

Proposed New Regulations for the Northwest Florida Mullet Fishery

G. C. BROADHEAD and C. P. IDYLL

The Marine Laboratory, University of Miami, Coral Gables, Florida

The present laws and regulations governing the fishery for black or striped mullet (*Mugil cephalus*) in Florida are numerous, contradictory and, in many cases, badly designed. Frequently they are not enforced, partly because of their poor construction and partly because both fishermen and enforcement officers believe they are not based upon the actual facts. Mullet regulations have been produced largely by rule of thumb. General laws have been so altered by individual county "local" laws that the result is an inconsistent patchwork with several different size limits prevailing along the coast.

Because of its first rank among the fin fisheries of Florida, the mullet fishery has received a major portion of the research carried out for the State Board of Conservation by the Marine Laboratory of the University of Miami. A thorough investigation of such a fishery, extending over a coastline the length of Florida's, requires a long time. The work is by no means finished; in fact only northwest Florida (from St. Marks to Pensacola) has been thoroughly investigated, and that only for one full year. Suggested regulations, therefore, are largely for that region, and these proposals may be changed if further research shows this to be necessary. Despite the inability to propose permanent regulations for the whole coast, it is felt that enough information is available to permit considerable improvement in the present laws, changes which, it is hoped, will increase the value of the catch to the industry.

One basic principle guides the management program proposed for the mullet. This principle is that regulations must be for the benefit of the fishermen. It might be possible to propose ideal regulations which, if enforced, could result in considerable improvements in the size of the mullet stocks, but which might so reduce catches for a period that fishermen could not make a living. To cripple the industry while the fishery was being restored would be bad management. Certainly any regulations which are to be effective in the mullet fishery will, at first, result in smaller catches, *although not necessarily of less value*, in order that stabilization at a higher level of production can follow in

later years, but it is essential that complete disruption of the fishery is not permitted to take place while the adjustments are being made. A further principle followed in this program is that where irreconcilable conflicts of interests exist, the regulations must be designed to favor the largest segment of the fishery.

Present Regulations

At present, regulations on the mullet fishery vary from county to county. In all coastal counties of west Florida west of Jefferson County the minimum size limit of fish is 8 inches and the minimum stretched mesh size is 2 inches. In other Florida coastal counties the minimum size of fish varies from 8 inches to 12 inches. The legal minimum mesh size is 3 inches, but the regulation is largely ignored. The closed season is from December 10 to January 20 in all coast counties.

Proposed Regulations

The proposed regulations include consideration of size limits of the fish, mesh size limits and closed seasons.

Size Limits

- a. From the Alabama border to the Jefferson-Taylor County line the minimum legal size limit should be 10" from the tip of the snout to the fork of the tail.
- b. From the Jefferson County-Taylor County line south, and including all other coastal counties of Florida, the minimum legal size should be 10½".

Mesh Sizes

- a. From the Alabama border to the Jefferson County-Taylor County line the minimum stretched mesh should be 2⅝", when wet.
- b. For the remaining coastal counties of Florida the minimum stretched mesh size should be 3", when wet.

Closed Season

The closed season should be abolished.

Proposed regulations are separated into two parts: (1) for northwest Florida, from Jefferson County west; and (2) for the remainder of the coastal area. Considering the second region first, regulations suggested are not different from those now in existence, except that present inconsistencies are eliminated as far as possible and the same regulations are proposed for the whole region.

For this region, a minimum size limit of 10½" is proposed, along with a 3" minimum stretched mesh.

It is emphasized that the proposals for this area, which includes most of the mullet fishing grounds of the state, are temporary only and may be altered after the research which is now in progress is complete.

In the northwest area the proposed regulations suggest an increase in minimum size limits from the present 8" to 10" and an increase in minimum mesh size from the present 2" to 2⅝". It is proposed that closed seasons be abolished.

Discussion

The technical information which has served as a basis for these proposals has been published, in part, in the various Quarterly Reports on Fisheries Research, issued by the Marine Laboratory of the University of Miami to the Florida State Board of Conservation. The reader is referred to reports by Idyll and Sutton (1952) and Broadhead (1953) for more detailed data.

It has long been the contention of fishermen in west Florida that the mullet in that region were of a separate population from those farther east and south, and that these mullet were of a smaller average size than those in other areas. If this were true, it would justify small legal size limits in west Florida.

Extensive sampling and tagging upholds the view that there are more than one population of mullet in Florida. The evidence is the following:

1. Tagging has shown that most mullet appear to remain in the same general area for considerable periods. Most fish have been recovered within 20 miles or less of the place where they were tagged. This includes fish free from 9 to 12 months and fish at large over a spawning season.
2. The average size mullet caught is progressively smaller toward the western part of the state.
3. The time of spawning is different for different areas, becoming progressively earlier to the westward.
4. The average size at maturity is different for different areas, becoming progressively smaller to the westward.

In other fisheries minimum size limits for fish have frequently been set to allow the fish to spawn at least once before being subjected to capture. There is, of course, justification for this, particularly in an intense fishery, or in a fishery for a species producing few eggs, where there is danger of insufficient spawn to maintain the stock. A more precise method of setting minimum size limits depends upon the relationship between growth rate, natural mortality rates and fishing rates. With fish which grow slowly after reaching marketable size, and which suffer a high natural mortality, a larger total yield can be obtained by catching the fish at a relatively small size. The size at which the largest yield can be obtained may actually be smaller than the size at first maturity, in extreme cases. Conversely, with fish which grow rapidly after reaching marketable size and which have a low rate of natural death, a greater yield may be obtained by delaying capture until the fish are of a comparatively large size. A further factor enters into the consideration of the optimum size limit; namely, the comparative market prices of large and small fish. Weight of fish increases about three times as fast as length, and it is often much more profitable to delay capture of fish until they are of a larger size, since the unit price then increases. This is the case with the mullet. The size limits suggested here for the mullet in northwest Florida are based on the growth and mortality rates, and on the price differential between large and small fish. Growth rate and mortality rate data are incomplete and some error may have been resulted from this but it is thought that this should not be large.

Wholesale dealers in northwest Florida agree that the quantities of small mullet (under 10 inches) placed on the market from time to time are the biggest factor in keeping the price at a low level. These small fish are often sold for one-third to one-half the price of the larger mullet. When fish are plentiful, truckers, upon whom many wholesale dealers depend to sell their fish, will not pay the higher price for the large fish. Wholesale dealers are then forced to cut their prices on larger fish to avoid spoilage. These price cuts are passed along to the fisherman.

Price cutting is also encouraged by the lax enforcement of licensing laws.

Many fishermen and retail dealers act in the capacity of wholesalers and do not have wholesale licenses. They can operate with less expense on this basis and provide unfair competition to licensed dealers. Prices are consequently lowered and all concerned suffer.

A proper harvesting of the present supply of mullet could increase its value to the fisherman greatly. Table 1 shows the theoretical increase in poundage and value of the catch which should result from the imposition of the minimum sizes proposed. These figures ignore possible improvement in the stocks of fish from the increased spawning.

It is expected that the strict adherence to the new size limits should increase the landings of mullet after initial decreases in production. An even larger increase in total income to the fishery should result from the larger average size of the fish.

Mesh Size

A combination of both minimum fish size and mesh size limits are necessary to insure that the proper size of fish are caught. The minimum mesh sizes are set as a result of measurements of fish from various-sized meshes. A range of sizes of mullet are caught by any given size mesh, and the mesh sizes suggested, will, of course, catch some smaller fish than the legal minimum. Allowance should be made in the wording of the law for those few smaller-than-legal fish which will be caught by the legal mesh nets.

The mesh sizes proposed should apply to gill nets, trammel nets and beach seines. One of the most difficult decisions to make in drafting these proposals was whether to permit a smaller mesh size for beach seines, either for the whole net or for the bag only. It is poor management practice to penalize a fishing gear merely because it is more efficient, as the seines are. In this case, however, there is more than efficiency involved, since the seines with small meshes catch small fish in west Florida; and the whole management program would be endangered by allowing one gear to catch mullet smaller than the proposed minimum. Initially the production from seines would fall as a result of these regulations, but if the population increases in numbers and average size, as it is expected to do, the seine fishermen would ultimately benefit along with the rest of the fishery. The apparent present downward trend in abundance must be checked some time and the sooner the better. It is not thought desirable nor necessary to permit a smaller mesh size in the bags of the seines, since this too would permit the capture of under-sized fish.

It is true that some small fish would gill in the net if the meshes are large. This constitutes a nuisance to seine fishermen, but it cannot be allowed to endanger the whole management program. The size of fish in a school can be roughly estimated by experienced fishermen, and many schools of small mullet which are now set on would be avoided if the fisherman knew he could not legally catch or sell the fish.

TABLE 1

THE RESULTING CATCH OF MULLET AND ITS VALUE, USING VARIOUS MINIMUM SIZES—TOTAL POUNDAGE IS THAT WHICH WOULD THEORETICALLY BE HARVESTED FROM EACH 100 POUNDS OF FISH ENTERING THE FISHERY; VALUE WAS CALCULATED USING 3 CENTS PER POUND FOR FISH 9 $\frac{7}{8}$ " AND BELOW, AND 10 CENTS PER POUND FOR FISH OVER THIS LENGTH.

Minimum Size Imposed	Catch in Pounds	Value
7 $\frac{7}{8}$ inches	147.0	\$10.92
7 $\frac{3}{4}$ inches	152.8	12.01
9 $\frac{1}{4}$ inches	154.8	13.02
9 $\frac{7}{8}$ inches	155.3	14.16
10 $\frac{1}{2}$ inches	153.5	15.35
11 inches	150.4	15.04
11 $\frac{1}{2}$ inches	143.5	14.35
12 $\frac{1}{4}$ inches	136.4	13.64

Fishermen have a large investment in nets of smaller mesh size than those proposed here. To avoid the loss which would result in outlawing these nets abruptly, it is proposed that the regulations should not go into effect until one year from the time the law becomes effective. This will allow the fishermen to wear out the old nets.

Closed Seasons

It is proposed that closed seasons be abolished in the mullet fishery in Florida. This may seem to be a revolutionary proposal, but it is believed to be based on adequate reasoning.

Closed seasons are imposed for the following reasons:

1. To reduce the fishing effort.
2. To protect ripe females and thus ensure adequate spawning.
3. To prevent the capture of fish in poor condition.

The reduction of fishing effort cannot be accomplished with any precision by closed seasons. As Herrington (1944) points out: "... the effectiveness of a reduction of 20 per cent in the season's length, in an effort to obtain a 20 per cent reduction in the catch, would depend on the time of the year included and might easily be rendered ineffective if the fishermen worked a little harder during the open season." A closed season would be justified if it were imposed during a period when, by reason of their schooling behavior, the fish were more than ordinarily vulnerable to capture, and the fishing gear could take a dangerously large portion of the run. On the other hand, if capture of the fish were easier during this period, it would be improper to penalize efficient fishing, and force fishermen to make their catches during periods when the schools are more scattered and difficult to intercept. The method which allows the permissible quantity of fish to be caught with the least expenditure of man-hours and energy is the best method. In the case of the northwest Florida mullet fishery, it is thought that fishing effort will be controlled sufficiently by the size limits suggested, without the additional penalties of closed seasons.

It is traditional among fishermen and others to believe that fish, particularly female fish, require special protection when they are in spawning condition. This is justified when there is reason to believe that depletion, if it

exists, is caused by insufficient egg production. This may be the case in some fisheries, but it is considered by fishery scientists that scarcity is usually caused by other factors and that the egg potential of a relatively small population is sufficient to maintain the stock. Protection of a certain segment of the spawning population is certainly essential, but this can be better accomplished by size limits than by closed seasons. Female fish caught a month before the spawning season are as surely lost as reproducing units as those caught during the spawning season.

In cases where fish are in poor condition during the spawning period and are thus of less value in the market, they should be protected from capture. In the case of the mullet, however, the female fish are of considerably greater value when they are in full roe, since the roe brings a high price. To prevent the capture of these fish would greatly reduce the value of the fishery.

At present the closed period is fixed in west Florida at a time when little fishing is done, because of scarcity of mullet. It does not serve to protect spawners. The success of these proposals as a whole depends on rigid enforcement. Other states are able to do the job, and Florida must do so as well. This argument in favor of abolishment of the closed season on mullet now does not mean that a closed season may not be desirable at another time, or, more important, for other species in Florida. Inability to regulate other fisheries by size limits might easily leave no alternative than to suggest closed seasons for other fish as a means of reducing fishing effort. Furthermore, new information, or changed conditions, may necessitate re-imposition of closed seasons on mullet at some future time.

REFERENCES

- Broadhead, Gordon C. 1953. Investigations on the Black Mullet, *Mugil cephalus* L. in northwest Florida. Fla. State Bd. Cons., Tech Ser. 7, 34 pp. Univ. Miami.
- Herrington, William C. 1944. Some methods of fishery management and their usefulness in a management program. U. S. Fish and Wildl. Serv., Spec. Sci. Rept., 18:3-22, 54-58.
- Idyll, Clarence P. and John W. Sutton 1952. Results of the first year's tagging of mullet, *Mugil cephalus* L., on the west coast of Florida. Trans. Amer. Fish. Soc. 81:69-77.

Review of the Caribbean Fisheries Conference Held in Trinidad in March, 1952

DUDLEY W. WILES
Fishery Officer, Barbados

Some background of the Caribbean Fisheries Conference that was held in Trinidad during March of 1952 can be obtained from the foreword of the Report. "The Caribbean Commission and its predecessor, the Angle-American Caribbean Commission, have always given prominence to the subject of fisheries. The Angle-American Caribbean Commission included fisheries in the agenda of the West Indian Conference (First Session), held in Barbados in March 1944; the Caribbean Commission included fisheries in the three fields selected for emphasis at its Thirteenth Meeting, held in St. Croix in November 1951.

"A Caribbean Fisheries Conference was recommended by the Caribbean Research Council in 1950. Owing to financial considerations, and to the time required for its preparation, the conference was not convened before March, 1952. The attendance of representatives of the territories of the four