PRESENT STATUS AND FUTURE TRENDS IN COASTAL AND ESTUARINE FISHERIES MANAGEMENT

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INTRODUCTION

The present paper will begin and be developed from a premise that might be hotly debated by some of my colleagues; nevertheless, I would maintain that up to and including the present time our efforts to manage estuarine and coastal fisheries have not been notably successful. I have not taken this approach with any desire to be negative or cynical, rather it is my intent to review what seem to me to have been the principal deterrents to success in the past, to examine to what extent we are presently overcoming these deterrents, and to project future progress. The latter task is fraught with risk, as prophecy always is, but I understand that this is one of the principal purposes of this panel discussion.

Like most of the other panelists, I am taking as a point of departure the excellent AFS treatise dealing with the first century of fishery research and in terms of historical review. It should be noted that the treatise did not deal with estuarine and coastal fisheries as a unit. Yet, much of the general discussion scattered through many chapters is still highly appropriate.

Because of the geography of my experience and the interests of this group, most of my remarks will pertain to the estuarine and coastal fisheries of the Middle Atlantic, Southeast and Gulf coasts, and they may not be entirely appropriate in a broader geographic context. Some of my examples will be drawn from outside the region.

Among the problems that I will consider are failure to set and stick to reasonable management goals, fractured or total lack of jurisdiction, the diverse nature of many of our southern fisheries, a deteriorating environment, the lack of basic knowledge and lastly the nature of the decision making process. These are listed in the order of discussion but not in the order of importance. No doubt others might consider this subject and arrive at different conclusions and certainly different priorities. While the paper begins with a discouraging premise it will end with an optimistic projection.

PROBLEMS AND PRESENT STATUS

Management Goals

I am beginning this discussion with the question of goals not only because I think it is an important one, but also because it is one element of fishery management that should be entirely under man's control. The best laid management plans can be wrecked by catastrophic climatic events, unexplained year class failures, etc. but the selection of management goals should be simply a decision making process.

The point I would like to make here is not that I think we have been and still are using the wrong goals but that too often we have functioned at the working management level with no goals in mind at all. A fisheries management plan is no more than a set of steps or procedures that one implements in order to achieve a desired end. If we fail to identify the goal or desired end, I don't know how we can reasonably expect to succeed.

Over the past five years there has been a lively and I think very constructive discussion both in open forum and the formal literature concerning the proper goals of fishery management. There seems to be developing a general consensus

that the former goal of "maximum sustained yield" which was widely accepted though seldom achieved, is giving way to other goals which include economic and/or social considerations. I would state parenthetically that I do not think any single goal is going to be appropriate to all fisheries and all situations.

The lack of goals or conflicting goals can be seen both in commercial and recreational fisheries management. Many examples of confused goals can be found in the management of shell fisheries. This becomes especially critical when bottom lease arrangements and problems of mechanization are considered. Here one set of practices may lead to maximum employment within the industry, while an almost opposite set of practices may lead to maximum productivity and maximum efficiency in an economic sense. Very often our existing management practices seem to straddle this fence and not be committed to either approach.

What is the management goal for a given commercial fishery? Is it to produce the maximum catch or is it to achieve maximum net economic return or is its purpose to provide maximum employment? Perhaps we should manage with the objective of insuring that the American people will have available maximum quantities of high quality seafood at the lowest possible price. I would concede that all of these goals have some merit taken individually and not all are mutually exclusive but some are nearly so. In partial defense of the coastal fishery administrator, I would point out that in many states he has never been given the authority to make these kinds of decisions. I would state a personal opinion that without clear authority he should not make decisions that may deprive a man of his livelihood, regardless of his economic inefficiency.

Within the estuarine and coastal recreational field, almost every fishery manager has been faced with the question of whether it is better to provide greater numbers of smaller fish or lesser numbers of trophy fish. Management practices certainly differ depending on this choice but how often is a choice actually made? In this case, I think we need to do a better job of finding out what the public really wants. Let's consider one area in which our goals have been limited and clear. Artificial reef construction has had the goal of creating suitable habitat where none existed and attracting fish to areas in reach of large numbers of fishermen. Our goals have been simple and direct and our success rather phenomenal in many cases.

We might pose the question of why our management is not more goal oriented. At least part of the answer, I believe, lies in the fact that fishery scientists may devise management plans but they do not enact legislation. So much of our management authority is tied up in statutory and regulatory law which has accumulated over the last century and most of which was adopted in a piecemeal fashion. In fact, I believe a significant percentage of these laws were enacted in response to a specific pressure that had nothing to do with an overall management scheme. In some states the law permits management only for the conservation of the stocks.

What does the future hold in this problem area? I believe the situation is improving, and the tendency towards regional or state-federal management plans that are beginning to reach the drawing boards hold the hope for much greater improvement.

Fractionated Jurisdiction or Lack of Jurisdiction

I believe that fractured jurisdiction and in many cases lack of jurisdiction has been one of the principal deterrents to successful management of coastal and estuarine fisheries. The lack of jurisdiction has been most apparent in coastal waters. State jurisdiction extends in most cases only 3 miles offshore and formerly no authority to manage fisheries existed beyond that except in those few cases where bilateral or multilateral treaties existed among nations. The

adoption of the 9 mile contiguous zone did establish federal authority but up to now no federal agency has exerted any clear management responsibility in that zone, so little has changed. Where no authority to manage exists, there is obviously not going to be effective fisheries management. The only possible exception is where a specific fishing industry may have adopted voluntary practices, but such cases have been few and of limited effectiveness.

Considering estuaries, we are no longer dealing with lack of jurisdiction but certainly the problems of fractured jurisdiction still remain. Recall if you will that some of our major estuaries are shared by several states, and fishery management practices change abruptly at arbitrary geographic boundaries. These boundaries are crossed quite freely by fishery stocks. Even where estuarine waters lie entirely within the confines of a single state, fisheries jurisdiction may not be entirely at the state level. Certain management practices may be retained at the county level and in some states at the township or other very local units of government.

The question of fractured jurisdiction is closely tied to some very troublesome questions of equity. To develop this point, consider some of the management problems associated with the Atlantic menhaden fishery. This is a rather classic example of a species which occupies different segments of a rather extensive range during different periods of its life history. To grossly over-simplify the pattern, we can consider that the Chesapeake Bay constitutes a major nursery ground and that this area is occupied predominately by young-of-the-year and one year old fish. In succeeding summers these fish are likely to be off Delaware as two year olds and New Jersey and New York as three, four and five year olds. Let's assume, for the sake of discussion, that yield-per-recruit models showed conclusively that the best harvest could be obtained by limiting the catch to 3, 4 and 5 year old fish. Is it even reasonable to expect that a fishery administrator in Virginia is going to recommend a cessation of fishing in his state even for net benefits, if those benefits accrue entirely to another state? The answer to this is obvious. The problem becomes further complicated when one state or one nation is expending both effort and funds to protect nursery grounds producing stocks that will be harvested elsewhere. Many similar examples could be cited.

This question of equity is so important and yet so frequently seems to be overlooked. In addition to the equity between geographic areas, there are also equity problems between segments of the industry. We often make the mistake of thinking of the oyster industry or the shrimp industry or the menhaden industry as single monolithic units, rather than a number of competitive sub-units. Many management schemes not only discriminate against regions but also against individual companies even when the net effect may be favorable.

Probably our best examples of successful management in estuarine and coastal waters have been with non-mobile or at least non-migratory stocks. We do have good examples of successful management with clam and oyster fisheries and with mobile species such as the blue crab which can be managed on a state by state basis.

If fractured jurisdiction or lack of jurisdiction has been a serious deterrent in the past, to what extent can we look to improvement in the future? The presently evolving state-federal partnership in fisheries management holds the only hope I see to solve the jurisdictional dilemma short of a total federal take-over of the management process. While some of the enabling legislation is still before Congress, important steps are already being taken. For example, the Atlantic coastal states from North Carolina to Main are working together and with the federal government to develop a regional management plan for the American lobster that encompasses the entire range of the American fishery. The middle Atlantic states are developing regional management plans for the surf clam. The states of North Carolina, South Carolina, Georgia and Florida are presently

working on the early stages of a regional plan for management of penaeid shrimp. The Gulf states are collectively looking at the menhaden problem.

This state-federal cooperative regional approach is not going to provide any instant panaceas. It will require that we look at fisheries and fishery stocks one at a time. Moreover it will necessitate a great deal of give and take and patient, unselfish negotiation on the part of the individual states and the federal government. I hope that we are up to the task for I believe this is one of the important single problem areas to be solved to make coastal and estuarine management successful. However, solving the jurisdictional problems will not solve the related equity problems already referred to, and some of these may constitute problems with which we just have to live.

Diverse Nature of Fisheries

The great world fisheries which are best known and which have received most management attention are primarily single species fisheries. Halibut, haddock, king crab and lobster are examples. As one moves further south one tends to encounter more mixed fisheries that are gear oriented rather than species oriented. The pound net fisheries of Virginia, the trawl fisheries of North Carolina and the haul seine fisheries of our southern beaches are all examples of fisheries working on mixed assemblages of species. The recreational fisheries of coastal and estuarine waters are also mixed species fisheries. We tend to group these as pier fisheries, small boat bottom fisheries, offshore reef fisheries or offshore big-game fisheries. In all cases, each of these fisheries is based on a mixture of species. Despite this fact of life, almost all our fishery management theory is based upon the concept of management on a species by species basis. Most of our present management tools are of limited use in a mixed species fishery. Several fishery scientists have commented on this dilemma but I have yet to see proposed any workable schemes to deal with the problem, and I am not able to offer any solution. This is going to be one of the challenges we have to deal with in the future for there is no reason to assume that a species exploited in a mixed fishery is in any less need of management.

In support of the fact that mixed fisheries add to the difficulties of management is the fact that most of our limited successes have come with single species fisheries. One of our most successful management tools has been based on yield-per-recruit models. This model has to be approached on a single species basis.

Problems of Environment Degradation

The effects of a degraded environment on estuarine and coastal fisheries is too well known to require elaborate confirmation and discussion. Probably the most direct and severe costs have been borne by the shellfish industry. Here is a case where hundreds of thousands of acres of productive shellfish grounds have been closed because of the human health problems associated with domestic pollution. Although much attention has been given to the role of DDT and other persistent pesticides in the estuarine and coastal environment, I think it is possible we may have underestimated the damage. In a paper presented to this group about five years ago I pointed out a series of suggestive parallels between the use of DDT and the decline of the weakfish (*Cynoscion regalis*) on the east coast. This was at a time when weakfish stocks were at all time low levels and when DDT was going out of use but still legal. It is interesting, but certainly far from conclusive, that this species has shown a dramatic recovery over the past two years. How many species may have been affected will probably never be clearly documented.

On the southeast and Gulf coast the physical alteration and total loss of inshore nursery grounds has greater long term implications, in my opinion, than

does either domestic or industrial pollution. Although the rate of degradation and loss has been slowed through public awareness we are still losing productive areas and will no doubt continue to. We have to do a better job of deciding when coastal alterations are in the greater public interests, and make our strongest stand when such is not the case. In general, on both the pollution and coastal alteration problem, I think we have considerable cause for optimism. If this optimism is to be fulfilled we must get our coastal zone management systems functioning.

Lack of Knowledge of Fishery Populations

For at least the twenty years I have been involved in estuarine and coastal fisheries, fishery scientists have been saying that we lack sufficient basic knowledge for effective management. This was largely true twenty years ago, is still partially true today and will be true to a degree twenty years hence. Despite some very significant gaps in basic knowledge, I do not believe this is or has been the principal deterrent to present success. From a management standpoint in the southeast and Gulf, I feel we are hampered more by lack of good catch and effort statistics than we are by biological knowledge gaps. In fact, many of the critical biological gaps are not going to be answered until we do have adequate catch and effort figures. A case in point is the very important but difficult question of the relation between parental stock size and number of progeny in the resultant year class. Direct population measurements over a number of years and for a variety of species are not likely to be achieved, whereas usable indirect estimates can be obtained from adequate catch and effort systems.

Over the last twenty years there has been almost no improvement in the quantity or quality of catch and effort statistics for most commercial fisheries. Over the same time, we have achieved an awareness of the necessity for catch statistics for recreational fisheries, but except for a few studies based on small sample estimates, have not gotten beyond the awareness stage. Meeting this latter need is going to provide another severe challenge.

The Nature of the Decision Making Process

In an earlier section I referred to the fact that legislators, not fishery administrators, make laws. I would like to return to this point and consider pragmatically some of the problems inherent in the actual decision-making process. For discussion let us create a hypothetical situation for which I feel certain actual analogs have existed in virtually every state. Let us imagine that the State fishery agency in conjunction with fishery scientists and economists from the State University have worked for several years designing a new oyster lease system under which seed oysters can be planted and harvested entirely by mechanical means, and without environmental complications. Further, our economist informs us that this method will increase economic efficiency and permit the shucking and canning houses a sufficient profit margin to upgrade their plants to meet the new federal health standards. Because this practice is inconsistent with existing law we must take our plan before the next legislative session. Unfortunately Alligator County up on the northern border has few suitable bottoms for mechanical harvesting but it does have 25 fishermen who manage a meager living by hand-tonging. More importantly, Alligator County is the home district of Senator Fox, Chairman of the Senate Tidewater Committee through which all fishery legislation passes. The result is likely to be a new law in the code prohibiting mechanical harvesters while we are still polishing up the grammar in our grand management scheme. My purpose here is not to criticize the Senator. He has listened to his constituency and acted in what he believes to be their best interests.

One sees more and more in the fisheries literature on sophisticated computer simulation techniques to aid the decision making process. This approach is

promising and deserves support but we must do a better job of identifying who is the real decision maker, how he functions and most important how we can function effectively with him.

SUMMARY

If the problem areas that I have discussed have been real deterrents to success in the past, I am optimistic over the chances for future improvement. I believe we have turned the corner on environmental problems, our knowledge base is improving each year, fishery scientists and managers are becoming more goal-oriented and are working more closely with the legislative process. I personally feel that the new state-federal initiatives and especially the attempts at cooperative regional management hold great promise. If we get the necessary legislation and can give the program our best efforts I feel we have a good chance of solving many of our jurisdictional problems. Furthermore, I see some improvement that could result from the state-federal approach in virtually all of the problem areas referred to.

PROBLEMS AND SOLUTIONS, GOALS AND OBJECTIVES OF FISHERY MANAGEMENT

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ABSTRACT

This summary and discussion covers four papers on current fishery management problems and programs in small ponds and community lakes, reservoirs, streams, and coastal and estuarine environments. Problems are classified in four major categories: economic, political, social, and biological. Biological problems are subdivided as either environmental (physical-chemical) or biotic. In discussing the goals and objectives of fishery management, a distinction is made between the terms harvest, catch and yield, and the goals of maximum sustained harvest and optimum sustained yield. Discussion of management of largemouth bass populations in reservoirs develops the hypothesis that bass biomass may amount to only one half to one sixth of the potential sustained carrying capacity in some waters. Calculations are made to project changes in biomass, production, catch and harvest that may result from the application of various protected-length regulations. The calculations suggest that under conditions as specified in the model, fishing quality and yield values may be much improved and closer to optimum with a minimum length limit as high as 18 inches. Achievement of values approaching optimum sustained yield in sport fishing will require research to test concepts and theories, development and implementation of improved management programs and enhancement of our professional credibility and compentence.

[1]The Bureau of Sport Fisheries and Wildlife, University of Missouri and Missouri Department of Conservation cooperating.