

Woods Hole Oceanographic Institution



ABSTRACTS OF READINGS IN FISHERIES
MANAGEMENT AND COMMON PROPERTY RESOURCES

by

Yoshiaki Matsuda

March 1979

TECHNICAL REPORT

Prepared with funds from the National Marine Fisheries Service under Contract #03-78-DO1-72 and additional support from the Pew Memorial Trust and by the Department of Commerce, NOAA Office of Sea Grant under Grant #04-8-MO1-149, and the Institution's Marine Policy and Ocean Management Program.

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Abstract

Since the passage of Public Law 94-265 - the Fishery Conservation and Management Act of 1976 - there has been increased awareness among the public and among academicians in the problems of common property resources. The literature reviewed and summarized here deals with a number of the major issues related to common property resource management, and with the particular management technique most often mentioned for fisheries: limited entry. As with any review of the literature, it is not inclusive; rather it attempts to cover the literature that is frequently referenced and/or basic to an understanding of common property resource management.

PREFACE

This research was prepared with funds from the National Marine Fisheries Service under Contract #03-78-D01-72, and additional support from the Pew Memorial Trust and by the Department of Commerce, NOAA Office of Sea Grant under Grant #04-8-M01-149, and the Institution's Marine Policy and Ocean Management Program. This report is a partial fulfillment of the Negotiated Research Contract for the National Marine Fisheries Service. The author wishes to acknowledge Drs. Robert Edwards, Susan Peterson and Leah Smith for offering me the opportunity, criticism and support; Drs. Richard Hennemuth, Keith Smith and James Kirkley for their constructive criticism; Mrs. Ann Martin for all her help in preparing this manuscript; and Miss Kaleroy Hatzikon, Lynda Davis, Jane Zentz and Catherine Ferreira for typing the report. Acknowledgment is also extended to Librarians Judy Brownlow and Karin Negoro and other enumerators who kindly provided the information for me.

Acheson, J. M. 1975. Fisheries Management and Social Context: The Case of the Maine Lobster Fishery. Trans. Am. Fish. Soc. 104(4): 653:668. ✓

The author discusses the importance of social context to fisheries management. Fisheries management agencies have traditionally promoted regulations with only the resource in mind. All too often, the regulations proposed have conflicted so strongly with basic social and cultural features of fishing communities that they have been massively resisted. Here it is argued that opposition to fisheries regulations would be minimized if such regulations were congruent with the existing social and economic system. Five kinds of management proposals designed to decrease fishing effort in the Maine lobster industry are discussed against the background of certain key institutional features of coastal communities. Survey results suggest that any attempt to decrease fishing effort by a moratorium on fishing, by taxation, or by the imposition of many biological controls (e.g., raising the legal carapace size) would be resisted strongly. On the other hand, a trap limit and limited entry scheme are consistent enough with some institutional features - especially the system of fishing territories - that they would receive substantial political support. However, the lobster industry in Maine is so heterogeneous that no managerial proposal would be supported universally.

Adasiak, A. 1978. Experience with Limited Entry: Alaska, Paper presented at the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

This paper reviews the goals and performance of the limited entry program in Alaska beginning in 1973 and discusses the present problems and future prospects. At present 29 fisheries are under entry limitation in Alaska. Goals, explicitly or implicitly, include the intention of shifting power from processors to fishermen, minimum social dislocation based on percent of income earned from the fishery and permit transferability, a professionalized and diversified fleet, economic health and stability, conservation and sustained yield management and buyback.

Some apparent results are that financial opportunity and the bargaining strength of fishermen has increased; social, nonpecuniary handling of permits is operative; the price of entry permits has increased rapidly, and an exclusive "rich men's club" has been created. Major problems pertain to lack of information, complexity, the problem of part-timers vs. full-timers, legal constraints, allocation criteria litigation, the litigation workload, entry permit prices, community disruption, program monitoring, and effects on non-limited fisheries. Judging by Alaska's experience, the political reality for establishing a limited entry system depends on the impetus of a crisis or a disaster.

Agnello, R. J. and L. P. Donnelley 1975. Property Rights and Efficiency in the Oyster Industry. J. Law Econ. 18(2):521-533.

The significance of property rights for one aspect of economic efficiency, labor productivity, is empirically tested, using data from the U.S. East and Gulf coast oyster industry.

The findings suggests that private property rights in general make a significant difference in a state's average labor productivity in oyster harvesting. Common property rights are associated with low labor productivity resulting from disinvestment, congestion, over-exploitation and government restrictions. Since the costs of enforcing private rights do not seem to be a serious problem for sessile species in intertidal coastal waters, considerations other than efficiency are used by states relying upon common property for the oyster industry.

Alaska Commercial Fisheries Entry Commission 1974. Proposed Regulations Limited Entry. Report to the Fishermen of Alaska, July 1, State of Alaska, Juneau.

These proposed regulations for issuing permanent entry permits into some Alaskan fisheries were prepared by the Commercial Fisheries Entry Commission, the State of Alaska, and addressed to the fishermen of Alaska. Fisheries proposed for limited entry in 1975 were all salmon seine and gill net fisheries in Alaska, except those in the Arctic-Yukon-Kuskokwim area. An entry limit on the power troll fishery was also proposed.

The commission made these proposals after sponsoring more than thirty public meetings during the previous year to discuss limited entry and get fishermen's views on how best to apply it to different fisheries. The Commission planned to adopt final regulations after reviewing public testimony and making adjustments and revisions.

Alaska Governor's Study Group on Limited Entry 1973. A Limited Entry Program for Alaska's Fisheries, State of Alaska, Juneau. 345 pp.

This study was the first large-scale effort by the State of Alaska to gather information on Alaska's commercial fishermen and on the commercial salmon fishery as it relates to them. This summary is to provide a factual basis for developing a program for limiting entry into Alaska's fisheries and applying that program to the overcrowded salmon fishery.

These are some highlights of Governor William A. Egan's plan for limiting entry. The plan is intended to make the fishery accessible to those who depend most on fishing. This limited entry program is for commercial fishing only, and does not affect sport fishing or subsistence fishing. It is to operate independently of the existing licensing system. Initially, the program is directed at the types of gear used to take salmon commercially; however, it is also designed to apply to any species for which fishing pressure is too great. The plan calls for the establishment of a full-time three-man Alaska Commercial Fisheries Entry Commission composed of a commercial fisherman, a fisheries management specialist and an attorney. Commissioners would be given broad powers to limit entry to the fisheries. This study attempts to provide a sound starting point for a legal and workable limited entry program for Alaska's fisheries. Questions and answers on limited entry are included.

Allen, W.R. Scarcity and Order: The Hobbesian Problem and the Humean Resolution. Soc. Sci. Quart. 57(2):263-275.

Our present world of scarcity without the resources adequate to provide all of our wants and needs is a world of limitations, constraints, and conflicts, requiring the bearing of costs and calling for communal coordination. Such consequences of scarcity have profound repercussions on and implications for the broadest and most elemental considerations of societal arrangements. Hobbes was the first writer to comprehend and explain the problem of order when men-selfish, passionate, fearful, aggressive, and yet rational- seek to satisfy their individual and diverse desire with scarce resources. But Hobbes's solution-introduction through a social contract of an absolute sovereign "To keep them in awe, and to direct their actions to the Common Benefit"-has been philosophically unsatisfying and logically-empirically dubious. However, to the economist the Hobbesian problem of order is not only real, but central.

Hume sought to reconcile private and public economic interest with societal arrangements, encompassing a competitive market mechanism, which tend to guide selfishly generated energies into coordinated ways beneficial to the community. Hume indicated that men act in partial awareness of personal advantage, but with individual time horizons too brief and interests too particular to ensure social efficiency and stability. The social order must be placed on firmer ground than a sense of sacrificial moral obligation to the collectivity or a mythical contractual requirement. Rather, what is required is that members of the group find constitutional constraints, societal conventions, and institutional options to provide approximation of optimal possibilities for individual gain and benefit-but with "the avidity and partiality of men..restrained by some general and inflexible principles." But "rules without a supportive ethic" may be fragile. In stipulating and enforcing minimal "rules of the game," if in nothing else, a society and its economy require some coercion: a "free" society cannot be in a situation of anarchy.

/Anderson, L. G. 1975. Optimum Economic Yield of An Internationally Utilized Common Property Resource. U. S. Fish. Bull. 73(1): 51-66.

A simple general equilibrium model is used to analyze the problem of the allocation of fisheries resources where common property or open access occur. The model was applied to three cases of one country, two countries and international models. It is possible to explicitly take into account the lost production of other goods. Improvements in terms of trade for either the exporter or the importer of fish can in some circumstances lead to a decrease in welfare; and attempts at unilateral management can lead to a decrease in welfare, depending on the way in which the other country's fishing industry reacts. The author presents three conditions for maximum economic yield (MEY) of an internationally utilized fishery under free market conditions, open access and open-access with free trade. Assuming the willingness of government to negotiate in an open and far ranging manner at zero cost; free trade in all goods; regulation methods that are not at the expense of efficiency, and a physically independent fish stock that is available only to two countries, the discussion showed that the international MEY of the fishery can be reached.

Anderson, L. G. 1976. The Relationship Between Firm and Fishery in Common Property Fisheries. Land Econ. 52(2): 179-191.

The author shows the relationship between firm and industry in a common property fishery and compares and contrasts it to the standard analysis. Fishing effort is considered as the output of the vessels. Formulated in this way, the model provides for a more explicit and hence empirically meaningful model than does the standard analysis based on catch rate. Use of the model can provide insight that is necessary for the proper regulation of a fishery composed of independent vessels.

Anderson, L. G. editor 1977. Economic Impacts of Extended Fisheries Jurisdiction. Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, 428 pp.

This volume contains all the papers presented at the conference on Economic Impacts of Extended Fisheries Jurisdiction held at the University of Delaware in April 1976. The book is divided into six sections: 1) international aspects of extended jurisdiction; 2) optimum economic yield and extended jurisdiction; 3) industry aspects of extended jurisdiction; 4) practical management problems; 5) optimal control and fisheries management; and 6) discussion.

The first section includes: World-wide economic aspects of extended fishery jurisdiction management, by Frederick W. Bell; Canada and Fisheries Management with Extended Jurisdiction: A Preliminary View, by Gordon R. Munro; Conditions for Effective Fisheries Management in the Northwest Atlantic, by Giulio Pontecorvo, Douglas M. Johnston and Maurice Wilkinson; Law of the Sea Negotiations and Extended Jurisdiction, by James A. Storer; The Management of Foreign Fishing with Reference to the New England Herring Stocks, by Lars Vidaeus and Virgil J. Norton; and Anadromous Species and Extended Jurisdiction, by R. Bruce Rettig and Richard S. Johnston.

The second section contains: Limited Access Systems Under the Fishery Conservation and Management Act of 1976, by Francis T. Christy, Jr.; Production Relationships Among Interrelated Fisheries, by Richard J. Agnello and Lee G. Anderson; Fee Management Systems for the Northwest Atlantic, by James A. Wilson and Robert C. Anderson; Some Aspects of Optimal Timing of Intraseasonal Catch, by Richard J. Agnello and Lawrence P. Donnelley; and Fishing Boat Income, Capital and Labor: A Distributional Study of a New England Port, by Leah J. Smith.

In the third section: Marketing and Distribution Problems With Extended Jurisdiction, by A. Desmond O'Rourke; and Domestic Investment in Harvesting and Processing Sectors Required To Utilize Fish Stocks Available Under Extended Jurisdiction, by John Vondruska.

The fourth section: Instituting a Management Regime for the Prawn Fishery of the Northern Territory of Australia, by Parzival Copes; From Economic Theory to Fisheries Policy: Conceptual Problems and Management Prescriptions, by Daniel W. Bromley and Richard C. Bishop; and Incorporating Economic Considerations into Practical Fishery Policies, by C. Bruce Austin.

The fifth section: Control Theory in Fisheries Economics: Frill or Fundamental? by Colin W. Clark; A Management Model for a Multispecies Fishery, by I.E. Strand and D. L. Hueth; and Optimal Fishery Management Under Conditions of Uncertainty, by Tracy R. Lewis.

The final section contains two reviews of the conference as a whole, one by an economist, James A. Crutchfield, and the other by a biologist, Dayton L. Alverson. In addition there are commentaries on several papers.

Anderson, L.C. 1977. The Economics of Fisheries Management. The Johns Hopkins University Press, Baltimore and London, 214 pp.

The rational exploitation of fisheries has many aspects - biological, legal, political, and economic - each of which has given rise to voluminous literature. However, no clear, concise discussion of the economic aspects exists, because the materials are dispersed. This is a first attempt to present these materials in a complete and detailed manner, yet one that the diligent non-economist can understand.

This book on the economic theory of fisheries exploitation presents a brief introduction to the basic principles of economics important to the study of fisheries, and gives an economic analysis which includes the concept of equilibrium in a fishery. More intricate economic models of fisheries exploitation are used to consider the effects of more complex population dynamics and the concepts of a maximum social yield, of an international maximum economic yield, of multi-species and interdependent fisheries, and of formal dynamic models. A general discussion of types of fishery regulation focuses primarily on their economic aspects. Some recent empirical studies are introduced, and the author shows how the theory of the previous chapters can be used to provide useful information.

Anderson, T. L. and P. J. Hill 1975. The Evolution of Property Rights: A Study of the American West. J. Law Econ. 18(1): 163-179.

The effects of property rights and the way they are assigned, enforced, and transferred, on the allocation of resources and hence the amount and distribution of output are examined. Assuming that the social arrangements, laws, and customs which govern asset ownership are established on the basis of variables endogenous to the economic system, such as demand, factor endowments and technology, the authors develop a theory of property rights evolution. On the benefit side of an individual's investment decision, the value of the asset and the probability of losing the right to use that asset rises with the degree of definition and enforcement activity. On the cost side are the production function for such activities and the opportunity costs of resources devoted to definition and enforcement. Technological change on lower resource prices increases property rights activity.

Empirical results suggest that data from the history of the American West is consistent with the theory: when the benefits increased or cost decreased, individuals increased the amount of time and resources they devoted to definition and enforcement of rights to land, water, and livestock. When declining livestock and land values decreased the marginal gain, there was a reduction in enforcement activity.

Anderson, T. L. and P. J. Hill 1976. The Role of Private Property in the History of American Agriculture, 1776-1976. Am. J. Agr. Econ. 58(5):937-945.

The evolution process has tempered the structure of property rights in the agricultural sector; the authors discuss how these rules have affected resource allocation. Six periods in American agricultural history are examined: the adjustment of new conditions in colonial America, the formation of a national land policy, westward expansion, the closing of the frontier, the new role of government, and the recent environmental movement.

Early in the history of this nation a firm basis was laid for an efficient allocative mechanism in agriculture—a property system that provided strong incentives for increases in production. Between colonial times and the first three quarters of the nineteenth century the main focus was on defining and enforcing property rights in inputs which was instrumental in directing the course of private property rights, especially to land. From the last quarter of the nineteenth century until the present, the primary concern of the farmer has been with the establishment of private property rights in a larger share of the national income; again these efforts were influential in setting the direction of federal policy. Now with the rise of water and land use planning, the agricultural sector is again concerning itself with the definition and enforcement of rights in inputs. Concerns for equity have increased transfer activity accompanied by government regulation.

Anonymous 1973. Alaska's Limited Entry Law, A Summary: What It Means to You. Alaska Seas and Coasts 1(3):1-3, 7-8.

This summary describes Alaska's limited entry law. In 1972 Alaska's voters approved, by a four-to-one margin, a constitutional amendment enabling Gov. William A. Egan and the state legislature to enact limited entry. The basic objective of the legislature was to develop a program that would stop gear expansion; allow for new entry, avoid paralyzing the normal, necessary transitions between gear types and between areas; pass the tests of the courts, and place as small a hardship as possible on all fishermen. Finally, it had to be politically acceptable.

The bill established an Alaska Commercial Fisheries Entry Commission which would regulate entry into all commercial fisheries of the state by issuing interim-use permits or entry permits to qualified individuals.

This describes the limited entry law, focusing on responsibilities and duties of the Commission, permits, eligibility of permits, maximum number of permits, issuance of permits, terms and conditions, fees for permits, transfer of permits, buy-back fund, optimum number of permits, some common misconceptions.

In addition, this newsletter includes "Fishermen's Forum (pages 2-3)" which deals with questions and answers on the limited entry law.

Anonymous 1977. Fisheries Symposium 1977; Symposium on the Fishery Conservation and Management Act of 1976. Washington Law Review 52(3):427-745.

The articles in the Symposium on the Fisheries Conservation and Management Act of 1976 held at the University of Washington in 1977, are included in this review: The Fishery Conservation and Management Act of 1976: First Step Toward Improved Management of Marine Fisheries, by Warren Magnuson; Potential Conflicts Between a Future Law of the Sea Treaty and the Fisheries Conservation and Management Act of 1976, by Jon Jacobson and Douglas Cameron; Enforcement of the Fishery Conservation and Management Act of 1976: The Policeman's Lot by Eugene Fidell; Fishery Management and the General Welfare: Implications of the New Structure, by Giulio Pontecorvo; The Fishery Conservation and Management Act of 1976: Management Objectives and the Distribution of Benefits and Costs, by Francis T. Christy; Recapture of Economic Rent Under the FCMA: Sections 303-304 on Permits and Fees, by William T. Burke; Economic Dimensions of Fees and Access Control Under the Fishery Conservation and Management Act of 1976, by Robert Anderson and James Wilson; and The Role of Conservation and Fishery Science Under the Fishery Conservation and Management Act of 1976, by Dayton L. Alverson.

Anonymous 1976. Legal dimensions of entry: Fishery Management. William and Mary Law Review 17: 757-779.

The constitutional objections to the exclusionary theory of limited entry are reviewed. A limited entry program is subject to at least three constitutional challenges. The equal protection clause challenge would assert that the method by which access to the fishery is allocated unreasonably discriminates between the persons willing to participate. The due process claim would allege that liberty (the right to fish) and/or property (the fish or fishing gear) were being taken without satisfying due process standards. The takings claim is a variant of due process; the fisherman would assert that the regulatory scheme resulted in a taking of his property for public use without compensation.

Limited entry may be implemented through the use of licenses, stock certificates, or user fees. Two legal considerations underlie implementation of each of these alternatives. These are 1) creation of a new form of property in the right to fish and the attributes of the property; and 2) allocation and distribution of the newly created property. The major problems facing limited entry are not legal but rather are practical and political.

Asada, Y. 1973. License Limitation Regulations: The Japanese System.
J. Fish. Res. Board Canada 30(12): 2085-2097.

This paper reviews license limitation regulations in Japan, where the major fisheries are controlled. A fishing license legally exempts an individual from those prohibitions imposed for conservation purposes or for the maintenance of order in the exploitation of fishing grounds. Licenses are subject to restrictions in respect to area fished, closed season, vessel tonnage, equipment and power, minimum size of fish, and others.

The number of licenses issued has increased in only a few fisheries. In several instances their number has been reduced when exploitation seemed too high; in some cases vessels have been transferred to other fisheries; in others those phased out have been compensated by those remaining. Since renewal is nearly assured, the license acquires value, and is used as security for investments and loans, although there is no fee charged for the licenses.

Although the licensing system in Japan is regarded as successful, some improvements are needed. A tonnage supplement system is proposed to reduce the effects of increase in fishing power resulting from the use of larger and more efficient vessels within the licensing system.

Ashby, F.R.S. and M. Anderson 1976. Studies in the Politics of Environmental Protection: The Historical Roots of the British Clean Air Act, 1956: 1. The Awakening of Public Opinion over Industrial Smoke, 1843-1853. ISR 1 (4): 279-290.

Air is a 'free good' which nobody owns; therefore it will not be protected from pollution by the voluntary efforts of individuals for protection costs money. If it is to be protected, intervention has to come from the state, and if the state is to intervene, three conditions must be satisfied: 1) the cause of the nuisance must be understood scientifically and there must be a practicable technology for abating it; 2) it must be politically practicable and advisable to bring in laws or regulations to abate it; 3) there must be practicable means for surveillance over the laws and regulations and recourse to courts in cases of infringement.

This is the first of three articles about the campaign to abate smoke in the cities of England. It began early in the 19th century and culminated in the Clean Air Act, 1956. Between 1844 and 1850 no fewer than six bills were introduced into parliament to compel furnaces to 'consume their own smoke'. All failed although enough was known about the science and technology of combustion to justify legislation for furnaces used to raise steam power. In 1853 Palmerston succeeded in putting on the statute books the first really effective clean air act for the metropolis of London. It did not cover dwelling houses; the campaign to bring these under the law had to await improvements in the design of domestic grates. It was during the decade 1843-1853 that the public conscience was awakened to the need for laws to protect the environment against pollution.

Bell, D. M. 1978. Gear Reduction/Buy-Back Programs in British Columbia and Washington State. Paper presented at the Workshop and Conference of Limitation of Entry into Fisheries, Institute for Marine Studies, University of Washington, May 8.

The British Columbia experience with a buy-back program and the Washington state experience with a gear reduction program are reviewed, compared, and evaluated for future prospects.

The British Columbia program is an example of a broadly based cooperative industry effort and represents only one phase of a comprehensive program dealing with a reduction in fishing effort for the entire salmon fishery, while the Washington state program provides economic assistance for fishermen who were adversely affected by a federal court decision (the Boldt Decision of 1974 - Indians are entitled to 50% of the salmon harvest...) and is much narrower in scope than the British Columbia program.

In addition to Indian/non-Indian conflicts, a substantial number of vessels involved in the both programs are moving into the salmon fisheries of adjacent political entities. The Washington state department of fisheries is developing a data base of socio-economic information for salmon fishing in the state of Washington to use as a basis for effective management decisions.

Bell, F. W. 1972. Technological Externalities and Common Property Resources: An Empirical Study of the U.S. Northern Lobster Fishery. J. Pol. Econ. 80(1): 148-158.

Quantitative analysis is used to demonstrate the effect of technological externalities on the production of northern lobster, a common-property resource. The results show that an increase in effort of 100,000 traps fished will depress landings per trap fished by 2.4 pounds. Because of this technological externality and the maximum sustainable yield (MSY) from the resource, the cost functions of northern location are different from normal cost functions. First, the technological externality produces a rising-cost industry throughout expansion, in contrast to manufacturing industries where long-run average costs first decline and then increase. Second, after reaching MSY the average cost function bends backward, since additional effort produces a reduction in output at higher unit costs. As shown by Gordon (1954), the industry will produce so as to equate average revenue to long-run average cost. Approximately one half of the present fishing effort would be needed to achieve economic efficiency or marginal cost pricing (where marginal cost equals to marginal revenue). Unless entry to the common-property resource is controlled, further increases in price because of rising consumer demand for lobster could potentially destroy the resource as more and more capital and labor are attracted to the fishery. The only solution to the market failure is government intervention, which must be qualified to include trade offs between optimum resource allocation versus employment effects.

Berry, D. and G. Steiker 1977. An Economic Analysis of Transfer of Development Rights. Natural Res. J. 17(1): 55-80.

The problems of more urbanization have prompted a number of methods to protect valuable landscapes and landmarks and to control the spatial pattern of growth. These include 1) tax incentives, 2) zoning, 3) public purchase of certain development rights, 4) public purchase of the fee, 5) establishing rural districts, and 6) transfer of development rights.

This article uses economic analysis to examine the implications of transferable development rights (TDR) arrangements. Under the TDR scheme, all land could be equipped with development rights and then zoned for various kinds of development. TDR's would then be awarded to all land owners, but developers would have to purchase the requisite number of rights.

TDR's are regarded as superior to other methods of protecting valuable landscapes and landmark because they impose relatively little cost on the public, they are essentially self-working market operations, and because they provide some compensation to landowners whose privileges of conversion are restricted.

Bishop, R. C. 1973. Limitation of Entry in the United States Fishing Industry: An Economic Appraisal of a Proposed Policy. Land Econ. 49(4): 381-390.

The author maintains that the potential gains from limiting entry into United States fisheries are so small that they could conceivably be more than offset by adverse effects on the distribution of income.

Economic inefficiency arising from misallocation of resources to the U.S. fishing industry is unimportant given its small share of total U.S. output; therefore, limited entry programs which could possibly correct such misallocations would be of limited benefit. Furthermore, given misallocations in the rest of the economy, an efficient allocation of resources to the fishing industry would be indeterminant. While limitation of entry could yield some windfalls to included fishermen in the short run, it would probably do little to alleviate poverty in the fisheries. Too little is known about the socioeconomic situation in fishing in the United States to predict what would happen were limitations of entry imposed. The more immobile excluded fishermen are, the greater would be their burden of limitation if entry is imposed. There are also redistributive implications for consumers of a decrease in the supply.

Bishop, R. C. 1975. Limitation of Entry in the United States Fishing Industry: A Reply. Land Econ. 51(2): 182-185.

This reply to comments by Owers and by Wilson and Olson on Bishop's article focuses on the social objectives of fisheries regulation, immobility and incomes of fishermen, and theoretical points of difference.

The most important social problems are the conservation of fisheries resources and the maintenance of a satisfactory distribution of catches, not a misallocation of resources between fishing and other industries. The potential of limited entry is not a fishery conservation tool, nor a tool to protect target groups of fishermen whose economic well-being is threatened by open access. For most present cases, the traditional total-catch quota systems are the conceptually sound approach to controlling overfishing unless there is concern about inter-industry misallocation. If the rent from a fishery under limitation of entry is allowed to go into the fishermen's pockets, political pressures to enlarge the fishery may be increased. Nor has limitation of entry proven itself as a policy tool to control who receives the income from fishing.

Will limited entry reduce poverty in the fisheries? No such generalization is warranted. Although a highly mobile group of fishermen exists, a significant portion of the fishing labor force and fixed capital in Alaska is immobile. In appraising the potential gains in efficiency from limitation of entry, it is important to remember that many fisheries are not MSY or overfished biologically.

Bishop, R. C., G. V. Johnson, and K. Samples. 1978. Wisconsin's Limited Entry Experience. Paper presented at the Workshop on Limitation of Entry, University of Washington, May 15-18.

This summary of ten years of Wisconsin's experiences with limited entry maintains that inadequate attention to the linkages between equity and efficiency has been given by economists advocating limited entry.

Although some problems exist, improved fishing, lake trout quotas and protection from entry seem to have contributed to an environment of guarded optimism in the Lake Superior fisheries. However, this approach is unpopular among the people of Lake Michigan. Part of the explanation must lie in the fact that Lake Michigan has not experienced the tensions over scarce lake trout resources that developed at Lake Superior. Nevertheless, a desire to clarify management authority led to limited entry, and the result was Wisconsin's 1978 Fishing Law which greatly expanded the Department of Natural Resources authority in fisheries management. Limited entry is regarded a set of tools for management and not a goal in itself.

Boeri, D. and J. Gibson 1976. Tell it Good-Bye, Kiddo: The Decline of the New England Offshore Fishery. International Marine Publishing Company, Camden, Maine, 154 pp.

The decline of New England's offshore groundfishing industry, a fleet of boats that once supplied much of America's demand for fish, is told from the level of the commercial fisherman to the dockside sale of fish, then to the business of fish companies and corporations, and finally to the workings of government agencies, the policies of the federal government toward fishing, and the actions of foreign governments and fishing fleets involved in the offshore waters of New England.

Most accounts of failing industries are concerned with economic overviews. However, the decline of the fishing fleet also means the dwindling from our society of a unique group of men and a culture whose importance outweighs in the end, the amount of fish they sell.

Bosselman, F. P. 1975. Property Rights in Land: New Statutory Approaches. Natural Res. J. 15(4):681-693.

As rules controlling the use of land become more restrictive and complex, interest grows in transferring this function to the legislature. This paper explores some alternatives for statutory redefinition of property rights and analyses three different approaches to systems of providing compensation to landowners: the English system, American Law Institute proposals, and administrative compensation.

Judicial attitudes are affected by general changes in public attitudes. Three areas of change have been important in recent years: 1) a growing recognition that land is a resource of immense environmental value, 2) a common popular assumption that urbanization inevitably leads to problems of air and water pollution, and 3) a growing belief that further development of the land is not in the homeowner's best interest due to increasing crime, tax and so forth.

Land owner compensation in England has depended on statutes, with most claims negotiated and settlements reached that were reasonably satisfactory to both parties. The American Law Institute proposals suggest an alternative which does not involve a specific request for compensation by the landowner; instead the landowner asks the court to declare the restrictive regulation invalid, thus allowing him to build on his property. A third possible solution is a system of administrative compensation through which the issue could be taken out of the hands of the courts entirely.

Bowles, F. P. 1973. Natural Regulation of an Island Fishing Community. Ph.D. Dissertation, Harvard University, 312 pp.

The isolated fishing villages of the coast of Maine represent a unique adaptation to changing circumstances. The author conducted an ecological enquiry into the special adaptations of a maritime community on Neilson's Island, Maine, from September 1969 to September 1971.

The behavior of the fishermen on Neilson's Island is constrained and regulated by their adaptation to lobster fishing and by the environmental and biotic milieu in which they live. Natural regulation occurs when the numbers of fishermen on the island approach the limit imposed by harbor size. Knowledge of the upper bound on the number of fishermen and identification of the natural factors which regulate the numbers of fishermen within the bounds have direct bearing on the relationship of the numbers of fishermen to natural fluctuations in the lobster population. Lobster wars are described as an example of the instability which occurs when the homeostatic regulation of a biotic system is seriously disturbed and attempts to find a new equilibrium point. Despite increased specialization and sophistication of lobster fishing technology, the total number of fishermen has not increased, and the size of the territory used by the islanders has remained roughly the same.

The understanding of the history and present adaptation of the fishermen on Neilson's Island can be clarified by the application of theorems concerning predator-prey interactions.

Campbell, B. A. 1973. License Limitation Regulations: Canada's Experience. J. Fish. Res. Board Canada 30(12) part 2-1: 2070-2076.

Canada's experience on license limitation regulations is reviewed. In the late sixties Canada introduced legislation to provide for the limitation of fishing licenses in two specialized fisheries - the lobster fishery of the Atlantic, and the salmon fishery of the Pacific Coast. These regulations were introduced for economic reasons, not for conservation.

In the salmon fishery, vessels with low production (B category) can remain in the salmon fishery for only 10 years. License fees for A category vessels have been increased sharply. New salmon vessels can be licensed only where an equal tonnage of A category vessels retires from the commercial fisheries. The government applies license money to a buy-back purpose. Indians have been given the special privilege of obtaining salmon licenses for their vessels at minimum cost, but they still cannot license a new vessel unless an equivalent tonnage of vessels has been retired. The average value of individual salmon vessels remaining in the fleet has increased substantially, and the higher values are not justified in relation to the increased return that can be achieved because of the fewer number of fishing vessels.

In the Maritime Provinces the limitation program for lobster boats also has not progressed as quickly as the salmon program in British Columbia. Vessels have been divided into A and B categories, but no action had been taken up to September 1972 to limit the life of B category lobster vessels.

Caves, R. D. and M. E. Porter 1977. From Entry Barriers to Mobility Barriers: Conjectural Decisions and Contrived Deterrence to New Competition. Quar. J. Econ. 91(2): 241-261.

Concentrated sellers can erect barriers to new competition which persistently distort efficient resource allocation, distortions which vary from industry to industry. This article argues three propositions: 1) both the newcomer and the established firm that acts to deter entry make investment decisions based on conjectures about uncertain future quasi-rents. The incumbent's actions affect both the entrant's conjectures about industry conditions following his entry and the "structural" barriers to entry. Thus, the entry barriers we observe are partly structural but at least partly endogenous; 2) the theory of entry barriers has been limited unnecessarily by confining itself to the movement of firms from zero outputs to positive. It becomes much broader when set forth as a general theory of the mobility of firms among segments of an industry, thus encompassing exit and intergroups shifts as well as entry; and 3) in this broad framework of barriers-of-mobility, diversification and the entry of established firms can be integrated to provide a basis for Bain's "general condition of entry."

Christy, F. T. Jr. 1969. Fisheries Goals and the Rights of Property, Trans. Am. Fish. Soc. 98(2): 369-378.

The author summarizes a session of the American Fisheries Society Annual Meeting in 1968. Satisfactory property rights in the fisheries are generally not available. In the absence of these rights, economic criteria have little meaning, and there is some justification to the charge that economic efficiency is irrelevant. The confusion that exists between biologists and economists does not come from the non-relevance of economic goal, but rather from the assumptions that are implicit to the achievement of economic goals. These assumptions revolve around the concept of property rights.

This paper attempts to clarify the meaning of property, distinguishing between owner and user, between access to wealth and access to use, and between the degrees and kind of property rights; to examine the different goals of fisheries management with reference to the necessity and desirability of establishing property; and to evaluate the practical problems - the costs and difficulties - associated with the creation of property rights.

Distinguishable rights in the fisheries include the rights to conserve, the right to access, and the right to extract rents. Five sets of goals are identified: increased catch, conservation, contributions to the economy, employment opportunities and the tradition of free fishing. The costs and difficulties of creating these rights, given the range of interests and variety of goals, have not been assessed, nor have the non-economic benefits been evaluated.

Christy, F. T. Jr. 1972. Fisheries: Common Property, Open Access, and the Common Heritage. Resources for the Future, Inc., Reprint Number 101, 25 pp.

The author examines several aspects of the concept of common property in the oceans, making a distinction between common property in terms of open access and common property in terms of the common heritage.

Trends toward both appropriation and dissipation of wealth are already apparent. The severity of the problems associated with these trends and the severity of the difficulties of overcoming them are closely related to the distinction between the definitions of common property.

Present interpretations of the law of the sea associate exclusive access with exclusive appropriation of wealth so that only those who exercise or acquire the right to fish can share in the distribution of wealth. This is supported by the customary and conventional law of the principle of the freedom of the seas. If the world community wishes to give meaning to the concept of common heritage in fisheries, free and open access must be closed and those who obtain the privilege of fishing must pay for this privilege.

Christy, F. T. Jr. 1975. Property Rights in the World Ocean.
Natural Res. J. 15(4): 695-712.

This article sketches the background and the problems associated with the transaction costs of acquiring and enforcing satisfactory property rights in the world ocean.

The two factors involved in the move toward the establishment and enforcement of jurisdiction over ocean resources are the economic desirability of creating satisfactory property rights, and political pressures for redistribution of the wealth of the seas. It is clear that considerable economic waste results from the present common property conditions, but it is not clear whether the costs of acquiring and enforcing some form of satisfactory property rights are less than the benefits that can be achieved. This calculation is particularly difficult for many fishery resources, especially for those that swim freely across man's boundaries. Whether or not the calculations indicate that the acquisition and enforcement of jurisdiction is desirable, political pressures are such that attempts to acquire jurisdiction can be considered inexorable, at least for resources of the coastal margin.

Christy, F. T. Jr. 1977. Limited Access Systems Under the Fishery Conservation and Management Act of 1976. In L. G. Anderson, editor Economic Impacts of Extended Fisheries Jurisdiction, Chapter 7, pp. 141-156, Ann Arbor, Ann Arbor Science publishers.

The author looks at the negative aspects of the Fisheries Conservation and Management Act of 1976 (Public Law 94-265).

Several provisions in this act significantly affect the adoption of limited access system by the fisheries and, in consequence, insures the long-run health of the industry. These concern: 1) the adoption of a limited access system; 2) collection of fees; 3) the capacity criterion with regard to the allocation of shares between domestic and foreign fishermen; and 4) the collection of fees from foreigners. The act is detrimental to the interest of society because no return is received from the use of publicly owned resources, it harms the taxpayer because the costs of research, development, enhancement, regulation and enforcement will be borne by him rather than by the beneficiaries - the fishermen. Ultimately these factors will force the Office of Management and Budget to limit funds for fisheries research and management, and the fishing industry will suffer as well. The consumer must pay higher prices for fish produced by domestic fishermen because of the exclusion of foreigners who provided low-priced imports. Although we are given the opportunity to receive some revenues from foreigners, revenues are limited and will decline as foreigners are phased out. Under this act, the effectiveness of limited access is severely limited. The prohibition against fees and taxes will severely hamper effective management of fisheries, and no one will gain, neither the fishermen nor society.

Christy, F. T. Jr. and A. Scott 1965. The Common Wealth in Ocean Fisheries: Some Problems of Growth and Economic Allocation. Johns Hopkins Press, Baltimore, Maryland, 280 pp.

This study of some of the economic and political difficulties that impede the rational development of international fisheries is a background study on the economic characteristics of the fishery industries and on the legal and institutional framework within which the industries operate.

The concept of the fishery as a common property natural resource is fundamental to an understanding of economic inefficiency in the industry. The worldwide demand for fish is growing very rapidly, but the growth of demand is not uniform, either as to nation or as to the species of fish. The consumer discriminates between species of fish and between kinds of processing, so the fishermen of the world must still compete for the relatively few species for which there is a known market and clear demand. However, the desired fish are not distributed uniformly throughout the oceans. In general, the coastal waters and continental shelves yield the greatest quantities of fish currently in demand, but even in these areas there are wide differences; thus fishermen tend to concentrate in areas of known productivity.

The result is conflicts of increased competition for scarce resources, and of the extension of effort by foreign fishermen into areas that have historically been fished only by the vessels of the adjacent state. Perhaps the most immediate area of conflict lies in the definition of the extent of exclusive fishing rights. Even on the high seas, where it is clear that all nations have equal legal rights, problems arise because of congestion of vessels or because of conflicting methods of catching. The resolution of such conflicts over fisheries resources is difficult. It is suggested that economic objectives should play a stronger role in the decisions on international arrangements than in the past. The author suggests an international fishery authority that could make use of the lowest cost labor and vessels and sell its product to the highest bidder.

Cicin-Sain, B. 1978. Evaluative Criteria in Making Limited Entry Decisions: An Overview. Paper prepared for the National Conference to Consider Limited Entry as a Tool in Fishery Management, Denver, Colorado, July 17-19.

Among the major methods of fisheries management, limited entry has received most attention and stirred up the greatest controversy. Possibly limited entry represents an effort to restrict freedom of entry into an occupation noted for its tradition of independence.

The author abstracts the major considerations in evaluating alternative management arrangements, including biological effectiveness, social equity, economic efficiency, legal feasibility, political feasibility, and administrative feasibility, and proposes an application of this framework to the specific management technique of limited entry.

The extent to which limited entry addresses questions of biological effectiveness is unclear, for, in most cases, limited entry needs to be complemented by other management measures. Considering social equity, a number of difficult questions such as equitable license allocation, compensation, and long-range effects as well as short-range effects must be resolved. With regard to economic efficiency, the hypothesized benefits from limited entry need to be tested against empirical reality. Alternative methods of management must also be judged according to their legal, political and administrative feasibilities. No solution is universally applicable. Each fishery demands a different set of calculations and calls for different management solutions.

Ciracy-Wantrup, S. V. and R. C. Bishop 1975. Common Property as a Concept in Natural Resources Policy. Natural Res. J. 15(4): 714-727.

The authors argue that the term "common property" as used by modern day economists when referring to the so-called "theory of common property resources" or "tragedy of the commons", often distorts the basic meaning of the concept in such a way as to discredit it as a valuable tool in the economic analysis and solution of problems of natural resources policy.

The term "common property" refers here to a distribution of property rights in resources in which a number of owners are co-equal in their rights of usage. Their rights are not lost through non-use, but co-equal owners are not necessarily equal with respect to the quantities of the resource each uses over a period of time. This meaning of the concept of common property is well established in formal institutions such as the Anglo-Saxon common law, the German land law, the Roman law and their successors. Common property is not everybody's property; potential resource users who are not members of a group of co-equal owners are excluded. In any event, economists are not free to use the concept under conditions where no institutional arrangements exist.

This paper defines institutional level as a three-level hierarchy of decision systems: operating level, institutional level and policy level. The commons in economic history are also reviewed, and common property, public trust and public property as solutions for natural resource management problems are examined.

Crutchfield, J. A., editor 1965. *The Fisheries: Problems in Resource Management*. University of Washington Press, Seattle, 1965, 136 pp.

This series of papers and commentary on public policy issues involved in the management of fisheries resources were prepared by members of the faculty of the University of Washington for the inaugural series of Natural Resources Public Policy Seminars, sponsored by the Graduate School of Public Affairs, held in 1963.

Included are: *Concepts and Practices in the Conservation of Fishery Resources*, by William F. Royse; *Methods of Fishery Regulation*, by Donald E. Bevan; *Economic Objectives of Fishery Management*, by J. A. Crutchfield; *Evaluation of the Fishing Industry and Fish Preservation Facilities: The Columbia River Case*, by Marion E. Marts; *Principle of Abstention: The Case of the United States Halibut Fishery*, by Richard Van Cleve; *Constitutionality of Limiting the Number of Fishermen in a Commercial Fishery*, by Robert L. Fletcher; and *High Seas Fisheries and the Law: A Case Study in the North Pacific*, by Ralph W. Johnson.

Crutchfield, J. A. and G. Pontecorvo 1969. *The Pacific Salmon Fisheries: A Study of International Conservation*, Johns Hopkins Press, Baltimore, 220 pp.

The consequences of open access and irrational conservation are described, and the authors develop a model that can be used in other case studies and a framework for control of access and for the establishment of effective conservation rules and efficient economic measures.

Despite millions of dollars invested in research, propagation, and regulatory activity, the Pacific Coast salmon resources are, at best, stabilized; in some areas salmon is clearly subject to continuing depletion due to irrational conservation measures, with little scientific knowledge, power plays by competing fishing and processing groups, research and regulatory emphasis on reductions in efficiency, and from unrestricted access.

The generalized model suggests that the industry will always be balanced precariously with respect to interindustry and international competition under the open access situation. There are no simple remedies, and variations in the geographic, technical, legal, and sociological elements underlying the structure of different fisheries call for the careful construction of efficiency-oriented management programs adopted to each separate case. Once the industry has adjusted to depletion and/or to regulations framed in terms of physical objectives, only second best solutions are possible, at least in the short run.

Dales, J. H. 1972. Land, Water, and Ownership. In R. Dorfman and N. S. Dorfman, editors, Economics of the Environment. W. W. Norton & Company, Inc., New York, pp. 171-186.

This proposal to the common property market in pollution rights is based on one-way communication. The government-owner's decisions about the use of water would be transmitted to the users of the asset, with no feedback from the users to the owner. A rise in the price of a pollution right would be the signal that the waste disposal use of water is becoming more valuable; but this does not mean that the supply of allowable waste disposal capacity should be increased, for the value of the competing amenity use of water is likely to increase under the impact of the same growth forces that make the waste disposal use more valuable.

Four important elements in this scheme are: the mapping of water regions; the setting of waste equivalents; the choice of the allowable amount of waste discharge; and the choice of a time interval during which the number of pollution rights is fixed.

Pollution charges should be higher in areas where pollution is currently at low levels than in areas where it is at high levels, for the system of low pollution charges for a low pollution level tends to spread pollution evenly over the countryside.

Dam, K. W. 1974. The Evolution of North Sea Licensing Policy in Britain and Norway. J. Law Econ. 17(2): 213-263.

Great Britain is expected to become self-sufficient in oil production by 1980 due to recent discoveries of large quantities of oil in the British sector of the North Sea. Since there is no requirement in Britain that oil, unlike gas, be sold to a monopoly buyer, the oil will be sold at a market price. Hence, the law provides no means for capturing any economic rent for resources discovered under existing licenses. As the magnitude of the total oil reserves in the North Sea has become apparent, public uneasiness about the size of future oil company profits and the inadequacy of the existing system has grown. The newly elected Labour Government's White Paper (1974) called for "Government participation" and reform of the corporation tax system.

This article describes the evolution of the economic dimensions of licensing policy. Governments operate in a political environment and face two basic requirements: 1) the system must attract private capital and technical capability, and 2) the system cannot be seen by the voters as a giveaway to private companies of the nation's resources. Only when these two basic requirements are satisfied can the government's licensing policy expect to achieve allocative efficiency and actually capture the economic rent. The decision faced by governments has been whether to use the auction system or a discretionary system, and the latter alternative having been chosen, how to deal with the resulting transfer of wealth to private hands. In Britain it was the desire to favor local enterprise, to force the rate of exploration, and to keep maximum flexibility and control in the government's hands that led to the discretionary system.

Dennen, R. T. 1976. Cattlemen's Associations and Property Rights in Land in the American West. Expl. Econ. Hist. 13: 423-436.

A clearly defined arrangement of property rights evolved in the use of American range land. The rise of the range cattle industry in the United States began in the late 1860's, with exclusive tenure to land on the Great Plains gained in several ways: 1) purchase at government auctions with minimum price of \$1.25 per acre; 2) a pre-emption claim of 160 acres for a fee of \$1.25 per acre; and 3) a homestead claim to receive 160 acres at no cost by fulfilling certain requirements. However, 160 acres of free land could support only 5 to 15 head of cattle per year, and land at \$1.25 per acre was generally priced too high to make purchase feasible. It was economically impossible for cattlemen to acquire large areas of range land; thus common property use of unowned land developed. The overuse of common property land, became a major concern of cattlemen, and they organized in Cattlemen's Associations to prevent it. Two vital functions were recognized: the establishment of a method for agreeing on who should be admitted to a range, and the prevention of entry by newcomers. The important rights developed were "range rights" and "water rights". Established cattlement refused to cooperate with new entrants, and such a refusal effectively blocked entry. The intensity of use was controlled by the practice of stocking the range in proportion to holdings of water rights by members of the association. This rule was enforced by the threat of expulsion from the joint roundup. The increased income available to any individual was determined by allocation of property rights within the group. Exchange of range rights was a common occurrence.

Dorfman, R. and N. S. Dorfman, editors 1972. *Economics of the Environment: Selected Readings*. W. W. Norton and Company, Inc., New York, 426 pp.

The essays in this collection are concerned with the economic aspects of current environmental problems. The collection consists of twenty-six papers divided into five groups: 1) An overview; 2) formal analysis; 3) policies for environmental protection; 4) the roots of environmental degradation; and 5) measuring costs and benefits.

In the first group are: *The Economic Common Sense of Pollution*, by Larry E. Ruff; *Analysis of Environmental Pollution*, by Allen V. Kneese; and *International Environmental Problems - A Taxonomy*, by Clifford S. Russell and Hans H. Landsberg.

The second group: *Externalities, Information, and Alternative Collective Action*, by Otto A. Davis and Morton I. Kamien; *The Economic Theory of a Common-Property Resource: The Fishery*, by H. Scott Gordon; *The Problem of Social Cost*, by Ronald Coase; *On Divergences between Social Cost and Private Cost*, by Ralph Turvey; and *Causing Offsite Costs to be Reflected in Waste Disposal Decisions*, by Allen V. Kneese and Blair T. Bower.

The third group: *Standards, Charges, and Equity*, by Allen V. Kneese and Blair T. Bower; *Land, Water, and Ownership*, by J. H. Dales; *Property Rights and Amenity Rights*, by E. J. Mishan; *Transaction Costs, Resource Allocation, and Liability Rules*, by Guido Calabresi; *The Role of Government: Neighborhood Effect*, by Milton Friedman; *A Public-Decision Model Applied to Local Pollution Problems*, by Robert Dorfman and Henry D. Jacoby; and *The Animal Farm: A Mathematical Model for the Discussion of Social Standards for Control of the Environment*, by Harold A. Thomas, Jr.

In the fourth group: *The Environmental costs of Economic Growth*, by Barry Commoner; *The Cultural Basis for Our Environmental Crises*, by Lewis W. Moncriff; *The Convergence of Environmental Disruption*, by Marshall I. Goldman; *The Property Interface*, by J. H. Dales; *Growthmania*, by E. J. Mishan on Progress, by Roger W. Weiss; and *The Further Dimensions*, by John Kenneth Galbraith.

The final group: *The Valuation of Public Goods*, by Paul Davidson; *Air Pollution and Human Health*, by Lester B. Lave and Eugene P. Seskin; *Comparisons of Methods for Recreation Evaluation*, by Jack L. Knetsch and Robert K. Davis; and *Environmental Repercussions and the Economic Structure: An Input-Output Approach*, by Wassily Leontief.

Fraser, G. A. 1977. License Limitation in the British Columbia Salmon Fishery. Environment Canada, Economics and Special Industry Service Directorate Pacific Region Technical Report Series No. PAC/T-77-13. 74 pp.

This study offers a useful summary of the British Columbia experience on license limitation. The author focuses on the historical and theoretical background, the implementation of license limitation and the effectiveness of the program.

Earlier limited licensing plans applied in British Columbia suffered from a single major defect: they were viewed primarily as a means for resource conservation, and their full consequences were disregarded. Limitation created an economic rent from the resource; this rent inevitably accrued to those canneries and individuals who obtained the right of resource exploitation. This created a general demand from those excluded to enter the industry. These pressures inevitably led to the demise of the licensing programme.

The forces that operate now are better understood. Nevertheless, it appears that little has been learned; the major problems with the current programme seem to bear an uncanny resemblance to those of the past.

Gertenbach, L. P. D. 1973. License Limitation Regulations: The South African System. J. Fish. Res. Board Canada 30: 2077-2084.

The South African system of license limitation regulations began in 1949 when the government refused to issue licenses for additional fish-processing factories and to limit the number and capacity to those already in operation or under construction. The present regulations are based on regulations enacted in 1953. A Pilchard/Marasbanker Boat Limitation Committee of government, factory, and fishermen representatives was established to apply controls over the number of boats, their hold capacity and the allocation of this fleet to the various factories. Adjustments were made from time to time to cope with changing conditions in the resource. However, this control system was weakened when fishing and processing licenses were granted to operators of fishmeal factory ships. The limitation of entry into fishing and processing has resulted in a smaller number of boats, larger-size boats with more powerful engines and equipment, and increased factory-ownership of boats. Through the policy of restricting entry at the early stages of the new industry, it acquired sufficient resilience to cope with both ups and downs. However, it appears doubtful that overcrowded fishing and processing sectors would have had sufficient resilience to face fluctuating catches and fishmeal prices.

Gordon, H. S. 1954. The Economic Theory of a Common Property Resource: The Fishery. J. Pol. Econ. 62(2): 124-142.

In this modern examination of the economic theory of a common-property resource such as the fisheries, the author demonstrates that an "overfishing problem" has its roots in the economic organization of the industry.

All control measures have, in the past, been designed by biologists, who paid attention solely to the production aspects of the problem, and not to the cost side. The result has been a persistent problem of overfishing.

The author uses a static analysis of the production function of the fishing industry to show that optimum economic fishing intensity occurs where marginal cost equals marginal revenue and is less than that which results in a pattern of competition among fishermen which culminates in the dissipation of the rent of the intramarginal grounds; and that it is possible that some grounds could be exploited at a level of negative marginal productivity.

The great immobility of fishermen and their hope of a lucky catch prevent an equilibration of their incomes with that of other members of society. In a few places fishermen have banded together into a local monopoly, preventing entry and controlling their own operations. By this means the amount of fishing gear has been greatly reduced and incomes considerably improved.

Gulland, J. A. 1974. *The Management of Marine Fisheries*. University of Washington Press, Seattle, 198 pp.

This survey of fisheries management cites cases such as Antarctic whaling and North Atlantic trawl fisheries, reviews the biological basis, objectives, techniques and mechanics of fisheries management; and discusses the management of fisheries in the future.

Any account of the management of marine fisheries must discuss the history of Antarctic whaling as the foremost example of failure to manage and conserve a resource, and current progress in the national management of the whale stocks. The efficiency has been the immediate cause of most of the problems of fisheries management in the world today. Mesh size regulations and control of the amount of fishing are discussed.

All management of fisheries depends on biological information to predict population dynamics. The logistic model and dynamic pool model and their development are reviewed. Many management schemes are weighted in favor of the existing fishermen and their individual interests. In addition to ordinary techniques of management such as mesh or fish size limits, closed seasons or areas, gear limitation, the improvement of living resources, and the regulation of total catch by species, the direct control of the total amount of fishing such as limited entry, and the allocation of shares in any catch quota between countries are discussed. In response to the increasing popularity of multi-national fisheries, some new formal arrangements are necessary. Although many international bodies are concerned with fisheries management, enforcement is a problem. The need for rules to be kept-and to be seen to be kept- is especially important in international fisheries.

Haefele, E. T., editor 1974. *The Governance of Common Property Resources*. Johns Hopkins University Press, Baltimore and London, 181 pp.

This volume contains papers presented at a forum conducted by Resources for the Future, Inc., in Washington, D.C., January 21-22, 1974. These are: *The Technical Basis for Decision Making*, by Robert Dorfman; *Managing the Public Lands: Assignment of Property Rights and Valuation of Resources*, by Anthony C. Fisher and John V. Krutilla; *Environmental Quality, Household Migration, and Collective Choice*, by Paul Portney, John Sanstiel and Allen Kneese; *Industry Influence on Environmental Decision Making*, by Mark Sharefkin and Talbot Page; *The Continuing Role of the Courts in Allocating Common Property Resources*, by Victor G. Rosenblum; and *How Does the Agenda Get Set?* by J. Clarence Davies, 3d. In addition, some comments are given by Clifford S. Russell, Marion Clawson, John Hansen and Irving K. Fox.

Hamlisch, R., editor 1962. Economic Effects of Fishery Regulation. FAO Fisheries Report No. 5, 561 pp.

This includes working papers and a record of discussions at FAO expert meeting in Ottawa 12-17 June 1961. The panel issues: 1) The Economics of Regulating Fisheries, by A. Scott, 2) Effects of Fishery Regulations on the Catch of Fish, by L. M. Dickie, 3) The Economic Effects of the Regulation of the Trawl Fisheries of Japan, by N. Oka, 4) Regulation in the North American Lobster Fishery, by G. Pontecorvo, 5) License Limitation-British Columbia, by S. Sinclair, 6) Regulation of the Pacific Coast Halibut Fishery, by J. A. Crutchfield, and 7) Regulation of the South African West Coast Shoal Fisheries, by L. P. D. Gertenbach.

Five papers relating to the subject of the meeting, which were not discussed in Ottawa, were also included: 1) On Some Aspects of Fishery Conservation Problems, by A. Zellner, 2) Application of Mathematical Programming Techniques to Commercial Fishery Conservation Problems, by A. Zellner, 3) The Case for Regulations of the Shrimp Fishery of Panama, by L. K. Boerema and J. L. Obarrio, 4) Effects of Fishery Regulation on The Processing and Marketing of Fishery Products, by W. H. Stolting, and 5) Great Lakes Commercial Fishing Regulations, by K. D. Brouillard.

Harding, G. 1968. The Tragedy of the Commons. Science 162: 1243-1248.

This article illustrates the mechanism of a common property resource under open access by the example of cattle pastured on a commons. As long as the numbers of man and beast are well below the carrying capacity of the land, such an arrangement may be satisfactory. However, when social stability becomes a reality, each herdsman seeks to maximize his gain. Since each herdsman receives all the proceeds from the sale of an additional animal, the positive utility is nearly + 1. Since, however, the effects of overgrazing are shared by all the herdsman, the negative utility for any particular decision-making herdsman is on a fraction of - 1. Each rational herdsman adds more animal to his herd, so each man is locked into a system that compels him to increase his herd without limit in a world that is limited. The freedom of the commons brings ruin to all.

Juergensmeyer, J. C. and J. B. Wadley 1974. The Common Lands Concept: A "Commons" Solution to a Common Environmental Problem. Natural Res. J. 14(3): 361-381.

This history of the common lands concept begins in pre-Norman England, proceeds through English legal history to the American colonies, and ends in modern American jurisprudence as it deals with myriad problems of environment and ecology. The common lands concept is a manifestation of the communal ownership principle. Although the idea of community is a very real part of American property ownership and we are gradually recognizing the social nature of property, we in fact remain very compartmentalized. The common lands concept has become relevant to contemporary American jurisprudence as a reflection of society's need and ability to recognize more communal ownership and less private ownership, as in the environmental crisis. Although the common lands concept was developed to protect individuals in their enjoyment of private land use rights, the concept provides the framework and analytical methodology needed to protect individuals in their enjoyment of public land use rights.

Junankar, P. N. 1976. Land Tenure and Indian Agricultural Productivity. J. Develop. Studies Oct. 13(1): 42-60.

Land tenure is directly related to agricultural production in this econometric study of production in the Ferozepur district of Punjab using Farm Management Studies data for 1968/69 and 1969/70. Differences between small and large farms and the relative inefficiency of tenants relative to owners were tested.

Although results on the size issue are ambiguous, the study shows that a farmer decreases in efficiency as he leases more land, and tenants are less productive than owner farmers. These results imply that land reforms such as a land lease ceiling and/or "land to the tiller" are desirable as long-term solutions for Indian agriculture because a land lease ceiling and/or "land to the tiller" reforms would increase production as well as lead to a break-up of the landowning monopoly.

Kalish, L., J. Hartzog, and H. Cassidy 1978. The Threat of Entry with Mutually Aware Potential Entrants: Comment. J. Pol. Econ. 86(1): 147-150.

The theory of potential competition in taking account of potential entrants who are mutually aware of each other was broadened by Sherman and Willett (1967) and Goldberg and Moirao (1973). The former demonstrated that the likelihood of a specific firm entering an industry might decrease if the number of potential entrants increased from one to two. Based on this result, they concluded that the entry-forestalling price determined by the industries current competitors would either remain the same or rise. The latter accepted Sherman and Willett's result, but added that the limit price is more affected by the overall probability of there being one or more actual entrants, which they demonstrated must increase as the number of potential entrants increases. Thus, Goldberg and Moirao concluded that, if anything, the limit price will decline as the number of potential entrants increases.

This comment points out an error in Goldberg and Moirao and quantitatively demonstrates that when the number of potential entrants increases from one to two, the overall probability of one or more entrants may rise, fall, or remain constant.

Keen, Elmer A. 1978. Fishery Rights and the 200-Mile Zone: The Tragedy of a Mal-stinted Commons. Unpublished manuscript, Center for Marine Studies, San Diego State University.

The author assesses the present limited entry schemes negatively, explores more effective fisheries resource management schemes from the points of view of management and harvest functions and investment opportunity, and proposes a single owner type management system under national control.

Limited entry could serve to reduce excessive investment in the means of exploitation and create rent in the fisheries, but would not end dependence on measures designed to counter the tragedy of the commons by making fishing less efficient. Also, it would in no way encourage economic rent generated to be channeled into investment that would improve the resource. The long run effect would be to make management more difficult. The productivity of fishery resources, especially of the more valuable species, is certain to increase as the incentives for national investment created by the FCMA become effective. This increased production in turn will create a need to change effort within and between fisheries. Valuable property rights create conservation on the part of the holders, and inflexibilities will be created for resource managers.

Knight, H. G. and J. P. Lambert 1975. Legal Aspects of Limited Entry for Commercial Marine Fisheries. Louisiana State University, 119 pp.

This is a comprehensive study of the legal aspects of limited entry for commercial marine fisheries. The needs of each individual fishery are so diverse, and the economics of each fishing industry so varied, that no generalization would be helpful. This report provides a "checklist" of legal points which should be considered by resource managers and their lawyers when drafting a limited entry system. This list of issues, if properly addressed, should result in the preparation of a law which would survive any legal challenges.

Koch, C. L. 1978. A Federal Constitutional Analysis of Limited Entry System. Paper presented at the Workshop on Limited Entry into Fisheries, Institute for Marine Studies, University of Washington.

The paper presents an analysis of six constitutional issues that have been raised with regard to limited entry systems. These include: the Delegation Doctrine; Substantive Due Process; Procedural Due Process; Equal Protection; the "Taking" Issue; and Transferability of Permits.

There are no constitutional infirmities hindering the development of a limited entry program under the FCMA. The most significant administrative obstacle would be the hearings which may be required for fishermen denied access. The lesson to other constitutional objectives can be avoided by designing a limited entry system in which each ingredient of the plan bears a rational relationship to the objective sought through limited entry. Permits could constitutionally be made nontransferable. The major problem facing implementation of limited entry system would be administrative, not constitutional.

Krutilla, J. V. and A. C. Fisher 1975. The Economics of Natural Environments. Studies in the Valuation of Commodity and Amenity Resources. Johns Hopkins University Press, Baltimore, Maryland, 292 pp.

The economic evaluation of parks and wilderness areas, known as amenity resources, has been long neglected by traditional cost-benefit analysis. The result has been that land management personnel, faced with allocation decisions involving incompatible uses, have often opted for the tangible benefits of extractive development, taking little account of the economic losses incurred in the destruction of irreplaceable natural areas.

In this pioneering study, the authors put the amenity resources of natural environments into an analytical framework comparable to that for the extractive resources. The models and theoretical background of their techniques are illustrated by case studies which include the controversial Hells Canyon Dam, the Mineral King Ski Resort, and the Trans-Alaska pipeline.

The authors point out that resource development activities undertaken on public lands often receive financial advantages - preferential tax treatment, subsidized capital, and access to public resources - that are not taken into account in the costs of the project. True evaluation of the costs and benefits of a development project often tips the balance in favor of preserving an area in a natural state.

Leistritz, F. L. and S. W. Voelker 1975. Coal Resource Ownership: Patterns, Problems, and Suggested Solutions. Natural Res. J. 15: 643-662.

This article traces the historical development of coal ownership patterns in the United States and describes problems stemming from the separation of mineral rights from surface rights and the fractionalization of separated mineral rights. The authors examine the procedures used in West Germany and the United Kingdom to handle coal development problems under systems of separated mineral ownership. Finally, possible changes in contractual, institutional and legal arrangements to alleviate U.S. coal ownership problems are discussed.

The pattern of coal resource ownership differs greatly among the various coal areas. The most complex situations occur in the Northern Great Plains and the Rocky Mountains, where public and private ownership are intermingled, and mineral ownership is separated from surface ownership on more than half of the land. The continued expansion of strip mining in these two areas provokes numerous land use problems resulting from present ownership patterns.

Possible measures to resolve surface - subsurface conflicts include 1) acquisition of all coal resource ownerships by a single government unit; 2) an official arbitration system; 3) improvement of contractual relations between mining companies and surface owners by voluntary action; 4) pooling of royalty payments in each mine or locality; 5) establishment of trusts by district courts to subjection of all privately-owned mineral rights to property taxation.

Marcelli, R. J. and R. D. Matthew, editors 1975. *To Stem the Tide: Effective State Marine Fisheries Management*. The Council of State Governments, Lexington, Kentucky, 88 pp.

In July 1974, the Council of State Governments established a national task force on effective state marine fisheries management programs to develop suggested state legislation in this area. This publication contains an overview of the legislation, task-force recommendations, the Marine Fisheries Management Act and excerpts from the National Conference on Effective Management of Marine Fisheries held at Hyannis, Massachusetts, on June 24-25, 1975.

The excerpts includes: Role of the States in Fisheries Management, by Tom McCall; The State-Federal Fisheries Management Program, by Richard H. Schaefer; Limited Entry-Alaska Experience, by Roy Rickey; Statistics: Who Counts What and Why, by John P. Harville; Recreational Fishing Interests - Conflicts and Cooperation, by Frank E. Carlton; and Management of Marine Fisheries Resources, by David H. Wallace.

McConnell, K. E. and V. J. Norton 1978. *An Evaluation of Limited Entry and Alternative Approaches to Fishery Management*. Paper prepared for the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

Alternative fisheries management regulatory techniques must consider the following issues for economic efficiency: a) freedom of participants; b) transactions costs; c) technological advances; and d) waste from discards. Any management scheme which excludes limited entry tends to fall short of these criteria.

As a consequence, the authors propose a limited entry-price adjustment scheme which consider: 1) a moratorium on entry by ecosystem; 2) a price adjustment system which effectively reduces the ex-vessel price of over fished species; 3) a vessel buy-back program, designed to maintain or reduce the quantity of effort; 4) marine licenses and permits for recreational fishing; and 5) management of the fishery in a way that corresponds as closely as possible to the free enterprise economy.

McHugh, J. L. 1978. Limited Entry: Conservation or Monopoly. Paper presented at the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

There are many difficulties hindering successful application of limited entry to the coastal fisheries of the United States; the laissez-faire approach possibly could be the optimum economic approach for all interests combined.

A limited entry regime, properly designed and enforced, can be an effective substitute for conventional fishery management measures such as catch quotas. However, limited entry is not viable for most single-species fisheries because fluctuations in abundance interfere. The flexibility to shift from one resource to another is necessary for economic stability, as well as for optimum conservation of living resources. Sociopolitical opposition to limited entry is maximum in fully-developed or overfished fisheries. Saltwater sport fisheries may offer a significant threat to the success of a comprehensive limited entry scheme. Limited entry as originally conceived was too narrow to serve all interests. The economic welfare of the primary producer is only one element in a web of interests that ends with the consumers or taxpayers.

Meany, T. F. 1975. License Limitation as a Fisheries Management Tool. Austral. Fish. 34(7): 9-11.

In the past 10 to 15 years the use of license limitation as a fisheries management tool has become increasingly popular in Australia. This article looks at the strengths and weaknesses of the system and attempts to evaluate its long-term implications.

Introduction of license limitation can lead to a period of profitable operation for those boats already in the fishery. The freeze of the number of licenses, however, does not prevent an increase in fishing effort, and the increased fishing effort may not result in a significant increase in total catch in those fisheries near full exploitation. Thus, a long-term result may be a minimal return on capital investment due to overcapitalization.

Some mechanism for continually reducing the number of boats in a fishery as efficiency increases is necessary. One logical approach is for a government to advance an initial amount that can be used to start a buy-back scheme. This amount could be in the form of an interest-bearing loan. Such a loan would be repaid as the overall profitability of fishing (and the amount that could be collected as royalty) increased with the reduction in number of boats.

Meany, F. 1977. License Limitation in a Multi-purpose Fishery. Austral. Fish. 36(11): 8-19.

The author describes license limitation as it is based on Australia's environment and proposes an integrated license limitation system as one alternative to the conventional license limitation (the concept of managing each sector of a multipurpose fishery as if it were separate entity). Many of Australia's fisheries (rock lobster, prawns, tuna and abalone) have been multipurpose, with boats transferring freely from one fishery to another. Boats change their fishing operations considerably from year to year, with varying dependence on different fishing methods.

Any multipurpose fishery depending on a conventional license limitation invites at least a partial failure in one or other of the fisheries involved. Among the problems of this system are those of equality among fishermen, potential fishing effort, flexibility and fishing efficiency.

Any management system should retain the flexibility that was enjoyed by the fleet prior to the introduction of license limitation, limit total fishing effort to a level appropriate for the stocks of fish available, and apportion effort among the different fishing methods so that no one stock of fish is subject to excess pressure.

Mishan, E. J. 1972. Property Rights and Amenity Rights. In R. Dorfman and N. S. Dorfman, editors, Economics of the Environment. W. W. Norton and Company, Inc., New York, 187-193 pp.

The implications of amenity rights legislation in England are assessed. Under the existing law, a proliferation of adverse spillover effects continues to hide behind the barrier of decision costs. Amenity rights would mean that no one could be forced against his will to absorb the noxious by-products of the activity of others. The magnitude of decision costs implies that under the status quo there will be too much spillover; under the proposed status, on the other hand, there will be too little. Over time, changes in population, in tastes, and in technology may reduce some of the decision costs and may raise the value of the potential economic improvements under either law. Wherever the value of the potential economic gain of some mutual arrangement exceeds the decision costs, the new arrangement would be brought into effect and the right amount of spillover and the right amount of amenity would result. However, spillover is likely to grow rapidly over the future, and much of it is causing irrevocable damage. Thus, the interest of society is better served by too little spillover rather than too much.

Mundt, J. C. 1978. Legal aspects: Washington. Paper presented at the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

This memorandum contains an analysis of the issues which might arise in a lawsuit challenging the Limited Entry Act or the Salmon License Moratorium Extension Act as those bills have been developed in the State of Washington.

The two legislative purposes of each of the proposed acts are 1) improvement of the management of the salmon fishery and 2) improvement of the economic health of the salmon fishing industry.

The analysis comments on the validity of these legislative purposes; a substantive due process theory; the equal protection clause of the U.S. Constitution; the impact of the acts on interstate commerce; the privileges and immunities clause of the U.S. Constitution; the terms of the Interstate Compact between Oregon and Washington with respect to the management of fisheries on the Columbia River; the impact which the Pacific Marine Fisheries Compact between California, Washington and Oregon and the resulting Washington state legislation may have on the enactment and implementation of the two acts; the impact of the International Pacific Salmon Fisheries Convention and the implementing federal legislation; the effects of the Boldt and Belloni decisions on the prospective Washington laws; the future impact of the Fisheries Conservation and Management Act of 1976; and other issues such as securities laws, anti-trust laws and compensation for private property.

Newton, C. H. B. 1978. Experience with Limited Entry in Fisheries: British Columbia. Paper presented at the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

The ten years' of experience with limited entry in British Columbia are reviewed with respect to major criticisms of the program. The author presents arguments against the five major criticisms and notes that the future of the program requires clear government action with respect to the future of the common property aspect of the resource.

These criticisms are summarized as 1) limited entry has not prevented overcapitalization; 2) the ownership of the resource has been transferred to an elite; 3) the status quo between gear types is irrevocably changed; 4) management of the resource has not been facilitated; and 5) limited entry has not provided a solution to long-term control of fishing effort. These criticisms may stem from misconceptions about the objectives of the program: 1) increased incomes to fishermen up to the average regional wage; 2) reduced level of overcapacity by reducing the size of the fleet, and 3) reduced number of vessels to improve the management of the resource. The operational guideline is to identify the salmon fleet through the grandfathering system and then to apply tools to reduce the fleet. It is not possible to judge the adequacy of limited entry programs in a short time.

Olsen, Fred L. 1974. Fisheries Management with Landings Fees and Subsidies. Presented at the Northeast Fish and Wildlife Conferences Northeast Division, American Fisheries Society, February 27.

The author proposes a landing equalization fee and a subsidy scheme as a fisheries management tool. This plan would place a landing equalization fee on a valuable overfished species distribute and the accumulated funds back to the fishing fleet in proportion to their landings of other species that are of lower value and abundance. This type of scheme would make fishermen indifferent as to which resource they harvest because the net income from the overfished resource minus the landings fee would be the same as the net income from the abundant resource plus the subsidy provided by the landing fees.

Orbach, M. K. 1978. Social and cultural aspects of limited entry. Paper presented at the Workshop and Conference on Limitation of Entry into Fisheries Institute for Marine Studies, University of Washington, May and July.

The social and cultural aspects and effects of limiting access to fisheries resources are interwoven with others such as the economic and the political. The national standards set out in the FCMA suggest some limitations on the use of social and economic considerations.

Limited entry is described as a method of protecting individuals' economic, social, and psychological well-being from the effects of their own actions, or from the actions of others. It is an exercise in social responsibility. The social, cultural, and economic effects of limited entry systems are relative, meaningful only against the backdrop of the objectives of the program. If the primary objectives are biological, limited entry may not be necessary; if the objectives are other than biological, there must be a definition of who will be "in", who will be "out", and with what consequences.

Owers, J. 1975. Limitation of Entry in the United States Fishing Industry, A Comment. Land Econ. 51(2): 177-178.

The author discusses why limited entry is necessary, based on the Alaskan experience. Uncontrolled access with high catching efficiency and large holding capacity of many vessels causes escapement numbers of salmon and king crab to drop to dangerously low levels within a very short period, so that it is impossible for the management biologist to know when to close the season by emergency regulation. The further problem exists of processing within several weeks a highly perishable product that was formerly processed over a period of several months.

It is unlikely that poverty in the fisheries is caused by immobility of labor. Because the salmon season in Alaska lasts only three or four months, a high percentage of fishermen in the state have some alternative source of income. Some move to other fisheries, but this is the exception rather than the rule since only an estimated 20% of the vessels in the state has several types of gear. Further, limited entry may result in more of the total product reaching the consumer. The marginal cost curve for seafood products with an inelastic demand is asymptotic to the yield curve at MSY, so that under the open access conditions there would be no reduction in catch resulting in overfishing: less total product to the consumer in the long-run.

Owers, J. E. 1975. An Empirical Study of Limited Entry in Alaska's Salmon Fisheries. Mar. Fish. Rev. 37(6): 22-25.

Empirical evidence collected by the State of Alaska both before and after passing limited entry legislation in 1973 suggests that limited entry is necessary and can alleviate social distress in the salmon fisheries.

Many of the fisheries in the state last only a few months, and for many individuals commercial fishing is not a main source of income. Thus the level of average net earnings is very low and a large segment of Alaska's salmon fishermen have relatively high labor mobility. Furthermore, there is not self-correcting mechanism for assuming adequate incomes so long as a large percentage of fishermen have little economic dependence upon commercial fishing.

The data indicates that there are sufficient differences between vocational and others in the fisheries. Alaska's limited entry favors those most economically dependent on commercial fishing and intends to stabilize or reduce the level of gear in the fisheries in the hope that it will result in increased income to vocational fishermen.

Platt, R. H. 1977. The Loss of Farmland: Evolution of Public Response. Geogr. Rev. 67: 93-101.

The Connecticut River Valley, once the cradle of Massachusetts agriculture, may soon be its grave. Cultivation of the boulder-free and unforested lowlands began in the 1640's and continued until the soils were exhausted. Farming then expanded into the less congenial gneiss and schist uplands, ultimately to occupy two-thirds of the state's land area by the time of the Civil War. Migration of rural population to the West and to cities caused land in agriculture to shrink as rapidly as it had grown. Analogous to the accounting principle of "last in-first out", the latest cleared pastures of the hill towns were the earliest to be abandoned. Land in Massachusetts agriculture declined from 2.2 million acres to 604,684 acres during the 1935-1974 period; Massachusetts now imports 85% of its food. A similar trend appears in California, Florida and Illinois. Officials of the northeastern states are increasingly worried about the future food supply from the present food exporting states.

The public response to the farmland issue has evolved from speculation to strategies; from differential assessment to purchase of development rights; and from production policy to income policy.

This article describes the results of a Connecticut Valley survey, examining three variables with respect to existing farmlands: levels of assessment, zoning and extent of flood hazard. The survey suggests that rural communities have difficulty relating their newly discovered land-use powers to the attainment of any rational purpose, least of all the encouragement of agriculture.

Randall, A. 1975. Property Rights and Social Microeconomics. Natural Res. J. 15(4): 729-747.

In this selective review of a rapidly growing body of literature based on the property rights approach to social microeconomics, the author regards property rights as a very substantial component of the structure of incentives guiding economic decisions, and hence, perhaps a key to the study of interactions between institutions, resource allocation and income distribution.

The property rights approach is an application of neoclassical microeconomics methodology to institutional questions and uses the assumption of constrained utility maximization to predict individual and aggregate responses to existing and alternative structures of incentives. The focus is on the design of institutions and structures of rights to direct behavior into socially desirable avenues. Substantial insights into the relationship between efficiency (and conversely inefficiency in its various forms, including externality and the public goods and common property resource problems) and the structure of rights were generated. Attention was directed toward transaction costs and their influence on the efficiency of institutional alternatives. Significant advances were made in explaining the behavior of large corporations, non-profit firms, regulated firms, bureaucracies and legislative bodies. The search of value-free welfare criteria has been unsuccessful, but new ways of looking at the criteria problem and the issue of compensation for economic injury have been developed.

Rickey, R. 1975. Limited Entry - The Alaska Experience. In R. J. Marcelli and R. O. Matthews, editors, *To Stem the Tide: Effective State Marine Fisheries Management*, 59-61 pp., Lexington: Council of State Government.

The main impetus behind the enactment of the Alaskan limited entry legislation in 1973 was the dilemma confronting the salmon fisheries in the state. The primary problem was a radical increase in the amount of gear being used to fish a salmon resource resulting in decline of catches. Secondly, it was strongly believed that if the state did not take some form of affirmative action, the federal government would intervene.

Two areas make this act unique. First, the commission sets the fees for the permits, which reflect the cost of administering this program. Secondly, the general taxpayer does not pay for this program. The fishermen who are involved in the program are the source of funding, and they pay an entry permit fee in addition to the licensing fee.

The act applies to only 19 fisheries. The mechanism that is used in the reduction plan is a voluntary buy-back system. The state developed a point system to determine eligible fishermen. Under this program the entry permits are considered personal property. The Commercial Fisheries Entry Commission was established as a distinct entity at the outset in order to avoid disruption.

Roedel, P. M., editor, 1975. *Optimum Sustainable Yield as a Concept in Fisheries Management*. American Fisheries Society Special Publication No. 9, Washington, DC, 89 pp.

This volume of the proceedings of a symposium held during the 104th annual meeting of the American Fisheries Society, Honolulu, Hawaii, September 9, 1974 includes: Use of Yield Models in Fishery Management, by William F. Royce; An Economic View of Optimum Sustainable Yield, by James A. Crutchfield; Application of Optimum Sustainable Yield Theory to Marine Fisheries, by John Radovich; Optimum Sustainable Yield in Inland Recreational Fisheries Management, by Richard O. Anderson; Optimum Sustainable Yield-Commercial Fisheries Views, by Robert G. Mauermann; Optimum Sustainable Yield as a Management Concept in Recreational Fisheries, by Frank E. Carlton; Multidisciplinary Aspects of Optimum Sustainable Yield, by John P. Harville; Views of a State Fisheries Administrator, by Thomas L. Linton; Views of an Economist in the Academic World, by Savatore Comitini; Views of a Recreational Fisherman, by Frank L. Cassidy, Jr.; and Usefulness of the Optimum Yield Concept, by Richard S. Croker. In addition, a summary and critique of the symposium is given by Philip M. Roedel.

Rothschild, B. J., editor, 1972. World Fisheries Policy: Multidisciplinary Views. University of Washington Press, Seattle and London, 272 pp.

In a series of interdisciplinary seminars sponsored by the Graduate School of Public Affairs of the University of Washington, sixteen distinguished scientists, economists and government and United Nations officials evaluate the effectiveness of past fisheries policy and outline the concepts and attitudes that will shape the policy of the future.

It contains: Fisheries and the Future World Food Supply, by Roy I. Jackson; International Fishery Disputes, by Hiroshi Kasahara; World Fisheries-World Concern, by Donald L. McKernan; Some Thoughts on Fisheries and a New Conference on the Law of the Sea, by William T. Burke; Economic and Political Objectives in Fishery Management, by James A. Crutchfield; International Arrangements for the Management of Tuna: A World Resource, by James Joseph; Indian Ocean Fishery Development, by John C. Marr; Jeffersonian Democracy and the Fisheries, by J. L. McHugh; The Gap between Theory and Policy in Fishery Development, by William F. Royce; Fisheries and the National Interest, by William M. Terry; Fishery Management and the Needs of Developing Countries, by J. A. Gulland; A Confidential Memorandum on Fisheries Science, by Peter A. Larkin; The Need for Analysis in the Development of United States Fisheries Policy, by Brian J. Rothschild; Science and Fisheries Management, by Dayton L. Alverson; Fisheries and the Quantitative Revolution, by G. J. Paulik; and Management of the Exploitation of Fishery Resources, by G. L. Kesteven.

Royce, W. F., O. D. Bevan, J. A. Crutchfield, G. J. Paulik and R. L. Fletcher 1963. Salmon Gear Limitation in Northern Washington Waters. Fisheries N. S. 2(1): 123.

This economic, biological, and legal survey of the salmon resources of northern Puget Sound and the Strait of Juan de Fuca is a report requested by the Governor's Fishery Advisory Committee and the Legislative Interim Committee on Fisheries to the University of Washington. The excess fishing gear used to harvest the salmon resource of northern Washington waters has endangered the conservation of the salmon runs and greatly reduced the earnings of the men and vessels engaged. The findings include: 1) the number of units of fishing gear can be reduced to one half the recent amount with no effect on the full harvest of any except very large runs; 2) the recent earnings of all three major types of gear are severely depressed despite record or near-record runs of the most valuable species, the sockeye; 3) reduction of the number of units of fishing gear can substantially increase incomes to fisherman; 4) conservation regulations can be more precise with fewer units of fishing gear and the runs would be subject to less risk of overfishing; and 5) if legislation to limit the number of fishermen is enacted, it would probably withstand challenges based on the constitutional concepts of due process and equal protection.

Recommendations are made for specific steps to reduce the number of units of fishing gear.

Samuelson, P. A. 1977. A Modern Theorists Vindication of Adam Smith. Am. Econ. Rev. 67(1): 42-49.

Adam Smith's work provides a valuable model that defends him from criticisms by Ricardo and Marx and from a general disparagement of Smith as an unoriginal theorist without logic or content. Samuelson considers that Smith's value-added accounting is correct by Leontief-Sraffa modeling; that his pluralistic supply-and-demand analysis in terms of all three component of wages, rent, and profits is a valid and valuable anticipation of general equilibrium modeling; and that his vision of transient growth from invention and capital accumulation, brought to an equilibrium with a low rate of profit and a high total of land rent, is isomorphic with the model of Ricardo, Malthus, and Marx. A mathematical appendix is included.

Smith's assumptions are: 1) goods are produced in a time-phased way out of land and of labor-cum-raw-materials; 2) to arrive at net consumable outputs of goods, one must subtract from the gross production of each the amount of that respective good used as input components of the various industry doses; 3) a ration of subsistence goods per laborer is required to produce and reproduce the population - when the worker's money wage can buy more than the subsistence vector, population grows at a positive percentage rate, and vice versa, and at the subsistence wage, population is constant; 4) perfect competition prevails, land use is auctioned off for rentals, free entry and constant returns to scale prevail, and knowledge becomes general. Smith's implications to our present society are also discussed. A declining supply of primary land that is, declining stocks of non-reproducible natural resources, such as seams of metal ores and coal and exhausted geographic deposits of oil and gas - we are prepared for the Club of Rome's future.

Scott, A. 1955. The Fishery: The Objectives of Sale Ownership. J. Pol. Econ. 63(2): 116-124.

The author refers to "The Economic Theory of a Common-Property Resource: The Fishery" by H. Scott Gordon (1954) and develops a concept that common-property resources should be allocated to sole ownership such as cooperatives, associations, or governments.

No one husband and maintains a common-property resource unless he has a property right in the yield. However, the mere existence of the institution of private property is not sufficient to insure the efficient management of natural resources; property must be allocated on a scale sufficient to insure that one management has complete control of the asset.

Long-run considerations of efficiency suggest that sole ownership is much superior to competition, but in the short-run little difference exists between the efficiency of common and of private property.

Scott, A. D., editor, 1970. H. R. MacMillan Lectures in Fisheries: Economics of Fisheries Management, a Symposium. Institute of Animal Resource Ecology, The University of British Columbia.

The importance of the economics of fisheries management is related to the increasing poverty of fishermen and the approaching depletion of the world's fish stock in formerly populated waters; the unique opportunity to apply welfare economics; and consideration of the equilibrium of the whole economy in harmony with the natural environment. New tools have been developed for refining past results and benefit-cost analyses have been applied to the fisheries. Consequently a conference was held at the University of British Columbia, March 24-25, 1969.

All the papers delivered at the conference are included in this volume, along with most of the commentaries. These are: Dynamic Economic Models of Fishing, by James P. Quirk and Vernon L. Smith; Some Seasonal Models of the Fishing Industry, by Paul G. Bradley; The Problem of Achieving Efficient Regulation of a Fishery, by Anthony Scott and Clive Southey; Economic Aspects of International Fishing Conventions, by James A. Crutchfield; Price and Allocation over Space, by George T. Judge and Takashi Takayama; Contractual Arrangements and Resource Allocation in Marine Fisheries, by Steven N. S. Chueng; and Management of Marine Resources: Some Key Problems Requiring Additional Analysis, by Arnold Zellner.

Smith, L. J. 1978. Case Studies on Economic Effects of Limited Entry to the Fisheries. Paper presented at the Workshop and Conference on Limitation of Entry into Fisheries, Institute for Marine Studies, University of Washington, May and July.

Limited entry has several implications for the structure of the fishing industry, including barriers to entry and exit, profitability, efficiency and innovation, allocation between fishermen and processors, and the degree of integration within the industry. The economic effects which have accompanied introduction of limited entry programs in several places are described through case studies of Atlantic Canada, South Africa, Maine and Massachusetts. Concerns expressed over the introduction of limited entry programs to the fisheries of New England are examined and used to illustrate the problems of applying such techniques to U.S. fishery management.

The conclusion suggests that the most promising way to indicate a limited entry program may be to introduce regulations that are acceptable to fishermen and management councils which would pave the future changes in the system. A temporary moratorium on entry into one fishery, coupled with a licensing system for all fisheries to collect necessary information for future change, is suggested.

Smith, V. L. 1975. The Primitive Hunter Culture, Pleistocene Extinction, and the Rise of Agriculture. J. Pol. Econ. 83(4): 727-755.

Using an economic model of a replenishable resource, the author examines the hypothesis that megafauna extinction some ten thousand years ago was due to overkill by Paleolithic hunters. The large herding animals that became extinct represented low hunting cost and high kill value. The absence of appropriation provided incentives for the wastage killing evident in some kill sites, while the slow growth, long lives, and long maturation of large animals increased their vulnerability to extinction. Free-access hunting is compared with socially optimal hunting and used to interpret the development of conservationist ethics and controls in more recent primitive cultures.

Property rights, social or legal restrictions on individual harvesting, and the enculturation of conservationist behavior have all been used extensively and ingeniously by primitive peoples at one time or another. This study suggests that the optimal stationary-state animal stock crops (and the prospects of extinction is greater) as the biotic potential if the species gets smaller; as the efficiency of labor in agriculture relative to hunting gets less, the cultural value placed on meat rises and the culture's preference for present over future consumption increases.

Sokoloski, A. A., editor, 1973. Ocean Fishery Management: Discussion and Research. NOAA Technical Report NMFS (IRC-371), Seattle, Washington, April, 173 pp.

This circular is a report of a workshop sponsored by the Division of Economic Research, National Marine Fisheries Service, November 5-6, 1970. It includes the following articles:

- "The Status of Fisheries Management Research: An Overview", Adam A. Sokoloski, pp. 1-6.
- "Issues in Fishery Management", A. A. Sokoloski, pp. 7-8.
- "Problems in Implementing New Fishery Management Programs", Lawrence W. VanMeir, pp. 9-11.
- "On the Utility of Bioeconomic Models for Fisheries Management", Guilio Pontecorvo, pp. 12-22.
- "Multiple Objectives for Marine Resource Management", R. Bruce Rettig, pp. 23-27.
- "Economic, Political, and Social Barriers to Efficiency in Selected Coast Fisheries:", James A. Crutchfield, pp. 28-38.
- "Production Functions and Bioeconomic Models: Research Implications", A. A. Sokoloski, pp. 39-41.
- "Cross Section Production Functions for North Atlantic Groundfish and Tropical Tuna Seine Fisheries", Ernest W. Carlson, pp. 42-56.
- "Optimal Fishing Effort in the Peruvian Anchoveta Fishery", Edilberto L. Segura, pp. 57-64.
- "Natural Resources and External Economics: Regulation of the Pacific Halibut Fishery", Jack Rich, pp. 65-71.
- "Production from the Sea", Frederick W. Bell, Ernest W. Carlson and Frederick V. Waugh, pp. 72-91.
- "Some Suggestions for the Development of a Bioeconomic Theory of the Fishery", Russell G. Thompson, pp. 92-95.
- "Practical Problems of Constructing Bioeconomic Models for Fishery Management", Paul Adam, pp. 96-103.
- "Issues Related to Fishery Management: Research Results", A. A. Sokoloski, pp. 104-105.
- "Management of the Peruvian Anchoveta Resource", Andreas A. Holmsen, pp. 106-111.
- "A Stochastic Investment Model for a Survival Conscious Fishing Firm", Russel G. Thompson, Richard W. Callen, and Lawrence C. Wolken, pp. 112-120.
- "Simulation Experiments to Evaluate Alternative Hunting Strategies for a Dear Population", F. M. Anderson, G. E. Connolly, A. N. Halter, and W. M. Longhurst, pp. 121-132.
- "Augmentation of Salmon Stocks through Artificial Proagation: Methods and Implications", Joe B. Stevens and Bruce W. Mattox, pp. 133-145.
- "Limited Entry: The Case of the Japanese Tuna Fishery", E. A. Keen, pp. 146-158.
- "A Study of the Socioeconomic Impact of Changes in the Harvesting Labor Force in the Marine Lobster Industry", A. M. Huq, pp. 159-173.

Spengler, J. J. 1977. The Invisible Hand and Other Matters: Adam Smith on Human Capital. Amer. Econ. Rev. 67(1): 32-41.

The author examines Adam Smith's treatment of human capital under five heads: the optimizing system of natural liberty; the nature of human capital; its sources; its necessary costliness; and obstacles to its optimum use.

Smith conceptualized individual but apparently interrelated phenomena, perceiving order beneath seeming chaos in man's affairs as in nature. He believed the development and use of human capital as of other resources to be closely associated with the degree to which the system of natural liberty, together with free competition, was allowed to prevail. Under the system of natural liberty, the individual in search of his own security and gain could be led, as "by an invisible hand to promote an end which was no part of his intention, "namely, the welfare of other men and of society.

There are two sources of human capital: 1) experience associated with the specialization of activities in an economy based on division of labor; and 2) education in schools and colleges or through arrangements such as apprenticeship. Investment in human capital is regarded as complementary to that in other capital, even as "tolerable stock" is essential to the growth of a nation's stock of capital and its employment. The reward of human capital must reflect the investment embodied in it as does the return on other fixed capital. Division of labor has reduced all trades to simple operations and affords an opportunity of employing very young children. Suboptimal or excessive remuneration and/or use of the services of human capital, together with inequality of reward, was traceable to perversions of apprenticeship, corporation privileges, poor and settlement laws, wage regulations, and subsidization of professional education. Thus, upon removal of such privileges, subsidies, and barriers, gross-income inequalities other than those properly associated with interindividual variation in human-capital investment could disappear.

Sweeney, R. J., R. D. Tollison and T. D. Willett 1974. Market Failure, the Common-Pool Problem, and Ocean Resource Exploitation. J. Law Econ. 17(1): 179-192.

The assessment of efficiency in ocean exploitation reviews the nature of the common-pool problem as it applies to the exploitation of fish and oil resources and to the mining of manganese nodules from the deep-sea floor.

There is an economic rationale for government regulation of fisheries because of common-pool problems. Oil production also suffers from common-pool difficulties, but these extend only over each particular pool of oil. Thus, efficient exploitation of oil does not require regulation of the overall rate of exploitation. In the case of nodule mining, there are no common-pool problems and unregulated economic activity may be expected to yield an efficient outcome.

Pollution and claim-jumping are two potential cases of market failure due to problems of defining and enforcing property rights which might affect nodule and utilized oil production.

The authors conclude that private, profit-motivated access to deep-sea mining would not result in the over-exploitation of ocean minerals and that private, profit-motivated claim jumping is unlikely. The traditional economic rationales for special government regulation beyond provisions for environmental protection do not apply here. Thus, there appears to be no need to create an international regulatory authority to supervise ocean mineral resource exploitation.

Talhelm, D. R. 1978. Limited Entry in Michigan Fisheries. Paper presented at the National Conference to Consider Limited Entry as a Tool in Fisheries Management, Denver, Colorado, July 17-19.

The author reviews Michigan's fisheries experience, focusing on a contracting commercial fishery; complex, somewhat unsatisfactory regulations; an ecosystem much altered by man; uncertainty about the future of commercial fishing due to continuing court challenges by native Americans; a contrast between equity and efficiency; the increasing importance of sport fishery; and an enlightened plan (franchise program) for the future.

Although some restrictions were imposed in 1929, a serious limited entry program was not enacted until 1968 (revised in 1974), and it has been only a partial success. Employment in the commercial fisheries has declined from over 6000 at the turn of the century to three or four hundred today. The number of licensed sport fishermen, on the other hand, has doubled from under 700,000 in the 1930's to around 1.3 million today. The economic impact of the Great Lakes sport fishery on Michigan's economy is \$300 million per year, and that of the commercial fishery is around \$20 million. The costs of commercial fisheries management, administration and law enforcement exceed license revenues by about 15 to 1 (\$400,000 to \$26,000 in 1971), and the excess is paid by sportsmen, an apparent inequity. Ideally the commercial fishery should pay for itself, and perhaps even pay rent to the public.

Thompson, R. N., editor, 1971. Marine Fishery Resources: Proceedings from Oregon's 1971 National Discussion Forum. Portland, Oregon, December 12-14, 1971, 1972, 235 pp.

The panels included in these proceedings are: 1) Foreign Fisheries Problems, 2) Limits and Allowable Harvest of Marine Resources, 3) Concept of Limited Entry in Commercial Fisheries, 4) Interrelation of Commercial and Sports Harvest of Marine Resources, 5) Man's Alteration of the Ocean Environment, 6) Preservation and Use of Estuaries.

Issues in Panel No. 1 are: Are international fishery agreements useful in protecting U.S. fish and fisheries? How can individual fishermen help solve foreign fishing problems? What management concepts protect both U.S. fisheries and fish everywhere? Can and should the U.S. unilaterally declare and enforce effective conservation zones beyond 12 miles off its coast? What realistic immediate solutions are available? Can the International Law of the Sea Conference in 1973 develop a solution acceptable to the U.S.?

Panel No. 2: Who should develop information on ocean stocks-private, state, federal or a combination and how should it be coordinated? Are joint research investigations with other countries appropriate for establishing mutually-acceptable harvest levels? How do we obtain information to develop usable management parameters for population dynamics and fisheries management? How do we encourage fisheries on underutilized stocks? How and when should catch limits be placed on underexploited marine resources?

Panel No. 3: What are the real objectives of limited entry? Can limited entry work with any U.S. fishery? Are Canada's limited entry programs in the salmon and lobster fisheries successful? How can harvest regulations be developed to benefit rather than hinder commercial and sport fishing efficiency? Should long-term leasing of public land and water for commercial finfish and shellfish farming be permitted? Should fisheries regulations inside and/or outside 3 and 12 miles be established by state legislatures, state agencies, congress, the federal government, international organizations or a combination?

Panel No. 4: What are the merits of biological, social and economic bases for fisheries management? Should research and management be based on specific user interests? What measure should be used for maximum economic benefit from a resource? Should there be a priority of use between commercial and sport fishing, and what should be the criteria of allocation? Should fisheries management and production programs be financed by users in proportion to their respective harvests? What can be done to make sport and commercial fisheries and fishermen more compatible?

Panel No 5: What are the potential effects of discharges into the oceans by nuclear electric power generating and desalinization plants? What are the possible effects of ocean mining, oil drilling and construction on marine resources? How can man use the marine environment to produce more fish? How should marine sanctuaries be selected, used and protected? How should standards of purity for ocean environment be established and enforced? Who should fund ocean pollution studies?

Panel No. 6: Should there be a moratorium on further estuary development? Is historical use of misuse of an estuary a preferential right? How can estuary production of aquatic life be increased? What is the impact of urban development on the coastal zone? Are environmental preservation and human use of estuaries incompatible? Should estuarine planning, development and control be local, state, federal or a cooperative combination?

Tollefson, T. C. et al. 1971. Panel No. 3 - Concept of Limited Entry in Commercial Fisheries, In R. N. Thompson, editor, Marine Fisheries Resources. Proceedings from Oregon's 1971 National Discussion Forum, Portland, Oregon, December 12-14, pp. 99-126.

The panel questions for this section of Oregon's 1971 National Discussion Forum are:

1) What are the real objectives of limited entry? 2) Can limited entry work with any U.S. Fishery? 3) Are Canada's limited entry programs in the salmon and lobster fisheries successful? 4) How can harvest regulations be developed to benefit rather than hinder commercial and sports fishing efficiency? 5) Should long-term leasing of public land and water for commercial finfish and shellfish farming be permitted? and 6) Should fisheries regulations inside and/or outside 3 and 12 miles be established by state legislatures, state agencies, congress the federal government, international organizations or a combination of these?

Panelists included H. C. Buckingham, Commercial Fisherman, Newport, Oregon; J. Crutchfield, Professor of Economics, University of Washington, Seattle Washington; W. C. Herrington, Law of the Sea Institute, University of Rhode Island, Kingston, Rhode Island; and B. A. Campbell, Manager, Planning Support Branch, Department of Fisheries and Forestry, Vancouver, British Columbia, Canada.

The panelists concluded that to encourage healthy fishing industry, a management body would need broad authority with participation of industry representatives in decision making, and that management measures should be developed and applied step by step to permit evaluation and modification. Provisions should be developed for handling social, economic and other problems.

Turvey, R. 1964. Optimization and Suboptimization in Fisheries Regulation. Am. Econ. Rev. 54(2): 64-76.

The author regards fishery regulation is one of those spheres of economic policy where the best thing to do depends on what can be done. Assuming that the port market is competitive and that there are no restrictions on entry into the fishery, he makes a static analysis of a single-trawl fishery of only one fish stock, fished from ports which supply a common market and which are equidistant from the fishing grounds.

Considering the weight of catch, fishing effort, total costs and revenues, he finds that higher level of demand means greater employment of resources in the industry but a smaller total product. This result indicates an existence of external diseconomies in fishery because: 1) while the catch of the individual fisherman is proportionate to his own fishing effort, the same is not true of all fishermen collectively, and 2) by catching small fish, fishermen reduce the number of large fish to be caught later. When external diseconomies are involved both in the level of fishing effort and in the choice of mesh size, achievement of optimum resource allocation requires regulations of both these variables. However, because political or administrative conditions frequently make the introduction of regulation of fishing effort or of mesh size impossible, the author considers the suboptima that can be reached by regulating only one or the other of these variables.

Wenk, E. Jr. 1972. The Politics of the Ocean. University of Washington Press, Seattle and London, 590 pp.

In the historical pattern of alternating interest and neglect, the decade of the 1960's saw a reawakened and deeper consideration of the seas. For the first time, however, problems and opportunities that held serious portent for all citizens on the planet were examined by the President, by Congress, by officials of other lands, and by the United Nations. And now the issues concerned the public order of the oceans; their sharply intensified use for navigation and extraction of fish, energy, and mineral resources; conflicts in development along the ocean's rim; and pollution threats to the health of the ocean itself.

Drawing on his extensive personal experience, in-depth interviews with key participants, and familiarity with the documentary background, the author describes a case history of decision making in the top echelons of the United States Government. In addition to recommendations on such specific concerns as managing the coastal zones, conserving fisheries resources, eliminating pollution, and promoting international cooperation, he offers significant proposals to improve the governmental process of making decisions relating to science and technology. His proposals include rational management of ocean space and international stewardship of the planet.

Wilson, J. and F. Olson 1975. Limitation of Entry in the United States Fishing Industry: A Second Comment. Land Econ. 51(2): 179-181.

These authors emphasize the importance of corrective action in fisheries and the scope and implications of limited entry in their comment on Bishop's (1973) paper.

As long as the benefits from the government's spending are greater than the costs and relatively favorable, reasonable policy would be required in a case where the industry is excessively burdened by external diseconomies caused by the common property nature of the resource.

Limited entry advocates have focused on those fisheries where limited entry promises the greatest improvements in efficiency and output, not suggested indiscriminate application of limited entry. Under limited entry the cost of harvesting will fall, and limited entry may result in temporary reductions in total harvest, but in the long-run will contribute to a closer approximation to MSY and greater sustained harvest than we currently experience under open access.

Consumers and taxpayers will probably gain due to greater efficiency and sustained output. The major losses could be that some people would be denied future employment. This potential loss to society, however, must be weighed against the very real possibility that the continued mismanagement of our common property resource fisheries will result in the depletion of those resources and few if any job opportunities for anyone.

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