SYNOPTIC RATIONALE OF EXISTING FLORIDA SHRIMP REGULATIONS[1]

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FLORIDA HAS BEEN BLESSED by a legislative branch of government receptive to statutory changes whenever experience indicated that amendments were desirable. The executive branch has, in turn, been willing to undertake and administer new type regulations so long as there seemed reason to believe that the old ones needed improvement.

These two facts, together with the long history we have had in the shrimping enterprise, have resulted in a rather substantial amount of experience in the supervision and regulation of shrimp. Some of the earlier attempts and their deficiencies are summarized in a report given to this meeting in Nassau several years ago (Ingle, 1956).

The summary I will give today is in the nature of a progress report. We do not claim that the regulations as described are infallible or that new knowledge will not be available tomorrow that will require new adaptations. However, when our shrimp rules were put into effect during the past three years they were consonant with existing information and had the benefit of abundant experience.

We do feel that while there will no doubt be changes in some of the details, the basic features of flexibility and sampling are unlikely to be substantially altered.

It should be pointed out that each shrimp habitat is different and regulations must be tailored for local conditions.

Much has been written concerning the justification for fisheries management. It is not the purpose of this report to deal exhaustively with all of the socio-economic factors involved with regulations *per se*, nor do I feel I should enter into the nuances of philosophy involved when the complex biological and fiscal dynamics of *laissez faire* shrimp production are altered by human intervention.

Those persons interested in extremely complicated ramifications of fishery management are referred to the many extant publications on the subject, among which are Herrington (1948), Burkenroad (1951), Smith (1958), and Schaeffer (1959).

Instead, all of our discussion and evidence will be developed with one assumption in mind. This assumption will not be defended, but will be accepted on *a priori* grounds.

A. THE ASSUMPTION: It is desirable to catch the greatest possible number of pounds of shrimp, this desirability being enhanced as the sizes of the shrimp caught are increased.

Let us examine several hypotheses which might be explored in an effort to determine the best means by which to apply Assumption A.

[1]Based in part on an address presented at the Ninth Annual Meeting of the Shrimp Association of the Americas, Mexico City, June, 1960.
[2]Contribution No. 48.

1. Hypothesis:

The stocks of shrimp which form the foundation of the fishery can be increased or decreased by regulation of fishing.

Evidence:

Present information negates this hypothesis. Abundance of individual shrimp created by the fishery appears to be regulated by natural factors. See: Hildebrand and Gunter (1953); Gunter and Hildebrand (1954); Viosca (1945); Lunz (1957), (1959), (1960); Burkenroad (1951); Collier and Ingle, *et al.* (1959) and Lindner and Anderson (1956).

Remarks:

Note the expression "regulation of fishing" in Hypothesis (above). It is felt that man's improvident use and management of shallow protected nursery grounds can affect stocks by reducing potential sanctuaries for immature stages. However, this matter lies outside the province of fisheries regulations which are the subject of consideration here.

Conclusion:

Restriction of fishing by any means is not justified if the purpose be to enhance numbers of spawners or to affect the abundance of the year class. The number of spawners needed to replenish stocks is extremely small, almost total elimination of adults being unable to suppress the following generation. The benefits implicit in Assumption A (above) cannot be derived by regulations aimed at increasing stocks.

2. Hypothesis:

Pounds of shrimp landed can be increased when unrestricted fishing is replaced by managed fishing.

Evidence:

Shrimp growth has received attention from many workers. In weight, the monthly increment varies with size and season. Roughly, from the egg to a size of 50 tails to make a pound requires about six months in warm weather. This may be slowed somewhat during winter. During the early stages of development, shrimp grow at a rate which, in the aggregate, offsets the weight lost by natural mortality. See Gunter (1956). Studies on white shrimp indicate that the mortality rate lies close to 25 per cent per month. See Lindner (1959). At this rate, the size at which harvest should take place is at 50 tails to the pound. When shrimp become larger than this, mortality exceeds weight increment. Although the case is not proven, the weight of evidence lies with protection of the young.[1]

Protection of larger individuals, indigenous to the offshore waters, is thought to be not only of no value in augmenting landings but may actually diminish landings. See Gunter (1956), Burkenroad, *et al.* (1955) and Schaeffer (1959).

Remarks:

Statisticans and biometricians have, in the past few years, developed

[1]Lindner, 1960, reported that his calculations were being revised and that the mortality rate appeared to be higher than he reported in 1959 and the best size to harvest would be lower.

new and improved techniques for the evaluation of fishery dynamics. No attempt will be made here to enumerate these works, but mention can be made of a few. See Schaeffer (1951) and (1954), DeLury (1947) and (1951) and Ketchen (1953).

Similar methods developed in other fields may also be of interest. See, for instance, Eyles and Cox (1943). In the light of the evidence, it seems prudent for us to accept the idea of protection for young, at the same time that we attempt to improve our understanding of shrimp productivity. See Collier and Ingle, *et al.* (1959).

Conclusion:

The protection of shrimp of a count greater than 50 tails to the pound would be effective in attaining benefits implicit in Assumption A (above); that is, a regulation prohibiting fishing of young shrimp would result in more pounds landed and greater financial return.

3. Hypothesis:

In order to achieve the benefits described under Hypothesis 2 (above), which are deemed desirable for Assumption A, a closed area should be established in each shrimp fishery in which no harvest should be permitted.

Evidence:

Several methods have been tried in the long history of small shrimp protection. These have largely been discussed by Ingle (1956). Since that summary, net mesh size minima were also attempted. The results of the latter were indifferent and the methods had several difficult aspects. See Iversen and Idyll, 1959.

From a practical standpoint, the method discussed generally by Burkenroad (1951) and Collier and Ingle, *et al.* (1959), and which was put into operation in Apalachicola, Florida, in 1953 and reported upon later by Ingle (1956), has proven to be the most satisfactory.

It has been in operation since 1957 in the shallow, coastal sectors of the Tortugas fishery and has served well. See Ingle, *et al.* (1959).

Remarks:

The principal feature of the present Florida regulation is flexibility. Since shrimp biology is so closely related to natural fluctuations of currents, nutrients, temperature, dissolved gasses, light and many other factors, a rigid prohibition will, at times, be inapplicable or, worse, of detriment to the industry.

Management, based upon changing conditions on the grounds, can be dependably effective.

The regulation as applied to Florida inshore waters has one other highly desirable feature. Because regular and frequent sampling is carried out as part of the regulation, to keep accurate account of the growth of developing broods, there is available revealing data which can, when properly treated, allow an internal audit of the efficiency of the management program and an evaluation of its success.

It also permits the regulation to develop and change as greater understanding directs. See Collier and Ingle, *et al.* (1959) and Burkenroad (1951).

Conclusion:

A flexible closure of shallow nursery grounds will, in the light of present understanding, provide more pounds of shrimp for the fishing fleet. These shrimp will be of larger average size than would be available without the restriction. Both benefits set out in Assumption A (above) will be derived from such a regulation. This type of management also permits a continuous evaluation.

Recommendations:

In spite of the fact that some information exists to support the protection of small shrimp more detailed quantitative evaluations are still needed.

Because of the complexities of the population dynamics involved, it is anticipated that a massive sampling program such as that outlined earlier by Ingle (1959) and involving extensive tagging will be required.

A particularly vexatious factor, and one which partly interferes with the use of landings data in population studies, is the nature of recruitment to the fishing area. As is well known, shrimp enter the Tortugas fishery (and other shrimp fisheries) over relatively long periods each year. Also, the sizes vary widely at which they leave shallow, protected areas and become available to the fleet and to sampling projects. This means that any particular size group is made up of many elements. There are those that entered at a relatively small size and have experienced natural and fishing mortalities for a considerable length of time. There are others that have entered the fishery at almost the size at which they were caught and hence have only been depleted by natural mortality during their lives. Other shrimp enter the fishing grounds at intermediate sizes between these two extremes.

We need to know more about the relative numbers of various sized shrimp that enter the fishery in order that corrections can be applied to data obtained from landings and sampling. In the meantime, it will be difficult to apply even such relatively simple techniques as those suggested for other fisheries. One of these is given by Carlander (1959).

An additional complication for this problem is the fact that shrimp of a smaller size are shown by Ingle, *et al.* (1959) and Iversen, *et al.* (1960), to enter the fishery in greater numbers seasonally.

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Promote Your Product or Lose Your Market

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I WOULD LIKE TO DEAL here briefly with one important part of the fishing industry's job—to sell its production profitably and the role of industry-backed promotion and advertising in doing this. The battle for the consumers' food dollar is a battle of advertising, promotion and new products. Twenty-four new products a day are presented to chain buyers to add to their more than 5,000 items in a super market. In 1959, sales in the United States rose to an all-time high of $78.8 billion for food and drink—about 24c out of every dollar of disposable consumer income. To spark this sales increase, the food manufacturing industry increased advertising expenditures from $320,000,000 in 1947 to a whopping $759,000,000 in 1959. It is worthy of note that many of the food companies showing the greatest sales growth and the best profits also showed the greatest expenditures for advertising.

No figures showing the amount spent for advertising by fish and seafood