Management of Fishery Resources for Optimum Returns Would It Work in the Gulf of Mexico?

W. C. HERRINGTON
Law of the Sea Institute
University of Rhode Island
Kingston, R.I. 02881

INTRODUCTION

During the past decade, even the past 5 years, there has been a substantial modification in the thinking of many of the most knowledgeable practitioners, as well as theoreticians, of marine fishery management, regarding what is needed to make management more effective. Effective today it is not, with few exceptions, either on the national or international scale. Examine what has happened biologically and economically during the past decade under our present system, to haddock, yellowtail flounders, northwest Atlantic herring, Bering Sea flounders, king crab and so on and so on.

In the light of this record, what does the U.S. government propose for the future? The U.S. in its 1971 presentation at Geneva, has proposed essentially a continuation of the present international system, plus a provision for anadromous fish and a few additional provisions for settling disputes, similar to those developed at the 1958 Geneva Conference on Law of the Sea. These additional provisions for settling disputes are part of the 1958 Fisheries Convention, which has not been ratified by a majority of the major fishing powers and of the less developed nations, and I suspect from the record of the two preparatory meetings in 1971, are even less acceptable to these nations now than during the past decade. The 1958 Convention was concerned with the then current and developing problems. The current U.S. position seems to me to be looking backward to the problems of the 1960's and earlier, not forward to the problems of the present and future.

Concepts of fish resources management have changed drastically during the past half century and particularly the past decade. In 1920 there was little effective marine fishery management in the U.S. and mighty little in the rest of the world. Marine fishing generally amounted to uninhibited hunting under the common property concept and assumption that if and when fish became scarce in one area the hunters could shift to another area or species. It is true that a few thoughtful people, such as Johan Hjort in Norway and Will Thompson in the U.S., had begun some statistical analysis of this assumption, but we had no successful management programs in being.

During the next three decades, 1920-1950, the management concept was developed further, and most successfully put into practice in the North Pacific Halibut and the Sockeye Salmon Commissions. In the northeast Atlantic some progress was made among European fishing countries in the North Sea Overfishing Convention, which slowed down overfishing but did not bring it to a halt, or even less, reverse the downward trend. By the 1940's I believe that the maximum sustainable yield concept was somewhat further advanced among fishery research and management people in North America than in Europe. In a "Forum Discussion of Principles and Methods of Fishery Management", presented before the Atlantic States Marine Fisheries Commission in December,

1942, I stated: "I believe that most of us will agree that the ultimate aim of all our fishery work is to obtain the maximum continuous yield (optimum yield) from our fishery resources in the way of food, value, recreation, or other return, for the benefit of our country, our state, our people and our fishing industry (fishermen, dealers, etc.)."

MAXIMUM SUSTAINABLE YIELD (m.s.y.)

The concept of maximum sustained yield was first formally stated as the objective of management, in the Northwest Atlantic Fisheries Convention negotiated in 1949, in the phrase "in order to make possible the maintenance of a maximum sustained catch". The concept received further recognition in the North Pacific Fisheries Convention among Canada, Japan and the U.S.A., negotiated in 1951, where it was specified as the objective which would "best serve the common interests of mankind, as well as the interests of the Contracting Parties". What was even more significant, it was cited as the first and principal condition which must be met for a stock to qualify for "abstention", as follows: "Evidence based upon scientific research indicates that more intensive exploitation will not provide a substantial increase in yield which can be sustained year after year." Later it achieved international stature at the 1955 Rome Technical Conference on the Conservation of the Living Resources of the Sea, and in 1958 it became the primary element in the definition of conservation in the "Convention on Fishing and Conservation of the Living Resources of the High Seas". Most of the international conventions dealing with fishery management which the U.S. had negotiated since 1950, include m.s.y. as the primary management objective.

It may be noted that the 1958 Convention "Fishing and Conservation of the Living Resources of the Sea" uses the phrase "maximum sustainable yield" whereas the earlier bilateral and multilateral conventions use "maximum sustained yield". There is an interesting story behind this. In 1954, before the 1955 Rome Conference and the 1958 Geneva Conference had been scheduled (or even conceived), I visited Ottawa and London to explore with their fishery and Foreign Office people support for an effort to convene a world conference including technical as well as legal experts, for the purpose of developing worldwide standards for dealing with international conservation problems. At that time a number of north European countries, which had lost practically all of their high seas fishing fleets during the war, were rapidly rebuilding and expanding their new and more efficient fleets. The United Kingdom had come through the war and immediate post war years with her fishing fleet in considerably better shape than those of the other European countries. The United Kingdom fishery experts saw that the delayed but rapid buildup of the other European fleets soon would lead to a return of the excessive fishing capacity of pre-war years which had caused serious overfishing in the North Sea. This overfishing was highlighted in Michael Graham's book "The Fishing Gate". To forestall a repetition, the British were pressing for a North Sea agreement which would halt further expansion of the European fishing fleets. Incidentally, this would leave the U.K. fleet in a dominant position and for that reason, among others, the proposal had been rather cooly received by other countries.

The British were reluctant to shift their objective from this "limited entry" to the m.s.y. approach. Furthermore, Michael Graham was not satisfied that the

phrase "sustained yield" was the proper technical term. He proposed "sustainable" as being more appropriate. After extensive discussion and in view of the very limited or negligible possibility of securing international agreement on the limitation of fishing effort desired by the British, they agreed to support the concept of "maximum sustainable yield", and this expression later was sanctified in the 1958 Geneva Fisheries Convention.

Since 1958 m.s.y. generally has been accepted in theory as the objective of international fishery management, but in practice has been honored more in the breach than the observance. Probably only in the halibut, salmon and Inter-American Tropical Tuna Commissions, has there been a realistic and reasonably successful effort to observe this objective.

MAXIMUM ECONOMIC YIELD (m.e.y.)

The concept of improving the economic yield from fishing by limiting participation (of others) goes back to the early days of fishing. Certainly the Japanese have formally practiced the art for many years. The first serious attempt by government in the U.S. to implement such a regime was the Maryland Management Plan, promoted particularly by Bob Nesbitt and others in the late 1930's and early 1940's (debated in the Forum Discussion of fishery management at the regular meeting of the Atlantic States Marine Fisheries Commission on December 9, 1942). This plan was initiated in Maryland in the early 1940's, with limited entry and the Grandfather provision, but became mixed up with politics and never was effectively implemented.

The efforts of the U.K. to secure agreement in Europe to limit the amount of fishing capacity in the North Sea Fisheries, referred to earlier, can be classified as an effort to improve or maintain the economic yield by limiting participation. It failed because the other Europeans thought they could secure a bigger share of the pie, even though that pie might decrease in overall size.

During the 1950's the economists got into the act in a big way. Largely because of the greatly improved statistics amassed for the conservation programs for halibut and salmon, it was possible to show with considerable statistical precision that the sustainable catches of these species could be taken with much less gear and fishing effort. The limitations on length of fishing season, number of fishing days and restrictions on kind of gear used, provided dramatic evidence of surplus fishing capacity. The economists demonstrated the substantial savings that could be made by limiting participation to the most economic level of fishing capacity, a savings which could be absorbed by government or divided among government, consumer and fishermen. However, they failed to recognize, tackle and resolve the numerous problems that would develop from such a reduction; the social, legal and political problems that would arise from reduced employment and reduced capital equipment. Most boat owners and fishermen were not persuaded that their uncertain and probably little understood prospects under m.e.y. justified giving up their traditional freedom of entry. Furthermore, how many were prepared to dedicate their future to maximizing the net economic yield (not necessarily their own)? There were such satisfactions as leisure, way of life and so forth to be considered. I think that there also was considerable concern regarding how such a system would operate, to what extent their operations and earnings would be dictated by government bureaucrats. It became increasingly clear that m.e.y. by itself was not a very saleable objective.

OPTIMUM RETURNS

As the problems that would be engendered by an m.e.y. system have become clearer, there has been a growing shift to support "optimum returns" as the most desirable and realistic objective of fishery management, a mix of biological, economic, social and possibly political considerations. Questions of unemployment, alternative employment, way of life and overall community benefits, cannot be ignored. Such a mix may vary considerably in different situations, and therefore does not have any universal determinable value. For a given stock of fish the optimum might be quite different for two countries. Therefore, under the common property concept, it does not provide a usable common objective for an international convention, for its evaluation could be quite different for the several member countries.

IMPLEMENTATION OF "OPTIMUM RETURNS" AS AN OBJECTIVE

If "optimum returns" is to be taken as a viable objective of fishery management we must have an acceptable procedure for determining the proper mix of biological, economic and social values. Furthermore, if net economic return is to be a factor, the system must include provisions for limiting participation. A first conclusion might be that the mix should be determined by government. However, I doubt that many in industry are prepared to support this. They would have many justified and many unjustified reservations regarding how such a mix would be developed. Extensive management detail and the resultant expansion of bureaucracy would be required and administering officials would be subject to strong political and financial influences as well as personal convictions. I very much doubt that adequate political support could be developed for such a procedure.

It seems probable that normally most of the decisions on mix would principally affect the participants in the fishery. Assuming that original participation is established through some provision such as the Grandfather clause, then the methods and rate of controlling and reducing fishing capacity and the type of gear used would principally affect the participants, who could balance the current impact of such measures against future gains. However, if other activities such as recreation and mining took place in the same area, these interests would be affected by the measures used. Furthermore, the public would be concerned in regard to whether the fishery resources were managed on a sustainable or non-sustainable basis, as a continuing harvest or a depletable resource.

Another question of general concern: how would the increased net returns from improved efficiency in production be divided? How would the increased earnings be apportioned among the producer, the consumer and society? If government operated the entire management apparatus, would it absorb a large part of the increased earnings through bureaucratic costs or user charges?

A third and most important question: how would you secure the political support needed to install such a management system, support from the producer, the processor and the public? The producer must be convinced that he would be better off under the proposed system, the processor must be convinced that he would be better off or at least no worse off, and the public must be convinced that it would benefit through reduced prices, increased supplies, increased public revenue or better use of the resources.

All of these questions pose serious problems and we have little direct domestic experience on which to base answers.

CONCLUSION

Many, if not most, of the problems I have discussed stem from or are intensified by the tradition hallowed concept of marine fishery resources as common property. In the past, particularly the distant past, there were good reasons for this point of view. With the recent rapidly changing relationship of fishing capacity to the extent of the resources, the common property concept becomes increasingly archaic, that is, if one is concerned with optimizing the returns from marine fishery resources. This is being acknowledged by more and more knowledgeable fishery people who have been frustrated by the problems of securing improved management, domestic and international, under the present system.

Development of some form of property concept, international and domestic, at least for some fishery resources, would greatly facilitate solutions to the management problems I have noted.

Under such a concept the mix of biological, economic and social considerations to secure "optimum returns", could be determined by participant-government management bodies, with representatives of the participants playing the primary role on issues which principally affect participants, and the government on issues which affect the public interest. The latter issues might include the requirement to harvest on a sustainable yield basis, provisions for recreation, navigation and others.

Such a system also would facilitate an appropriate division of the increased earnings resulting from better economic and biological management of the fishery, through our accepted tax system. Development of property values, and increased earnings after covering management costs, would produce public revenues through property and income taxes, comparable to other business and industry. Society, by taking its share of earnings after a profit was made, rather than before, would not inhibit management for long range returns and the development of marginal resources.

The final problem, and one of overriding importance, is securing needed support for the desired system. No matter how biologically and economically sound the concept may be, and advantageous to society, it is not likely to go anywhere unless it is generally acceptable to the producers, the processors and the public.

From my general experience in domestic and international fisheries management and examination of the various attempts to develop management along some such line as I have proposed, I am persuaded that programs can be developed for many fisheries which would be demonstrably advantageous to the three groups just mentioned. However, I do not believe that we know enough at present to lay out any precise formula. Each fishery must be studied and measures developed to satisfy its particular problems. Then these measures must be tried out on a trial and error basis.

The feature of this approach to management which most of all appeals to me, is that it would provide strong incentives for the producers of fish to support better management, both long range and short. Participants would be assured that they individually would benefit from improved yields, an assurance that is sadly lacking in our present common property management system. This lack is

largely responsible for the increasing deterioration in national and international marine resources.

IMPLEMENTATION

As I earlier stated, I know of no precise formula for implementing the management system I have discussed. However, I believe that certain general guide lines can be set out.

The basic requirement is not limited entry but establishment of some sort of property concept. This concept almost automatically involves limited entry but it must also include certain other important features. To begin with, a single authority must be established with power to enact and enforce adequate measures for the resources to be managed.

In connection with the University of Miami "Decision Seminars" held over the past academic year, I ventured to set out some of the general guide lines for fish stocks outside of the jurisdiction of the several states, which seemed to me to be appropriate and or necessary for establishing a management system for optimum returns. They are as follows:

A. *Objectives of the Management System:*

1. Achieve optimum sustainable returns (in terms of quantity, value and costs) through use of: (a) leases to manage and harvest certain fishery resources (stocks of fish); (b) fishing licenses to control number of participants in the fishery and/or fishing capacity for certain fishery resources and (c) other measures.

2. Provide incentives for the participants to support management for optimum sustainable returns, by making leases and licenses long term, renewable and subject to purchase and sale, thus enabling holders to benefit from current restraints on their fishing operations and investment of their time, effort and money to improve future production.

3. Increase efficiency of operations and reduce production costs by reducing and/or preventing use of excess fishing capacity.

4. Provide a substantive role in decision making for representatives of the participants. This would involve giving them a controlling voice on management decisions primarily affecting the participants and appropriate influence on other decisions of primary importance to others, subject to suitable guide lines with respect to matters of public interest.

B. *Leases* (particularly applicable for stocks with a fixed or limited range):

1. May be granted for specific fishery management units, to cooperatives, partnerships, corporations or individuals.

2. Where resources are being fully utilized, the first priority would be to the organization which included the majority of those engaged in the fishery or was approved by the majority of those so engaged.

3. Where resources are unutilized or under-utilized, the lease would go to the highest bidder, provided that each of those who had been engaged in harvesting the resource during a stipulated base period would be eligible, at nominal cost, for a license covering the producing capacity (size and/or equipment of vessel) he used during the base period.

4. Leases would be transferable by open market purchase and sale.

C. *Licenses* (particularly applicable for stocks of fish which range rather widely and intermingle to a substantial extent with other stocks):

1. All vessels which had participated in the fishery during a stipulated base period would be eligible for licenses at nominal cost. Such licenses would be related to the fishing capacity of the boat or other producing unit (Grandfather clause).

2. Licenses would be transferable by open market purchase and sale.

3. Licenses might be of different categories, related to the extent to which the boat had participated in the fishery.

4. Measures taken to increase the returns per boat or licensed unit of gear, such as buying up and retiring licenses to reduce excess fishing capacity, would be financed by special assessments. The size of the individual assessments would be related to the extent to which the participants would benefit from such measures, e.g., size or fishing capacity of boat.

D. *Management Procedures*

1. Leased fisheries: The organization holding the lease would have the responsibility to manage the resource for optimum returns, subject to the following requirements: (a) Management must be on a sustainable basis; (b) Where management measures for this resource substantially impinge on measures for other resources, the measures would be developed in cooperation with the other management organization or organizations; (c) Where proposed management measures for this resource substantially impinge on public activities such as recreation, transportation and so forth, the measures would be subject to review and approval by a committee including representatives of such other activities; and (d) (tentative) If agreement cannot be reached under (b) and (c) the issue would be referred to a review committee appointed by the Secretaries of the departments concerned with the involved issues.

2. Licensed fisheries: Management programs for licensed fisheries would be developed and administered by the National Marine Fisheries Service (NMFS), subject to the following: (a) For each management unit consisting of one or more stocks of fish, a management committee would be established made up of representatives of the license holders with a representative of the NMFS as chairman; (b) Management measures primarily affecting the resources and license holders included in the management unit, would be subject to review and approval of the management committee, provided that: the measures must be consistent with management of the resources on a sustainable basis and the total licensed fishing capacity must not be limited to less than the amount required to fully harvest the stock; (c) Where management measures for this resource substantially impinge on measures for other resources, the measures would be subject to review and approval by the combined management committees for this and such other resources; (d) Where management measures for this resource substantially impinge on public activities such as recreation, transportation and other such interests, the measures would be subject to review and approval by a committee including representatives of such other activities; and (e) (tentative) If agreement cannot be reached under (c) and (d), the issue would be referred to a review committee appointed by the Secretaries of the departments concerned with the involved issues.

Certainly many problems will develop when we set out to apply such a system to particular resource management units, particularly where mixed and supplemental fisheries and mixed fishing fleets are involved. In section D, management procedures, 1(d) and 2(e), I have outlined a tentative procedure for resolving such problems when agreement among diverse interests cannot be achieved. However, I am sure that real solutions cannot be developed until we sit

down with those involved and work out procedures for specific management units.

In order to initiate such a program the first requirement is that some one administrative body have authority to develop and enforce the necessary measures. For stocks of fish found predominantly outside of state jurisdiction, this would be the national government. This government now has the responsibility but no legislative authority to manage such stocks on this or any other basis. For stocks found predominantly within the waters of a single state, the program could be administered by a state agency, if this agency were given the necessary legislative authority. To manage a stock of fish ranging the waters of two or more states, these states would have to give broad authority to an interstate body to develop and enforce such a system without requiring further state legislative action on specific measures and without the right of veto by individual states. Lacking such action by the states, this program could be administered only by the national government or some national agency such as TVA or an interstate port authority.

The complexities of a management program would vary substantially among the different resources. Probably the simplest situations would be found where a single self-sustaining stock of fish occupied a limited geographic area and was the principal component of the catch of a fishing fleet which concentrated on this fishery for all or most of the year. The Georges Bank haddock fishery approached this situation prior to advent of the foreign fleets. The New Bedford yellowtail flounder fishery also approached it, but there were several other fleets which looked to this resource for supplemental catches. The sea clam fishery of the middle Atlantic coast appears to provide favorable conditions, except that recruitment in specific geographic areas appears to be so irregular that a fishing fleet would find it impossible to make out over a period of years, if confined to a limited geographic area. For this reason probably the entire middle Atlantic fishery would have to be included in any sea clam management unit.

Now at last I am coming to the question I am supposed to talk about. Will fishery management for optimum returns work in the Gulf of Mexico? I have reviewed some of the principal requirements for fishery management for optimum returns and some of the great advantages it could provide over the present system. But I must admit that I don't know enough about the fishery resources of the Gulf and the economic and social problems of these fisheries, to give you specific answers for these resources. I have briefly discussed this question with friends in this area and have not received specific answers. I doubt that such specific answers can be secured without sitting down and working out measures for specific resources. However, I am sure that such management could be worked out, at least for some fisheries, if the needed broad legislative authority were available and the program proceeded on a careful trial and error basis, much as the Canadians have used in their salmon program in British Columbia.

What would be the most promising fisheries to explore in more detail? What fisheries most closely approach the less complex situation which I have outlined: involve a single self sustaining stock of fish which occupies a limited geographic range and make up the principal component of the catch of a fishing fleet dependent on this stock for all or a substantial part of the year? Having identified such a stock, we then should examine the extent to which this fishery overlaps other management units and what sustainable gains can be secured by the proposed management, in terms of increased yields, increased earnings,

improved conditions of employment and other social developments advantageous to the individual, the community and society in general.

The menhaden fishery would appear to offer favorable possibilities. Shrimp offer some possibilities, but certainly a challenge, for the stocks are wide-spread and fishery operations diverse. Red snapper might offer a possibility if one could eliminate foreign fishing complications. I am sure there are others, perhaps local stocks of fish. I hope that some of you in the audience, with a much greater knowledge of the Gulf fisheries, will give us the benefit of your views regarding Gulf possibilities.