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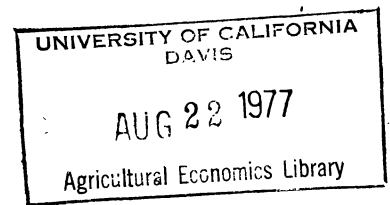
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CONSTRAINTS TO WELFARE GAINS UNDER EXTENDED JURISDICTION  
FISHERIES MANAGEMENT

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## Constraints to Welfare Gains Under Extended Jurisdiction Fisheries Management

The recent extension of the United States' fishery conservation zone to 200 miles, and the adoption of economic objectives for fisheries management in this zone make the consideration of welfare gains an important current issue. The economic objectives contained in the Fishery Conservation and Management Act of 1976 (FCMA) are especially noteworthy. It has been well established in both theory and practice that economic gains will not necessarily result from fishery management geared to the traditional biological objectives such as maximum sustainable physical yield (MSY). The maximization of social welfare requires the explicit consideration of economic values generated by fisheries, the private and social costs of exploiting and managing the fisheries, and the probable distribution of income resulting from fishery regulations. In addition, theoretical economic analyses must be tailored to statutory requirements and political necessities before economically sensible fisheries management will be achieved. To assure that this administrative and political process results in the realization of potential economic gains will be a long-term task for fisheries economists and administrators.

The received body of theory in fishery economics emphasizes the importance of free access to fisheries as a source of welfare loss. The theoretical argument has changed little since the publication of H. Scott Gordon's seminal article in 1954. Gordon argues that a competitive industry exploiting a common property fish stock will grow until all potential net economic return (or rental value of the stock) is dissipated. Fishing vessels which are privately maximizing their own profits will fail to

respond to the social costs of depleting the resource, and, as a group, will deplete the fish stock until the average cost of production rises to equal the market price of the fish. If the rate of fishing were lower than the competitive equilibrium rate, the fish stock would be more abundant and the cost of production per ton of fish would be lower. The ideal economic solution to the common property (or "externality") problem requires that the investment of capital and labor in the fishery be prevented beyond the point where incremental costs are justified by marginal social returns. There are a variety of institutional arrangements which could facilitate the achievement of the economically efficient production pattern, including administrative allocation of fishing licenses, fixed-price license sales, fishing license auctions, landings taxes, assignment of individual quotas to fishermen, and undoubtedly others (Christy).

The static economic efficiency theory has been extended to incorporate dynamic efficiency criteria by, for example, Gardner Brown and Colin Clark. Also, numerous case studies have applied variations of Gordon's theory to real fishery situations, and have uniformly found that efficient economic exploitation of fish stocks entails the maintenance of larger fish populations and smaller fishing fleets than would be achieved under free access competition (see, for example, Crutchfield and Zellner, Crutchfield and Pontecorvo, Gates and Norton, Huppert or Bell). By maintaining smaller fishing fleets and larger average fish stock abundances, an efficient economic management system would provide more real income to the nation than would either free competition or management for maximum physical yield.

Francis T. Christy, Jr. suggests that the total amount of economic yield lost through free access competition in the United States' fisheries is on the order of \$300 million annually. At 6% annual interest, the capitalized value of the lost economic yield is about \$5 billion. This represents an impressive potential gain in real national income, and should provide an incentive for greater efforts to achieve economic efficiency in fisheries.

#### Some Income Distribution Aspects

The body of traditional literature on fishery economics clearly emphasizes the inefficiency of free competition for fishery resources and prescribes economically efficient rates of exploitation. To a large extent, the policy prescriptions of the received theory rely upon an implicit assumption that the group or groups subject to the welfare arguments are well defined. In actual fact, there are several stances that might be taken in defining the constituent group. Each definition carries with it a different set of conclusions for United States policy. Three possible accounting frameworks which come immediately to mind are (1) the group of existing participants in United States fisheries, i.e., the domestic fishermen; (2) the domestic populace as a whole, dominated by consumer interests; and (3) the world population. Clearly, the fishery management policies which would be adopted to benefit the existing domestic fishermen most would differ from the policies that would most benefit the aggregate of domestic and foreign fishermen or which serves the population of the United States at the expense of foreign consumers and fishermen.

Although an interesting discussion could focus on the relative deservingness of foreign versus domestic interests, the FCMA is obviously intended to place U.S. citizens in a privileged position. It should be

noted, however, that maximizing domestic benefits from fishery resources in the Fishery Conservation Zone is not synonymous with developing a solely domestic fishery. Not only are some of the heavily exploited fishery resources presently utilized mainly by foreigners (such as Pacific hake and Alaska pollack), but it may well be that sunk investments in substantial vessel capacity coupled with lower wage rates make foreign exploitation an economically desirable alternative to development of domestic capacity.

Explicit economic cooperation is a growing possibility. Joint fishing arrangements between foreign interests and U.S. domestic companies are already beginning to appear. These arrangements take two forms: (1) the foreign processing vessels plan to buy fresh fish from U.S. fishing vessels, and (2) foreign companies invest directly in U.S. companies for the purpose of assuring a future supply of fish. In either case, the flow of fish from the U.S. zone to the foreign nation may proceed despite the declaration of exclusive fisheries jurisdiction by the United States. The United States can still benefit from the fishery harvests by either harvesting and selling the fish, by participating in a joint venture to harvest and process the fish on U.S. soil before shipping to a foreign nation, or by simply charging a fair price for the foreign harvests.

Domestically, the welfare gain estimated by Christy could be distributed in a number of ways. If existing participants are freely given property rights to the annual yields of the domestic fish stocks and the exploitation of these stocks is rationalized through limited entry programs, the gain could accrue solely to the aggregate of fishermen. If, on the other hand, the marginal social value of the fish stocks is extracted from fishermen through taxes or license fees, the net economic

value of fisheries could accrue, through the public treasury, to the U.S. populace as a whole. Innumerable combinations of fees and licensing arrangements could be devised to distribute any proportion of the potential economic value to both the fishermen specifically and to the public generally. In any case, the realization of the potential economic value is predicated on a reorganization of existing institutions. Such reorganization removes the long-observed right of all citizens to fish commercially, and replaces it with a conditional permit to fish bestowed upon the chosen fishermen by the Federal authorities. Regardless of how this transformation is engineered, some fishermen are bound to be excluded from traditional fisheries in order to allow the remaining participants (or the general public) to enjoy the fruits of economic efficiency. A measurable increase in net income to some existing and all future participants may not be socially desirable, however, if it is accomplished only at the cost of impoverishing some segment of the existing fishery or eliminating potential future income of yet unborn fishermen. Thus the existing economic structure may combine with official reluctance to deal with difficult distributional issues and prevent the development of institutional arrangements which allow net economic benefit to be enjoyed from the nation's fisheries.

#### Potential Barriers to Welfare Gains

Because the Fishery Conservation and Management Act provides the most important new set of institutions in the domestic fishery arena, most of my comments will focus on it. Nevertheless, the new fishery management councils and the Secretary of Commerce's authority to promulgate new fishery management regulations must be viewed as an additional layer of Federal jurisdiction imposed upon established state/local and

international institutions. States retain fishery management authority within their boundaries (i.e., within 3 miles of shore) and highly migratory species of fish, primarily tunas, remain within the institutional framework of international fishery management agreements. Also, many of the important species of fish exploited by U.S. fisheries do not obey the artificial political boundaries of the Fishery Conservation Zone. On the West Coast, trans-boundary stocks include the several species of salmon in the Pacific Northwest, the northern anchovy stock, and several commercially and recreationally important pelagic fish stocks. In the New England region, the major demersal fish stocks range significantly into the Canadian fishery zone. Superficially, the FCMA appears to create the mythical "sole owner" envisioned by Anthony Scott and other economic theorists, but in reality, the Federal authority created by the Act is but one of two or more authorities now claiming some management rights to many of the fish stocks important to the U.S. fishing industry.

The lack of comprehensive, unified management authority and the resulting possibility for counter-productive jurisdictional disputes can be identified as a significant institutional factor constraining the potential achievement of economic efficiency in U.S. fisheries. Disputes between State and Federal authorities are likely to be of relatively minor significance due to the pre-eminence of the Federal authority (Sec. 306 of the FCMA). This is not to say that differences of opinion will be rare, but only that the ability of the Secretary of Commerce to overrule State management regulations within State waters should be sufficient to prevent any substantial economic losses through inadequate management control in fisheries occurring both within State waters and the Fishery Conservation Zone.



In the international arena, of course, there is no similar superior authority. Ideally, the independent nations participating in a given fishery would reach agreement upon optimal management measures and would subsequently share in the economic benefits of efficient exploitation. In most cases, such agreement would probably have to rest upon improvements in the welfare of each participating nation. Crutchfield has noted that most major international fisheries in the north Atlantic and north Pacific involve sufficient waste that rational management could provide adequate welfare gains to a large number of participating nations (p. 67). Nevertheless, the institutions for implementing international management authority, even with unanimous agreement about its desirability, are either nonexistent or poorly organized in important cases. Also, it is unfortunately true that some nations may choose to engage in strategic behavior designed to gain them greater shares of the world's resources in the long run, rather than to join international agreements which tend to reinforce existing shares as a compromise position.

Although some nations may find unilateral or multilateral agreements beneficial even without full participation by all nations involved in the fishery, economic theory suggests that such actions may be disadvantageous. According to Lee Anderson, if one nation reduces fishing effort in order to approach a unilateral optimum fishing level, there is an automatic incentive for other nations to increase their rates of fishing. It is even possible that the resulting decrease in available fish to the original nation could be of sufficient size that in the new international equilibrium the nation loses economically (Anderson, p. 58). Under such circumstances, international cooperation would appear to be an all-or-nothing proposition. On the other hand, most shared fisheries important to the United States may be sufficiently controllable unilaterally to allow the achievement of some welfare gains without full international cooperation.

Some specific provisions of the FCMA and current implementing regulations may also act to retard progress towards economic efficiency. The FCMA specifically prohibits the Secretary of Commerce from collecting from domestic fishermen fees which exceed the administrative costs incurred in issuing permits to fish. This provision effectively bars any limited access program attempting to restrict fishing effort through imposition of user charges or attempting to extract some of the net economic yield from the fishing industry for support of scientific research, management costs or general budget items. Without charging fees sufficiently high to extract rent or discourage excessive investments, a limited access program can still be implemented and can result in substantial economic efficiency benefits. But the distribution of the benefits is a rather non-negotiable matter; the fishermen (or the owners of permits to fish, if not fishermen) will "get the swag." Depending on one's sense of distributive justice, this could be bad or good. But, as Francis Christy observes, the fact that the general taxpayer will be footing the bill for research and management but not receiving any corresponding return from the public fishery resource, the Office of Management and Budget may feel compelled to severely limit the funds for fisheries research and management.

The level of foreign fishing fees levied under the authority of Sec. 204 of the FCMA is to be established by the Secretary of Commerce in consultation with the secretary of State. The Act imposes no rigid limit on the fees charged to foreign interests, but the fees are to be reasonable and apply nondiscriminatorily to each foreign nation. The fees adopted for the period starting March 1, 1977 include a permit fee of \$1.00 per gross registered ton for each fishing vessel, \$0.50 per gross registered ton for each processing vessel, and a flat \$200 annual fee for each vessel assisting or aiding the fishing operation. Also, a poundage fee of 3.5%

is levied against the ex-vessel value of the foreign harvests. As of May 21, 1977, nearly \$10.3 million dollars had been collected from these fees; \$785,087 in permit fees, and \$9.5 million in poundage fees. In adopting the fee schedule, the Department of Commerce decided not to use the fees as a management tool to restrict foreign fishing, but did want to cover an appropriate part of the management costs related to foreign fishing. It was never made clear what the "appropriate part" of the costs were, but it is clear that the low poundage fee would not extract a significant portion of the total value of the foreign catch, estimated to be \$271 million at 1977 prices.

The decision not to use the foreign fees as a management device or as a means to appropriate a significant part of the resource value has important ramifications. Under the constraint of minimal foreign fishing fees, the domestic optimization of fishery management may rely upon second-best measures, including an excessive emphasis on replacing foreign fleets with domestic fleets--even in those fisheries which are most efficiently prosecuted by foreign fleets. Also, some fisheries will continue to be dominated by foreign interests. In these, the combination of low fees and rationalized management could eventually result in a transfer of economic rents from the United States to foreign fishing firms. A theoretically sound fee structure would place a tax on harvests equal to marginal increase in fishing costs due to the reduction in fish stocks by harvesters (see Smith, p. 194, for example). While there may be compelling political and economic reasons for not charging such a tax to domestic fishermen, the extension of this policy to foreign interests will certainly reduce the welfare gains enjoyed by the United States citizens under extended jurisdiction fishery management.

Other possible constraints to the achievement of welfare gains arise from the regional orientation of the fishery councils and the make-up of the councils themselves. It seems highly probable that each Regional Fishery Management Council will tend to consider only regional income gains. Because the political and social, if not economic, importance of the regional fishing industry will loom larger than national concerns, a parochial view of management on the part of councils could easily lead to management plans aimed at improving the economic wealth of regional segments of the industry at the expense of the nation as a whole. Such a tendency could, for instance, be manifest in plans requiring tremendous inputs of research and administrative manpower, while requiring little or no restrictions on commercial fishing to improve efficiency and calling for no fees whatever to be paid by the beneficiaries of the plan.

Countering this tendency are the national objectives and standards of the FCMA. Specifically, the optimum yield of each fishery is to be defined such that the greatest overall benefit to the nation is served. Theoretically, such a yield is defined with a heavy weighting given to consumer interests, emphasizing larger sustainable supplies of fishery products and prices as low as possible under current cost structures. Also, the national standards relating to efficiency and cost minimization, if vigorously enforced by the Secretary of Commerce, would constrain the ability of Regional Fishery Management Councils to act in a nationally non-beneficial manner.

One additional observation on the likelihood of fishery management being focused on local, rather than national, interests is appropriate. By and large, the appointed membership of the councils is dominated by industry spokesmen and others having long time connections with past fisheries management bodies. While this is only natural under the circumstances,

the new economic objectives and initiatives called for under the FCMA may not come easily from such management bodies. Experienced fisheries scientists and administrative officials in the United States have generally been reluctant to tackle issues of income distribution and economic efficiency. To many, limited access is anathema on ideological grounds. Witness the "Alaska limit" purse seiner, the sail-powered clam dredge, the grossly over-capitalized Pacific Northwest salmon fisheries. Combine this with the pronounced tendency of labor unions to maintain employment above technologically necessary levels, and the general interest of established industry members to protect entrenched interests, and there may be substantial resistance to the adoption of measures which improve fishing efficiency and which sufficiently reduce or retard over-capitalization.

A final constraint to improved economic performance of fishery management is the woefully inadequate existing economic knowledge of recreational fisheries and the consequent lack of serviceable economic models and measurements addressing the trade-offs between recreational and commercial fisheries. On a theoretical plane, enjoyment of fishing as recreation has as much claim to the attention of economic analysis as the consumption of fish as a commercial product. As a practical matter, the marine recreational activities have a substantial economic value. It should be expected, therefore, that a significant source of national welfare gain would accrue from optimal treatment of recreational fisheries.

One reason for the dearth of economic studies on recreation is the difficulty encountered in applying traditional competitive market theory. The output in the recreational fishery is not satisfactorily valued at

market prices. Economists have emphasized that recreationalists are not buying fish, but are paying for an experience, one aspect of which is the capture and consumption of fish. And a commonly espoused institution in recreational fishing is free access to the resource.

Lacking adequate price data, demand curves can be estimated by the travel cost method (see Brown, W. G. et al) or the direct interview method (see Meyer). The resulting estimates provide a means of valuing fishing trips, but do not necessarily yield information pertaining to the marginal value of fish to anglers. Special efforts must be made to estimate marginal values so that recreational and commercial values can be converted to the same economic units.

Further confounding the ability of fishery managers to adequately balance recreational and commercial values is the fact that the optimal yield and optimum stock size may be radically different for a recreational fishery than for a commercial fishery. As noted by John Radovich, recreational fishing may be best with fish stocks much closer to virgin levels than to the level required for maximum sustainable yield. To the extent that a high catch-per-angler-day is a valuable aspect of recreation, any attempt to optimize a commercial fishery will be of detriment to recreation. Also, large "trophy" fish are more abundant in a large, older fish population. Finally, there is some evidence that recreational fish have a greater tendency to strike angler's baited hooks when fish populations are closer to maximum abundance.

On the assumption that management authorities will take quantified, commercial value as more important than unquantified, recreational values for fish, the lack of established, measured values of fish to the

recreational sector could result in substantial misallocations of fishery resources, thus reducing the welfare gain achieved under extended jurisdiction fishery management. The responsibility for solving this problem rests squarely on the academic and government economists involved in fisheries. The evaluation of all fishery sectors is, after all, the job of the practicing economists.

### Conclusions

The fact that several important constraints to welfare gains can be found in current institutions should not be received with overwhelming pessimism. Necessary, but not sufficient, conditions for improved economic performance of U.S. fisheries are created by the passage of the Fishery Conservation and Management Act of 1976. Among these conditions are (1) the establishment of Federal authority over areas of sufficient breadth to allow unified management; (2) creation of regional councils authorized to develop management plans with local industry cooperation as well as scientific advice; (3) specific economic criteria for fishery management plans; and (4) means to control foreign fishing harvests within the U.S. zone. Although there are some disturbing restrictions upon the use of economically desirable management tools (such as substantial fees or landings taxes on fishermen) and remaining opportunities for economically inefficient fishery management plans, the success of the management effort to achieve economic welfare gains will depend more upon the actions and attitudes of the fishery councils and Federal authorities than upon any rigid institutional constraints.

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