Bridging the Gap Between Economic Theory and Fisheries Management: Can the MFCMA Produce Economically Rational Management?

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Introduction

This paper addresses the question of whether the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA) can produce "good" fishery management, "good" in this case meaning appropriate utilization of lessons to be learned from economic theory. The MFCMA outlines a philosphy and process for management of the nation's marine fishery resources. The Act also is the basis of the institutional structure for marine fisheries management.

National concerns about preservation, as well as accepted biological and economic theories, play an important role in fishery management decisions. What emerges from the decision-making process, however, is also influenced by institutional organization and structure. Of particular importance is the interaction between individuals in the structure, and the way these individuals perceive and carry out their respective roles.

The analysis will proceed as follows. The first section defines terms while the second presents a general analysis of what is meant by the fishery management institutional structure and describes how it interrelates with industry activity, and how this interplay determines the nature of actual fisheries operation. The next section describes the institutional structure set up by the MFCMA, giving special attention to the direct and indirect hindrances to good management it imposes. The fourth section discusses proposed changes in the system as put forth by Congressional amendments to the MFCMA and a report commissioned by the NOAA Administrator. The final section summarizes the general conclusions.

Before going on, however, it is important to stress that while I am somewhat critical of the MFCMA and the structure it imposes, this does not necessarily reflect on the individuals who work in the system. On the whole, they are working in a professional manner. Unfortunately, they are working in a system which sometimes encourages strategic behavior where what appears beneficial for one part or level of the system can be deleterious for the whole and which also, directly or indirectly, proscribes many useful approaches or actions.

Definitions

If this paper is to have any focus, it will be necessary to define what is meant by good management. Most biologist or economist fisheries professionals define good management as that which most closely meets a specified set of criteria. Economic criteria are concerned with the proper use of fish and other resources over time and focus on determining an intertemporal harvest plan wherein the correct amount is caught each year giving appropriate attention to all related costs including harvest, programmatic management, and implementation and enforcement costs. Biological criteria deal with sustainable yields and protecting the stocks against depletion. Other potential criteria include employment levels, cultural traditions, etc.

In practical applications, however, good management often is nothing more than something upon which all concerned can agree. Having a regime in place, regardless of its theoretical content or its potential for effective implementation, is sometimes seen as evidence of a successful management institution. In my view, this is hardly a satisfactory criteria for good management. Getting something in place can be a useful first step, but only if the step is in the right direction.

Because the emphasis of this symposium is on bridging the gap between economic theory and fishery management, I will use broadly defined economic criteria to define good management. I will consider the issues of can or will the gap between economic theory and practice be bridged under the MFCMA; I will not however, directly address the question of should the gap be bridged or at least narrowed, notwithstanding my predilection toward answering that question in the affirmative.

To anticipate the argument to follow, however, the MFCMA can be judged completely successful only by the more limited criteria of ability to getting something into place. Fishery management plans often are a compromise that the majority of interests can agree on, but sometimes they are regimes that politically astute or powerful minorities can push

ABSTRACT—The paper analyzes the possibility and the probability of appropriate use of fundamental economic principles in the fishery management plans developed under the Magnuson Fishery Conservation and Management Act. After reviewing the resource, industry, and government aspects of the fishery management development process and some of the important aspects of both the existing law and suggested changes, it is concluded that while the possiblity exists, the probability is quite low.

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through the system to the dismay of the majority. Is it possible for this system to produce good management by my broadly defined economic criteria? Perhaps so, but a better question is "Is it likely that sound economically rational management will be produced?" My view is that the answer to the latter question is "probably no."

I base my pessimistic conclusion on the following analysis and also on my somewhat limited direct experience with the workings of the fisheries management system. I recently worked with others at the National Marine Fisheries Service (NMFS) in preparing a set of guidelines for regulatory analysis of fisheries management actions. The main goal of the guidelines was to insure that fishery managment plans (FMP's) gave appropriate consideration to all aspects, but especially the economic aspects, of the national standards (see below), and other regulatory directives. Although most people I talked to would unofficially agree that the structure and logic of the guidelines was quite good, there was less than enthusiastic support for their implementation. Because of the nature of the fishery management system, wherein the Councils and NMFS are sometimes adversaries, this attempt to introduce some basic economic principles into the management plan development process, was viewed by some as another attempt to make the work of the Councils more difficult and to put them even more firmly under the control of NMFS. Others question whether guidelines would be effective in a system that is so heavily influenced by political considerations.

The Importance of the Institutional Structure in Fisheries Management

Simply put, the purpose of fisheries management is to change or otherwise influence the behavior of commercial and recreational users of the resource. To understand fishery management it is necessary to understand how the various behavior patterns relate to the biology of the stock. However, a significant part of users' behavior is their interaction with the fisheries management agencies, and it will be just as necessary to understand this as well.

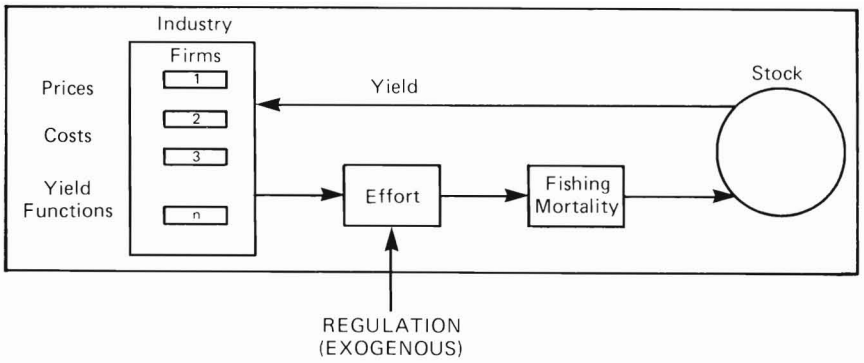

Figure 1.—The Bioeconomic Model: What kind of regulations should we have? Regulation is viewed as an exogenous variable which can control the amount of fishing effort so as to achieve various objectives.

Focusing on commercial fishing only to keep the discussion within bounds, consider first the harvesting industry aspects of fisheries utilization. This can be described by a bioeconomic model of a fishery (Fig. 1). In this model, the fishing industry is viewed as a collection of individual firms or boats which react to market prices, input cost, and the fisheries production function (i.e., the relation between fishing effort and catch) and produce fishing effort as long as it is to their financial advantage to do so. Profits are viewed as the driving force of the whole system. The search for profits and avoidance of losses determine the number and rate of change of the vessels and the amount of effort produced by each. Total effort, in combination with the size and the cohort distribution of the current fish stock, determines the annual yield and the condition of the stock in the next period.

Using the bioeconomic model with specific economic and biological assumptions, it is possible to construct detailed models which describe how fleet size and effort, and stock size and composition will vary over time. For example, under certain circumstances, it is possible to describe an open-access equilibrium where the stock will not change because harvest is just equal to natural growth, and where fleet size will not change because profits are sufficient to keep existing vessels operating but not high enough to attract new entrants (Anderson, 1986: Chapter 2). Due to the open-access nature of the industry, the unowned fish resources are suboptimally utilized in that the value of the marginal or last unit of fish caught in any period (VMO_F) is less than the value of the marginal foregone production necessary to produce fishing effort ($VMFP_E$) plus the marginal present value of changes in future production due to changes in the size of the existing fish stock. The latter is often referred to as the marginal user cost (MUC).

Looked at from a different angle, the optimizing condition for an economically efficient fishery in terms is:

$$VMO_F = VMFP_E + MUC. \qquad (1)$$

The critical reader will note that Fisheries Management Councils have never used condition (1) for an objective of any of their management plans. Perhaps this is a result of the incomplete information used by or made available to the decision makers. It is likely, however, that the decision makers have a fair understanding of the economic issues. It is just that other issues are more important.

To better understand what lies behind management decision, it is useful to expand the bioeconomic model by adding to it the institutional structure which develops fishery management and development policy. Elsewhere (Anderson, 1982a, 1984, In press) I have called this expanded analysis the political bioregunomics approach. A schematic of this approach is diagramed in Figure 2. By necessity, Figure 2 ignores many of the complexities of the issues involved. The

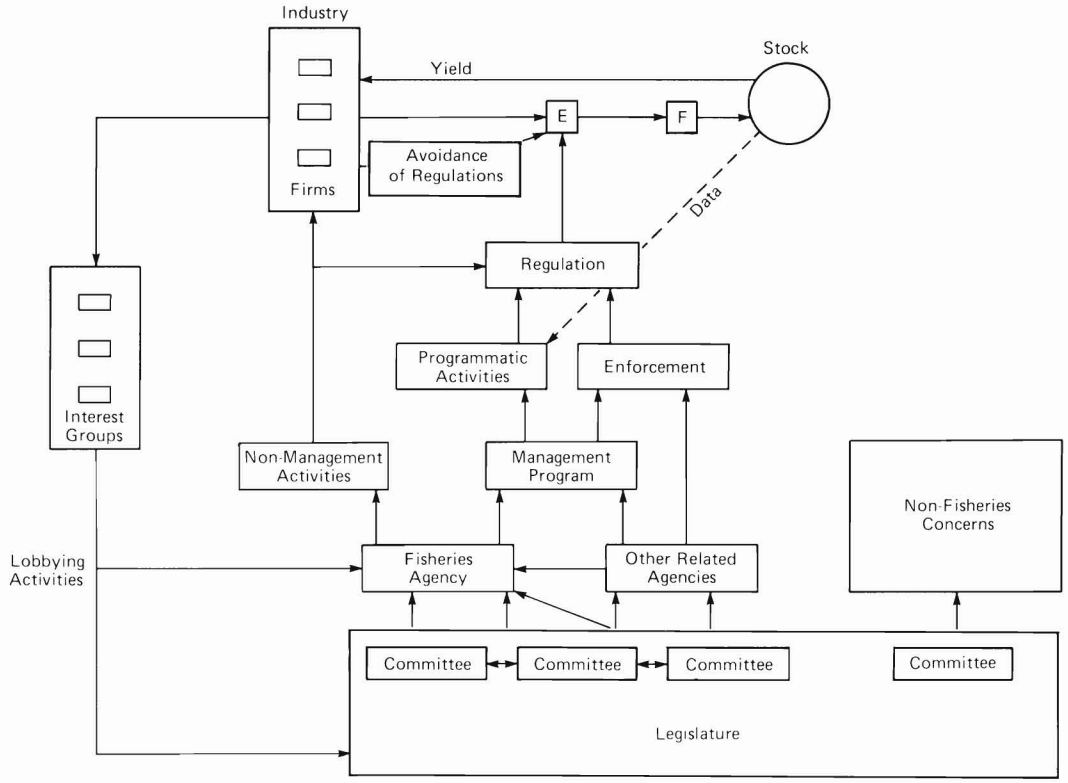

Figure 2.—The Political Bioregunomics Model: What kind of regulations are we likely to have? Regulation is viewed as a endogenous variable which is determined by the interactions of fishermen, politicians, bureaucrats, and other interest groups.

behavior of the fishing industry is still the driving force of the system, but in addition to price, cost, and yield, the individual firms also react to signals from various government agencies and, in some instances, even take steps to influence government activities or to moderate their effects. Government bureaus and regulatory agencies are also driving forces whose behavior must be understood. Indeed just as the bioeconomic approach considers the interactions of the fish stock and of the industry, the political bioregunomic approach looks at the three-way interaction between fish stocks, industry, and government entities.

At the top of the institutional structure is the legislature. It determines mandates, areas of influence, basic operational guidelines, and, perhaps most important of all, the budgets for the various agencies. Because fisheries matters are only a small part of the overall concern of legislatures, nonfisheries activities and agencies must be considered since they are a competitor for legislative time and budget allocations. For example, the legislature may choose not to allocate funds to a research program even if it can be shown that it would improve management, because in their opinion, there are other more important uses of the scarce government revenues.

While nonfishery concerns cannot be ignored, the main focus should be on those agencies which have direct or indirect effects on fisheries utilization. For any level of government, these can usually be divided into fisheries agency and other related agencies. In the United States, the latter group includes the State Department, which is concerned with the allocation of quotas to foreigners; parts of the Commerce Department such as the Small Business Administration which may grant loans to the fishermen; and the U.S. Coast Guard which has a large role in regulation enforcement.

An intermediate step between the legislature and the relevant agencies is the former's committee structure. Most important decisions are made in committees and the mandates and budgets given to the various agencies can depend on the favor each are given in various committees and sometimes on the particular attitudes of influential members of important committees. In addition, since more than one committee may deal with a particular agency, the interrelationships between committees is important. Also, the oversight responsibilities of certain committees can, when members so desire, have an important influence on the day-to-day activities of particular agencies (Weingast and Moran, 1983).

The fisheries agency is obviously an important part of the fisheries management institutional structure. Given the budgets, mandates, and constraints imposed by the legislature, its committees, and other related agencies, the fisheries agency, or more correctly, its directors and personnel, operate so as to achieve

their perceived objectives. The nature of these perceived objectives is very important but it is something about which we know very little. Modeling a firm's behavior is relatively easy since profits are a measure of its success. Since, for the most part, the long run return to the individual employee depends upon the firm's success, employees will, by and large, operate so as to maximize the firm's profits. There is no such straightforward "bottom line" in government agencies, however, and so it is much more difficult to predict how individual bureaucrats will operate (Wolf, 1979). In addition, there is often a number of international, Federal, regional, state, and sometimes even local fisheries agencies which have some management authority. Obviously, the way they interact (explicitly or implicitly) is an important part of this analysis, but one which can be quite difficult to understand.

The work of the fisheries agency can be divided into management and nonmanagement activities. Management activities are any programs directly related to the control of harvest to prevent overexploitation, however defined. Nonmanagement activities include fisheries development (i.e., marketing programs, loan programs, etc.), product quality, navigational safety, etc. Although the latter are not directly aimed at controlling harvest levels, they have an effect on the amount of effort that will be produced because they can affect prices and costs facing individual firms.

A management program can be thought of as the fixed component of fisheries policy. The agency can use total quotas, gear restrictions, taxes, individual quotas, etc., or some combination as its basic regulation tool. Once the tool is chosen, however, there are two variable components. Programmatic activities include the research and bureaucratic work necessary to determine how the governing instrument will be used. For example, the role of these activities is to determine the size of the quota, the nature of the specific gear restrictions, etc. The other variable component is enforcement or monitoring. The management program will have no effect on the behavior of the industry and hence, no effect on stock utilization unless there is an incentive for industry compliance in the form of penalties for noncompliance.

The expansion of the analysis to include the institutional structure makes regulation (i.e., those activities which modify the activities of the firms) an endogenous variable of the model. The actual amount of regulation produced depends upon the net effect of nonmanagement and management activities, and the latter depends critically on the variable components of policy (i.e., programmatic activities and enforcement).

The political bioregunomics approach also allows for other industry activities. First, firms can form interest groups to lobby fisheries agencies and the legislature to modify the regulation producing process to their advantage. In some instances these lobbying groups will have common interests, as would be the case in legislative budgetary debates between fisheries-related agencies and nonfisheries agencies. Frequently, however, the lobbying groups may have conflicting interests (i.e., inshore vs. offshore interests, etc.). In this regard, the industry must be expanded to include processors which can be motivated to lobby for both management and nonmanagement programs either in support of or in opposition to the interests of the harvesting sector. The relationship between the processing and the harvesting sectors is a topic that has received scant attention in the bioeconomic models, but it is obviously an important item in the understanding of how the management institutional structure actually works.

Individual firms may also find it to their advantage to engage in avoidance activities to reduce the effects of regulation (Anderson and Lee, 1986). If returns from using resources to evade regulations are greater than the expected costs, at least some firms will likely do so. This behavior is important for two reasons. First, the avoidance costs will be a waste of resources and second, it will affect the way regulation actually modifies fishing behavior.

An advantage of this broader approach to understanding fisheries utilization is the recognition of other types of management costs. The basic thrust of the bioeconomic approach is to compare the difference between the open access and the economically optimal utilization of the fishery. In terms of the political bioregunomic approach, open-access becomes almost irrelevant. The focus of interest is the regulated equilibrium. That is, how will the fishery operate, given the types and amounts of regulation produced. Also the optimal utilization of the fisheries is more complicated. In addition to the cost of producing effort and the marginal user cost, the cost of lobbying and regulation avoidance to the industry, and the programmatic and enforcement costs of the agencies must be considered. To be precise, the efficient output point is where the value of the marginal output of fish is equal to marginal user cost plus the sum of the values of the foregone production from producing effort, lobbying, and avoiding regulation and instituting and monitoring management policy.

The obvious question that follows is how can the institutional and industry structures be changed so as to increase the likelihood of having the regulated equilibrium coincide with the expanded version of optimal utilization. In addition, however, the question of what types of regulation are optimal must be reformulated to consider the effects of various regulations on those costs related to activities other than producing effort. For example, lobbying costs may be a function of the ease of access of lobbyists into the halls of power and the flexibility given to individual administrators. If there is little flexibility, the returns to lobbying will be low and hence lobbying expenses will be low. High flexibility programs, on the other hand, may encourage lobbying. Similarly, certain programs may be easier to enforce than others and hence monitoring costs will be lower, and avoidance costs may be lower as well because the returns to evasion will be low.

Using the political bioregunomic approach to view the system as a whole, the actors interact as follows. The firms produce output so as to maximize profits subject to the constraints of market prices, costs, fish availability, nonmanagement government intervention, and the type and enforcement level of management regulations. They also form groups to lobby the fishery agency and legislature. The agency (or agencies)

produce management and nonmanagement regulation and enforcement activities, according to their view of what is good for the stock, the industry, and their absolute and relative position in the bureaucratic hierarchy, taking into account the lobbying pressure of the firms, and subject to the constraints of the budgets and operational guidelines. The legislature determines the size of the agency budget and its general operational guidelines subject to the constraints of the constitution, the overall government budget, the relative importance of other government activities, and political realities.

To understand what kind of fisheries management will be produced by the institutional structure set up by the MFCMA, it is necessary to view this structure in terms of the above framework. This will be the subject of the next section, which draws heavily on a previous work of the author (Anderson, 1982b).

Current Management Institutions Under MFCMA

The main purpose of the MFCMA can be summarized by the National Standards found in the act:

> Conservation and management measures shall prevent over-fishing while achieving, on a continuing basis, the optimum yield. . . .The term "optimum" with respect to the yield from any fishery means the amount of fish—(A) which will provide the greatest overall benefit to the nation with particular reference to food production and recreational opportunities and (B) which is prescribed as such on the basis of maximum sustainable yield from such fishery as modified by any relevant economic, social, or ecological factor.
>
> Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources except that no such measure shall have economic allocation as its sole purpose.
>
> Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplications.
>
> To the extent practical . . . interrelated stocks of fish shall be managed as a unit or in close coordination.

The first two of these national standards appears to establish economic efficiency as an important objective of fisheries management in the United States. However, the phrase "where practicable" certainly has the potential of weakening this objective, depending upon its interpretation. Therefore, my rigid criteria for what constitutes good management has some basis in the MFCMA itself.

As the law was written, the difference between "optimal yield" and the expected domestic annual harvest of each species or group of species was to be made available by the State Department to foreign nations who had traditionally harvested that species and who met certain requirements. However, these foreign boats were required to pay certain vessel fees, and "poundage" taxes on their allowable catch. There have been subsequent changes in the law that require domestic processing capacity to be utilized before turning to foreign processors (regardless of the relative costs of the two) and provisions have also been made for eventually phasing out foreign fishing when there are specified increases in domestic capacity.

The most important operational elements of the MFCMA are the eight regional Fisheries Management Councils, which prepare management plans specifying how much of each species will be caught and determining, directly or indirectly, by whom.

Each Council has the responsibility of managing the species within its geographical area, but where species are important in two or more areas, they are jointly managed by the respective Councils, although one may be designated as the lead Council. While they are important, the Councils are only one part of a complex management system set up by the MFCMA, which also includes the National Marine Fisheries Service, the Departments of Commerce and State, and the U.S. Coast Guard. The role of each of these other agencies, and a description of how they interact with each other and with the Councils will be discussed below. For the moment, we will focus on the role of the Councils.

About half of the Council members are the secretaries for natural resources (or the equivalent) in the states in the particular region, along with the regional director of the National Marine Fisheries Service of the Commerce Department's National Oceanic and Atmospheric Administration. The other half are "knowledgeable or experienced members of the public" who are nominated by the governors of each member state and selected by the Secretary of Commerce. In addition, individuals from the U.S. Coast Guard and the Department of State are nonvoting members of the Councils. Since the number of states in each region is not equal, Council membership varies between eight and sixteen people.

The makeup of the Councils is obviously quite important in determining what kinds of plans are developed. It is, therefore, interesting that the public members have predominantly been representatives of harvesters, processors, distributors, or some other aspect of the fishing industry. Individuals who might represent other or more general interests—consumer advocates, professional biologists, economists, or recreational fisheries, or planners, for example—have certainly been in the minority.

The main work of the Councils is done by a full-time professional staff consisting of an executive director and others with training in biology, law, planning, and economics. The Councils usually meet every 4-6 weeks for 2-3 days, under the direction of a chairperson elected from their midst, to review and approve the work done by the staff, to discuss future activities, and to vote on policy issues.

Each Council has a Scientific and Statistical Committee, a voluntary organization, composed of academic and government fisheries management scientists including biologists, economists, sociologists and anthropologists, and planners. The purpose of this committee is to provide technical advice. In addition, they can have voluntary industry advisory boards comprised of industry participants to provide practical advice on how various regulations will affect them, both as a unit and each component part.

Although each Council has the same organizational structure, they often differ widely in the way they operate. For example, Councils have in the past issued contracts to consulting firms or universities to write the plans. Others set up special task forces consisting of Council members, scientific and statistical committee members, industry representatives, and NMFS and Council staff peo-

ple to write the plan. In some Councils the staff has primary responsibility for writing plans. Finally, some Councils actually write important sections of their plans during regular Council meetings. The result is that the plans prepared by the Councils have sometimes been quite different.

However it is developed, each fishery management plan must be discussed in open public meetings and must be published in the *Federal Register*. The Council must respond in writing to any written comments that result, and often does so in an appendix to the final plan. It should come as no surprise that these comments come almost exclusively from representatives of the industry. Industry people have more to gain from the costs of preparing such formal comments, since a specific proposal could significantly affect their profits. By contrast, isolated individuals may gain very little from advocating economic efficiency even though the gains to the whole economy are quite large.

After the public hearing process, the plan must be approved, technically, by the Secretary of Commerce, but for all practical purposes, by the National Marine Fisheries Service. Before going back and discussing the plan preparation process in more detail, it will prove useful to explain exactly how NMFS and other agencies fit into the system.

The National Marine Fisheries Service has a double role. First it is the source of most of the biological and economic information used to produce the plans. This has sometimes been a source of conflict for a number of reasons. The Councils complain that they are not provided with the right types of data in a manner in which it can be of direct use. NMFS responds that they are providing the best data they can, given the state of biological and economic research, and of their existing personnel and budget constraints and the other research tasks they are obligated to perform. Sometimes when scientific biological data is apparently at odds with industry observation, there is pressure on NMFS to reassess their stand. When the Councils try to increase their biological staffs, it is sometimes viewed by NMFS, at worst, as a way to either bend the data, or at best, as a way to take over some of the responsibility which they believe rightfully belongs to them.

The other role for NMFS is to approve the plans prepared by the Councils. As can be imagined this causes a considerable amount of friction between two organizations. In some instances understanding the institutional aspects of the approval process is even more difficult than it appears on the surface because of the presence of other players who are not actually on the formal program. The staffs of the NMFS regional and research center offices often work quite closely with Councils and Council staffs in the preparation of management plans. Indeed the Regional Director is a member of all of the Councils in his area. Because of this familiarity with the details of all the issues, and quite frankly, with the personality and preferences of the Council members, staff members, and industry representatives as well, there is a certain amount of internal pressure for approval by the National Office of NMFS from its field offices. When approval doesn't come, the Council and industry see NMFS as an agency with different conflicting points of view.

Another important player in the management development process is the Congress of the United States. Admittedly, its most visible role in the whole system, now that the law is in place, is to allocate annual budgets. However, the MFCMA has been amended many times in its 10 year life and has been going through an extensive Congressional review as part of the 10 year reauthorization process. In addition to these efforts with respect to the framework of the system, Congress sometimes also has some direct input in the plan approval process. As a plan is developed at the Council level and then forwarded to the latter for approval, individuals who will be hurt by the specific regulations, or who would be better off under different regulations, have plenty of time to see their relative positions under different types of schemes and to make their view known. (In fact, it may be argued that such access is too freely available.) However, the incentives to change the plan do not halt with final approval or disapproval from NMFS. Industry representatives have been known to go directly to their legislators if the approval process has gone or appears to be going the wrong way. It is not possible to cite specific examples, for obvious reasons, but occurrences are such common subjects of complaint at many fisheries management conferences (e.g., Frady, 1985) that even if they don't occur (which is highly unlikely) the very fact that they are perceived to occur has an effect on the operations of other parts of the system.

The states are also another important part of the system. Since they have control of fisheries out to 3 miles, their cooperation on stocks that can be harvested on both sides of that line is crucial. If they do not work closely on such things as enforcement and data collection, the chances of good management are quite small. There is a feeling, however, especially in the Gulf states, that the states can do a better job independent from the cumbersome Council system. This obviously has an effect on the way they will work with the Council system because if it fails, the revised system may give them full control.

Fisheries management plans are enforced jointly by a branch of the National Marine Fisheries Service and U.S. Coast Guard. Since the latter has many other responsibilities, an important part of producing good management is inducing the Coast Guard to act in a coordinated way with NMFS and not allow emphasis on other activities to crowd out the time required for at-sea enforcement.

While these paragraphs can only provide a brief outline of some of the nuances of the entire system, it should be obvious that the institutional structure is a complex one indeed, and as will be seen below, these complexities will have implications of the types of policies that will actually be produced.

Returning now to the actual operation of the Councils, each one has the responsibility of preparing annual, biennial, or even permanent framework plans for the species under its control. Even after 10 years, none of the Councils have completed plans for all the species under their jurisdictions. The workload of the Councils is substantial and all are revising their existing plans and developing others.

On the surface, most Councils use the

following procedure for developing fishery management plans. First, the objectives for management are determined. Within the constraints set by the National Standards and various operational guidelines produced by the National Marine Fisheries Service, the Councils can choose any objective they feel appropriate for the fishery involved and the particular problems it faces. The real problem is specifying objectives that have operational significance (a goal to "improve the fishery" is not of much use in choosing among specific management techniques). If there are conflicting objectives, the Council must place relative weights on them so appropriate tradeoffs can be made.

The next step is to identify a set of alternative plans which will specify optimal yield and identify how the harvest will be limited to that level. Finally, the plan which most nearly achieves the stated objectives is selected. If the objectives are reasonable, if the range of alternatives considered is broad and imaginative, and if the analysis used to compare the alternative plans and the objectives is correctly done, a suitable management plan will result.

In all fairness to the Councils, it must be noted that while the above procedure is easy enough to explain, it is often most difficult to apply in practice. There is often a lack of critical data (in some instances there are no data at all), and even where it exists, budget, time, and manpower constraints make it very difficult to perform the above procedure in a perfect way.

In reality, of course, the system does not operate this straightforwardly. One sometimes gets the feeling that a particular plan is chosen in advance and that the desired yield, objectives, and other components are then selected to ensure that the favored alternative emerges victorious. This is especially true when the pursuit of one objective—say efficiency—might impose job losses or other distributional problems on certain parts of the fleet. With respect to the tradeoff between economic efficiency and distributional issues, the latter implicitly appear to be more important, as one would expect given the influence of industry representatives in the planning process.

Another reason why the above procedure is not followed as rigorously as need be is the bureaucratic motivation of the main agencies in the management system. For instance, one reason for rejecting an economic efficiency objective is that according to the MFCMA and NMFS procedures, a main criterion for plan approval is how well the selected management policy achieves the stated objectives. Therefore, why include an efficiency objective when it can be difficult to judge different options against it? The business of the Council is to produce plans and thus they are loath to do something that will make their job more difficult.

Also, since it is industry that is most likely to protest, there is a tendency for the plans to be written so as to minimize potential complaints, lawsuits, and other procedures that can make the work of the Councils more burdensome and increase the probability of a negative review from NMFS. Therefore, economic efficiency and other important management issues which are of little concern to those likely to complain may not receive appropriate consideration.

On the other hand, NMFS appears to have taken the position that as long as the plans meet the stated objectives and unless they blatantly violate one of the National Standards, the plan will be approved. It is unlikely that a plan will be disapproved on grounds of inadequate objectives. NMFS too is in the business of producing plans and they do not want to stand in the way of implementation, especially over issues concerning income distribution or other politically sensitive topics. This is an important point. Secretarial approval of plans does provide the opportunity for consistency and also can ensure that purely regional interests do not prevail in fisheries policy. If, in fact, the review system is lax in this regard, some of the potential benefits of the MFCMA will be lost.

While NMFS has been reluctant to refuse approval because of inadequate consideration of efficiency, it frequently disapproves plans because of procedural issues. This has created animosity between the Councils and NMFS, with the former sometimes accusing the latter of trying to regain some of the preeminence it lost with the passage of the MFCMA. NMFS counters such arguments by emphasizing that rejections on procedural grounds are appropriate because they will prevent potential lawsuits. This ill will can certainly affect the smooth operation of the system. In addition, these rejections have caused the Councils to be even more concerned with the necessity of preparing plans that will be approved and hence they are less willing to look at economic efficiency matters.

For someone not familiar with the MFCMA, the above discussion is probably very bewildering. The process of developing fisheries management in the United States is very complex, and it is very difficult to describe the formal chains of command and to provide a feel for the informal structure that is built around it. On the other hand, individuals who have worked closely with the system may feel that the picture is far from complete. As bewildering as the described system may appear, the reality is often another step beyond.

To some degree, my failure to capture all of the system was a matter of choice. I felt the constraints of space and therefore only covered the more prominent parts of the system. However, some of the failure was due to a lack of complete information. I make no claim to knowing all there is to know about the system. One would have to work full time at all levels in order to obtain such expertise. Further, since each of the Councils act differently within a different set of state governments trying to manage species of different types and different biological and economic complexities, knowing how the system works within one Council or on one coast, would not necessarily mean knowing how things work elsewhere. However, while the discussion may not have provided a complete and general analysis of the way things work, I believe it does describe the rudiments of the operation and provide a feel for the complexities involved.

To summarize, the fisheries management institutional structure as set up by the MFCMA, the operational guidelines, and formal and informal standard operating procedures is not very conducive to introducing economic efficiency reasoning into management plans. There are too

many places where individuals, groups, or agencies can step in and stop, slow down, or reroute the process if it does not appear to be producing results favorable to a particular point of view. Many can hinder progress, but no one is held accountable for not achieving it. A process that has so many bosses that no one is really in charge is almost certainly doomed to failure. On the other hand, a juggernaut which rammed things through giving no attention to divergent views would be also unlikely to prove successful. To correct these faults, it will be necessary to assign accountability for success to a single source, while at the same time granting it sufficient latitude and resources to do the job. It will also be necessary to maintain public review and comment procedures to insure that all views and positions can be utilized in making the final decision.

Proposed Changes in the System

The 10-Year Reauthorization

As part of the 10 year reauthorization of the MFCMA, there are numerous suggested changes to the act which have appeared as formal legislation to amend the act. In addition, a "Blue Ribbon Panel" appointed by the Administrator of NOAA has just released a report on ways to improve the management system set up by the MFCMA. The purpose of this section will be to evaluate these proposed changes in terms of their ability to improve the likelihood of the system to produce good management.

Some of the proposed changes contained in the legislation now before Congress can have significant effects on the way the whole system works. Rather than discuss each of the specific bills, the analysis will focus, instead, on specific changes, some of which are found in more than one bill.

Several of the amendments directly address the interests and the qualifications of prospective Council members. One changes the qualification criteria from "knowledgeable or experienced" to "knowledgeable and experienced" and in addition requires that members provide a written statement of their current financial interests in the commercial and recreational sector of the fishing industry which will be made available to the public at each Council meeting. Another requires that when making Council appointments, it shall be necessary to "ensure a fair apportionment, on a rotating or other basis, of the active participants (or their representatives) involved in the fisheries under Council jurisdiction." Another would require a representative number of commercial and recreational fishermen including at least one practicing commercial fisherman.

In an early critique of the make up of Councils, Pontecorvo (1977) provided the following quote from Adam Smith (1776:128).

> "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices. It is impossible indeed to prevent such meetings, by any law which either could be executed, or would be consistent with liberty and justice. But though the law cannot hinder people of the same trade from sometimes assembling together, it ought to do nothing to facilitate such assemblies much less to render them necessary."

It is useful to interpret the motivation behind the above amendments in the framework of this quote, although there are, admittedly, other relevant issues here as well. The MFCMA does more than bring people from the same trade together, it gives them significant power in determining how the industry will be operated. There is a delicate balance here, however. Successful management requires extensive amounts of data, a great deal of which can be most easily supplied by industry participants, as well as, at least, the begrudged consent of those being regulated. Therefore there are good reasons for industry to have, at least, a strong advisory role, and given the nature of the whole system, some minimum number of voting members on the council.

As indicated above, my view is that one of the weaknesses of the present law is the strength of the overall industry interest group. The goal of most of the above changes, however, would be to increase that strength. Making knowledgeability and experience a requirement for Council membership sounds fine at the surface, but if experience is interpreted to be experience in the industry, it will prevent academics, and those with recreational and consumer expertise from participating. Further, while the financial disclosure requirement may provide some relief against votes that are clearly in one's own business interest, there are no proscriptions against potential conflict of interest voting.

Although there is definitely a pro-industry flavor to these suggestions, many of them may have evolved from intra-industry conflicts, both recreational vs. commercial sectors, as well as between different parts of the commercial fishery. Each wants to insure that their interests are adequately represented.

In general then, there is little hope that these particular changes will improve the system. In one sense they may be viewed as another round of interest group bickering, although at a higher level, that has already been identified as an endemic failure of the system. If the system was focused on issues of real concern to actual management, we would not have to waste time on these points, but given what the system is, it is not hard to see why participants are pressing these issues rather hard. However, there is little hope that strengthening the absolute power of industry on the Councils will do anything other than focus even more attention on distributional issues rather than on the hard but necessary choices of how to restrict effort on overutilized resources. The suggestion of rotating industry sector representation on the Council may be useful in preventing over-representation of particular interests, but it is flawed because it legitimizes bickering over distributional gains.

Other parts of the proposed amendments address the conflict between foreign and domestic utilization of the fish stocks of our shores. The current batch of amendments is a continuation of a trend in past changes in the MFCMA to phase out all aspects of foreign fishing and to develop a 100 percent U.S. harvesting and processing industry. This is a more difficult issue to evaluate, and there are at least two aspects that should be considered. First, there is the overall economic

rationale for complete domestic utilization. Second, there is the potential effect of too much attention being paid to who catches the fish as opposed to other more important management issues.

From an economic efficiency point of view, there are reasons to question a pure domestic industry policy. If U.S. harvesters and processors really have a comparative advantage in utilizing the fish in the conservation zone, the most they would require is a short period of protection in which to learn the most suitable techniques and to gain access to the appropriate markets. Forcing the foreigners out when they are more efficient harvesters or processors could be to the long-run detriment of the general U.S. economy. In that situation it would be better to charge the foreigners an appropriate market price for access to our zone and then use our labor and capital resources where they can be more productive. The U.S. economy would then have foreign exchange with which to import goods and services, and the value of the production of our own resources.

With respect to the second issue, note that every regulation program has distributional aspects. Quotas sometimes benefit those parts of the fleet which are able to get out early in the season, gear restrictions place a significant relative disadvantage on those individuals who are skilled in the prohibited activities. As such there will be built-in support and opposition factions for most regulations. The potential for disagreement will hinder the approval and implementation of such regulations. However, the "Americanization" policy brings the distribution issues straight to the surface and makes them part and parcel of the plan development process. Therefore, a difficult problem is made even harder. This is especially the case since Americanization of processing can hurt domestic harvesting by shutting off a potential range of buyers and hence lowering aggregate demand for their product. The fisheries plan development process is restricted in the types of things it can do, and some of the things it must do will have a tendency to cause dissension among parts of the industry. In a very real sense then, by the very nature of the law, the focus of management, from the top to the bottom of the system, will be shifted, more than it would otherwise, from the real issue of controlling effort to the distributional question of whose effort will be controlled.

Several of the proposed amendments deal with the prospects of implementing limited entry or limited access programs. One would change the law so that specific fees could be levied over and above the actual cost of operating the management program and further that these monies could be used to set up a dislocation compensation fund. The purpose of the fund would be to compensate fishermen for the loss or reduction of livelihood that may result from the implementation of limited entry program. This would obviously increase the chances of such regulation because it would reduce political opposition by potential losers.

Another proposed change would prohibit the implementation of limited entry programs (something that has been possible under the law since its inception) unless it was approved by not less than three-fourths of the voting members of the Council and by at least two-thirds of the fishermen presently participating in that fishery. This would obviously decrease the probability of passage. No other type of regulation or Council action requires such strict stipulations where such a small minority can prevent action.

A final change would prohibit the sale of any permits, shares, or rights granted to fishermen under a limited access system. Since transferability is crucial to achieving the full advantages of individual transferable quota or similar limited entry program, this change will obviously negatively impact on the ability of the MFCMA to achieve good economic management.

On the whole, if all three of these changes are accepted, the probability of bridging the gap between solid economic theory and practical fisheries management will have been reduced. The vote provisions will likely overpower the potential for the compensation fund, and the prohibition on transferability would drastically reduce the usefulness of any limited entry program that did get approved. On the other hand if only the tax and compensation fund provision is passed, the gap will have been narrowed.

NOAA Fishery Management Study

Several months ago the NOAA Administrator commissioned an extensive "Blue Ribbon Panel" study on the workings of the fisheries management system in the United States, and the first report was issued on 30 June 1986 (NOAA, 1986). One of the panel's objectives was to evaluate existing and potential institutional arrangements and management strategies according to their ability to best achieve the goals of marine fisheries management. Although the introductory prose in the report gives little or no attention to the economic aspects of fisheries management per se, the panel does state that a goal of their effort is to achieve management which is as responsible, effective, efficient, and economical as possible. They make many specific recommendations as to how to improve the system and it will prove useful to discuss many of them in detail.

The dominant theme of the entire report is the need to make a clear separation between what it calls "conservation" and "allocation" decisions. According to the report, conservation decisions are meant to maintain resource productivity for future generations, while allocation decisions basically distribute the opportunity to participate in a fishery. The panel argues that when these decisions are made simultaneously, there is a tendency to focus too much on allocation as a result of industry pressure to keep current catch levels high. As a result, conservation issues are put aside or ignored, and the stocks are often placed in danger.

As a solution, the panel recommends that NOAA, through the auspices of the National Marine Fisheries Service, set an "allowable biological catch" (ABC) for each fishery in the country based on the best scientific information currently available. These catch levels would be inviolable for the period for which they are established. The role of the Councils, according to the panel, would be to prepare management measures to allocate a harvest level equal to or less than the ABC among potential participants in the fishery.

While the basic point about pressures from the allocation decision having a ten-

dency to push conservation issues aside is only too true, the separation of the two decisions is not as neat as the panel might have one believe. In making such a sharp distinction, the panel ignores many biological, economic, and political aspects of management. Dichotomizing all of fisheries management into conservation and allocation is a gross simplification that could lead to serious problems in the construction and implementation of fishery management plans, and more importantly in the optimal utilization of the stocks for which they are designed.

In the first place, the conservation question (i.e., how much should be harvested this year and how much should be left to grow and reproduce) has economic and social components as well as the obvious biological one. The economic literature is replete with many theoretical and empirical articles on the optimal use through time of both nonrenewable and renewable resources (Clark, 1976; Fisher, 1981). With respect to renewable resources, the optimal harvest path is a function of the value in use through time, harvesting and processing cost through time, the discount rate, and the size and net growth rate of the stock through time. Therefore, the determination of how much to catch in the next few periods is considerably more complicated than a biological calculation of how much can be safely harvested. Since who does the harvesting (i.e., the solution to the allocation decision) affects the value in use and harvesting and processing costs, the link between conservation (how much should be harvested each year) and allocation is quite clear.

The joint relationship between what the panel calls conservation and allocation can be purely economic, purely biological, or some combination of the two. Consider first a pure economic interrelationship. Whether to catch more this year or postpone harvest until next year is, in part, determined by the relative values of the harvest in the different time periods. To take an extreme case, if the decision to harvest now is based on a high value fresh home consumption use but the allocation decision puts harvesting in the industrial sector, then the rationale for present use may be lost. The value of current catch in that use is less than can be obtained from postponing the harvest.

There can be a joint biological relationship because of differences in by-catch rates. If the decision to harvest 100 tons of X and 50 tons of Y is based on a low by-catch rate of Y with X using one type of gear, but the allocation decision allows most of the harvest by another gear with a higher by-catch rate, the ABC of species Y will be surpassed. Although these examples are quite simple, they demonstrate the point quite clearly. The conservation and allocation decisions simply cannot be separated.

Even if one ignores the fundamental link between the two questions, the problems of biological variability and determining the desired rate of the change in stock size raise other important issues with this artificial dichotomy. Expecting biologists to come up with a single number for an ABC is, quite simply, asking for more than they have, or are likely to have, the capability to do. Even if the goal is to keep a constant stock, given the uncertain knowledge of recruitment, natural mortality, and individual growth, and how catch and discards can be translated into fishing mortality, the best that can be done will be to produce a range of catches that will likely not change stock size. In some cases, it may be possible to estimate a probability of success to each catch size in the range.

If this is the best that can be done from a biological point of view, then perhaps the Councils should be given more than just allocative authority. With these uncertainties, there is a trade-off between harvest level and success in maintaining stock size. Further, since resolving it involves the range of social, economic, and cultural aspects of management, one might argue that the Councils are the proper place to address it. Let NMFS prepare the range and then let the Councils decide where along it the actual allowable harvest should be. The council can take the assigned probabilities of success into account so as to have a basis for trading off a lowered probability of maintaining the stock size next year and the probable extent of the potential error against the benefits from increased harvest this year.

The issue is even more complex when it is clear that increases in stock size are necessary or desirable. There will certainly be some trade-offs between the rate at which the stock is augmented and the achievement of other important fishery management objectives. It is hard to see how a decision on these trade-offs can easily be made in terms of the conservation and allocation dichotomy. One way to get around the problem would be to let the Council specify the growth path it desires and then NMFS can provide an estimate of the range of catch limits and associated success probabilities that will likely achieve that path.

The panel has identified a significant problem that occurs all too often in both national and international management organizations the world over, the Fishery Management Councils being no exception. Allocation issues can become so pervasive that conservation issues are pushed to the background. However, for the reasons discussed above, the suggested cure may be worse than the problem itself. Perhaps a better way to solve it would be to take a broader vision of what is really involved in producing good management. The panel seems to think that the essence of management can be stated in terms of two questions: 1) How much should be caught? and 2) Who should catch it?

Using this view and their suggested separation of authority, each Council is transformed into little more than a harried referee in a "battle royal" of all potential harvesters. Their chances of success are probably about the same as a single referee in a free-for-all with ten professional wrestlers. To be fair to the panel, I'm sure they envision a more significant role for the Councils, but with the emphasis on allocation, it is sometimes difficult to discern just what that role is expected to be. I strongly suspect, however, that the original authors of the MFCMA and the current members of the U.S. Congress expect more from the Councils than merely acting as organizations with the authority to cut up the fisheries pie.

I would propose a slightly modified version of the essence of management. Instead of two, I would use the following three questions: 1) How much should be caught? 2) How should it be caught? and 3) Who should catch it?

Because the National Standards man-

date efficiency in the utilization of fishery resources, the second question must be an integral part of a fisheries management plan. The Council must give consideration to the cost of harvesting fish, and, where practicable, give precedence to more efficient means of harvest.

Using a strictly economic point of view, the answer to these three questions are simultaneously determined by the solution of the economically efficient harvest time path. But given the difficulty of determining that solution, and in the interest of solving real-world fisheries management problems, including the one posed by NOAA's Blue Ribbon Panel, they can easily and quite rationally be looked at sequentially.

Once an ABC is specified, it is then necessary to determine with what gear, at what location, and at what time the fish should be harvested. Given the emphasis in the National Standards, consideration must be given to that harvesting approach that will produce that overall harvest as efficiently as possible, taking implementation and enforcement costs into account. Unless all industry participants use the same gear and can operate in an identical manner, the question of how the ABC should be caught will provide some preliminary answers to, or at least some important information on, the question of "who should catch it?".

If the Council feels that the allocation aspects of an economically efficient harvest plan are clearly inequitable and will likely produce long term injustices which cannot be compensated by other means, a more direct attack on the question of "who should catch it" will be necessary. Using the three questions as the basis for management will definitely put the allocation issue prominently on the Council's agenda, but it will also focus attention on other important issues of more national interest. This is in contrast to the panel's view of the Council's primary role as an arbitrator of parochial interests.

If the U.S. Congress and NOAA are determined to follow the panel's recommendation of a "separation of powers", it should be modified in the following way. NOAA and NMFS could still be given the responsibility of determining the ABC's for each fishery, but the expected response would be the range of catches and the associated probabilities discussed above. The determination of this range would be a joint biological and economic solution, taking into account the stochasticity of the mortality, catch, and recruitment characteristics of the stocks, expected output prices in various uses, expected harvesting and processing costs, the discount rate, as well as any objectives concerning stock growth rates provided by the Council. NMFS should be required to provide the range of catch limits for the next year, and, as an aid in long-term planning, for as many years into the future as existing data will allow.

The role of the Councils would be to: 1) Set the broad overall recovery plans for depleted stocks as an input into the work of NMFS in determining the ABC's (recovery plans that are significantly different from the economically optimal stock growth plan could be justified on some other grounds) and 2) determine the exact level of catch from the range provided by NMFS and how that harvest should be obtained.

Important issues for the first role are the rate at which depleted stocks can potentially be revived given their biological characteristics and the social and economic benefits and costs of the different paths to recovery. The important issues for the second role can be summarized in two questions: 1) Given the range of potential ABC's and the relative values of their probabilities of success, what is the appropriate trade off between extra catch today and success in achieving the stock recovery goals? and 2) What is the most effective and equitable way of obtaining a harvest less than or equal to specified ABC, taking into account harvesting, plan implementation and enforcement costs, and the financial and social effects on those who are, and are not, allowed to participate in the industry?

Both of these roles are obviously related to the biological attributes of the stocks, but they also involve economic, social and cultural issues, and as such, should be given to the Councils rather than to NMFS. The allocation issue is certainly a big part of the Councils' role, but it is not their entire reason for being.

The NOAA panel also had some strong words about the Secretarial review process. It recommended that review be limited to only the data, views, and comments which have been made a part of the official record, and be confined to the issue of consistency with the National Standards and other applicable law. The justification for this recommendation is the perception that the Secretary also reviews the policy judgments of the Councils. The speed and nature of the review process has been a source of contention since the inception of the MFCMA and, although not mentioned in the previous section, many of the current proposed amendments also deal with this controversial issue. Also, many of the amendments that have been passed since 1977 have tried, with varying degrees of success, to clarify and simplify the review process.

While it may be unpopular to argue for more power at the Federal level, in my opinion, the panel's appeals for a more restricted review process should be evaluated with care. Certainly an overburdening process can be costly and counterproductive to good, flexible fisheries management, but it is clear that there needs to be significant power at the top to insure appropriate consistency among the Councils (not that all Councils should have identical operations by any means) and to protect national resources against the somewhat parochial interests of the Councils. Therefore, any effort to restrict the Secretary's authority to review overall policy may place a severe limitation on the ability of the MFCMA to achieve good management.

There may be a problem with semantics here, however. If one reads the National Standards and Executive Order 12291 carefully, it is clear that plans are mandated to have a considerable amount of economic content in objectives, analysis, and the construction of the management regime. If the councils do not follow these mandates, the plans they produce should be subject to Secretarial disapproval. If this is what the panel meant by confining the review to issues of consistency with other applicable law, then I fully support their recommendation. However, I believe the panel, and certainly many others, would require a much less severe test of consistency, especially with the economic issues of Executive Order 12291. Some of the issues

that I would say are mandated by that Order, others may interpret as unnecessary interference in the policy making powers of the Councils.

The panel also recommended changing the way Council members are appointed. Instead of having governors from the various states make the nominations, the panel would allow any interested party within the geographical boundary of a particular Council to make a nomination. Then a nine-member national review board would review the background and experience of all nominees and present a list of the three best qualified individuals for each position to be filled to the Secretary. The purpose of the change would be to reduce the likelihood of purely political and hence less than qualified appointees.

As should be obvious from the first two sections of this paper, the make up of the Councils is critically important to the operation of the whole system. Therefore, the manner in which they are selected is a very serious issue. The proposed change would likely increase the number and range of interests of the individuals who would be considered for nomination, although there is nothing to prevent anyone from making suggestions to the governors under the existing arrangement. In one sense, of course, the change will only be moving the politicization back one step in the decision making process. The slate of nominees put forward will depend upon the makeup of the review board. The recommendation stresses that the board have broad geographic and user representation. Because of the problem of industry members regulating themselves discussed above, it is important that both the review board and the Councils themselves contain a balance of knowledgeable nonindustry individuals such as academics, recreational users, and consumers, as well.

The NOAA panel also makes two other recommendations related to subjects already covered in the discussion of amendments. First it recommends that any impediments to the implementation of limited entry be removed from the MFCMA and that Councils should seriously consider it as a management tool. This suggestion, if accepted, would obviously increase the chances of the MFCMA producing economically rational management.

They also recommend eliminating all barriers to full domestic utilization of all fisheries under MFCMA jurisdiction. They feel that by removing such impediments such as trade barriers, restrictions on the type of vessels that can be used, etc., the U.S. fishing industry can legitimately and successfully compete with foreign fishermen on the market. Stated in these terms, this argument certainly makes economic sense.

Conclusions

Can the MFCMA, in its present form or with some of the proposed modifications, produce good (as defined in this paper) management? The answer to the question, phrased as it is, must be a qualified "yes." If individuals up and down the institutional structure wanted to include economic analysis and conclusions in the construction, implementation, and enforcement of management plans, for all practical purposes they could do so. There are some restrictions, such as the current limits on implementing fees, but they are not generally fatal. While they may preclude certain options, others, which are relatively good substitutes, are permissable. In addition, some of the proposed changes would remove or weaken these restrictions, and so they may be even less of a problem in the future.

Will the MFCMA, in its present form or with some of the proposed modifications, produce good (as defined in this paper) management? The answer to this question is "probably not." The reason for this pessimistic reply is that while the institutional structure will permit the development of good management, it has so much flexibility that it cannot guarantee the same.

There are two ways to bridge the gap between economic theory and practical fisheries management. First, all, or at least a significant proportion, of the critical participants must be convinced of the necessity of introducing rational economics into the system. Second, some of the flexibility in the system must be replaced with binding guidelines which can insure that economic principles receive appropriate attention and are properly balanced with biological, social, and political considerations.

There is some hope for the first of these. Meeting such as this at the American Fisheries Society, and the growing importance and increasing amount of economic analysis in NMFS and Council activities are important steps in improving the overall economic literacy throughout the system. But, quite frankly, there are still many participants who have little or no understanding of the important economic concepts dealing with determining catch levels and the regulations to achieve them. As long as this is the case, the system will not give appropriate attention to economics.

On the other hand, there are many in the system who understand economic efficiency issues only too well, but for political or social reasons, choose to ignore them. A Congressman with an important fisheries constituency, may be motivated to defer to proposals that may be of short-run benefit to the voters in their area, especially in times immediately preceding elections, rather than focus attention on the broader scope of good fisheries management. Similar behavior is possible, and is indeed happening, at all levels in the institutional structure. Improvements in the dissemination of economic information will likely have little effect on this behavior.

Therefore, because of the lack of economic knowledge itself and a lack of concern for its implementation in some quarters, if the system is to bridge the gap, then the institutional structure will have to be modified to mandate that appropriate attention be given to the economic realities of management. To be truthful, however, such a change will require little, if any, change in the MFCMA and other supporting law. A careful reading of the National Standards and Executive Order 12291 will show that much more emphasis on economics is required than is currently being achieved. The real issue is that no place in the system is pushing for a rigorous interpretation of these points of law or for their strict implementation. In essence, the gap between economic theory and practical fisheries management is blocked by the

nature of the system itself, and by the type of behavior it motivates on the part of many of the individuals in it. As such, the gap is unlikely to be bridged in the near future.

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Bridging the Gap Between Economic Theory and Fisheries Management: Can the MFCMA Produce Economically Rational Management? Discussion

JAMES E. KIRKLEY

Discussing the relationship between economic theory and fisheries management is a difficult task to ask of anyone. It is nearly impossible to do when the discussion is restricted to practical aspects. Given the complexity of such a discussion, Lee G. Anderson has provided an excellent discussion on the problems of managing fisheries with the MFCMA, particularly those relating to economics.

More important, I believe, is that Anderson has clearly identified and stated the problems which have limited the management of fisheries in accordance with economic goals and objectives. This has obviously been a source of considerable frustration among economists involved in fisheries management.

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Anderson poses one fundamental question about economics and management. The question is "Is it likely that sound and economically rational management will be produced?" in accordance with economic criteria. The criteria are concerned with proper use of fish and other resources over time with appropriate attention given to all related costs including harvest, programmatic, management, implementation, and enforcement costs. The answer offered by Anderson, and which I concur, is "Not very."

Two reasons why sound management will not be produced are given by Anderson. First, the institutional setting and industry structure hinders management. Second, the politically astute and powerful minorities force attention on self-serving interests or away from economic goals and objectives. These are the same problems identified in the literature on regulating industry (e.g., Buchanan and Tollison, 1984; Crain, 1979; Eckert, 1973; Sen, 1970; Hilton, 1972; McCormick and Tollison, 1981). Other reasons given in the literature for the failure of rational management include issue linkages or making trade-offs explicit among issues, conflicts of interest, and payment of managers and regulators. All of these would appear to be valid causes for the failure to achieve sound economic management of fisheries.

Anderson provides a comprehensive discussion of the institutional setting and structure by which fisheries are managed and regulated under the MFCMA. His paper, in fact, might be more appropriately titled "Collective choice, conflicting criteria, and agency theory in managing fisheries." He notes the existence of multiple objectives, which are often quite diverse; the fact that there are many agents and individuals which affect or are affected by fisheries management; and that, in practice, management is often something upon which all concerned can agree.

One aspect of the institutional setting which is properly accorded rigorous treatment in the paper is the relationship between the Fishery Management Councils and the National Marine Fisheries Service (NMFS). It is proposed that the relationship is one of animosity in which