratory in Rockport, Texas. Program arrangements will be under the direction of J. L. Baughman, Chief Marine Biologist.

There are two seminars held annually, this being the first session for 1951. The last session held in October of 1950 proved to be very

successful and the attendance figure almost doubled that of the first session of 1950. Even though the Seminar was primarily designed as an educational experiment with the universities and colleges of Texas, it has attracted many people from non-educational institutions, industrial laboratories, and other closely allied fields.

General topics under discussion will be marine fisheries, oceanography, disposition of industrial waste, and utilization of sea water for in-

dustrial purposes. Outstanding authorities will present lectures on these and other pertinent subjects.

The entire Marine Laboratory staff, equipment and library will be available to the Seminar. As soon as a definite schedule has been formulated and approved a program announcement will be sent out. Arrangements have been made for housing at a minimum rate. To obtain this rate, all arrangements for billeting should be handled through the Marine Laboratory offices at Rockport.

Our law enforcement division is thinly spread and more wardens would doubtless help divide the hunting more fairly among the hunters; but the Fall decline of quail numbers would continue if law enforcement were perfect.

DAN W. LAY
Wildlife Biologist

Dear Sir:

I should be sincerely grateful if you would kindly send me a single copy of your recent publication: "The Poisonous Snakes of Texas and the First-Aid Treatment of Their Bites," by J. E. Werler. The same subject is becoming of increasing importance at this end of the world, the number of fatal cases of snake-bite having risen sharply during the last few years, and I am confident that your pamphlet will prove to be helpful.

JACOB H. HOFIEN
Tel-Aviv, Israel

(Our supply of the bulletin "The Poisonous Snakes of Texas" by John Werler has been exhausted. However, we are having this important bulletin reprinted and will send you some of them as soon as we receive them from our printer. The Editor.)

Dear Sir:

I just received your complimentary copy of TEXAS GAME AND FISH and sat right down and read it from cover to cover. It is an excellent magazine. I especially liked the article entitled "The WHY of Migratory Waterfowl Regulations." If every sportsman and so-called conservationist could read it there wouldn't be the misunderstanding as to the strict waterfowl regulations.

I am a teacher of Natural History at several camps and the painting of the Canada Geese will help to decorate the walls of one of our "Museums."

I am enclosing a dollar for a year's subscription to TEXAS GAME AND FISH.

JOHN CUNNINGHAM
1311 5th Street
Santa Monica, California

(Thank you for your interest in our magazine. We will try to acquaint our readers with the facts behind the regulations affecting wildlife. We will make every effort to keep our readers posted on the status of wildlife throughout the year. Future issues of TEXAS GAME AND FISH will contain other inserts on the various geese every Texas hunter should know. The Editor.)

Dear Sir:

I would certainly appreciate your sending me any booklets or bulletins on all aspects of raising minnows. If you do not have such bulletins, will you please tell me where I can get the desired information? I am considering going into the propagation of minnows commercially. I do not know whether it makes any difference as to location or not, but if I should do this it will be in Anderson or Cass County.

I am a subscriber to TEXAS GAME AND FISH and think it is one of the best magazines of its kind. I am not griping but don't you think the article "Hunters to Help in Quail Study" in the January issue was a little late? I received my copy around January 10th, and all of my bird hunting had been done previously.

HUBERT KNIGHT
213 South Brighton Ave.
Dallas, Texas

(At present we do not have any bulletins or booklets on minnow raising in Texas. I would suggest that you write to the Fish and Wildlife Service, Washington 25, D. C., and request a copy of their booklet on this subject. We are planning to publish an article in TEXAS GAME AND FISH in the near future covering minnow raising. The first article on "Facts from Quail Wings" by Dan Lay appeared in our December issue. The article to which you refer in your letter was simply a follow-up to remind the hunters that our department needed this help. The Editor.)

Dear Sir:

I received your advertising letter the other day, wanting me to subscribe to your sports magazine, TEXAS GAME AND FISH. I have not as yet renewed my subscription and am considering whether to do so or not. I have no bone to pick with you, but there are a few things that I would like to say in a sportsmanlike way.

Personally, I feel as I know others do that your magazine like all others is somewhat too professionalized. By that, I mean just what you suggested—that your magazine is written by men who know. This eliminates the amateur entirely. To my way of thinking, there is where you lose a big portion of your interests with the many sportsmen. How often have we heard the expression "to heck with the expert." That is obviously a rejection to your magazine and the experts who write the articles. I am of the opinion that if your magazine and others would consider the advice of the more ordinary sportsman and give him more attention, and publish some of his articles, and print some of his pictures, it would not only open the eyes of the editors as to what they are doing, and how they do it, and with what success, but it would also swell your subscription list considerably.

CHARLES DESCHNER
2538 E. Houston Street
San Antonio 2, Texas

(TEXAS GAME AND FISH is not the ordinary run-of-the-mill outdoors magazine but a professional publication which is designed to acquaint Texas sportsmen with the problems of wildlife conservation in this state and to keep them posted on what the Game Commission is doing toward increasing the various game species. You will notice that we do publish articles written by sportsmen and use as many hunting and fishing pictures submitted as space permits. We are always glad to receive such pictures and articles. And we also appreciate receiving views and opinions of our fellow Texas sportsmen. The Editor.)

Conference Program Panels Filled

FINAL selections of papers to be presented at the 16th North American Wildlife Conference in Milwaukee, on March 5, 6, and 7 have been made by the program committees and the session chairman. Advance indications point to one of the most successful of these international meetings ever held in the Midwest.

W. C. Glazener, Director of Wildlife Restoration for the Texas Game, Fish and Oyster Commission, will represent Region 5 of the National Wildlife Society at its regular annual business meeting to be held during the Conference. The general program outline follows that of Conferences of recent years.

Planners built the program around a central theme of "What Is Wildlife Worth To You?" The question applies readily to people from many walks of life in every section of America. The attitudes reflected by their individual answers spell out the future of more than wildlife.

There will be three general sessions, one each day, devoted largely to the broad, basic problems of natural resources conservation and two concurrent technical sessions daily at which specific problems will be examined in detail. Dan W. Lay, Wildlife Biologist for the Texas Game Department, will serve as leader of one of these sessions which will deal with problems of land use and game management.

Howard D. Dodgen, executive secretary of the Texas Game Commission, and Marion Toole, director of inland fisheries, will also attend the meeting and participate in these technical sessions.

One of the highlights of this Conference should be the general session under the chairmanship of the Honorable William O. Doug-

las, associate justice of the Supreme Court of the United States, a distinguished author, and recognized as one of the great conservationists in public life today. Because America's policy for the management of natural resources, or the lack of such a policy, has received

much attention from official agencies since the last World War, an entire general session will be devoted to the question. A panel of five of the foremost authorities in North America will discuss this problem.

Those on the panel are Leland Olds, member of the President's Water Resources Policy Commission, who will discuss water resources; Morris E. Fonda, president of the Soil Conservation Society of America, who will speak on crop and pasture land; E. L. Dammon, director of the Lake States Forest and Range Experiment Station, whose subject will be forest and range policies; M. O. Steen, chief of the Fish and Game Division, Missouri Conservation Commission, whose topic will be fish and wildlife; and Earl H. Taylor, associate editor of *THE COUNTRY GENTLEMAN*, whose paper will embrace the broad aspects of the major problem which the others have examined in detail.

At the opening general session, under the chairmanship of Dr. W. E. Morgan, president of Colorado A. and M. College, other internationally known experts will discuss the place of wildlife in today's economy. The final session—at the conclusion of which Sigurd F. Olson, ecologist of the Izaak Walton League of America, will summarize the entire conference—will be devoted to the question of the future of waterfowl. Herman Forster, president of the New York State Conservation Council, will serve as chairman.

As in the past, there will be no registration fee, and all sessions will be open to the public. The annual banquet will be held in the headquarters hotel on Tuesday evening, March 6.

Things You May Not Know

The bear moves with an awkward or shuffling gait because he has no clavicle to keep the shoulder bones steadily apart. Thus, as the forelegs are moved, the blade-bones "work" much more on the side than is usual in animals.

* * *

Especially wary when awake, the weasel is a very sound sleeper. It can often be taken up by the head, feet or tail and swung around for a considerable time before it begins to awake.

* * *

Otters, when hunting for fish, always swim up stream. This is because fish, when waiting for food or reposing, have their heads up the water. The otter can more easily approach them from behind.

* * *

The main difference in the physical structure of the dog and the wolf is in the eye. The pupil of the dog's eye is round, that of the wolf is oblique.

* * *

When a female mole is caught in a trap, the male's sorrow at losing his mate is often so great that he starves to death.

* * *

The common garden snail has 14,175 teeth. These are located on the snail's tongue, in 135 rows, each row containing 105 teeth.

cats, snakes, other much larger birds, and may assault even man. They will start any cat or dog running by diving on them and plucking hairs from the animal's back.

William E. Scott relates an incident of the maternal care exercised by a young pet mocker over a younger mockingbird, a young oriole, and a young tanager. This young mockingbird took over the care of the other young birds and fed and cared for them in the same manner as a parent.

The famous American ornithologist, Frank M. Chapman* (for many years Curator of Birds in the American Museum of Natural History) believes that the Texas mockingbirds which he heard in the Valley of the Nueces in 1891 have a richer voice than the birds he had been hearing in Florida a few weeks previously. The mockingbird is, indeed, our American nightingale, and would give a good account of himself in any song contest.

There is an interesting Mexican folk-lore story about how the mockingbird got its white wing feathers. I believe the story was told to me by the late Professor Thomas of the English Department of South Texas State College at San Marces, and who was a close student of Texas folk-lore. As I remember it, the story goes something like this:

A long time ago an old male mockingbird thought he was some pumpkins because he had such a sweet voice. At that time, so the story goes, all the birds talked a common language. This was the Spanish language. The Mexicans call the mockingbird *el zinzontle*. When the *zinzontle* sang

all the other birds hushed singing; the Indian lover ceased speaking his words of love to his dusky Indian maiden; and even the arroyo stopped talking. He foretold the coming of spring and brought forth the blossoms on the trees and caused the flowers to cover the wild prairies. When he sang, the other birds began to mate, and the All Wise Man was much pleased with the singing. This old mocker was very conceited and boasted of all these things to his good wife. His wife said to him, "hush, you are conceited and foolish like all men. All this is caused by the voice of God and not by you, foolish one."

To prove his powers, he told his wife that on the morrow he would give a concert to the flowers to show her how they would obey him. She replied, "con el favor de Dios," meaning, if God wills it. The old singer was very angry with his wife and replied that he would do all this whether God willed it or not, as the flowers would obey him, not God.

Early the next morning the old bird flew to the top of a huisache tree and began to sing. He would sing a few notes and then hop into the air and go through a few flips and turns, singing all the while in his most beautiful voice. Just as he thought he had reached the climax of his singing and all the flowers were ready to obey his voice, an old hawk swooped down and in his steel-like claws, carried the old mocker away. As he was being carried higher and higher he thought of the words of his wife, "con el favor de Dios." He realized how vain and foolish he was and he cried out, "oh God, it is you who make the flowers to bloom and the birds to sing and not I." As he said this he felt himself falling to the earth. He fell down into a cotton patch, and oh what a fall. "Oh! my wings," he mourned. "Look at them, how tattered and torn they are! How shall I meet my good wife and whatever shall I tell her? Oh, that I had listened to her and not been so foolish and vain."

A white-winged dove who had her nest in a nearby tree took pity on him and comforted him. She plucked three of her white feathers and mended his

wings. As a reminder of his foolishness *el zinzontle* to this day has the white wing feathers of the dove, and it is said, by those who know, that he never begins to sing without saying, "con el favor de Dios."

THE SONG OF THE MOCKER

The Mockingbird, the prince of birds,
Sits high up in a tree,
And sings when all are stilled in sleep,
In a spirit glad and free.
He sings a love song to his mate,
Or with joyous animation,
The songs of all the other birds
With skillful imitation.

He is not dressed up in fancy dress
As other birds may be,
But the grace with which he moves about
Is a pleasing thing to see.
He protects his home and family dear
With brave and fearless zeal,
And woe be to marauders bold
Who steal within his field.

The Veery sings at twilight
With a song so rich and rare;
The Skylark sings with bubbling joy
As he soars high in the air;
The Redbird sings his clarion notes
Throughout the entire year;
But the Mockingbird surpasses all
With his rhapsodies so clear.

—C. E. Chamberlin

Texas Skunks

• Continued from Page 21

Even so, large numbers were marketed from Texas before the recent collapse of the fur prices. Detailed life-history investigations of this species and its cousin in the Lower Rio Grande Valley would make an interesting and worthwhile study.

The largest of the North American skunks is the Gulf Coast hog-nosed skunk, *Conepatus leuconotus*, and superficially it resembles the inland hog-nosed skunk although it is larger and the white stripe on the back is much narrower, wedge-shaped rather than truncate on the head and reduced in width or entirely absent on the rump. The upper side is black toward the basal half and white toward the tip. This skunk occurs along the Gulf Coast of Texas from Arkansas County south to Cameron and Webb counties. Practically nothing is known about its habits. The exact distribution of spotted skunks and hog-nosed skunks in Texas is not well known.

*Frank M. Chapman, *The Autobiography of a Bird Lover*, 1938. 95-96.

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BOOKS



WATER, LAND, AND PEOPLE, by Bernard Frank and Anthony Netboy. 329 xi pages. Illustrated with 37 half-tones and four maps. Published by Alfred A. Knopf, Incorporated, 501 Madison Avenue, New York 22, New York; 1950. Price \$4.00.

It is an encouraging sign that several books devoted to the basic problems of land and water conservation have appeared within the past year or two, probably more than were printed in any former decade. Of these, perhaps, the most readable to the general public is this new volume which should give food for thought to many people who take water and top soil for granted.

The authors examine past and present land-use practices from all angles and through clear eyes. What they see is not always pleasant, and some of it is discouraging. From the beginning of American history, our land and water policy has been one of ruthless exploitation without thought for the future. After the biggest spree in the history of any nation in the world, we are awakening with a hang-over as acute as that of the scion of a wealthy family who suddenly finds that, in addition to a million dollars in cash, his inheritance includes \$999,000 in debts. Floods, abandoned farms, forests of stumps, gullies, and ghost towns are the monuments to past generations which, endowed with more than they could use, thought that the same conditions would prevail forever.

The old folks were not to blame; the voices which warned them of coming disaster were weak and few. There is no excuse for continuing on the same reckless course today but, as this book makes abundantly clear, our momentum has been slowed but has not been stopped. The solution, the authors say, lies in the coordination and improved balance among all phases of land and water use. They point out that dams and levees are tools of water conservation but not

necessarily conservation itself. A balanced program calls for complete watershed planning: permanent vegetation on steep slopes, grazing limited to portions of the watershed where these activities will not cause serious run-off; sustained-yield lumbering; soil conservation farming; and well-planned engineering structures to supplement the watershed program and to provide water for necessary irrigation, power, and domestic use. On a small scale, the Muskingum Watershed Conservancy District of Ohio offering the best-known example, has worked and worked well, the authors say.

There is an interesting section on river-basin development with TVA used as an example. The authors feel that this huge government project falls short of its objectives primarily because the job of watershed protection and development has not kept

pace with the development of power, essentially the same indictment which has been made against our national program. If the forests of the Valley were producing at full capacity, forest-products industries could employ triple the present number of men engaged in this field, they say. The reason, in evidence here as in most other phases of our national water and land programs: lack of Congressional interest in and appropriations for long-term watershed protection as opposed to practically unlimited funds for power, navigation, and other purely engineering aspects.

Fortunately, the authors do not place themselves in the dangerous position of being in opposition to one bureau or agency at the expense of another; they merely present a set of facts concerning a major problem, examine it carefully from all angles, and then show how the problems might best be solved in the best interests of all the people. The book is well-written and amazingly up-to-date, so much so that some of the material must have been added after the volume was well beyond the manuscript stage. This is the book that conservationists have awaited for a long time. It is required reading for anyone who considers himself well-informed on developments in the field of natural-resource conservation.

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Fear

Fear is one of the common characteristics of animal life. Tempered by other characteristics, it governs the activities of man, livestock, birds and other species. The snake does not rob the roadrunner's nest because it is afraid of the roadrunner. We do not steal our neighbor's property for we fear the consequence.

Fear, then, can be a good thing. Governed by our capacity to reason correctly, it helps to keep us within the bounds of rules set up for our society. It tempers our regard for justice and our expression of ego.

On the other hand, essentially all of the bad that we find in our fellow man can be traced to fear. Too often it is fear implanted by the parents in a once healthy child.

A wildlife destructionist is such a character. Chances are that as a child, he was filled with the confusion that shaped his diseased adult mind.

Avidly seeking knowledge, he was taught great fear of little mice. Most interesting and harmless snakes became ugly things with deadly bites. Every living animal to his child's mind became a fearful pest or varmint. The woods and the dark were filled with boogers and viciously crazed beasts.

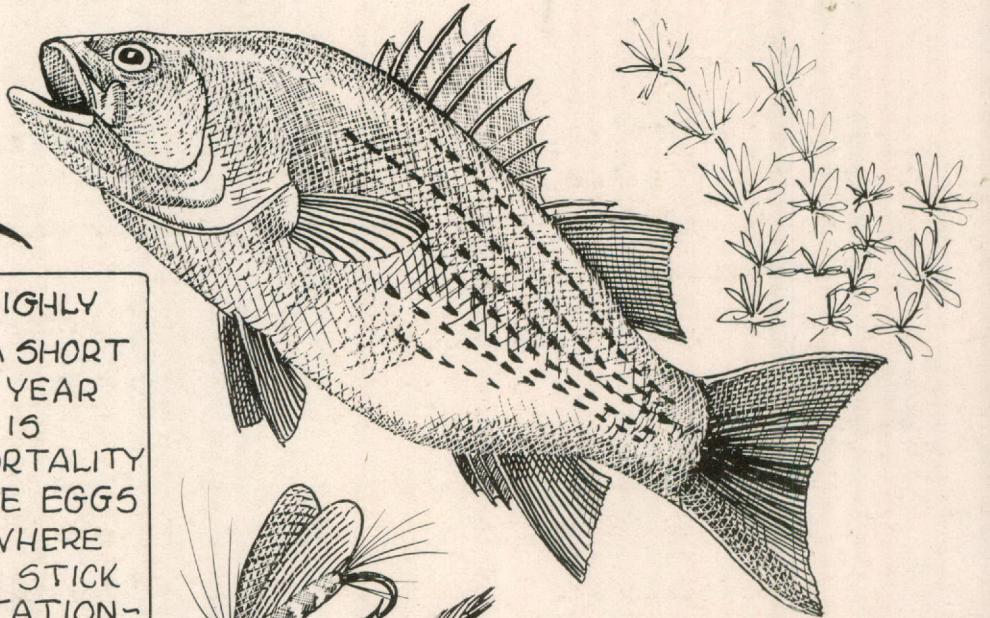
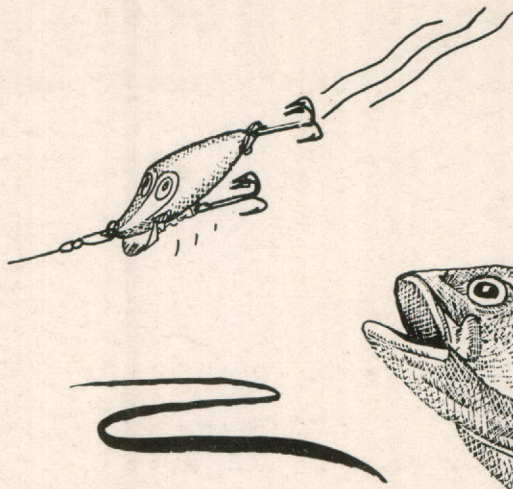
Do parents realize how cruel such teachings are? How untrue? Why is it necessary to teach fear and killing of all snakes to gain simple respect for the few that can be dangerous? There is nothing ugly about a mouse or a beetle. They are a great part of life, and can be an ever source of joy to the child.

Under such fearful teachings, what chance does a poor child have to develop a proper sense of appreciation for the out-of-doors? With such deeply scarred mental impressions, later, it is not easy for him to see beauty and good reason in all nature's handiwork. Fighting fear instead, he becomes a killer, destroying life to assert his superiority.

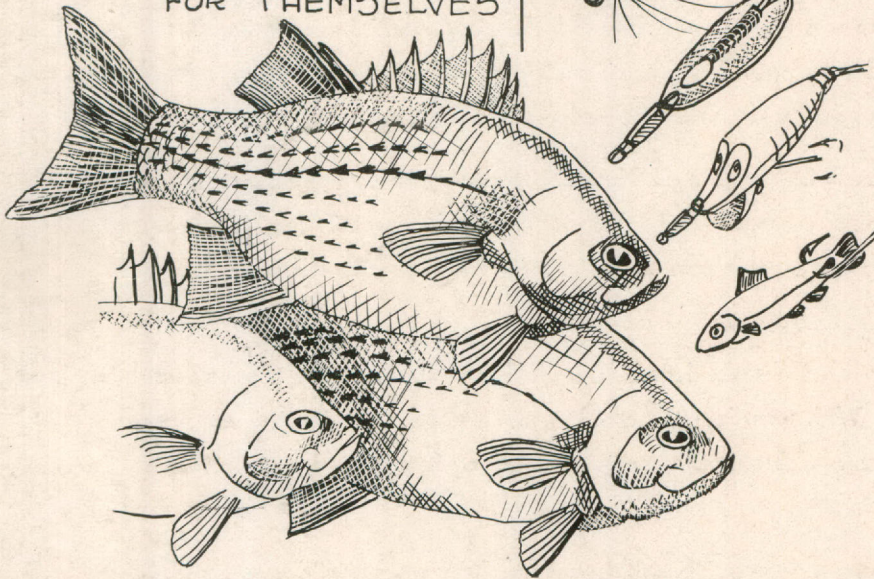
Real truths tempered with proper fear build healthful regard. Accurate knowledge of our wildlife together with fear of our losing it as a heritage is the lesson our children should learn. A deep love for the wild and the experiences associated with it would be the result.

ERNEST G. MARSH,
Assistant Director of Restoration

THE *White Bass*

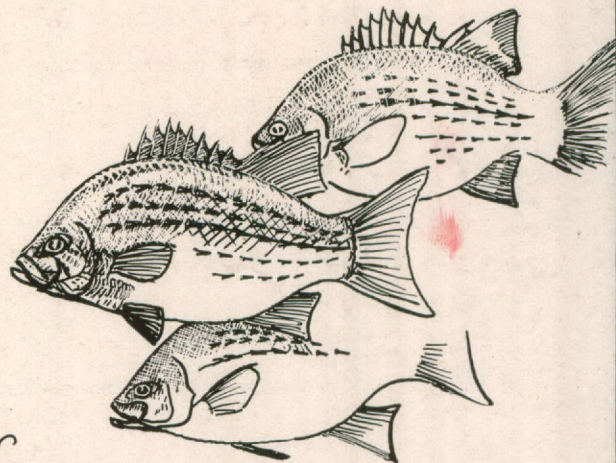


WHITE BASS ARE A HIGHLY PROLIFIC FISH WITH A SHORT LIFE SPAN. A FOUR YEAR OR FOUR POUND FISH IS UNCOMMON. THE MORTALITY RATE IS HIGH AS THE EGGS ARE SCATTERED WHERE THEY ARE LEFT TO STICK TO ROCKS AND VEGETATION—THE YOUNG HATCH AND FEND FOR THEMSELVES



THE WHITE BASS CAN BE CAUGHT BY EITHER FLY OR BAIT CASTING OR BY STILL FISHING. TROLLING IS POSSIBLY THE MOST COMMON METHOD OF FISHING—SPOONS BEING THE MOST POPULAR BAIT.

WHITE BASS ARE USUALLY FOUND IN SCHOOLS OF ALL MALES, ALL FEMALES, OR ALL JUVENILES. THE JUVENILES DO NOT MAKE THE EXTENSIVE SPAWN RUN TO THE FAST WATER AT THE HEAD OF THE LAKE, OR SHALLOW SANDY SHORES WHERE THE EGGS ARE DEPOSITED.



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