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# LIMITED ENTRY

AS A FISHERY  
MANAGEMENT TOOL

R. Bruce Rettig and Jay J. C. Ginter, Editors

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# LIMITED ENTRY

## AS A FISHERY MANAGEMENT TOOL

Proceedings of a National Conference to Consider  
Limited Entry as a Tool in Fishery Management

Denver  
July 17-19, 1978

R. Bruce Rettig and Jay J. C. Ginter, Editors

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# DEDICATIONS

J. L. McHugh

Don McKernan's death, at the untimely age of sixty-one, was nevertheless how he would have wanted to go—in harness, almost half the world away from home, working with a delegation that had fisheries and marine resources as one of its primary themes.

Don's passing marked the end of an important era in marine fishery management. Beginning with W. F. Thompson at the University of Washington in the 1920s, it blossomed in the 1950s and 1960s with W. M. Chapman, M. B. Schaefer, and D. L. McKernan in the lead. The 1970s have been marked by the loss of all three. These were the last of the renaissance men. No person has yet appeared with the capacity to grasp and influence the intricate and interacting affairs of oceanic living resources. Fishery management now takes on a different complexion.

Donald L. McKernan graduated from the University of Washington in 1940. In high school he had suffered from osteomyelitis, a crippling disease that most would not have overcome. For much of his high school career he was bed-ridden, and his education was coordinated by his mother. Although he was told by his doctor that he might never walk again, Don's subsequent career is ample evidence that the doctor did not understand the measure of the man he was dealing with.

His professional career began in 1941 with the Washington State Department of Fisheries. In his first four years he became director of the Washington State Shellfish Research Laboratory and did some of his earliest work on the effects of sulphite waste liquor on oysters. There followed about seven years (1945-1952) in which he was director of research with the Oregon Fish Commission. During this period he found time also to complete academic requirements for the Ph.D. at the University of Washington, to spend time in Tokyo on the staff of General MacArthur, and to lecture at the University of Washington. From 1952 to 1955 he was assistant director of the Pacific Oceanic Fishery Investigations of the U.S. Fish and Wildlife Service in Hawaii, from 1955 to 1957 administrator of commercial fisheries in Alaska, and in 1957 he went to Washington, D.C., to head up the new Bureau of Commercial Fisheries in the Department of the Interior.

Not long after that, Don asked me to join him as chief of the Division of Biological Research, having known me from the early days in the Pacific Northwest. This I did at the beginning of 1959. Since that time, I was intimately associated with him, even when he went to the State Department in 1966 as special assistant to the secretary, with the rank of ambassador. After I left the bureau in 1970 to come to the State University of New York, I maintained contact with him in a variety of roles. He was always interested in my contention, and later proof, that we had done far better in international management of fisheries, imperfect though it was, than we had in preserving totally domestic fisheries. As United States Commissioner on the International Whaling Commission I was

guided by his advice (with which I did not always agree) until 1972, when I resigned from the commission. In another instance he once asked me to take over discussion of a particularly frustrating salmon problem, then, sitting next to me, told me how to do it. I tried for a while, then said: "Let me do it my way, or don't ask me to do it at all." He had an astute and positive mind, but he sometimes found it difficult to delegate. In 1974 he left the government service, in which he had served so long and brilliantly, again to join the University of Washington, this time as director of the Institute for Marine Studies, a position that he held to the end. Typically, he threw himself into this new position with vigor, and remained active in international affairs.

I could go on almost endlessly about the special positions he held and the many honors he received, but will reduce these to a sampling, to show how well he was regarded in all quarters. He was alternate representative on the delegation of the United States to the United Nations Conference on Law of the Sea from 1968 to 1975, a member of the State Department Advisory Committee on Law of the Sea following that appointment, and chairman of the National Advisory Committee on Oceans and Atmosphere, a presidential appointment. He received distinguished service awards from the Department of the Interior and the Department of State, the National Fisheries Institute "Man of the Year" award, a special award from the National Cannery Association, and a special award from the Anglers Club of New York. I would prefer, however, to speak of a few special and personal things, perhaps quite trivial in themselves, that show the special facets of his personality.

Don was a big man, big in every way, a truly remarkable character. In the Bureau of Commercial Fisheries we called him "the big fisherman." I was constantly impressed with his compassion, and at the same time with his unrelenting impatience with incompetence. For some time after I joined the bureau I was amazed to see how he rode certain people. One high official in the bureau he criticized unmercifully and constantly. At first it seemed that he did it with unnecessary vigor, but as I became more familiar with the issues, I came to be equally amazed at his forbearance with this person. Some people on Don's staff never learned how to take him, and were so overwhelmed by his forceful personality that they became far less effective. Others, who understood him better, would argue long and loud with him, and this is what he liked. The only thing to beware was to be sure you were right or at least had a rational argument. He had endless patience with competence, but no use for incompetence at all.

I remember one time that Wib Chapman had written a letter critical of something we did. It was confidential (that is, he sent it to only about one hundred of his colleagues). We sat down with Wib one Saturday morning and went through it, word by word, arguing every step of the way. Then we went over it again and again, until Wib had agreed that he was wrong on nearly every point. It was an unforgettable experience. To my knowledge, the letter was never recanted in any way, other than verbally at this session. But the satisfaction that McKernan received from the exchange was obvious. They argued constantly, usually with great vigor, but they were the closest of friends.

With Benny Schaefer it was much the same way. He was just as positive as Chapman, and sometimes equally as wrong. For two years, Benny was science

adviser to Secretary of the Interior Udall, and we saw a good deal of him. Benny was impatient with the usually slow pace of government, and he did not remain silent when he thought we were guilty of that fault. McKernan would argue incessantly with Schaefer, occasionally getting him to admit he was wrong. Schaefer would return the compliment, occasionally getting the upper hand on McKernan. Their mutual respect for each other never faltered.

At times his activities could be maddening. He often dropped into my office early in the morning, before anyone else had arrived, to discuss some important matter. He was intensely curious about everything, and never missed a thing. I remember once he saw three new books lying on my table, the titles of which intrigued him. They had just arrived and I had not even had time to put my name on them. He asked to borrow them and of course I said, yes. Eventually I discovered them, quite by chance, in the library of a colleague, where he also had visited on the way to his office, laid them down, and forgotten them. I persuaded the colleague that the books were mine, but I suspect he was never fully convinced. McKernan was so intensely interested in everything, that he sometimes forgot things he had started.

Sometimes his sense of loyalty caused him to change position drastically. These changes were sometimes so sudden as to be baffling. While he was with Interior, and later State, he was firmly opposed to an extension of jurisdiction to two hundred miles. Almost as soon as he joined the University of Washington he began actively to advocate it. This was such an abrupt about-face that I wrote him about it. He rationalized by saying that the Law of the Sea talks were simply not dealing with the question satisfactorily, and that he believed that the United States had to take a conservative position until a satisfactory agreement could be worked out. His opinion prevailed, and I think had an important effect on the outcome of the Fisheries Conservation and Management Act of 1976. I am still not sure that this was the best move. Time will tell.

It was a great personal satisfaction working for McKernan, and with his passing something is lost that will never be replaced. He had boundless energy, enthusiasm, great capacity for hard work, and a positive attitude. He was the most capable negotiator I have ever seen in action. He hated to lose, and he seldom did lose. I think that is what persuaded him to ignore his childhood doctor's prediction in the first place. He was a born leader, who got a little more out of his top staff than any of us would have believed possible. With him gone, there is no one who can take his place.

J. L. McHugh is presently professor of marine resources, Marine Sciences Research Center, State University of New York at Stony Brook. His professional career has included employment with the Biological Board of Canada and the Scripps Institution of Oceanography. He served as director, Virginia Fisheries Laboratory, and professor of marine biology, College of William and Mary; chief, Division of Biological Research, assistant director for biological research, and deputy director of the Bureau of Commercial Fisheries; director of the Office of Marine Resources, Department of the Interior; and head of the Office for the International Decade of Ocean Exploration, National Science Foundation. He has served as commissioner on the Inter-American Tropical Tuna Commission and the International Whaling Commission, member of the Advisory Committee on Marine Resources Research to the Director-General of the Food and Agriculture Organization of the United Nations, and member of the National Research Council. He has held consulting appointments on a wide variety of federal, state, and local governments. He was a lifelong friend and associate of Donald L. McKernan, W. M. Chapman, and M. B. Schaefer.

Edward L. Miles

I first met Don McKernan about twelve years ago, soon after he had shifted from the directorship of the Bureau of Commercial Fisheries over to the Department of State. He was already a legend then and one learned to recognize that the triumvirate of Wib Chapman, Benny Schaefer, and Don McKernan was one of the forces of nature in world fisheries. Don's personal qualities which impressed me as a new recruit at that time were his boundless energy, enthusiasm, his infinite capacity for hard work, and his positive attitude to the world. As I got to know him better, I became more impressed with the quality of his imagination, the depth and range of his detailed knowledge and interests, and his virtually unlimited generosity and tolerance towards youth and inexperience. He was also clearly in a class by himself as a gifted, tough, and effective negotiator.

During the time Don was at the Department of State, I followed only the global dimension of his multifaceted career closely. At that level, Don played major roles in several United Nations agencies: the Intergovernmental Oceanographic Commission (IOC) of Unesco, the Committee on Fisheries (COFI) of the Food and Agriculture Organization (FAO), and the U. N. Seabed Committee, precursor to the Third Law of the Sea Conference. Developments in the law of the sea led to the formation of a much closer link in the fates of these three units and this was just barely perceptible when Don succeeded Bill Herrington at the Department of State. In the IOC, Don had to deal mainly with U. S. distant-water oceanographers and the distant-water oceanographers of other developed maritime countries as his major constituencies. In COFI, Don dealt primarily with other fishery administrators from around the world, and particularly the world of developing countries, since COFI was then and still is the only mechanism that brought all these people together in one place. In fact, Don played a large role in the rejuvenation of the Division of Fisheries at FAO from the time that Roy Jackson was appointed assistant director general in 1967. It was at this time that a group of countries, led by Canada and the United States, succeeded in raising the Division of Fisheries to the status of a department in FAO, significantly increasing its share of FAO's resource, and creating the Committee on Fisheries.

Don was also deeply involved in the work of the U. N. Seabed Committee from 1969, and particularly from 1971, when that committee was charged with the task of preparing for the Third U. N. Law of the Sea Conference. In that connection, he was the alternate representative of the United States and chief spokesman for the U. S. on all matters affecting fisheries, marine scientific research, and the preservation of the marine environment. Don retained this position for two sessions of the conference itself in 1974 and 1975 before he turned his attention to other things.

Apart from the quality of his substantive performance, which was always at the accustomed high level, two things were particularly noticable. First was the care and attention that Don gave to his varied constituencies, consisting of repre-

sentatives of the U. S. fishing industry, marine scientists, and environmentalists, and the high personal regard in which he was held by them even when they differed, sometimes seriously. Second was the high personal regard in which he was held by his counterparts from developing countries, even when they were becoming increasingly angry at the United States.

Toward the end of his tenure in government, Don seemed to be more and more dissatisfied with the constraints of official life. He especially worried about the fact that government policy seemed always to be reactive. He developed a great interest in stimulating more systematic analysis of the longterm implications of policy choices, and in the construction of new theory. He was very excited about returning to the University of Washington as director of the Institute for Marine Studies, which would allow him to give priority to these tasks and to help him produce bright young professionals who, he said, would be better trained than he was to deal with marine policy problems.

What was particularly impressive at this time was the fact that Don gave equal priority in his mind to the need for applied work and for theory construction in marine affairs. Unfortunately, resources did not allow equal attention to the latter in practice. While he taught the rest of us about fisheries, he was willing to learn more about the social sciences in an attempt better to understand their potential applications to marine problems. And he already knew a great deal about marine law.

He had a vision of the future of marine affairs that was multidimensional. He was impressed that the University of Washington had a wide range of capabilities in the marine area, which needed to be consolidated as well as expanded. The Institute for Marine Studies, whose major purpose was teaching and research about marine policy problems, would attempt to marry the natural and social sciences in the pursuit of that goal. The capabilities that existed in the University would allow the Institute to develop a depth of training and research that would be difficult to achieve but could be done if a sufficiently significant commitment to do so was made by the University.

Don McKernan as a professional cannot be divorced from Don McKernan as a human being. He had an enormous impact on the lives of all of his colleagues and friends. He was a veritable tornado of activity. He had a great, uproarious sense of humor, great tolerance, and great interest in young people. He was willing to give unselfishly of his time, expertise, and concern wherever he was needed. His enthusiasm and excitement were infectious and his affection and regard stimulated one to try to do more and better. This did not prevent him from being a demanding task master because he had an abiding concern for quality of performance.

Our community is now smaller by one. But we are much poorer than numbers would indicate because of the quality of that one we have lost. It is important to note that with Don McKernan's passing, an era in U. S. and world fisheries is nearing an end. For the U. S., leadership in this era began at the University of Washington in the 1920s with W. F. Thompson, passed on to Wib Chapman and Benny Schaefer, and then to Don McKernan. We have now en-

tered a turbulent period of transition in the management of living resources throughout the entire world ocean. The future will be very different from the past and Don McKernan was very involved in helping to shape that future in more productive and less wasteful directions. We shall try to carry on this work but we shall miss him at every turn. He simply cannot be replaced. Our only consolation is that he has touched our lives in wonderful ways and from that we derive inspiration.

Edward L. Miles is professor of marine studies and public affairs at the Institute for Marine Studies, University of Washington in Seattle, Washington. He has been actively involved with the organization and education program at the institute under the direction of Professor McKernan since 1974. His fields of specialization include international law and organization, science technology and international relations, and marine policy and ocean management. Outside the university, his most recent professional career includes chairing the Ocean Policy Committee of the National Academy of Sciences/National Research Council and chairing the Working Group on Socio-economic Data Needs and Procedures for Developing Fishery Management Plans of the North Pacific Fishery Management Council. In addition, he is a member of the Scientific and Statistical Committee of the North Pacific Fishery Management Council (of which McKernan was a voting council member), member of the Executive Board of the Law of the Sea Institute, and is the joint appointee on the Maritime Authority of the Federated States of Micronesia. He has served as member of the Board of Editors for *International Organization*, as associate editor for *Ocean Development and International Law Journal*, and as an editorial board member for the *Sage Professional Papers in International Studies Series*. He is a frequent observer at the Law of the Sea Conference Sessions.

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# FOREWORD

Senator Warren G. Magnuson

The living marine resources near the United States' shores have always been an important source of food and revenue. Fishery products were among the first commercially exported goods from the American colonies. Since those early days of our history, the United States fishing industry has consistently provided our nation with a high quality food product.

In addition to their significant contribution to our economy, commercial fishermen are joined by a steadily growing number of recreational fishermen with interests in the fish resources no less important than the commercial interests. Those who supply and service fishermen and process and market their catch also depend on the abundance and quality of the fish resource for their livelihoods. Lastly, but perhaps most importantly, consumers have a direct interest in high quality, low cost seafood products. All these interests have combined especially in recent years to create increased demand for fish, while the supply either has stayed constant or, in many instances, has decreased or been highly variable. Although this situation is not new to fishery managers, in recent years it has reached troublesome and, in some cases, serious proportions.

Until recently, the approach to fishery management in the United States was haphazard. Effective conservation efforts were stymied by weak, divided authority and inadequate enforcement. The state governments had the only comprehensive fishery management authority by virtue of federal inaction and the Submerged Lands Act. This system grew out of a time when fishery stocks were relatively more abundant, and fishing effort was less extensive. Fish stocks on the high seas, outside territorial claims and special conservation zones, were open to fishermen from all nations. As these stocks became intensively exploited by foreign fishing operations, it became obvious that virtually uncontrolled harvesting eventually would mean economic hardship from our fishing industry, an unreliable food supply, and irreparable damage to our fishery resources. By the mid-1960s Congress began to understand these facts after hearing reports from both fishermen and scientists alike.

By the mid-1970s congressional action to protect our fishery interests was clearly called for and, despite strong opposition by the executive branch, the Fishery Conservation and Management Act (FCMA) was signed into law by President Ford on April 13, 1976. I am proud to have participated in the drafting of this landmark legislation. It is the most comprehensive action ever taken by the federal government to prevent fishery resources adjacent to our shores from becoming irretrievably depleted. While this law established internationally recognized controls over foreign fishing, this authority came with the responsibility of wise use—an objective that has often eluded us in the past in managing our natural resources. We can no longer use foreign fishing as an excuse for mismanagement of resources entirely within our jurisdiction.

The main purpose of the FCMA is to provide a basis for protecting our fishery resources from irrational or excessive exploitation, both foreign and domes-

tic, while providing our fishing and processing industries the opportunity for orderly development and full utilization of the fishery resources within the fishery conservation zone. The FCMA mandates a new conservation ethic and responsibility by virtue of our claimed proprietorship of the fishery resources off our shores.

Under this new conservation regime, we must not be content with traditional management tools in every situation. This symposium is dedicated to an examination of alternative management techniques—namely those based primarily upon economic rationale. These are considered radical, unnecessary, and disruptive by some, but to others they are an attempt to cure fundamental problems inherent in managing common property resources. I do not necessarily endorse any of the specific suggestions, statements, or recommendations made here. However, our fishery resources are of such significance to the welfare of our nation that all reasonable management tools available should be carefully considered. The FCMA expressly authorizes this kind of action while also attempting to protect the cultural and economic interests of fishermen and their communities. Although economically based controls on fishing effort are relatively unexplored in the United States, their merits and demerits are being closely watched in fisheries where they have been tried. A national discussion on the efficacy of this tool in fishery management is initiated with this conference and will no doubt be carried on at regional and local levels for years to come. The discussions and scholarly studies that emerge may well reveal basic problems in the fabric of the law and the economic theory. If so, we may then endeavor to correct these deficiencies. However, this can be accomplished only with the participation of all who are concerned with our fishery resources—fishery managers, fishermen, processors, and consumers.

We are entering a new era of conservation of marine fishery resources in this country, which is stimulated by the FCMA. The growing national and world demand for food from the sea will inevitably force us to view our extensive living marine resources and our fishing industry in new ways. We cannot ignore any management tool that will promote the conservation and wise use of these valuable resources. To this end, this symposium makes a noble beginning.

Warren G. Magnuson, Democrat from Seattle, is president pro tempore of the U. S. Senate. He graduated from the University of Washington School of Law in 1929 and was first elected to the U. S. Senate in 1944. He was chairman of the Committee on Commerce in 1976 when the Fishery Conservation and Management Act became law. He was principal sponsor of S. 961 introduced in March, 1975, the Senate counterpart of H. R. 200, which evolved into the Fishery Conservation and Management Act. He has been a leading supporter of marine fisheries conservation and development throughout his long career in the U. S. Senate.

# PREFACE

The Fishery Conservation and Management Act of 1976 (FCMA) precipitated momentous changes in the way marine fisheries are managed in waters adjacent to the United States. The key feature of the legislation was creation of jurisdiction over fishery resources outside the territorial sea but within 200 miles of national coastlines. This authority to assert new claims for United States' interest was accompanied by certain responsibilities, including that of planning and executing wise management of those resources. Recognizing that the expanded responsibility might strain traditional approaches to fishery management, Congress authorized limited entry as a tool in fishery management, but made it quite clear that this tool was to be employed carefully and only after careful examination at the regional level.

During the first year of fishery management planning under the FCMA, Professor Donald L. McKernan, director of the Institute for Marine Studies (IMS) at the University of Washington (UW) and a member of the North Pacific Fishery Management Council, became convinced that the regional fishery management councils lacked sufficient information about limited entry to even consider its use in fishery management plans. He found agreement with this view among his colleagues at the University of Washington, several of whom were vitally involved with the North Pacific Fishery Management Council and the Pacific Fishery Management Council. David Wallace, then associate administrator for marine resources of the National Oceanic and Atmospheric Administration (NOAA), also was highly supportive of the effort to provide a wide array of information on limited entry while keeping the responsibility to evaluate such information in the hands of the regional fishery management councils.

In a series of discussions in the summer of 1977 between NOAA and UW personnel, a work plan evolved that included establishing a steering committee, soliciting papers on technical aspects of and experience with limited entry, conducting a small workshop in which scientists and specialists would critique the papers, and organizing a national conference for members of all regional fishery management councils and concerned citizens. Very early, agreement emerged that the choice of papers, the nature of the workshop and the conference, and all other substantive issues would be determined by the steering committee in consultation with regional fishery management councils. The role of NOAA was to be limited to logistical support. A proposal to carry out this plan was submitted to NOAA through the National Sea Grant Program in August of 1977.

At that time, the Marine Fisheries Advisory Committee (MAFAC), a national group of knowledgeable citizens assigned to advise the Secretary of Commerce on fishery affairs, had become deeply interested in limited entry issues. They were concerned that the proposed activities of the Institute for Marine Studies in Seattle would be heavily biased in favor of limited entry and the Pacific Northwest point of view. The same concern was expressed by members of the New England Fishery Management Council (NEFMC), which was dealing with severe management problems in the haddock, cod, and yellowtail flounder fisheries. They argued that information emerging from the workshop and conference would be useless in dealing with their multi-species, groundfish fisheries if the primary data presented was from the northwest's largely single species fisheries.

Personnel at NOAA were highly responsive to suggestions made to meet the concerns raised by MAFAC and NEFMC. Initially, the steering committee membership was made broader to include representatives from eastern and southern regions of the nation. Steering committee membership included Donald L. McKernan and Harvey M. Hutchings of the National Marine Fisheries Service, Northwest Region, as co-chairmen; Donald E. Bevan and Stanley R. Murphy of the UW; Theodore B. Ford III from Louisiana; Edwin B. Joseph from South Carolina; J. L. McHugh from New York; R. Bruce Rettig from Oregon; and Leah J. Smith from Massachusetts. Subsequent decisions by this group increased the number of papers solicited to expand the technical and experience perspective, chose certain panelists specifically to represent pro and con and special regional viewpoints, and located the conference site in Denver so that no one particular region would be dominantly representative and the site would be more or less equidistant from all regions. All these changes increased the cost of the project and our support requirements from NOAA. However, we are particularly pleased with the outcome, since this volume reflects the wide array of experience, expertise, and national and regional perspectives represented at the workshop and conference.

The preconference workshop on limited entry as a fishery management tool was held on May 16 through 18, 1978, at the University of Washington's Continuing Education Center at Lake Wilderness, located about fifteen miles southeast of Seattle. The workshop was attended by thirty-eight university researchers and government administrators, all with particular familiarity with limited entry issues (workshop participants are noted in the list of conference and workshop attendees pages 456 to 463). Representatives from four foreign countries and fourteen states were present. Among the participants at the workshop was the steering committee for a Canadian symposium on limited entry. For the results of that symposium, the reader is referred to the July 1979 issue of the *Journal of the Fisheries Record Board of Canada* (Vol. 36(7): 711-867).

The purpose of the Lake Wilderness workshop was to review and critique fourteen of the solicited papers. The key contribution of that activity lies in the quality of the papers in this volume, since workshop comments were often used as a basis for revision. The editors also requested some revisions after the papers were distributed for confidential review. Discussion at the workshop was tape recorded and transcription amounted to 348 manuscript pages. A narrative summary of this discussion follows the conference discussion in section III. In general, workshop discussion tended to be more academic and technical (some would say esoteric) than the conference discussion. Views presented at the workshop, however, were reasonably well-balanced as to pro or con limited entry. In fact, a decision to include the papers by G. Alex Fraser and C. H. B. Newton, who have differing conclusions on the success of limited entry in British Columbia, was made after each of the Canadian economists presented their views at the workshop.

As originally conceived, the principal feature of the entire limited entry project was the conference itself. The conference was to be a forum for the presentation of information developed by the workshop, and the exchange of opinions and views in reaction to that information. This took place in Denver, Colorado,

on July 17 through 19, 1978. Over two hundred persons attended the conference, representing every fishery management region established by the FCMA and every aspect of the seafood industry from the fisherman to the consumer. Many special interest groups were represented also, but the primary audience was the fishery management decision makers. They are the group who must ultimately make the hard choices affecting fishermen's livelihoods and the viability of the resource.

The explicit objective of the conference was to consider whether limited entry programs might contribute to better management of the commercial fisheries of the United States and, if so, where, when, and how they could be employed. The conference was *not* intended to develop a national policy for limited entry as some people were led to believe. Neither did the conference develop any guidelines for a national policy specifically, although some are obviously implied.

The conference was designed by the steering committee with this objective foremost in mind. In the two and one-half days of meetings, the information developed by the workshop had to be transmitted and responded to while also allowing ample time for spontaneous and unstructured discussion. Basically, the first and second days were devoted to the technical issues of and experience with limited entry, respectively. Each day in turn was divided into two panel sessions, one panel comprising the experts (in most cases they were the authors of papers in this volume) and the second panel the individuals who responded to the papers and to the views expressed by the first panel. Only the statements of the second panel are presented here, since the views expressed by the experts were largely a reiteration of their papers. On the final half day, a third panel consisting of one representative from each of the eight regional fishery management councils expressed their views of limited entry and how it would or would not work in their regions. Panel participants were selected from the commercial fishing industry, state and federal agencies, the regional fishery management councils, the academic community, and the general public. Panelists represented various regional and occupational interests and held individual and diverse views on the limited entry issue.

The steering committee and organizers of the conference believed its purpose was better served by a relatively free exchange of information, views, and opinions. Therefore, all of the panel statements were kept short and few formal speeches were invited. The opening address was given by Mr. Terry Leitzell, director of the National Marine Fisheries Service. The key issues to be discussed in each of the first two days were presented in addresses by Drs. Fred Popper and Edwin B. Joseph, respectively. Professor McKernan concluded the conference on the final day with a special address. This agenda resulted in ample time for all conference participants to ask questions and make comments—most of which were directed at the panelists, but some of which served to vent frustration with current management. We see this discussion as a significant part of this book since it represented mostly the nonacademic or practitioner points of view.

This book is intended to be an official report of the workshop and conference. It should not be interpreted as a proceedings volume in the strictest sense, however, since it does not follow exactly the agendas of either the workshop or conference. Nor does it attempt to present every utterance at both meetings. In-

stead, we have taken the liberty of arranging the material in topical rather than chronological order. The four special addresses given at the conference constitute section I, all of the panel statements are in section II, and the spontaneous comments and questions from the floor are in section III.

In reviewing the taped transcripts of the discussion, we found most comments could be categorized into one of about six major concern areas. Much of this categorization is arbitrary. Other editors may well have arranged the material differently. However, we feel that the major concerns expressed by the conference participants are best represented as they appear here. Moreover, the discussion material was edited substantially. Printed word-for-word as it came off the tape, participants' comments would have made very obscure and confusing reading. Editing and rearranging was done with great care, however, to avoid contextual changes. This approach is designed to convey the conference's major concerns to readers who did not attend, improve readability of the discussion, and reduce overall verbiage. (It is ironic that some proponents of increasing the economic efficiency of fisheries do so with an apparent disregard for the efficiency of verbal communication).

Section IV presents the key points made in discussions at the workshop. We also analyze and compare the relative significance of key issues raised at both the workshop and conference sessions. Again, this represents our interpretations of proceedings at both forums.

Sections V and VI present the solicited papers in their entirety. These papers are the original and formal contributions of recognized authorities in their respective fields. The papers are not published elsewhere to our knowledge and copyright privileges reside with the individual authors. Most of these contributions were presented originally at the workshop but only briefly summarized at the conference as a basis for discussion.

All notes and references in the papers are contained in section VII. This arrangement, combined with additional suggested reading in section VIII, is designed for the convenience of readers with interests in the extant literature on limited entry.

The value of this book should be largely attributed to the authors of papers and the people who attended and spoke out at the conference and workshops. In essence, this book represents their viewpoints, derived collectively from countless years of work experience in the fishing industry and the administrative and analytical disciplines. Of course, such experience provides for expansive and often divergent viewpoints. We have tried to capture the richness and diversity of view represented. A special tribute must go to those people who expressed themselves openly yet with great consideration to those with different points of view. The high quality of involvement at the conference and workshop proved the value of these communication tools and made this book possible.

On the institutional level, the National Marine Fisheries Service of NOAA and the U. S. Department of Commerce are gratefully acknowledged for their financial support of the entire project, from workshop planning through publication of this volume. The University of Washington in Seattle also has made significant contributions through the involvement of its following subdivisions: Institute for Marine Studies, Division of Marine Resources (UW Sea Grant), College

of Fisheries, University of Washington Press, Department of Printing, Office of Publications, and Stenographic Service Bureau. The cooperation and service provided by these organizations are much appreciated.

However, it is certain individuals and not the institutions who acutally provided the necessary assistance. In this regard, we give special thanks to David Wallace, Harvey Hutchings, Lee Alverson, and C. P. Idyll, all of the National Marine Fisheries Service, for their personal support of our activities and patient encouragement. At the University of Washington, we would like to recognize those who helped us survive the bureaucracy—namely Martha Allison and Ora Chapman at IMS and Alan Krekel at UW Sea Grant. We would like to thank Washington Sea Grant Communications for editorial consultation and assistance with design and production. Additional editorial assistance was cheerfully provided by Dorothy Beall of the College of Fisheries and Lorraine Hartman of IMS. Credit for much of the endless typing and retyping of manuscript goes to Rowena Bethards at IMS, who persevered despite our endless copy revisions and changes of mind. The difficult task of typing the complete conference transcript from tape was performed well by Alice Robson at the College of Fisheries.

Wise counsel came from many colleagues at the University of Washington. We gratefully acknowledge the advice and comment provided by Donald Bevan, William Burke, Douglas Chapman, James Crutchfield, Jean-Paul Dumont, Ed Miles, Stanley Murphy, Robert Stokes, and James Wilen. To this list we add the names of those we consulted outside the University: in particular, James Acheson, Lee Anderson, Francis Christy, Svein Fougner, Michael Fraser, Thomas Hearne, Daniel Huppert, John Poggie, William Royce, and Cortland Smith. The efforts of our steering committee mentioned above are also much appreciated, especially since many of them had to take time out of their busy schedules to travel to Seattle on two occasions for planning meetings. Professor Warren Wooster provided major assistance overseeing final preparation of this volume.

Finally, and with utmost respect, we acknowledge Donald McKernan, whose foresight, desire to resolve conflict in fishery affairs, ideas, and presence still dominate this book and our careers.

R. Bruce Rettig  
Jay J. C. Ginter





# **Special Addresses**

## **PARTICIPANTS**

Terry L. Leitzell  
F. E. Popper  
Edwin B. Joseph  
Donald L. McKernan

# **FISHERIES MANAGEMENT UNDER THE FISHERY CONSERVATION AND MANAGEMENT ACT**

Terry L. Leitzell

Rather than limit myself to the subject of this conference, I was asked to speak in broader terms and, in so doing, to raise other problems we face, discuss our progress in implementing the Fishery Conservation and Management Act (FCMA), and speak of my experience in the past several months with fishery management problems. I hope to have the opportunity to discuss many of these issues with you more fully during the next three days. I would also be interested in talking with you about matters other than limited entry during these three days.

As all of you are aware, the impetus for the 200-mile legislation was the major threat to fisheries resources off our coasts posed by heavy fishing, mostly by foreign vessels. I think that we have done well under the system in halting the decline of most stocks and that we are beginning to get a handle on management of all major species that are presently heavily fished.

The act created a unique governmental system for resource management with the major actors including the Regional Fishery Management Councils, the departments of Commerce and State, the Coast Guard, and the coastal states. In addition, the act and the procedures under it require the input and action of all segments of the fishing industry in the development of management and conservation measures.

## **CURRENT ACTIVITIES**

One of the most striking factors in attempting to carry out our role is the necessity to react to the very different types of problems and needs from the various sectors of the country. In this regard, the creation in the act of regional management councils and the heavy emphasis that I intend to continue in the National Marine Fisheries Service on regional responsibility and actions are essential to respond to these serious regional problems. Let me give you a few examples.

In New England, we are dealing with a groundfish fishery for cod, haddock, and flounder that has been heavily developed for many decades and has a very heavy domestic fishing effort at present. As most of you know, the regional council and NOAA have been working hard to find answers to some of the problems that exist in New England. The need for strict management measures in that area has made it necessary for us in NOAA to develop a program to assist the industry in diverting effort from the more traditional species, such as cod and haddock, to other species, such as squid, which have not been heavily fished in the past by American fishermen. I spent over two weeks in New England in May discussing these problems with over eight-hundred members of all segments of the industry. We are now discussing with the industry and members of Congress

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a program to assist in diversification into nontraditional species. This program includes measures such as technological assistance, both to the harvesting and processing sectors, and market assistance to help develop both foreign and domestic markets for a wider variety of species. It is essential in New England to develop both a management and development strategy in parallel. We hope that we can work closely with the regional council and the industry to develop this joint strategy. The use of a parallel course for development and management of our fisheries may be essential nationwide.

I spent last week in Alaska, which has a much different set of problems and immense and very valuable resources off its coasts. With some resources such as tanner crab, the domestic industry is not yet able to fully utilize both species of the resource, but is working steadily and reasonably toward development of the harvesting and processing sector, and is encouraging the growth of a market for tanner crab. Some of the problems faced by Alaska relate to the high labor costs of processing and the great distances that are required to bring fish to processors and eventually to market. I believe that the industry and the council in the North Pacific are moving in rational directions to solve these problems and have assured them that the Department of Commerce is ready to assist them in their efforts.

In the Pacific Northwest, many of the major problems are related to the management of salmon, a resource that requires complicated management measures by its very nature. In addition, court decisions and the numerous and varied interest groups in that area have made management decisions difficult. As many of you may know, a task force within the executive branch has worked both at the regional and national level to find solutions to the salmon management questions and soon will begin to work with Congress on those issues.

In the Gulf of Mexico, the shrimp industry is having another good year with high prices. Last year's landings came close to a third of a billion dollars in ex-vessel prices. We in NOAA have been working with the industry and the environmental community to find rational solutions to potential areas of conflict between shrimp fishing and the incidental catching of marine sea turtles by shrimp trawlers. We are now working on an accelerated program to develop gear for shrimp trawling that will exclude marine turtles and eliminate or at least greatly reduce mortality of the turtles in both the Gulf and the South Atlantic.

These are examples of some of the specific problems.

## **PROBLEM AREAS**

We are still working within NOAA and with the regional councils to more clearly define our respective roles in dealing with management and conservation decisions under the Fishery Conservation and Management Act. I believe that the councils were intended to be on-the-spot managers of our fisheries, and that the Department of Commerce and NOAA were meant to oversee council actions and insure that all of the requirements of the law are met. Our interactions are not perfect by any means, but I do believe that we are making considerable progress in this area.

The act rightly provides for extensive public input into development of fishery management plans through open council meetings, use of advisory committees, and the opportunity to comment on environmental impact statements developed along with fishery management plans. In a few instances, some groups have felt that they have not had an adequate opportunity to be heard and we are working to insure that procedures throughout the country are uniform and do provide for adequate input. In general, I think that all interested groups have had an adequate opportunity for their opinions and concerns to be expressed to the councils and hope that future problems can be eliminated.

In some areas of the country, we have had difficulty with the complexity of regulations that have caused understandable confusion. In addition, many members of the industry are still adjusting to participation in the public process of development of management plans and are striving to increase the effectiveness of their input. In this respect, I believe that by discussing the very complicated questions related to limited entry, this conference will be helpful to the councils, the industry, and NOAA in working on potential limited entry situations in the future. Many management tools need this kind of attention if they are to be adequately and effectively used in our activities under the FCMA.

The Department of Commerce has had difficulties in providing enforcement capability in some areas of the country. The general trend in the federal government is toward reduction in the number of personnel employed and I do not foresee any major increases in the number of enforcement personnel available to us. We have tried to work with the coastal states to coordinate our enforcement efforts and to insure that we are both obtaining the maximum possible effort from our combined personnel. It is essential for us to have the cooperation of coastal states if we are to be successful in our enforcement efforts.

With regard to relations with other countries, several problems exist. First, we have a major deficit in foreign trade of fish and fish products of well over two billion dollars. The Department of Commerce is working to develop programs to reduce that deficit, both by increasing our access to foreign markets and by decreasing our imports through an increased domestic supply of desired fish products. I believe that reducing the trade deficit through development of our industry should be one of our major objectives. Second, we wish to achieve joint management of certain species and stocks of fish with our neighboring countries, particularly Canada and Mexico. In this respect, full coordination and cooperation with these countries would insure that species such as cod and haddock in the North Atlantic, salmon and anchovies in the Pacific, and shrimp in the Gulf will be managed in a completely effective fashion. Third, we are seeking viable means for U.S. domestic fleets to continue to fish abroad. We have had considerable difficulties in continuing arrangements with our tuna fleet fishing off foreign shores. With regard to tuna, the industry is striving to expand its efforts into the western Pacific and possibly the Indian Ocean, efforts we encourage.

I am particularly concerned that we make our efforts at habitat protection more effective through increased attention on our part and greatly increased cooperation with the industry and coastal states. Habitat protection in coastal areas, particularly estuarine and wetlands areas, is essential if our fishery resources are to continue to be healthy. Rapid and heavy development in many

coastal areas requires that provisions be made to insure that fishery habitats are protected so that stocks can continue to be healthy and to grow. I encourage members of industry to assist us in these efforts and hope that we can increase the amount of coordination and cooperation we have with coastal states.

Considerable concern has been expressed by members of Congress and industry at the extreme length of time required to process fishery management plans under the procedures of the FCMA. In cooperation with the industry and Congress, we will work to simplify procedures without decreasing the opportunities for public input into the development of management plans.

As I mentioned earlier, with regard to marine turtles in the Gulf and South Atlantic, we have some problems concerning potential conflicts between commercial fishing operations and the protection of marine mammals and endangered species. Other similar conflicts may confront us in the future. I believe that these problems can be solved in a reasonable fashion if we in the government undertake adequate research to understand the effects of fishing on these species and if industry, environmental groups, and the government cooperate in finding reasonable solutions.

## **CONCLUSION**

Fisheries management is clearly one of the most challenging and interesting areas of government action in this administration. The issues and problems that present themselves through our involvement with industry and the councils are exciting and challenging. We have a great opportunity to develop and build a major and important American industry, based on the abundance of fishery resources off our coasts. That development is possible only if all segments of the industry, including fishermen, processors, distributors, and all others, combine with the regional councils, the coastal states, and the federal government to work toward that common objective. There will be disagreements and rocky spots in the road along the way, but if we trust each other and work with a continuous understanding of the ultimate goal, we will be successful.

# FISHERY MANAGEMENT CONCEPTS AND LIMITED ENTRY

Frederick E. Popper

I consider it a great honor to have been asked to make a presentation to this very important conference. This conference can make a vital contribution to the development of management methods in fisheries—methods that will not only help to ensure the rational use of United States fishery resources in a manner generally acceptable to all concerned, but beyond the boundaries of your country might be acknowledged as providing an example to be emulated elsewhere. I was at first hesitant to accept this task because I felt poorly qualified for it. I have not been involved in the setting up of the present fishery management regime in the United States, I am not even a citizen or resident of your great country, nor am I an academic with research experience in this field as are so many distinguished members of the panels and of the audience here. However, I accepted, partly because I thought that you might have chosen me precisely for my lack of qualifications—as one who has no particular viewpoint to defend, no particular axe to grind—and partly because this simply was too attractive a challenge to refuse.

What I have been asked to do is to summarize for you the most important concepts contained in the technical papers presented in draft form at a workshop held in May, 1978, at a University of Washington conference center near Seattle. These technical papers dealt with the historical perspective on fisheries management, evaluation criteria for limited entry decisions, the economics of limited entry, economic effects of limited entry, social aspects, the question of whether limited entry served conservation or monopoly, and legal aspects. There were, in addition, a number of experience papers discussed at the workshop, but these will be presented separately tomorrow. I believe that you have written summaries of all these papers. Consequently, I shall not attempt to summarize the technical papers themselves, but shall try to present only what I feel are the most important concepts discussed, often appearing in more than one of the papers. These concepts concern various aspects of fishery management, particularly objectives—for instance, conservation of stocks or improvement of economic efficiency of a fishery; other effects of management measures—for example, effects on social structures or on the environment; and conditions or constraints—for example, legal or political constraints and management costs.

At this conference the concepts have to be considered specifically in relation to limited entry into fisheries. Limited entry is viewed as a technique or instrument of fishery management. The basic question to be discussed is: In what circumstances might or should a form of limited entry be used as a management instrument, either alone or in combination with other instruments or techniques, such as catch quotas, size limits, or seasons?

The essential feature of limited entry schemes that distinguishes them from other management measures appears to be that they directly control the number

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of participants—enterprises, individuals, or operating units—that have access to a particular fishery resource. Looked at in the other way, limited entry schemes exclude enterprises, individuals, or operating units that, without the scheme, did participate or would have participated in the particular fishery. This latter aspect will need to be considered with special care when one looks at the possible effects of limited entry schemes since it is this aspect, the exclusion of potential participants, that often produces the strongest objections to such schemes. To return then to the basic question of where and how limited entry might or should be applied, let us look at the subject first in relation to the principal objectives sought through fishery management.

I shall begin with the concept of *conservation of stocks* since in the recent past it has been the most important concept in fishery management here in the United States and throughout the world. It still commands the widest support, though it has undergone some substantive modifications over the years and has received quite serious criticism. Put in simplified terms and understanding the concept in its extreme form, it is the desire to maintain stocks of fish (or other aquatic resources) at a level where they can yield the highest possible harvest in perpetuity; if they have been depleted, it is the aim to restore them to such an optimum level. In practice, while not being content merely to prevent extinction or permanent reduction to a low level, one may not necessarily aim for maximum sustained yield, which is often very difficult to define, but simply for a high yield approaching perhaps the theoretical maximum sustainable yield.

The fishing effort can be controlled in a great variety of ways: by limiting the total quantity of fish that may be taken over a period of time; by limiting the effectiveness of the gear used and the periods during which it is used, etc.; and by limiting the number of operating units, that is, by limited entry. With the exception of overall quotas, the effect of any one of these measures tends to be shortlived, so that to achieve its purpose it must constantly be tightened or supplemented by other measures. This also applies to limited entry. If only the number of operating units is limited, each of these will tend to increase its individual effort by fishing longer, with more or with more efficient gear, etc., so that if the total effort is not to increase, numbers will have to be reduced constantly or separate limitations placed on operations, gear, etc. Generally, then, limited entry in itself will not be an effective way of controlling effort in the interest of conservation. Indeed, the papers I am reviewing give a number of examples of reasonably successful conservation schemes that did not make use of limited entry. There are, however, other cases where limitation of entry appears to have been a necessary or at least a useful ingredient of a conservation scheme because it made the application and enforcement of other measures feasible or at least easier. A limited number of units to be controlled makes the job administratively easier; however, limited entry is especially useful if it reduces or eliminates classes of participants whose efforts or fishing methods are particularly difficult to control, to give but two examples, foreign vessels and amateur divers.

The concept of stock conservation as an objective of fishery management has been criticized. As a means of preventing extinction it is said to be unnecessary since it is claimed that the profitability of a fishery ceases long before it reaches the intensity that would destroy the resource. As a means of ensuring

the maximum sustainable yield it is said to be ineffective since the short-term interests of the participants prevent management from limiting the fishing effort adequately. To some extent these criticisms are borne out by experience with certain conservation schemes, both national and international. However, it is generally believed that if their use were completely unregulated, fish stocks would be in a substantially worse state than they are under existing conservation management.

A more serious criticism of stock conservation as the principal objective in fishery management, and one which has greatly gained in acceptance over the last twenty years or so, is that stock conservation does not benefit the human participants in the fishery or society as a whole. Though the papers I am reviewing do not go into this in any detail, it has been shown that in an open access fishery there is a tendency for labor, capital, and operating costs to grow to the point where all the potential profits known as producers' surplus or resource rent are absorbed or dissipated. This happens even if total effort is successfully controlled in the interests of stock conservation, and is reflected in capital, labor, and other inputs into the fishery in excess of those necessary for a rational harvesting of the stocks. In the absence of effective management for economic benefit, in many fisheries the actual investments and costs are many times greater than they need to be to produce approximately the same or even a greater output under rational exploitation. Consequently, the potential gains from rationalization could not only provide much larger incomes for the producers, but, depending on what is done to redistribute these gains, could also significantly reduce the present high cost of fishery management and/or prices of fishery products to consumers.

It is argued, therefore, that an important, indeed perhaps the principal objective of fishery management should be to prevent or at least reduce the economic waste that now occurs in fisheries, that is, to *ensure economically rational use of the stocks*. This aim is often expressed in terms of maximization: of economic benefits, of economic rent, or of producers' and consumers' surplus. It has also been referred to as conservation of capital and labor. This economic rationality concept has had a much shorter history than that of stock conservation. Therefore, much greater uncertainty surrounds the precise aim and particularly the methods that may be used to achieve it, their incidental effects, and the various constraints to which they may be subject. This applies even more if, as has been advocated, the concept is broadened to embrace other social benefits, such as fairer distribution of benefits between groups, maintenance of cultural patterns, etc., in addition to economic benefits, such as higher incomes for fishermen or lower prices for consumers. While the concept is fairly new as an explicit management objective, in quite a few applications in the past management measures ostensibly taken in the interest of stock conservation have in fact had economic objectives. Examples are closed seasons that coincide with periods of low demand and the income distribution effects of gear discriminating regulations.

For the moment I shall confine myself to economic benefits in a narrow sense and come back to other social benefits and costs a little later. As has been suggested for the concept of maximum physical yield, the concept of maximum



economic benefit should be taken more as a point of reference or orientation indicating the direction in which management measures should be aimed, rather than as a practical target. Instead of fully maximizing economic benefit, one aims more modestly at a reduction in costs and increase in benefits of fisheries exploitation compatible with social, political, legal, and administrative constraints.

Since we are concerned with limited entry today, we must now ask whether and how and to what extent limited entry can serve to achieve economically more rational use of fishery resources. To do this we must look more closely at the way in which the potential economic benefits of fisheries are wasted. As soon as the participants in a fishery begin to earn more (in consequence, for instance of increased catch rates due to greater abundance of fish or because of higher prices due to increased demand), two things tend to happen. First, those already in the fishery try to increase their earnings by increasing their effort, and second, others from outside come in to add their effort to that of the first group. This continues until the extra cost of the increased effort has absorbed the extra value of the catch. This situation is aggravated by fluctuations in the availability of fish and sometimes by fluctuations in demand, both of which encourage maintenance of excess capacity, even in times of scarcity of fish or of low demand, because of the hope of a bonanza later on. This in turn leads to distress among producers, which may attract governmental assistance and support, which only tends to perpetuate the problem.

We can see then that to achieve the aim of economically rational use we must prevent, or at least control, increases of effort and costs by participants already in the fishery and by new entrants. It is evident that limited entry would make the problem much more tractable by removing the second of the two causes of increasing costs. But it would not solve the problem altogether. Control of additional effort from outside must be supplemented by something that will discourage existing participants from increasing their costs in an uneconomical way. It is relevant to point out that many of the measures adopted in the interest of stock conservation are economically counterproductive in that they increase costs or at least prevent economically efficient techniques from being used. This is particularly true with gear regulations. In fact, it is only a slight exaggeration to say that gear regulations are effective only to the extent that they raise costs. Except for measures aimed at securing adequate stock growth rates, and which would be cost effective for the sole owner of a stock (for example, minimum mesh sizes to reduce capture of undersized fish, protection of spawners through closure of grounds or seasons, etc.), most of the familiar measures of stock conservation schemes should be eliminated if economic rationality is the aim of management.

The problem of rationalizing a limited entry fishery must, therefore, be tackled by means that are properly designed to lead toward that objective rather than away from it.

One possible solution is to reduce the number of participants to a level where they are able to agree among themselves, tacitly or explicitly, to exercise restraint in their individual efforts to control costs and dissipation of economic benefits. One example of limited entry having this apparent effect is the herring food fishery in the Bay of Fundy. The extreme case would be that of a sole

owner of a fishery (which could be a fishermen's cooperative) who would have no incentive at all to incur unnecessary costs and would therefore realize the full economic benefit from the fishery. Among other ways of realizing economic benefits is the allocation of individual catch quotas to participants. In itself, this would limit entry as well as catch. The main objections to this solution are that it is difficult and sometimes impossible to adjust the quotas to fluctuations in the availability of fish, that in many situations the scheme is difficult and costly to administer, and that it would tend to hamper technological progress. A possibly superior alternative is the sale of what has been called stock certificates, that is, rights to take a certain quantity or part of a stock. This would assure the purchaser of a desired share in the harvest and, since he would not need to compete with others for it, he would have no incentive to increase effort and costs beyond those necessary to take his share in the most economical way. Moreover, there would be the possibility and tendency for efficient participants interested in increasing their share to buy certificates from less interested and generally less efficient participants. This would further reduce total costs and increase total benefits. Yet another way of reducing economic waste is taxation, which makes unnecessary cost increases unattractive and removes extra income, thus preventing its dissipation. The proceeds of taxation can be used to buy out owners of excess capacity and so reduce economic waste still further. A scheme of this kind is described in some detail in one of the papers under review.

So much then for the concept of economically rational use of fisheries in the narrow sense of its monetary results. As I mentioned earlier, the concept can be broadened to include other benefits to people. One obvious benefit is that of recreation. The pursuit of this third concept has important implications for the two already discussed, stock conservation and increased economic benefits. Instead of aiming primarily at enhancing economic benefits and reducing costs, management of recreational fisheries tries to ensure, above all, the enjoyment people derive from sport fishing. This requires that they have the chance of catching a reasonable number of fish on an average trip. The stocks should not be depleted nor the number of participants allowed to become excessive.

Stock conservation in recreational fisheries is not very different from conservation in commercial fisheries. There are likely to be administrative difficulties because of the large number of participants each with a small share of the catch and their geographic dispersion, etc. On the other hand, gear regulations have no obvious adverse effects and are more acceptable. However, to avoid excessive participation that substantially reduces the recreational value of the fishery, there will have to be some form of limited entry. Alternatively, excessive participation is prevented or discouraged unintentionally by high cost factors, for instance, by remoteness of the sports fishing area. To control the number of participants, the cost of recreational fishing can be increased deliberately by license fees and other forms of taxation. The choice between this method and limited entry will often depend on political feasibility. Similarly, where both commercial and recreational fisheries fish the same stock, their respective shares are most often determined by their relative political power. There are instances of commercial fishermen being totally excluded in favor of sport fishermen and, at the other extreme, of all part-timers being excluded in favor of the full-time commercial fisherman.

To avoid having these questions dealt with on a purely political basis, it has been suggested that recreational fisheries be evaluated in economic terms with commercial fisheries so that their combined maximum value could serve as the ultimate management objective. This could also be achieved by means of freely traded stock certificates to ensure catches for those who valued them most highly, whether they were commercial or recreational fishermen. Apart from administrative problems, such a scheme would run into objections from those who would not like to see less wealthy recreational fishermen put at a disadvantage vis-à-vis wealthy sport fishermen and commercial fishermen. In practice, compromise solutions, generally involving limited entry, have to be found and these will no doubt be discussed tomorrow in the light of actual experience.

Explicit consideration of other social benefits and costs in the construction and operation of fishery management schemes is a relatively new feature, though these considerations have, in fact, played some part in almost every management scheme in the past. They include—and I am making no attempt to list them comprehensively or in order of importance—freedom of choice of occupation and of means of pursuing it, social equity in access to the resource, maintenance of cultural patterns, participation of specific ethnic or other distinct groups or income classes, and desirable balance of economic power between fishermen, boat owners, and processors. These considerations are generally not among the primary objectives of management schemes but increasingly play a role in decisions on the adoption, rejection, or modification of such schemes.

Limited entry schemes are often vulnerable to criticism on this score, particularly on the ground that they curtail freedom of choice and inequitably bar individuals or groups from participation in the fishery. When analyzed, however, these criticisms are frequently found not to apply to the concept of limited entry itself but rather to specific details of the scheme in question, for example, the formulation of a grandfather clause, details of which can often be modified without abandoning any essential features. Nevertheless, two characteristics of these additional social goals must be recognized. One is that maintaining or increasing these subsidiary social benefits involves a cost in economic terms, and the second, that the benefits themselves compete with each other to some extent. For instance, preferential treatment for an ethnic group involves discrimination against other potential participants and also generally means that the fishing methods used are less efficient than they would be if maximizing economic benefits were the overriding criterion for obtaining access to the resource. The total cost incurred in the fishery is therefore higher than it need be. As regards competitiveness, it is obvious that strengthening the economic power of fishermen is at the expense of boat owners and/or processors and vice versa. Also, maintenance of cultural patterns involves some abridgement of the freedom of choice. Determination of the tradeoff between competing social benefit claims is ultimately a political decision. However, such decisions could be made more rationally and with less controversy if at least an approximate common measure could be applied to the social benefits and costs involved. Such measures remain to be developed in practice. Where the tradeoff is between economic efficiency and some other social benefit, the cost can normally be estimated within certain limits, and this should be done to provide a rational basis for the necessary political decision.

The most serious objections to limited entry schemes raised on social grounds have been directed at the initial measures taken because they violated the principle of equity by excluding some former participants right from the start. Such objections can be met, where a rapid reduction in the number of participants is not essential, by initially banning only new entrants and relying subsequently on natural attrition and/or buyback programs to reduce the numbers. Care needs also to be taken not to devalue inequitably the investments of existing participants, including those who may be leaving the fishery. Non-transferability of licenses, often imposed in the interest of social objectives, for example, to avoid concentration of boat ownership or increased influence by processors, has undesirable economic and social side effects. It is best avoided and replaced by other fiscal or regulatory measures. Where this is not found possible, there should at least be the possibility of turning back the license to the management authority on reasonable terms.

Among the constraints to which limited entry schemes are subject, those of a legal nature are prominent. They are dealt with systematically in two of the papers under review and are referred to in the experience papers and others. It is sufficient to say here that it appears that limited entry schemes can be established within the existing framework of federal and state law in the United States, provided the necessary legislation and regulations respect certain legal concepts, particularly those of equal protection and of due process. This requires that all aspects of each scheme must bear a rational relationship to the objectives. The objectives contemplated in the basic legislation (The Fishery Conservation and Management Act) are broad enough to accommodate the various concepts—biological, economic, and social—so far discussed.

The practical administrative constraints on the introduction and operation of limited entry schemes and, indeed, other management schemes are varied and numerous. They are not dealt with in a systematic way in the papers under review and can probably best be discussed in the light of actual experience with limited entry schemes. Let me point out only that, as shown in some papers, cost of administration is an important factor that should be taken into account properly when decisions on specific schemes are made and particularly estimating the net economic benefit of any scheme.

I have attempted to place before you some of the concepts contained in the basic papers reviewed at the preparatory workshop. In this connection I have regarded limited entry, that is, the direct control of participation in a fishery, as an instrument or technique to be used in trying to reach the principal objectives of fishery management. Of these objectives I singled out conservation of stocks, their economically rational use, and their use for recreational fishing. Other social benefits such as social equity, cultural values, etc., I have considered as effects of management schemes rather than as primary objectives and, therefore, as constraints on the achievement of the primary objectives. I suggested that while limited entry was not essential in stock conservation and normally not able by itself to achieve that objective, it could be a useful or even necessary ingredient in stock conservation schemes. If economically rational use of stocks is the objective of management, including an element of stock conservation, limited entry will have to be used either alone or in combination with other tech-

niques, particularly quotas or stock certificates and taxation. In a recreational fishery where the number of participants is large, limited entry will again be necessary in achieving the objective of management. Limited entry can have positive and negative effects on the other social values I mentioned. Some of these effects will depend on the detailed provisions of the scheme, but dealing with these effects will generally involve political tradeoffs with others, including concessions regarding the primary objectives of management. Where the tradeoff is with the economic efficiency of the fishery, the cost can and should be estimated and taken into account in the final political decision. I have only touched on legal and administrative constraints in the use of limited entry. This I have done because the former are well documented and the latter have to be evaluated in the light of actual experience.

# EXPERIENCE WITH LIMITED ENTRY: A REVIEW OF CONTRIBUTED PAPERS

Edwin B. Joseph

In our preliminary session in May, 1978, we spent the better part of two days listening to presentations describing actual experience with various forms of limited entry. I wish that every one in this audience could have had the benefit of those presentations and the follow-up discussion that was very open, sometimes volatile, but always interesting. It is my task today, as a means of leading off this session, to attempt a concise summary of the experience papers. As I hope you will appreciate, attempting to capsulize two days of presentation and vigorous discussion plus several hundred pages of draft manuscript into a summary presentation of less than one hour is not an easy task and may prove impossible. I feel certain that I will make serious errors of omission and commission and I apologize to the authors in advance. Fortunately, most of the authors are here today, either on panels or in the audience, so we should have ample opportunity for my misinterpretations to be corrected. I should like also to emphasize that I am not attempting to make any personal evaluations. If I say that any element of a specific limited entry program is wise or unwise, successful or not successful, this is not my judgment, but only what I believe the author was saying about that limited entry plan.

Before initiating a fishery-by-fishery catalog, let me attempt to make a few generalizations and, at the same time to lay out a pathway for the remainder of my discussion. The first point I would like to make is that if anyone entered the May discussions with the naive belief that limited entry is a simple, straightforward, universally agreed upon plan to conserve labor and capital and therefore increase the potential for economic rent, he would be in for a surprise. At least my naive understanding was completely shattered. Second, the limited entry schemes that we discussed seemed to differ as much in intent as they did in means of implementation. If the authors disagree with this statement, it should provide an interesting point around which to focus some of the later discussions. I will attempt to extract what the authors said about the purpose of the limited entry program, the major elements of implementation, and whether the plan appears to be leading towards attainment of its goals. Some plans were mentioned only in passing so this approach cannot be followed with total consistency.

I would like to deal first with the Great Lakes states of Michigan and Wisconsin. The Michigan experience was provided by Professor Talhelm of Michigan State, the Wisconsin experience by Professor Bishop of the University of Wisconsin. These plans seem to me to be quite different from all others. They share a number of similarities between them, but also some significant differences. They are both concerned with inland bodies of water, and they have Lake Michigan in common. Both deal with a remarkably small number of fishermen and with stocks that are also heavily exploited by recreational fishermen.

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The goals of the Michigan limited entry program seem to represent a mixture of biological conservation and economic objectives, and I interpret Professor Talhelm's paper to say that the conservation goals were first order objectives with economic goals clearly secondary. This latter point clearly is an interpretation, as Dr. Talhelm did not state the point explicitly. The goals of Michigan's limited entry program can be judged from several quotes, among them, "a serious limited entry program was not imposed until 1970, a few years after the beginning of the state's salmon stocking program." Later he states, "The program attempted to reduce direct and incidental commercial fishing effort for several sport species, and to convert an overcapitalized commercial fishery into a limited but more efficient fishery."

The major drop in numbers of commercial fishermen occurred prior to the introduction of limited entry. The number of licensed fishermen dropped from eleven hundred in 1950 to three hundred in 1969. This was the result of reduced stock levels from the lamprey introduction, overfishing, and environmental shifts. Under the current limited entry program, there are now only about one hundred forty licensed commercial fishing operations, while the optimum number may be as few as forty according to Professor Talhelm.

There has been a buyback element in the Michigan program. In 1974 the law was changed to permit the DNR to buy out all large mesh and most small mesh gill net operations, but to allow voluntary conversions to a limited number of trap nets. The gill nets were to be banned primarily to eliminate an incidental fishery for lake trout, one of the more important game species. Again this appears to be an allocation effort rather than an attempt to reduce participation for economic purposes.

How successful has Michigan's limited entry program been? Dr. Talhelm assesses, "At this point, due to the uncertainties produced by legal battles, the level of resentment, the inefficiencies, and the continued overfishing, the limited entry program cannot be considered completely satisfactory. It is a start however." This is a judgment we will hear about several other plans.

It seems relatively clear to me that the motivation of the Lake Superior program in Wisconsin was largely a biological conservation and allocation effort rather than one designed to achieve specific economic goals. Prior to the early 1950s, Lake Superior had supported a relatively valuable and stable commercial fishery based on several species, but principally on lake trout. Although the sea lamprey had been spreading its range and influence in the Great Lakes for several years, it was not until 1953 that this parasite/predator had a significant and detrimental impact on lake trout populations in Lake Superior. By 1962, the sea lamprey population had been brought under reasonable control. By then, however, it was obvious that the breeding population of lake trout was so reduced that it was not likely to rebound with any significant fishing pressure. Consequently, in July 1962, Wisconsin closed its lake trout fishery on Lake Superior. In 1964, after two years of closure, it became evident that the lake trout populations would recover and that the fishery could eventually be reopened. The fear that there would be a gearing-up by the commercial fishery to harvest the increasing lake trout stocks, resulting in intense pressure and rapid depletion, led to the limited entry program. From this background came Wisconsin Assembly

Bill 14, which became law in July, 1967. Professor Bishop writes: "The goal of the legislation was to promote wise use and conservation of fish resources."

The first step in implementation was to freeze the number of licenses at the then current level of sixty-eight. As in many states, the question of Indian fishing rights has added confusion. In 1972, quotas on lake trout were established for Indian and non-Indian participants, and, in 1976, the maximum number of commercial licenses was reduced to twenty. This reduction was brought about largely by eliminating part-time or casual operators.

Despite a variety of problems, the remaining operators seem to be optimistic about the future of the fishery and now investment in vessels and equipment has been stimulated.

Time precludes a discussion of the just-passed limited entry program for Lake Michigan waters, but Professor Bishop may well want to bring out some of the details of the new programs in later discussion.

At this point, I will turn to the more traditional fisheries of the east coast, particularly in New England and the maritime provinces of Canada.

Limited entry is widespread among fisheries in the maritimes. Unfortunately, they were not treated in much detail from the standpoint of experience. Among the fisheries covered are herring, except for gill net capture, Bay of Fundy Scallops, offshore scallops, offshore lobster, inshore lobster, groundfish, snowcrab, and bluefin tuna. These fisheries have been under limited entry for various periods of time and with varying regulations, although most have some elements in common.

If I interpret the author and some of the discussion properly, the motivation for eastern Canada's limited entry programs was far from single purpose. Rather, a mixture of conservation, economic, and social goals were being sought. In most cases, there was a need to bring fishing effort back into line with reduced stock levels. Here of course we have the more traditional goal of reducing effort without destroying the economic viability of the industry. Beyond this rather traditional usage of the limited entry tool, there are rather directly stated social goals concerned with redistribution of power, influence, and income within the industry.

In her paper, Dr. Smith quotes the Canadian Minister of Fisheries as follows. "The policy of my department is to encourage the ownership of fishing boats by individuals or fishing enterprises rather than by processing companies, . . . any attempt by a company to increase the size of its existing fleet would certainly be restricted." Furthermore, Mr. LeBlanc has proposed future "efforts . . . to separate the fishing fleet from the processing companies in Atlantic Canada, . . ." which shall ". . . improve efficiency of vessel operations, . . . raise fish prices and fishermen's incomes, increase the fishermen's bargaining power, create a healthier balance of forces in the industry, and invigorate fleet development by the fishermen." This statement encompasses many economic goals but, equally strongly, social judgments on distribution of income between various groups.

In terms of mechanics, all the programs of eastern Canada have certain policies in common. For example, entry permits or licenses are the property of the Crown and cannot be transferred freely among individuals, although mecha-



nisms for transfer exist. For example, a recent directive (April 20, 1977) provides for sale of vessel with permit only if the vessel has been owned by the seller for two or more years prior to sale and then only if the vessel has been used in the fishery in the previous twelve months. These rules are designed to reduce the potential for black market traffic in permits.

The author did not attempt any overall evaluation of the success of these limited entry programs. It does seem obvious, however, that in many of the fisheries mentioned, limited entry has not resulted in a reduction of effort.

Two U.S. Atlantic Coast states have attempted to limit entry into the inshore lobster fishery. In 1975, Maine put a freeze on lobster licenses, and legislation was introduced to create a permanent system for restricting licenses. While public debate on the issue was underway, a court test of the proposed residency requirement found the proposal unconstitutional. The entire issue in Maine became so complex and controversial that the legislation was never passed.

Even though the Maine limited entry program never materialized, there was an interesting sideline that has rather broad implications. The number of lobster licenses had shown steady growth through the early seventies but had a significant jump just before the temporary freeze. After the moratorium was lifted, the number of licenses fell under free entry. It is ironic that serious discussion over the need to limit entry tends to stimulate entry. This phenomenon is seen in several other cases we will discuss later.

In stark contrast to the events just described in Maine, in 1975 the Massachusetts legislature declared a moratorium on additional commercial lobster licenses with little fanfare and public controversy. The legislation was proposed by the commercial lobstermen. Although not explicitly stated, it would appear that the goals were largely economic, designed to maintain profitability among a limited number of participants. Although it limited participants, the 1975 legislation did not limit effort and the number of pots rose by 10 percent between 1975 and 1977.

The total number of licenses has not been significantly reduced since the moratorium was imposed. License holders who are inactive or who do not report catch are barred from renewal the following year. However, licenses that are dropped are made available to new participants the following year.

At our May preconference, we were exposed to a most interesting discussion of limited entry programs on the western shore of Australia. Both are crustacean fisheries, one based on rock lobster and a more northerly fishery based on Australian prawn.

The lobster fishery has existed on a small scale since the early days of settlement, but in the 1950s a U.S. market for frozen lobster tails was developed and this led to rapid and heavy exploitation of the resource. Pressure for the limitation on entry came from the industry itself. In 1963, the current number of licenses was frozen and a pot limit was established as a function of vessel length with a maximum limit.

The stated objectives of the limited entry program are:

1. Optimum utilization of the resource
2. Reasonable economic return to fishermen
3. Orderly fishing

As in several fisheries already discussed, we see in this case a mixture of biological, social, and economic goals.

Since 1963, the number of vessels has been fixed at eight hundred and the catch has stabilized at about twenty million pounds. The price, however, determined almost entirely by U.S. demand, has steadily increased.

It would appear that the original objectives have largely been met, but not without problems.

The early regulations that limited vessels did not effectively limit effort. Since the legal number of pots was a function of vessel length, many fishermen lengthened their boats or moved to larger vessels in order to increase their pot limit.

Management regulations have remained complicated and enforcement is difficult.

One controversial aspect of the program results from what is considered to be unrestricted sale of lobster concessions. Prior to limitation, the license had no market value. At this time, direct sale of license from one fisherman to another is permitted and license values may average six to eight thousand dollars. This may, on the other hand, be one measure of the success of the program.

The shrimp fishery to the north had quite different beginnings. The resources were known about since the early fifties but the remoteness of the area inhibited development of the fishery. In order to encourage development and reduce risk, exclusive processing rights were granted to two firms. A limited number of vessel licenses were issued, most of them granted to the shoreside firms. As new areas were opened, the same general pattern was followed. Here is a most unusual case where entry was limited from the initiation of the fishery, an option that is seldom available. The goals of this program were largely economic.

In no part of North America has interest in limited entry been stronger or of longer standing than in the Pacific Northwest. The remainder of this summary deals with this region, beginning with the experience of British Columbia.

In September of this year, the limited entry program of British Columbia will have been in place for a decade. It has rather clearly stated objectives and, with ten years of experience, it would seem that one could make a rather direct evaluation of the successes and inadequacies of the program. For a variety of reasons, some of which will be mentioned later, evaluation is not as clear-cut as might be hoped for.

The limited entry program introduced in 1968 had three basic objectives. I quote Dr. Newton's paper:

1. increase incomes to fishermen up to the average regional wage,
2. reduce the level of overcapacity by reducing the size of the fleet,  
and
3. reduce the number of vessels to improve the management of the resource."

The original limited entry program covered only the salmon fishery and most of Dr. Newton's remarks pertain to that fishery. It should be noted that

most other British Columbia fisheries have been brought under limited entry since 1968.

The initial concept was to identify the salmon fleet through a "grandfathering system" and then apply a variety of tools to reduce the fleet size. This initial process identified approximately seven thousand salmon vessels and it was obvious that a significant reduction in the size of the fleet would be necessary before significant increases in catch and income would accrue to the remaining fishermen. These vessels were assigned to an "A category" or "B category" status. "B-status" vessels were those that failed to land products valued at more than \$1,250.00 during the qualifying period. Original provisions called for the elimination of all the one thousand "B-status" vessels after a ten-year period.

In 1970, a buyback program was instituted that had as its purpose reduction of the number of "A-status" vessels. This program was abandoned in 1973 after 346 vessels had been removed. If I understand the situation correctly, this termination did not result from the belief that the fleet was adjusted to the proper size, but rather because of dramatic increases in salmon prices vessels were not being offered to the buyback program. The details of the (BC) buyback program were described in a separate paper by Douglas Bell, who administered that program.

Criticism of the British Columbia program revolves around four major issues:

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 has irrevocably changed, and
4. management of the resource has not been facilitated.

Dr. Newton's paper dealt with each of these points, and I will attempt to extract only the major points.

With regard to the question of overcapitalization, Dr. Newton points out that capital input has increased by 36 percent since the implementation of limited entry.

Despite this increase there are a number of extenuating circumstances. At the beginning of the limited entry program, the salmon fleet was in an advanced state of obsolescence even though overcapacity to harvest existed. Also, there has been a significant substitution of capital for labor. To quote Dr. Newton, "since some new investment was required, some substitution of labor with capital was needed, and overcapacity already existed, to assess a program's effectiveness at any point in time and criticize it for contributing to further overcapitalization is misleading."

On the question of creation of an elite class one must remember that one of the basic goals of the limited entry program was to increase fishermen's income. If an elite group has, in fact, been created, then it would seem to follow that the first objective has been met. If I follow Newton's argument here, he feels that the problem is not the creation of wealth among an elite group but rather whether economic rent is remaining entirely within the fishery rather than passing in part

back to the state. The argument here is one that is better expounded upon by the economists among us.

There has been a shift of gear types within the salmon fishery, which has been allowed because of the unrestricted transferability of licenses among gear types. The shift has been in the direction of seines, with a reduction in gillnet and troll licenses. Resource managers have not yet faced the questions of allocation by gear types or of whether the free competitive process should be allowed to continue.

With regard to whether resource management has been facilitated under limited entry, Dr. Newton makes the point that although management has not been facilitated, it is no more difficult now than it was before limited entry. According to him, the problem is the lack of flexibility required to adapt the program to changing conditions. There is no doubt that limited entry can facilitate resource management.

Our final experience paper concerns the largest and I think most interesting example of limited entry, that of Alaska. This experience paper was prepared by Allan Adasiak, chairman of Alaska's Commercial Fishery Entry Commission. The paper in its present draft form is almost seventy pages long, but highly readable and fascinating. I find myself quite unable to provide an adequate summary, in part because of the great number of personal insights that Allan brings to the paper. I will attempt to deal with some of the major technical points and hope that subsequent discussion will bring out much of the interesting content.

One of the first points to note is the sheer magnitude of the limited entry effort. It has already involved approximately fifteen thousand permit applications; about two-thirds of the applicants have received or will receive permits. Recall, if you will, that we began this discussion with a Lake Superior entry system in which there are not twenty license holders. Moreover, there are twenty-nine fisheries under limited entry scattered over some twenty thousand miles of Alaskan coastline.

The breadth of the intent of the law is also rather sweeping, clearly intending to encompass a variety of social and conservation as well as economic goals.

Mr. Adasiak's paper does not dwell on the legal difficulties of achieving limited entry in Alaska, but we have heard some discussion of those issues in yesterday's papers and discussion. For our purpose today, let us recall that there were serious constitutional issues that had to be overcome. The most recent attempt to overturn the limited entry program occurred in 1976 when the voters refused to reject the program by a two to one margin.

I would like to turn to some of the details of the permit process. First, permits are granted only to natural persons as opposed to companies, corporations, associations, etc. Also, provisions were included to keep permits in the hands of the fishermen. Permits cannot be mortgaged, pledged, or otherwise encumbered, but can be transferred directly from individual to individual. Also, a person may hold only a single permit for an identified fishery. This is an important point and requires some explanation. The term fishery in this sense is defined as "the commercial taking of a species by a specific type of gear in a specific area." For example, a fisherman may hold a salmon power-troll permit and a salmon gillnet permit in the same area but he cannot hold two gillnet permits for the

same area. Or a fisherman can hold a gillnet permit in one administrative area and another gillnet permit for a different area.

It appears that, in drafting the law, the Alaskan legislature gave detailed and serious consideration to the criteria by which permit applications would be evaluated. It also appears that the Limited Entry Commission is very conscious of the fact that the needs and problems of the separate areas and separate components of the fishery are so different in geography and social and cultural background that criteria must be interpreted with these diversities in mind.

How is the Alaska program working? I think it unfair to require anyone to provide an evaluation of a program of such magnitude that has been in force for such a short period of time. It may be especially difficult for one who is as deeply involved as is the chairman of the commission. Nevertheless, Mr. Adasiak does attempt at least a preliminary evaluation. His answer to the question of whether limited entry as it now functions is worth it to Alaska is a definite yes, although not an unqualified yes. There are many problems and indications that some of the most difficult may lie ahead.

The program is criticized for not having stabilized or reduced effort. It is true that effort has not been reduced, but the program was not designed explicitly to do this but rather to limit participation. Also, effort may be expanding much more slowly than it might have under continued unlimited effort.

There is no buyback program, but this issue is currently under study by the commission. The questions of fairness and the charge of creation of a wealthy elite have, of course, been raised, as they have in most other limited programs.

It is obvious that a final judgment on the program is premature at this stage.

I end this summary by borrowing the summary from Adasiak's paper. He has much to say about limited entry in general, based on his experience with Alaska's program, and that really is why we are here.

"The complex and changing nature of fisheries makes it difficult to isolate effects specifically attributable to limited entry and measure its contribution toward reaching goals. Limited entry is, of course, only one causal factor among many, ranging from national and international economics to foreign treaties and extended jurisdictions, social conditions, changing stock conditions, the state of the art in management and research, hatcheries and rehabilitation programs, and whatever else happens to be dear to any particular individual from his special perspective on the subject of fisheries. Limited entry should be viewed in this broader context, but because it is new in fisheries and because it brings about significant changes in the range and nature of social and economic behavior, it tends to stand out in the crowd.

"To summarize some of the high points of Alaska's experience with limited entry: You must identify a need and attempt to define clear goals. You must have information on the resource, the users of the resource, and the likely consequences of various trends in a fishery. Public participation in the development of this information, and public education concerning the facts and issues involved, will facilitate the implementation of limited entry in a timely manner. Although such public involvement is time-consuming, it is important if not essential to the success of limited entry programs. An articulated need, clear goals, solid information, clear thought, and public involvement become even more impor-

tant cornerstones in states where a sizable nonfishing constituency may be involved in various stages of the decision making process.

“The actual ‘how to’ of implementing limited entry perhaps cannot be set down in many general terms that will be useful. Economic, social, political situations can vary, and the nature of the need for limited entry can vary, and the specific form of limited entry should vary to fit the situation and need. Consequently, implementation becomes a function of these elements. However, I will hazard a brief checklist:

There must be a high level of concern for people at all stages of the process. Limited entry programs affect people and how they can live.

A limited entry system must be fair and must be perceived as fair. Those people potentially affected should participate in its development. Those actually affected should understand what is happening to them.

Limited entry programs must be tailored to specific fisheries to minimize or avoid adverse social or economic effects.

Competent experts should be engaged as necessary at all stages from conception through implementation to help assure a high standard of quality in what is being done.

The entity implementing a limited entry program should have sufficient size, responsibility, and authority to carry out its task.

Excellence should be sought, but perfection should not be expected in implementation. This is only to acknowledge what everyone knows: The courts for example occasionally convict an innocent man or free a guilty one, but overall the system works well. The expectations for any limited entry system should not be higher.

Given the generally prevalent social, political, and economic attitudes, the establishment and implementation of limited entry systems currently appears likely to come about only after there is a crisis or disaster in a fishery. It will take extensive preparation and general education beforehand to create a climate in which timely action will be possible on the basis of reliable, understood trends and relationships. In many cases, the next ten years or less may tell whether it is possible to have action before crisis or disaster in our fisheries.”

# CONFERENCE SUMMARY

Donald L. McKernan

I have a lot of nerve to stand here in front of you and try to summarize this conference with its wide ranging interests, views, and very complex subjects—but I am going to try. You recall when we started the conference that I indicated its purpose was at least to provide a forum for discussing the benefits and costs, advantages and disadvantages, to fishermen, the industry, and the consuming public of limitation of entry into fisheries. A great number of views have been expressed. Some of these views have been in opposition—rather strongly felt opposition to the whole concept of access controls. Some pertinent reasons for this opposition were given and, whether right or wrong, they are the basis for perceptions of people legitimately concerned for what limited entry might bring. On the other hand, there are strong proponents of limited entry.

As I have listened over the past two days, the most encouraging words have come from the regional fishery management council members who want to learn about this tool. They want to look at the possibilities of limited entry and to make decisions on its use based on what is best for fisheries management in their particular regions. It is gratifying to see people—brought largely from the lay public and put in positions of great responsibility as council members—have the interest, concern, and understanding of the growing fishery management problems.

Obviously, these problems differ in their intensity among the eight regions. What we are looking at are management techniques for the not too distant future. We have a little more time to gather and examine data, and reflect on our options. I am encouraged by these council members who neither think of limited entry as a panacea for our problems, nor as the devil, nor as a way of giving the U. S. government complete control over fishermen. I see this as an excellent sign.

I have no illusions about the concern expressed by some that this particular meeting may establish national policies or set hard and fast rules to be pressured through either the executive or legislative branches of government. Instead, the intention was to open a dialogue so that we all would see a broad range of views. It is important, for example, for those who have been studying limited entry academically to relate their studies into practical terms such that fishermen can see how it would affect them, their communities, and the stocks they harvest. It is important that we understand what wise use of fishery resources implies, and what the proper role of government might be. Reaching these understandings is really up to you.

Several individuals have expressed the feeling that this conference has been helpful; others may be disappointed that it has not gone further. I hope simply that out of this meeting will come a continuing dialogue in the councils. The papers written and summarized here should bring further discussion and communi-

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cation with scientists, government officials, and particularly with user groups and the interested public.

Limited entry has been talked about in various forms. The programs in Canada and Alaska apply direct limitations on numbers of licenses, the license going either to the vessel or the fisherman. However, controlled access management is really any system that directly or indirectly limits the number of vessels, fishermen, or amount of gear to improve the net economic return from the fishery as a whole. We tend to focus on direct limitation methods. These arouse great antipathy in some because of concerns over equity and the distribution of benefits. Basically, there are three alternative approaches to controlling access to fisheries. First, license limitation controls the number of licenses available to either vessels or fishermen. Second, some form of taxation or license fee to control access indirectly by providing disincentives for fishermen taking over-utilized species or entering overcapitalized fisheries. I recall Mr. Jake Dykstra suggesting something along these lines for the New England fishermen. Third, the fish quota or stock certificate system that would allocate known shares of the harvestable stock among fishermen. Quotas could be based on historical catches, but could be bought and sold as the fishermen see fit, depending on their individual capabilities. This system, as described to us from herring operations in the Bay of Fundy, seems to be accepted favorably because it gives the fishermen a kind of property right in resources, facilitates their investment decision making, and encourages conservation.

The kind of management system that could be developed by fishermen themselves could involve ingredients from all of these alternatives. As compared to the present systems, it should provide more effective conservation and enforcement and should involve less government controls—that is, less control by people who know far less about what is good or bad for the fisheries than the fishermen on the grounds. The function of the government managers might then become one of monitoring or auditing fishery operations to make sure objectives will be achieved and standards met.

We have talked also about what limited entry accomplishes. The question has been raised as to whether it improves regulation or conservation. Mr. Popper, some authors of the background papers, and others in the audience have pointed out that there can be successful conservation without limited entry. On the other hand, there is an opinion that limited entry improves conservation by reducing the in-season rate of exploitation, thereby allowing better perception of abundance fluctuations and better control of fishing. Also, we have seen the benefits of applying a limited entry system to foreign fishermen. We have reduced foreign fishing on many stocks of fish within our conservation zone and have reduced substantially the number of foreign vessels operating off our coast. Thus, we have already effectively applied a kind of limitation of foreign fishing vessels under the Fishery Conservation and Management Act. Now, we are debating whether or not this might be applied beneficially to domestic fishermen in some cases.

As everyone here is aware, we are now on the threshold of dramatic changes in domestic fisheries of the United States. Many of these changes will be precipitated by a new law (the Fishery Conservation and Management Act of



1976), which gives us sovereign rights over the living resources within 200 miles of our shores. In addition, we have asserted rights over anadromous species, such as salmon, outside the 200 mile zone. These claims have been widely accepted although some attorneys might disagree. Extended jurisdiction claims are now common and over seventy countries have extended their jurisdiction over fisheries beyond twelve miles. Along with the international impacts, our new law institutes a new management system that, by itself, is revolutionary in the way we have operated our fisheries. We are now attempting to apply this new law and its complicated and sophisticated principles for the rational use of our fishery resources.

The objectives of the law are rather specific. For one, we are supposed to aim for an optimum yield that, for the first time, provides for meeting economic, social, and ecological concerns, as well as meeting high standards of conservation of the stock. If we are going to act responsibly as council members we are obliged to consider these objectives and concerns very seriously. Unless we change our law, we can no longer manage our fisheries with the simple, single purpose of achieving the maximum pounds from our stock of fish. It is obvious and gratifying that the councils are concerned and determined to comply with our new fisheries policy as indicated by their presence at this three-day dialogue.

There is no question that there have been other changes brought about by this law. In addition to reduced foreign fishing effort and increased U. S. catches of some valuable species, there has been a significant increase in investment capital flowing into the fisheries for the first time in thirty years. There is optimism that U. S. fisheries will expand and provide new economic opportunities. Except in some special cases, capital in the past three decades went into the tuna, shrimp, and king crab fisheries, but now we can recognize a heavy flow of capital into practically all American fisheries, especially the groundfish fisheries. Some of this is the result of speculation and joint ventures. Other reasons could be cited, but it is clear that banks and other lending institutions see that the fishing industry is an opportunity area of our economy. This has brought about some undesirable effects caused by the unprecedented increased demand for and development of our fishery resources. Greater demand is bringing greater economic rewards to the fisheries and, as a consequence, an increase in fishing effort.

The question is, what is the best way this increased effort should be dispatched? Some obvious new areas are open to us. Increased effort can be and is currently directed toward underutilized resources no longer harvested by foreigners. New export markets can be developed for species not traditionally taken in quantity for domestic consumption. However, some of the increased effort must be recognized as going into fisheries that are already biologically and economically overfished. Any current or future increases in effort in these fisheries will not necessarily produce more fish and is potentially damaging to the resource. Thus, it seems to me that all kinds of management tools should be considered seriously to rationalize our growth in fisheries.

The experience that people have had with the limitation of effort is extremely important to consider. Success in some areas may well breed success in other areas. We tried to present in this conference an even handed view of sev-

eral different experiences. Certainly some limited entry programs around the world can be cited that are so fraught with problems and failing so badly that they should be discarded. But what developed from our discussions was that most people working under limited entry programs like them, even though some serious problems are recognized.

It isn't clear from statements made that limited entry has brought greater government control or any loss of freedoms traditionally enjoyed by fishermen. Although the points made about government intervention are worth closer scrutiny, it seems to me to be theoretically possible that limited entry schemes could decrease government control. The alternative is more certain: present increases in fishing effort will bring greater government intervention to protect the public interest in public owned resources. Witness the recent action taken by the Secretary of Commerce to limit effort by reducing fishing time during the four quarters of the year. This introduced another complicating but essential feature to the New England groundfish plan. This is an example of additional governmental interference that is going to get worse if we do not devise a system to deal with increasing effort, particularly on those stocks already heavily fished. Obviously, any effort-limiting system must also allow for expansion of effort for other species. The system chosen has to be tuned to the particular region and species involved as directed by the council.

The social implications of limited entry are important in all regions of the country. However, because limited entry does not appear to be imminent in some areas, its social consequences have not been widely studied. For the North Pacific council, the social impacts of management decisions are extremely important. The councils are properly obliged to give full consideration to minority groups, small and isolated communities, and cultural traditions significant to the way people live. This consideration should be required of any management plan, and not only plans that involve limited entry. Any system designed to improve the quantity and quality of fishery products, encourage efficiency, and stimulate development of underutilized species, while providing adequate conservation, will have social impacts.

On one hand we seek to minimize these impacts: to minimize deleterious disruption in human lives. On the other hand, with exponential increases in the worldwide demand for protein, we can no longer enjoy the luxury of inefficient use of our marine resources. Obviously, compromises must be found and every conceivable alternative given consideration. The authors of the papers summarized here have given us some very good suggestions, but it is obvious to me that another set of studies ought to be initiated to provide us with better grounds than we now have for making equitable and fair management decisions. Our anthropological and sociological information base is far from adequate at present. At least some studies should be done on the question of what is going to happen if we do nothing to improve our present system that seems to be leading us to more government interference and control and more socioeconomic problems.

In summary, this conference has brought together people, some who find entry limitation tools to be ideal for future fisheries management, and others who, having given it equally careful thought, find such management tools objectionable because they perceive them to be an abridgement of their rights. Never-

theless, it appears from actual experience that limited entry is a tool that should not be discarded. It has accomplished some economic and management objectives where it has been used to date in this country and in others. Equally obvious, however, if it is to be used it must be developed very carefully indeed. There are no clearly established solutions, but some guidelines have emerged from this conference that may be useful to regional councils, fishermen groups, consumers, and other interested citizens as they attempt to grapple with these management problems.

First, it is very important that councils identify the specific objectives of their fishery management plans in their particular regions. They must decide if their goals are primarily biological, economic, or, as in some areas in Alaska, primarily social in protecting communities and the social structure. Once objectives are identified and ranked according to perceived regional preferences, a limited entry system can be evaluated as to how well it meets the stated objectives. In going through this process we have to make some complicated and difficult choices. Unfortunately, we frequently do not have the data we need to make well informed choices. Thus, we have to rely heavily on the experience and understanding of intelligent people, many from the region who are engaged in the fisheries.

Second, councils should look closely at how effective their present management systems are. Are the present systems accomplishing the stated objectives? If the answer to that question is yes, then, of course, it would be foolish to change to another system less familiar and untried. Perhaps the only reason for changing a currently effective management system would be if alternative approaches could reduce management costs and government control. Otherwise, if a system is working well, don't knock it. Only in cases where current management is not working well, where it is giving us economic, social, or biological disadvantages, are the councils obviously obliged to consider alternative management schemes. Good examples of this latter situation are the New England groundfish fisheries and Pacific coast salmon fisheries. Another example is the Pacific halibut fishery, which has benefited from fifty years of ideal management, but which is in difficulty now because of the tremendous increase in fishing effort in the wake of largely eliminating foreign fishing on halibut.

Third, care must be taken to involve all interested groups, including consumers. A great deal has been said about this and it is my opinion that it should be emphasized, because action is being initiated outside the councils that has bearing on their decision making. For example, Zeke Grader mentioned that Pacific coast trollers have developed their own plan for a moratorium on entry. We heard also from Ed Manary, representing commercial charter boat operators in Washington State, who indicated that his group has brought in experts who have come up with a limited entry scheme. From New England, we heard Jake Dykstra describe an alternative management plan involving disincentives for fishing certain species. These are the kinds of initiatives that are coming from the fishing industry and that should be listened to by the councils and the Secretary of Commerce and all those working for her on these issues.

Fourth, I have recognized a reticence to consider seriously limited entry as a management tool among those who fear such systems could grow out of control

once started. Instituting a limited entry scheme for a specified time period, after which the scheme would self destruct, may be a reassuring approach. However, any system will take time to reveal its good and bad points. It may take a period of years to test empirically whether or not a new system has worked. Nevertheless, I think a self-destruct clause in a limited access scheme is a good thing, if, in fact, you decide that limited entry is needed.

Finally, management plans that provide for limited access, or any kind of change from present management methods, should have some built-in system for evaluation. This is something we have not had in the past that has contributed to the absence of good data on the performance of previous and present management strategies. It is conceivable that a properly prepared and well-executed limited-access scheme could reduce the function of government to that of an auditor simply to provide public accountability that management objectives and provisions of the law are being met. It seems critically important to have some kind of information feedback system at the regional level that provides an indicator of the health of the fisheries being managed without relying on dictates from higher levels of government.

It seems from our discussion that certain fisheries are prime candidates for immediate consideration of access limitation forms of management. You may not agree with the fisheries I choose and there may be others. However, those I would cite as examples for such consideration are the salmon and halibut fisheries of the Pacific Coast, the sea clam fisheries of the Atlantic, and probably the shellfish fisheries in the Bering Sea. We might include also the Gulf of Mexico shrimp fishery, since we heard Lyle St. Amant indicate that the economics of that industry appear questionable. The trawl fisheries in some regions and some recreational fisheries—particularly those for salmon and shrimp—may need some form of limited access control. We must look very carefully at the potential of a limited access form of management for these fisheries at least if we are going to accomplish what the Fishery Conservation and Management Act mandates.

To satisfy what is required, we must continue to work at some problems of communication. There are a lot of people in responsible positions, on councils and in government who are still not listening. On the other hand, there are fishermen's groups that have not gotten the message that there is a change taking place. They apparently have not recognized that something has to be done to cope with current law, and rationalize the way a great American natural resource is used. We need not discard any technique that adds to our tools to deal with fishery management problems. Limited access looks like one tool being applied in some fisheries with success—not with unqualified success, since some new problems have been created, but still with measurable success.

In conclusion, I want to thank all of you very much for your contributions. Personally, I have been interested in this subject for a number of years because our traditional management tools that do not fit the nuts and bolts have not corrected the problem of ever-increasing fishing pressure on important fish stocks. We witnessed conservation schemes for the northwest Atlantic ICNAF fisheries rendered useless because of uncontrolled increases in fishing effort. Now there appears to be an opportunity to correct this deficiency. With absolute control over the fishery resources off our coasts, we stand to receive maximum social

and economic benefits from these resources. The opportunity is here and I strongly urge the councils, government officials, and fishermen to give this new system of fisheries management a chance to work and to accomplish the tremendous goals, objectives, and benefits that I think all of us see possible.

# Panel Statements

## PARTICIPANTS—DAY I

Lyle St. Amant  
Gertrude W. Bernhard  
Richard B. Allen  
Louis K. Agard, Jr.  
Arthur E. Dammann  
Clement V. Tillion

## PARTICIPANTS—DAY II

John Martinis  
James E. Douglas, Jr.  
Jacob J. Dykstra  
Edward P. Manary

## PARTICIPANTS—DAY III

Allen E. Peterson  
William R. Pell III  
J. Roy Duggan  
Hector M. Vega-Morera  
Robert P. Jones  
Peter E. Reid, Jr.  
George J. Easley  
Jim H. Branson



# Day I

## LYLE ST. AMANT:

First, as far as I know, the only type of access limitation we have practiced in the Gulf of Mexico has been according to standard procedures such as closed season, closed areas, size limits, and gear restrictions. There has been absolutely no limit on the number of participants in a fishery at any time. Except in the case of the oyster fishery, where oyster producing grounds are leased, the fisheries of the Gulf are wide open. One thing I should say is that all species there are stream dependent and spend about half their lives in the territorial waters of the state. These species grow rapidly but are subjected to extreme fishing and environmental pressures. To date we have seen no evidence of any ill effect on the populations from these pressures, although there could be some argument about whether certain fin fishes are beginning to show signs of these pressures. Another factor that should be kept in mind regarding estuarine species is that fishery production is controlled a great deal by seasonal or annual stress from cyclical changes in the environment. These things the fishing industry simply has to live with. In spite of this, the Gulf produces 31 percent of the total United States catch. With this in mind, I would like to address some things that occurred to me this morning.

The thing that worries me the most is the question of looking at the optimum yield with all the social and political problems included. Those of us who have been in the fishery management business for years have looked after the stocks on the basis of maximum sustained yield. Now with the addition of these new factors that must be considered I don't know what will come out of it. The social issue question has been raised by Dr. Orbach, but nobody seems to have any data, and without data I don't think the councils are going to be able to provide any answers. It may be true that for the maximum good it is best to let everybody into the system. If you let this happen, as it is in some areas, the historic commercial industry declines and we see economic losses. This is basic to what is happening in some Gulf fisheries. For example, in the shrimp fishery in my state commercial licenses have jumped from five thousand in 1962 to twenty-six thousand in 1977. But the catch has not changed—it is still around eight million pounds. I am not concerned particularly about stocks in this instance, but I get heat from the industry and other sources because everybody's slice of the pie is being cut thinner and they want us to do something about it.

I know also that in addition to the twenty-six thousand commercial shrimpers we have an unknown number of noncommercial shrimpers, probably in the neighborhood of fifty-six thousand, working on this same stock of shrimp. The sad part is that nobody has accurate information on what is happening. I think this is one of the faults of our whole management system—we don't have the data to make the necessary decisions, whether they be toward limited entry or other types of management. We don't know how much of the resource the recreational people catch. We don't know where they catch it. We don't know where the catch goes. We don't know what is caught off shore. We don't know what nursery grounds produce the stock in all cases. I don't think the regional



councils can answer the social issue questions inherent to optimum yield without this kind of information. The law states that we have to work with the best available data and the best available data is not good enough.

Another thing that we run into with estuary dependent species is their natural fluctuations. For optimum management, biologists and statisticians will tell us we have to catch a certain amount of shrimp at a certain time for the maximum benefit from vessel and gear investment. But shrimp stocks move. The time we might recommend they may be caught, they may not be where they were reared. Then we are faced with the social and political questions of who gets the money out of the system. For example, in Louisiana, out of the twenty-six thousand shrimp boats, I would say that seventeen thousand don't dare go beyond three miles offshore to fish, so they are not going to chase the shrimp halfway to Texas to compete with a seventy-five foot double nigger. This is where the problem is in the area of competition; it is not really in control. When competition is in a local area, then we can come up with management systems that might separate the sheep and the goats, so to speak. When competition is in a broader area, control is more difficult and then we have some headaches.

Now, I would like to say something in defense of the fishery managers. We have heard a great deal said from the industry and the theoretical people. Those of us on the firing line have some real misgivings about what is going to happen when we try to institute the new programs and approaches that are called for. If you have spent some time in a state legislature or legislative committee trying to get the very simplest management procedures laid out, you will know what I am talking about. None of us has any trouble managing fish. We have trouble with people. I can't imagine getting cooperation from the various factions in the Louisiana shrimp industry, for example, much less the interested public, if state and federal regulations are saddled with the fact that they must satisfy every conceivable community interest, whether it be popular now or not. I think that we will be old men before the first plan gets through the courts in that case. Some things are practical and some are not and I am a pragmatist in this instance. I think that Mr. Duggan's point is important with respect to historic commercial fisheries. It seems that because of the flaw of time on people's hands, instead of a few commercial boats we now have 270 thousand boats of all descriptions fishing in Louisiana. Where do we draw the line? How do we draw it? Should it be with some type of limited entry system? I am here to get answers and raise questions, but I hope that some of the answers are practical because we are going to have to live with the end result.

### **GERTRUDE W. BERNHARD:**

As a member of the South Atlantic Fishery Management Council, a conservationist, a consumer, I am concerned. After listening today and, over the past few weeks, reading the position papers, my concern is growing. I have learned, and I'm sure it comes as no surprise to anyone, that there is no simple solution.

As a taxpayer, I see that no matter what the solution may be, it is going to cost a great deal, not only in dollars but also in social values. There is no easy, inexpensive way of enforcement; no inexpensive way to battle plans through the courts. As a recreational fisherman, I am concerned I will be unable to prove my

right or vested interest in fishing under limited entry management. For example, do your recreational fishing rights follow the male or female line of a family? It may sound a little facetious, but it may be one of the realities with which we'll have to deal.

As I listened today, I heard a lot of concern, but no good answers. Except for Laurie McHugh, I heard very little concern for the total resource as an ecosystem. We talk about a single species and how we will regulate fishing for it. We talk about how we will diversify from a single species to two or three species that can be taken with the same or similar gear. There seems to be no particular awareness, when we talk about limited entry and who is going to fish, of how much of the resource is going to be allocated to the ecosystem. As an environmentalist, that is of concern to me.

I also feel that council members have very definite responsibilities under the FCMA. We look to experts such as those here today for options we can take that will be defensible in terms of a functional and viable management plan. We want to be able to go home and live with our fishing neighbors without being tarred and feathered.

Last year I attended the Optimum Yield Conference and it also left me with a lot of questions and concern. About a year later I came up with my own personal definition of optimum yield; however, I am really concerned whether I will have my own personal answer to limited entry by next year. The issues here seem far more complex.

Each member of a fishery management council is involved in the planning process with various kinds of background expertise. I come from Florida, a state with some seven thousand miles of coastline; and I sit on a council responsible for the South Atlantic fisheries that, at this time, has no management plan in place. In Florida, as yet we don't have any type of salt water fishing license. We do have a freshwater fishing license with special provisions. I'm looking forward to hearing about the "Alaskan experience" on the practical aspects of limited entry.

In his paper Laurie McHugh brought up the question of whether limited entry is really a conservation tool. There was no definite answer. It seems to me as we talk about limited entry that many of us are looking at it as a total concept as opposed to one option, one piece of an answer in planning for fisheries management. There may be some fisheries where limited entry is a very good solution to the management problems. In some people's minds, limited entry for fisheries seems to be a new or radical concept. But for other resources such as offshore oil and natural gas, limited entry in the form of bidding for exploitation rights is well established. Some people have become very wealthy from this approach and others have lost their shirts. At this point in time for fisheries, I can simply express my concerns and say that I don't have any answers. But I look forward to asking many questions.

### **RICHARD B. ALLEN:**

I would like to make a number of comments and state some opinions on the position papers we heard reviewed this morning. Also, I'll bring in some ideas I have from my own experience.

The discussion of limited entry itself, especially when applied to a specific fishery, tends to increase the problems in that fishery. In a lot of cases we can see that as the fishery gets to a point where everybody starts saying, "Gee, we've got to put a lid on this thing, prevent new entrants, and cut down on effort," there is a big rush to get into the fishery so that people will qualify as permanent participants when the lid does go on. Also, it prevents people from switching to other fisheries. People in a fishery they know is kind of over the hill may find better opportunities elsewhere, but they are afraid of losing their qualification for an entry permit when limited entry is implemented. So they slide with the fishery; they would just as soon get out of because they want to maintain their qualification to work in that fishery in the future. Even when a limited entry program is implemented, the short term results will be contrary to what was intended. Some people are admitted through some quirk of the qualification formula who were previously marginal fishermen. Now they have a bigger stake in the fishery. To stay in they have to increase their effort to meet certain maintenance qualifications.

When I was first exposed to the common property problem in fisheries there was a basic yield curve that told the whole story. It showed as fishing effort increased, yield or catch increased until it reached the point of maximum sustained yield (MSY) and then it eventually dropped off. Then somebody said you can equate yield from a fishery with its total revenue—whether it is pounds of fish caught or dollars earned, the yield curve looks the same—initially increasing with effort but then decreasing as more effort is added after reaching MSY. Total costs, on the other hand, keep going up as effort is increased. Where the total cost curve intersects the total revenue curve to the right of MSY is the point where free entry into the fishery will theoretically stop because all the excess profit or rent is dissipated. Total revenue equals total costs. Economists tell us we should move back along the effort scale; reduce effort to the point where there is the greatest distance between the total revenue and total cost curves because this is where the net economic return is maximum.

Now from what I have seen recently, some economists I have checked with say that the total revenue curve does not always follow the yield curve. Because market demand for fish fluctuates up and down, total revenue fluctuates and you get an entirely different picture. Total costs may intersect the total revenue curve at some point below (to the left of) MSY and then you may get excess profits or rent again at a higher level of effort. This is because people make more money on scarce fish. When the stocks are reduced, prices go up faster than the reduction in landings. What that means to me is that it isn't necessarily true if you cut back on effort from the free entry point, fishermen's incomes are going to rise and everybody will be better off. Fishermen can actually be worse off. Fishermen's incomes may actually go down if you cut back effort. The impact that this will have on the industry and the political situation I don't think has really been addressed. It may be that for some obvious reason this is not valid. If so, I can't recognize it.

Another important point brought up this morning was the cyclical nature of fish resources, that is, fluctuations in abundance. I think that, with limited entry we would be playing "catch-up" for ever. We never have enough information to

really keep labor and capital and fluctuating resources and changes in market conditions all in balance. I don't see how we can make all the necessary investment decisions about effort as fish abundance fluctuates so much.

A major thing that bothers me about limited entry is that bureaucrats will be deciding how much a fisherman should make. Somebody will have to decide how many units should participate in a fishery. That means deciding how much each one will make. I don't see how you can make that a rational decision. The information needed to make that decision and the idea that someone can make a decision like that is just foreign to me. I believe that there is a common need and that there are things you can do to prevent depletion without increasing costs, such as protection of spawners and nursery grounds, minimum sizes, and so forth.

Another thing is the value of fisheries to a state in terms of the employment it generates. Benefits from limited entry might accrue to the individual or the federal government, but at a cost of increased unemployment locally. One of the principal benefits of fisheries in my area of the country is the high multiplier effect of fishing in the local economy. This aspect of fisheries may show us that the number of fishing units is more important than the total volume produced by the fishery. Also, I don't think that the price of fish to the consumer would be significantly lower under limited entry than under open access. Some people say it would, but to me, this would not necessarily be the case because of a lot of other factors affecting prices consumers have to pay.

I wonder if there is any more justification for requiring fisheries to be economically efficient than there is for any other industry. It seems that the economic efficiency argument can be made about any other industry, because it is normal in a free enterprise economy for economic rents to be dissipated. As long as there is excess profit, people will enter a given activity, whatever it is, until there is no market or any excess profit. That is just the normal situation. If the participants in a fishery keep the economic rent rather than its being taxed away, these funds will be available for the various activities maintaining our benefits. Our lobbying efforts would be increased and our ability to restrict local monopoly and supply local markets would be maintained. I don't think that a tax system would increase fishermen's incomes. Fishermen's costs and revenues would still have to average out to zero, so new participants will not be attracted into the fishery. According to Garrett Hardin, in his paper "The Tragedy of the Commons," the Taylor Grazing Act did not really solve the overgrazing problem. Even though grazing lands were leased to individual cattlemen, there was still a lot of pressure (on federal authorities) to increase head counts to the point where overgrazing produced erosion.

These are about all the comments I have. I hope I didn't use too much of a shotgun approach, so that all the points I made can receive some worthwhile discussion.

### **LOUIS K. AGARD JR.:**

Most of the comments I have are from my own observations and experiences in fisheries over about thirty years. We have a different situation out in the

Pacific, probably much different from that of the other seven councils. Where you have a large continental shelf under your offshore waters, we do not, and our fishery production as a result is limited. Tuna, of course, is our primary resource. It represents probably twice the amount of other fish we could catch in the Pacific. I think that all the Pacific islands in our council stretching from Hawaii to Guam and Midway, have gone on record, rightly or wrongly, proposing regulation of tuna. As a supplement to its fishery management program, limited entry presents added possibilities for the state of Hawaii. The limited shelf area around each island has very vulnerable static populations of fish. It is not unrealistic to say that the smaller shellfish populations are overfished—a common fact in many areas of the nation.

There are two separate fisheries for consideration: the territorial fisheries of Hawaii and the fisheries administered under the FCMA. The territorial fisheries have experienced attempts at regulation and conservation. For fisheries now under jurisdiction of the FCMA, little conservation has developed prior to inception of the act. In both instances it appears too early to evaluate any successes in management. However, a variety of limited entry concepts have been initiated and varying results achieved.

Historically, as fish was important in the diet in ancient times and continues to be, conservation has been practiced for a long period of time. Dating back hundreds of years, a system of conservation was administered by a manager. He had a special name, Konoiki. This system involving allocation of fish appeared to work and was in effect until fairly recent times. Some fishermen in Hawaii presently advocate a partial return to this type of conservation. Prior to the advent of statehood there was agitation to buy up the fishing rights from this manager. The result was that the state bought the rights and granted full access to the public. This open access to the originally regulated fishery apparently led to a dramatic decline in the stocks, lasting up to the present. During this same era, limited access to the ocean resources also came into effect. Only United States citizens could go to sea to fish. That may sound strange, but this was right after the Pearl Harbor attack. Prior to this, fishing was unrestricted, employing many foreign nationals. By permitting only U.S. citizens to fish and adding some price ceilings, we saw a very dramatic return of fish in large numbers. I think it is worth mentioning this because of the original very limited supply of fish in my area. In your area you would say that stocks were simply replenished.

In other experiments in restricting access, it was demonstrated that fish stocks showed increased recovery. We have fish sanctuaries on our capital island of Oahu and our outlying islands, and they have increases in fish populations. In these sanctuaries, only limited taking is permitted, mostly for scientific purposes, but for other purposes, too. Recovery of the indigenous animals in reef areas that were previously very barren has been satisfactory. Success with the initial sanctuaries encouraged the establishment of others around the Hawaiian Islands, and it is expected that total bans on fishing in these designated areas will be instituted on a rotating biennial basis. Perhaps this system would be worth thinking about for other areas of the country. Prior to the sanctuary system, it became apparent that early regulation of a fishery is necessary. There will be a lot of public resistance to implementing any plan for a fishery that has gone on without regulation in the past.

A new lobster fishery has developed on a fifteen-hundred-mile long island chain. The need for data to develop good management plans has been well demonstrated by the startup of this previously undiscovered and unrealized fishery resource. In a relatively short time, signs of decline in yield indicated the need for sound management procedures. Regulations have now been designed to promote and conserve this new fishery. It may be also necessary to use limited entry as this resource appears to be susceptible to overexploitation.

Our large area of some six thousand square miles of ocean has other pristine resources that are worth protecting, perhaps through a strong limited entry policy. We already have a permit system to fish in this area. The possible development of controlling vested interests may become a future concern, however. There are some highly productive and valuable resources within this area. For example, there are the seamount and albacore fisheries. Another is the fishery for a small anchovy called natal, which is heavily exploited. This is the prime skipjack bait and supplies a lot of the fish consumed raw. The state issues permits for the anchovy, and the permit requirements restrict who can enter the fishery.

The various approaches to conserve fisheries over the years have met with mixed reactions from the public. A comprehensive program to regulate the territorial fisheries has been sensitive to political considerations and has not been widely instituted. Subsistence fishing, which was prevalent in the past, has now been mostly discontinued with the decline of territorial sea resources. We have found that a part-time fisherman will more likely oppose limiting regulations while a fulltime commercial fisherman will more readily accept controls if the continuance of the fishery is at stake. Hawaii's fisheries regulations are similar to other states in that they are varied and have to be to adequately conserve the resources.

A final example of limited entry that may be applicable to fisheries is quite unique. Just as Hawaii has proposed some limited access in fisheries, so too has it proposed limited access in immigration to the islands. This approach to limiting population on the islands has been fully received in Congress although there is no national policy. As unpopular as this may be for my state, the need to recognize the limits of our resources is very real and necessary. Fresh water, the primary resource, for example, will be in critically short supply in the 1980s at the present rate of usage. Prepared guidelines to limit immigration, like those for limited entry to fisheries, need not be contrary to fulfilling recognized constitutional requirements while protecting valuable natural resources.

### **ARTHUR E. DAMMANN:**

I have listened to and read a good deal about limited entry. One of the things that impresses me here is that nearly all the talk so far has been aimed at relatively well developed fisheries. I would like to say a few words about less developed fisheries of smaller scale occurring in the Caribbean. Mr. Agard alluded to such fisheries in the western Pacific, but I suspect that some of what I say would be relevant in some places in Alaska and perhaps other regions.

The Caribbean region supports almost entirely an artisanal fishery. To imagine this kind of fishery you have to think of little islands, with no continental shelf and approximately two thousand square nautical miles of water around it

as is the case with the U.S. Virgin Islands and Puerto Rico. Fishermen there are landing between eight and ten million pounds a year maximum. That's the total annual catch. This is a few good hauls with a big boat in some other fisheries. In our artisanal fishery, annual income is typically from two to three thousand dollars per fisherman. This is not big economics and investments range from a few hundred dollars to maybe ten thousand dollars. Above that there are a few small scale commercial fishermen with slightly larger boats and more investment.

Caribbean fishermen have the same complaints about competition that fishermen have in the large developed fisheries. The major complaints in Puerto Rico and the Virgin Islands are, for example, "my neighboring fishermen are stealing fish from my pots"; "my neighboring fisherman is a part timer who drives a taxicab the rest of the time and I'm a fulltime fisherman and I depend on this for my livelihood." One would think that if there ever was a situation right for some sort of limited entry, this would be it. On the other hand, maximizing the income of his family is not the primary interest of the artisanal fisherman. He is well aware of many things that he could do to increase his annual average income, but he is completely unwilling to do those things just for the money.

We talk about lifestyles in fisheries and need to include lifestyle as a component in deciding on any sort of limited entry system. But historically, and almost by definition, most true artisanal fishermen are fishing because of the lifestyle it gives them. They are unwilling to do anything else although it would pay them more money, even if there was something else to do. These fishermen generally have no alternative source of income except gardening or taxicab driving or laying bricks on weekends or something like that. There is no other fishery they can go into in a small island environment.

More than 60 percent of our fishery lies within the (three-mile-wide) territorial sea. The 40 percent that lies outside territorial water is chopped off like the edge of this table in very deep water, at the furthest, about fifteen miles offshore. There is no single fishery that occurs entirely within the fishery conservation zone (FCZ). All our fisheries are a combination of either territorial sea fisheries, with a slight overlap into the FCZ, or they are entirely territorial sea fisheries.

While I realize the difficulties and costs of obtaining information—I have often made the statement made here earlier that we are probably spending more on fisheries than they are worth—I am intrigued by Mike Orbach's comments. The answers to those social questions are the only way we can arrive at a meaningful management regime for small scale, artisanal fisheries. Strictly economic rationale is not the answer. We have to understand why these people want to do what they are doing, why they have done it for generations, and what can be done to manage the stock. The Caribbean stocks in some cases are badly stressed in certain areas where they are easy to get to. The pressures are great and they require management. But it is an entirely different ballgame, in my opinion, from the large, well developed and economically powerful fisheries we have been hearing about.

### **CLEMENT V. TILLION:**

I am an advocate of limited entry. I was active in passing the limited entry legislation in Alaska a few years ago. While I was carrying the ball on this I was

constantly attacked. My opponents claimed that I was defending it because I had a permit. I gave the permit away. If I lose an election, I think that I might need it back again. It will take thirty-five thousand dollars to buy it back.

Limited entry gives us a property right in the resources and it's a conservation tool. Proof of this is in the court cases of fishermen making citizens' arrests of other fishermen caught doing things illegally. Now when a fisherman sees a creek robber taking fish, it's his fish the robber is taking because he has a property right and a personal interest in them. Enough fishermen are interested, in fact, that they are assessing themselves to build hatcheries. Though I am not a great hatchery advocate, it is important they are doing what they can.

Dick Allen's argument earlier about holding fishermen in fisheries that are over the hill brings me right up to the boiling point. It reminds me of the remark an old farmer made to a young conservation agent who was trying to teach farmers to rotate crops and plow across hills to avoid soil erosion. The old fellow said, "Now listen here, young man, I've already used up three farms so don't you be telling me." What I am listening to is the fisherman who has already used up a couple of stocks telling me he should have the right now to use ours.

We do not have consumer representatives on our council, but we have representatives for what we consider a basic consumer group, that is, our subsistence people. Throughout Alaska we have several thousand aborigines who have a subsistence life style. If one of their villages needs forty tons of herring, we have to be doggone sure when we let a boat come in that takes one hundred tons at a clatter that it doesn't leave them without enough to eat. To us, the subsistence fishery is basic. What we say is, the fish go first to those that have to catch them to eat, second to those that sell them, and third to those that play with them.

When I look at limited entry, I am not just looking at fishermen. I am looking at cannery workers, drug stores, net lofts, and boat repairs. I look at a fishery like our king crab fishery that has bloomed into one of the finest in the United States. On the other side of the coin is the fishery in Kodiak that lasted eight months. Two years ago they filled their quota in fifteen days. That meant they brought Filipino fruit workers from California to pack the catch and my native people sat in their villages without a job. That might be fine for the Seattle based boat, but it sure doesn't ride well with me. Limited entry doesn't really infringe upon out-of-state fishermen's rights any more than necessary to protect the rights of the people who live in Alaska who have to make a living, too. So I look at limited entry as a method of extending the season on certain species, so that shore workers have some steady employment. The processing industry does not support limited entry and I can see why. The Chignik fishermen make anywhere from one hundred thousand to two hundred and fifty thousand dollars a year because they have the only permit to fish that particular area. They notified the cannery that it can either sell out to them or watch another cannery built along side, because they are taking over the processing end, too.

As for the number of permits, it is very plain that more permits will be issued as soon as the Fish and Game Department says there are more fish to harvest. That means that if a fisherman has had a good season and wants to quit while there are still fish to be harvested, then we will issue enough permits for others to go out and take fish. Fishermen have got to work if they want to keep that exclu-



sive right to fish because with it comes the obligation to harvest what is available. With limited entry, there is a terrible balance. We could have had a competitive bid system. That is legal, but there are social and economic problems, too. So we allowed everybody that was in the fisheries to stay in. There is often an excessive amount of effort, but at least it stops the flood of increase. We allow free transfer of permits to avoid constitutional problems. There certainly can't be anything unconstitutional about the marketplace. We are fairly sure that as long as the permit is a property right, we don't have to worry about future court cases. Anybody can buy in, and a lot of people do. It is an interesting fact that for every nonresident who has bought a permit from an Alaskan, two Alaskans have bought permits from nonresidents. Most permits bought from Alaskans are bought by relatives who live elsewhere.

When you start laying out a limited entry program, it is not necessary to have the same program for every fishery. As Louis Agard said about Hawaiian fisheries, there can be one system for the reef fisherman who is home every night and a different system for the fisherman working in distant water. One system can help the boat; another can help the fisherman.

There are drawbacks to limited entry. I would be the last to say there are not. One problem is the balance of the return to the fishermen versus the efficiency of the fishery. Often, to get efficiency, an excessive return must be allowed to the fishermen. If you have guts, and I haven't found our legislature with them yet, you can tax a portion of the catch and get a rent on the resource. This would be a good economic approach that does not bloat the number of boats, and keeps the fishing season spread out, which is good for employment on shore. First, the limit is needed to hold down the flood of new entrants. Second, when the return to the fisherman becomes excessive, he reinvests in new equipment to avoid taxes. Now the new equipment requires a larger catch. If the state can get hold of the economic rent, it will help to some extent, but you can see the complexity and drawbacks. My point is, if you look at limited entry as a panacea, you are going to be greatly disappointed. If you look at it as a major management tool to stabilize your fishery, it is very good.

We are just writing a management plan for our troll salmon fishery. The federal government will ask us what the optimum yield of that fishery is. Well, that is a social-economic decision. We have towns that are built on that fishery, and so our limited entry program is designed to keep the fishery from getting bigger while not wiping out the towns of people who have substantial investments in the fishery. So when someone asks, "What is the optimum yield?" I think, "What is the yield the fishery *ought* to take?" We are going to allow them to take a certain portion of the total run, but they really should not take any. This is totally a social decision and we have to make some of those.

We will not limit the number of licenses in our sports fishery, but we do limit the area in which they fish. This works just as well because, if a sports fisherman is allowed a big catch, it is not as detrimental as it is to a commercial fisherman who can't catch enough to make it pay. On the other hand, if the commercial fisherman can't catch enough because the subsistence fisherman has taken the resource for his own food, then that is too bad. The number one priority has to be the man that fishes for food.

We are not by any means going to have unanimity on limited entry. I don't think there was even unanimity among cowboys and farmers about fencing the prairie. Recall the cowboy's song, "Don't fence me in." But the alternative to not fencing was to let the common prairie become desert. You know you have no choice, as pressure on the resources increases. When people say they want to keep the status quo in fisheries without limited entry they are dreaming. You will not get the status quo by not having limited entry, but will get it more likely in some cases by having some form of limited access.

I hope we can get into some argumentative parts of this limited entry business. In my legislative career I have found that nothing is solved until you have had a fight, because as long as you are being polite no one really says what he thinks. Until then you don't get down to figuring out how to solve the problem.

I realize that there are people who have large investments to pay off in the next four or five years and that their point of view is different from mine. I was looking at my grandson recently and thinking it will be another two years before he goes on the boat and another fifteen before he is ready to fish on his own. I want something for him, and so my opinion is very selfish. There isn't any argument—mine is four grandchildren and bones that are going to mold and mold right there in that ground, so I am very prejudiced against the fellow who just has to take more than the biologically allowable catch so that he can pay off a mortgage. I could care less about his mortgage. In fact, if he goes bankrupt, his might be a cheap boat for my son or grandson.

## **DAY II**

### **JOHN MARTINIS:**

In the state of Washington limited entry seems to be such a scary issue in the salmon fishing industry that we have had to go slow in building our limited entry scheme around the needs of the industry. The first thing we had to do was put a cap on licenses, and that is basically what the state of Washington has today in the form of limited entry.

I will run through a little of the history of limited entry, or moratorium, as we call it in the state of Washington. In 1934, a limited entry scheme for Puget Sound gillnetting was devised. This was created by public initiative. This limited entry scheme did not provide for transferability of licenses. In 1938, it was challenged in the Washington State Supreme Court and was overturned basically because of the nontransferability part. I introduced a license moratorium bill in 1970, the second year I was in the legislature. That legislation passed the house, but failed in the senate. In fact, it passed the house and failed in the senate again in 1971, 1972, and 1973. But in 1974 it finally passed in both houses of the legislature. The main opposition to that bill came from the trollers and Columbia River gillnetters: they were the ones who repeatedly killed the legislation in the senate. Ironically, it is the trollers and Columbia River gillnetters who are the strongest advocates of a moratorium in the state of Washington today. The basic reason for a moratorium was that annually we saw the numbers of licenses go up and the harvest go down. This required regulations to continually decrease the number of fishing days. Eventually the industry came to the legislature and asked for a moratorium. Not until 1974 was there a unified effort to control licenses. Historically, the number of licenses in Washington averaged between fifteen hundred and three thousand and the annual salmon harvest ran between two and twelve million pounds. In the 1960s and early 1970s the license numbers jumped from about thirty-five hundred to about eighty-two hundred annually and the harvest rate dropped. Today the number of licenses has stabilized at about six thousand and we have an annual harvest of five to seven million pounds.

The intent of the license moratorium legislation as set forth by the state of Washington legislature is as follows:

"The legislature finds that the protection, welfare, and economic good of the commercial salmon fishing industry is of paramount importance to the people of this state. Scientific advancement has increased the efficiency of salmon fishing gear. There presently exists an overabundance of commercial salmon fishing gear in our state waters which causes great pressure on the salmon fishery resource. This situation results in great economic waste to the state and prohibits conservation programs from achieving their goals. The public welfare requires that the number of commercial salmon fishing licenses and vessel delivery permits issued by the state be limited to insure that sound conservation programs can be scientifically carried out. It is the intention of the legislature to preserve this valuable natural resource so that our food supplies from such resource can continue to meet the ever increasing demands placed on it by the people of this state." (RCW 75.28.450)

The original moratorium legislation also called for an ad hoc committee of the user groups and the Department of Fisheries to develop recommendations for a phase II moratorium leading to limited entry.

There was very little unanimity among the different user groups in the state, and consequently we have only very few modifications in the law today. To qualify for a license under the original act, fishermen had to have fished for salmon during the years 1970 to May 6, 1974. The reason for the May 6, 1974, cutoff date was that that was the day the governor signed the legislation and that year there was no commercial salmon fishing in Puget Sound. Vessels under construction or purchased in good faith prior to May 6, 1974, were also allowed to enter the fishery. To get by the constitutional arguments that struck down the 1934 initiative, we created a review board to review hardship cases and made the licenses transferable. It is our legal counsel's opinion that this law will pass all constitutional tests.

The original moratorium law had a self-destruct clause. It was to expire December 31, 1977. In 1977, the legislature extended the moratorium for an additional three years. The only difference between the original moratorium and what we presently have is that starting in 1979 a fisherman can renew his license in succeeding years by showing that he delivered fish in 1978 and each year after that. This moratorium is still just for a three-year period and there is no guarantee that there will be a session of the legislature in 1980. The next regular session will be in 1979 and the moratorium will have to be extended at that time if it is to continue. I would guess that the cutoff dates would be taken off the law when it is extended, which would remove a future automatic repeal date.

I would like to run through some of the problems that the moratorium has encountered, and I would like to give you some possible solutions to these problems. In the document we passed out (Gary Benson and Robert Longman, pp. 333 to 352), there are some possible solutions suggested that are not necessarily endorsed by myself or the legislature. Some of the solutions I am going to state here are not necessarily my official opinions, but are intended mainly to stimulate questions from the floor.

One problem is that nothing in our moratorium prohibits multiple gear licenses. If you want to use gillnets and purse seines on Puget Sound, you are allowed to have multiple licenses for each kind of gear. In 1979, you will have to purchase and deliver fish on each one of those licenses, but there is no prohibition on how many types of gear you operate. A solution to that would be legislation similar to that in our charter boat moratorium. This would allow only one license per vessel. That vessel must be equipped to operate the gear for which it is licensed and must deliver fish each year following 1979 in either Washington or another state. I have to back up a little bit on our requirements for delivery. I left out the fact that our delivery requirements do not specify either the state of Washington or salmon. If the salmon resource hits a distressed year in Washington waters, we allow fishermen to validate their licenses by delivering fish other than salmon in another state.

A second problem we found, and this is true in other states, too, is that as soon as a moratorium is proposed there is a sudden increase in license applications. This is extremely difficult to avoid. However, these annual delivery re-

quirements plus a minimum delivery in your state or another state will take care of this problem. I believe that we licensed sixty-two hundred vessels in 1977—down from the seven and eight thousand licenses issued just before the moratorium. On minimum delivery a proposal could be made, as I'm sure it will in the next session of our legislature, that the minimum delivery be based on the economic value of the product harvested. This value could be determined by a regional average income plus a reasonable return on capital investment.

Economic rent is another problem. The economic rent on a fishery resource under a license moratorium will reflect a dramatic increase in the value of the licenses to fishermen. Possible solutions could include similar increases in licensing costs or use of landing taxes. If licenses have to be transferable to meet constitutional tests, a percentage excise tax on the sale of licenses up to 50 percent or higher could be imposed.

A fourth problem is that of the potential for concentration of licenses in few hands. There is one element of the salmon fishery in Washington that has up to 30 percent ownership by the processors. I believe that this should be prohibited and that processors should be prohibited from ownership of any commercial licenses except in cases where processing and harvesting are a single operation.

In reducing the number of fishing vessels in the state of Washington, we run into a problem with part-time fishermen. This is true especially in our troll fishery where we have people who are retired, fishing with smaller vessels, and not capable of producing great numbers of fish. Entry controls on these people could produce possible constitutional problems. One proposed solution would be to have a class B license for vessels meeting the minimum requirements. This would give the option of some sort of buyback program or taking a ten-year term license that is then not eligible for buyback or sellout advantages. There may be some constitutional problems in the Washington moratorium that will give this approach strong possibilities of working.

A sixth problem relates to transferring licenses between vessels of different sizes. In the net fisheries we have not found much of a relationship between the size of vessels and fishing effort. But in the troll fishery off the coast of Washington there is a direct link between size of vessel and effort. The larger troll vessels tend to be trip vessels with freezing facilities or medium size iceboats. The smaller sizes are day boats that are limited in their range out to sea. I believe that transferability should be limited to transfers within a size class so that total effort on the resource is not increased.

Another problem is that of setting minimum deliveries for license qualification. Using the criteria of average regional income plus acceptable return on capital investment may not be adequate. There are times when people travel or are ill or have other good reasons why they would be out of the fishery and not be able to meet their minimum requirements. There would have to be some type of sabbatical leave allowance, as the university types would call it. Those temporarily inactive licenses could be deposited with the director of the system so that a person could sit out a season or two without penalty.

The last problem I'll mention relates to vessel buyback programs. The state of Washington has had a buyback program for a few years now and we have taken between two hundred fifty and three hundred boats out of our fishery. Our buyback program was necessitated primarily because of Indian treaty prob-

lems that I don't care to discuss at this time. My point is that our program is run on federal funds provided to compensate those people who are economically distressed by the federal court decisions on Indian treaties. This fund still exists, but eventually it will be depleted. If it is not renewed by the federal government, a buyback system will have to be devised by the industry through landing taxes or other revenue sources. Some kind of separate account for buyback will have to be instituted.

The other part of the moratorium in the state of Washington has to deal with the charter boat industry and I will leave that part of it to my good friend Ed Manary. Thank you.

### **JAMES E. DOUGLAS, JR.:**

Let me begin by establishing my credentials. I am no marine scientist. I am not even a biologist. I am a businessman from Virginia, a state with no limited entry scheme. I have had a little over seven years' experience with fisheries management. So you might ask, as I did when Don McKernan asked me to come on this panel, "What can I contribute?" I asked a similar question some seven years ago when the Governor of Virginia asked if I would take over the state agency dealing with fisheries management. I reminded him that I had no experience in that particular field. He told me that if I could just think fast and say the right thing, give some right answers, I would do okay. Now, I have never been known to think fast and I am finding a lot of my answers are wrong, but I am encouraged when I remember a young lad, a student of mine when I taught briefly for the University of Virginia. If this young man pushed the limits of knowledge one centimeter in either direction, I would be fooled. But he was the kind of fellow everybody really enjoyed. He had enthusiasm and would go into anything with gusto. One summer he got a job down at the local grocery store. I was in there one day, and I found out he was a tremendous employee. The women in particular liked him because he was so helpful to anyone that came into the grocery store. It seemed that one day a gentleman came into the store and had difficulty finding some of the items he wanted. This young man came up and said, "Can I help you?"

"Yes," the gentleman said, "I would like five pounds of potatoes."

"Yes, sir," and the young man got the five pounds of potatoes and put them in a bag.

"Now I would like some celery, if you will."

"Yes, sir," the kid said, and put some celery in the bag.

Then the gentleman requested half a head of lettuce. Now, this kid had never had that kind of request before, but he knew enough to ask the store manager. He went to the back of the store to find the manager, but unbeknownst to him the customer followed and was right behind him.

"Boss," the kid said to his manager, "some SOB out there wants half a head of lettuce." Just then the kid noticed his customer was right behind him. Quick as a wink he said, "And this gentleman has expressed an interest in the other half."

If that young fellow could think that quickly and come up with right answers, I'd like to believe that I can, too.

I would start by saying that I think it is really impossible for those of us on this panel, who have the task of commenting and acting as a sounding board for the folks who earlier today described their ongoing limited entry schemes. If there is anything that I am perceiving from this conference, it is that all limited entry schemes are different. They are all very esoteric, applicable to very specific fisheries, and designed to solve particularly unique problems. They all have different goals and objectives and some of them enunciate their goals and serve their objectives better than others. I think that in dealing with our problems we are getting extremely "textbook" in our approaches. I remember that Lyle St. Amant, who is one of my favorite state fisheries administrators, told us yesterday that the academicians can make these proposals but it is those of us on the firing line that have to answer to the fishermen. I think sometimes that it may have been academicians who advised Custer that the Little Big Horn was a good place to make a stand. When he started to lose the fight he didn't see the academicians anywhere. I feel like Custer sometimes when I go to some of these meetings and defend some of the more academic points of view. Then I look around and, to paraphrase Custer, I say, "Holy cow, where did all those fishermen come from?" I don't see any academicians.

But we need them. They are certainly essential, especially in this type of forum where we come to grasp some of the philosophical problems of managing our fisheries.

As I said, Virginia has no limited entry scheme, but I am associated with one. It is one devised by the Mid-Atlantic Fishery Management Council. I think it has some parallels to some of the experiences with limited entry we heard described earlier. But it is also unique in that it is on the East Coast. The Mid-Atlantic council used limited entry in the very first plan they promulgated—the surf clam and ocean quahog plan. It also became the very first use of limited entry in a plan promulgated under the FCMA. The West Coast and Midwest programs are entirely under state authority. The Mid-Atlantic program is the first and only one so far that is a federally endorsed limited entry scheme since, after all, the council's plan becomes the Secretary of Commerce's regulations.

We have a classic case of overharvesting in surf clams. It is a relatively new fishery which has been pursued I suppose for twenty or thirty years. We started with a virgin resource and we fished off the cream of the crop. I recall talking to Jack Davis, who is now with the South Atlantic Fishery Management Council, and he used to discuss this with me and draw the curves. I still don't understand them, but I am getting a little better. Capital flowed into the industry as we fished the surf clams. It seemed that the catch would just be limitless and that surf clams would go on and on. I suppose we really ought to have been warned because the fleet that started working off of Long Island first moved south off of New Jersey and then off of Delaware and then finally off of Maryland and Virginia. I guess we should have realized that those surf clams did not go all the way to the

South Pole and that some day we were going to run out of them. The fishing was obviously well beyond the stock's MSY and the catches began to decline dramatically. But the interesting thing was that capital was still being committed. Boats and new harvesting equipment were still pouring into the industry even as the catch rates were declining, even as the total catch was declining. The obvious result was a classic case of overcapitalization and a depleted resource.

Now, the Mid-Atlantic council responded to this problem, and I think appropriately, by setting annual catch quotas, designed to restore the stocks eventually to what the scientists told us was an appropriate MSY. But you see, the FCMA allows—in fact, some of us believe it requires—that the economic impact of a management proposal be estimated. The FCMA also allows for management's decisions based on the economics of an industry. I think, up to that point, that nearly all of us who were dealing with surf clams could agree on the facts, on the problem, and even to some extent on the philosophy. But at this economic point I think we reach very divergent philosophies, and dilemmas arise. For example, there are those who say, "Don't manage the economics of the industry, just manage the resource." If we can determine the MSY and what the quota should be to reach that MSY, these people would let economics take care of itself and let industry solve its economic problems. On the other hand, it seems to me that we have created a system that precludes the industry from actually getting together and solving the economic problems. The solution to economic problems then are placed in the hands of fisheries managers and in this case the Mid-Atlantic council.

The question I raise and, quite frankly, I do not have an answer for is to what extent may we or must we or should we manage the economics of the fishing industry? There are those that will argue that the FCMA requires management of the economics of a fishery on a continual basis. There are others who take the position, more as I do, that says manage the resource and in doing so try to minimize the economic impact. That is a lot different from going into full scale economic management.

Frankly, I come down far short of continual management of economics. You see, if you follow management of economics to its ultimate conclusions, I feel that we will be asked to make decisions on how much income is enough or appropriate for an individual fisherman. We have heard folks on this panel acknowledge that as a part of the decision making process. In my present thinking, that is something I do not wish to subscribe to. As a matter of fact, if I am going to manage the incomes of individuals, I would prefer to manage the incomes of lawyers and doctors rather than fishermen. I think I could have a far better impact on society that way than I would trying to manage individual incomes of fishermen. I really believe that may be exactly where we are headed. We may be inevitably talking about fisheries as a public utility. The farmers, for example, are paid for not planting and they are asking for 100 percent parity in maintaining farm incomes. Why shouldn't fishermen ask the same thing? In fact, you can argue and conclude that every business has a public interest. But where do we stop and to what extent do we decide to manage individual incomes, which, pre-



sumably, in our scheme of things is indicative of a person's contribution to society?

Well, that is enough of personal philosophy. Going back to our experience with surf clams, the council has indeed taken into consideration the economic issues of the industry. We broke the annual quota into quarterly segments, thereby precluding what we foresaw as a possible gold rush. We didn't want the annual quota taken in a free-for-all the very first two or three months of a year. That would impose an economic hardship on the industry of having unproductive boats for nine or ten months. The council went even further and provided for limiting the days for fishing in any quarter. This was a dynamic approach. That is to say that, as the catch statistics rolled in and the rate at which the quarterly quota was harvested became known, the days of fishing could be adjusted either upward or downward.

We started this program with three or four days' fishing and we are now down to one twenty-four-hour period a week—one day a week. In addition, the council saw fit to place a moratorium on issuing new licenses to harvest surf clams. It is this portion of the scheme that makes it limited entry management.

Yesterday, Mr. Mundt was asked the question of whether a moratorium was any different from any other limited entry scheme. His answer was that he did not believe it was, that it was subject to the same legal constraints. I agree with that. While I see a moratorium as a somewhat less complex form of limited entry than, say, the program in Alaska. I believe that the moratorium is indeed subject to the same legal constraints. Mr. Rose also made an interesting point yesterday that has been discussed in our council. It is that moratoriums are appropriate because the fisherman who assists in rebuilding the stock by adhering to regulations is, in fact, foregoing some present harvest in anticipation of greater harvests. Without the moratorium, as the stocks improve, new entrants would diminish to zero the fisherman's anticipated benefits and he would not be compensated for his sacrifice in the name of conservation. It was also pointed out to me yesterday, however, that the person who would have come into the fishery but did not has similarly contributed, even more so perhaps, to the rebuilding of stocks. So I think that this whole moratorium concept poses some distinct problems for us. When we first proposed it, the industry seemed to be split as to whether it was a good or bad thing. Now, as we come up for renewal of the moratorium, I find that the industry is generally in favor of the moratorium. I must say that the industry sees which side its bread is buttered on and that it is recognizing that a type of monopoly has been created.

Another question raised today asks whether the moratorium or limited entry schemes have affected the price to consumers. In our experience at least, I do not believe that the moratorium has at all affected the market price of the product. I think that the quota and, therefore, the limiting of the supply of clams available to the public may well be more responsible for maintaining a reasonably high price than any kind of moratorium.

As I view this and try to grasp what is going to happen in the future, some troublesome and perhaps unforeseen issues are arising. Some people feel that the moratorium is not needed in their local area. Also, we must deal with a buildup in licenses in one area or in another fishery that could easily spill over

into the proscribed fishery when the moratorium is lifted. This brings in the question of whether a moratorium is temporary or permanent. I believe that the definition of moratorium is temporary. Thus, when do you lift the moratorium? Mr. Martinis from Washington said that his state, like we in the Mid-Atlantic, had a moratorium that self-destructs. But he has extended his and we are in the process of extending ours. Mr. Martinis indicated that the Washington moratorium may become permanent. One problem is that we failed to make very clear what our criteria were for releasing the moratorium. When will the Mid-Atlantic council decide that the moratorium is no longer needed? Is it when the stocks increase to a certain point, or is it when the fishery can return to, say, five days' fishing, or is it when there is sufficient profitability in the industry? It seems that I always come back to the moratorium, and perhaps all limited entry schemes, being primarily of an economic nature. If the price of surf clams were to rise enough, then even one day a week of fishing would be so profitable that there would be no need to prevent new entries because they could all profitably make a living. Suppose also that if we are able to increase the stocks of surf clams and if the price were to remain at or near present levels, then vessels could fish five days a week instead of one and again there would be no need to prevent new entries since they would be profitable. So, eventually, I always come full circle back to individual incomes, and what is enough, and what is appropriate and proper, and I have a problem with that.

Terry Leitzell said it yesterday: we really don't know all the consequences of even our traditional management tools, much less this tool of limited entry. Frankly, I am here to try to learn from those who have had experience with limited entry. I think that we must look very arduously for the long-term impact and consequences of a limited entry scheme. I made a note of Mr. Green's pertinent question. He asked: are we certain of our goals, and are they well enunciated before we start down this path of limited entry? It is clear to me from listening to all that has been said that Mr. Adasiak really summed it up very neatly in his presentation. He said that if you don't need it, don't do it. If you do need it, then you must (1) articulate that need, (2) have clear goals, and (3) have solid data, which obviously means you have to (4) have solid thought. I would add a fifth point, and that is that you prescribe an evaluation process with a mechanism for making timely changes. Again, the conclusion is that each of us needs to give long and arduous objective study to the myriad of longrange consequences of limited entry. The motto that I have adopted in this fisheries game, and I believe it to be an eminently wise motto, is that there are no simple solutions, only intelligent choices.

### **JACOB J. DYKSTRA:**

I do not have a learned dissertation. First let me say that I share the feelings of the other fishermen here about limited entry. All the academic people, the managers, and the bureaucrats say that if you don't need it, don't have it. We can see that in most cases you probably don't need limited entry, but it seems to me that everything that is going on here kind of brushes that aside. It's as if we are saying, now that we've discussed all the problems with it, let's decide the

best way to get this limited entry as soon as we can. This is just a feeling I have and maybe it is wrong. I would like to comment on some of the speakers and papers of today and yesterday and then relate what is going on with the ground-fish plan in New England and relate it to limited entry.

It amazes me that we have not had a lot of definitions here, because this kind of crowd generally likes definitions. We have gone all around describing limited entry but we still do not have a clear definition. It seems to me that limited entry is anything from regulations that prevent fishing today for certain species to some very sophisticated arrangements. Yesterday, Christy said that there are four different kinds of limited entry schemes, and the one that disturbs fishermen from my area the most is direct limitation of units. That is what limited entry means to them. I have been accused of being against limited entry and espousing a limited entry scheme. This is because I have done some talking and writing about a tax system that I think would work. I will explain later (see p. 115) that, although it may be a limited entry scheme by some definition, it is mostly designed to allow fishermen to go fishing as they always have, and make choices on what species they fish according to how many bucks they think they will bring home. This is a lot different from limiting units, having tax certificates, franchises, or any of these other schemes, as far as I am concerned. I would like to see the fishermen I represent able to go to sea and make the same kind of choices they do now and not have their freedom curtailed in the way some of the other schemes would do. I don't know what we mean by limited entry here, but what I mean by not having limited entry is to have my fishermen go free and fish.

Another thing that really bothers me is the word "moratorium." What the heck is a moratorium? It seems to me that moratorium is a pain pill, a tranquilizer. It is really a quick and dirty inequitable form of limited entry, but done gently. Nobody ever intends for, or at least I have never heard of, one of these moratoriums being lifted. Every time there is a moratorium it gets "extended." Basically, it is people saying we think we need to have limited entry but we don't know how to go about it, and we don't want to get fishermen upset, so we're going to use this word "moratorium" so that it's not really limited entry. I fail to see the difference.

There has been a lot of talk here about the purposes of limited entry and talk about whether or not it is a conservation measure. Most of the speakers say it can be a conservation measure, but some papers and speakers say it hasn't worked well in certain cases, and if we are really looking for conservation, there are probably better alternatives. Limited entry may very well have conservation effects, and sometimes it may be the main conservation measure. But in a number of cases they say it isn't working that well as a conservation measure. The major purpose of limited entry, we are told, is to reduce overcapitalization, overcapacity, and all these neat things. But then there are costs. We are not asking simply if we should have limited entry or not, but what the tradeoffs and costs are. Then, a lot of people say that, yes, in most cases the costs of having limited entry are greater than not having limited entry, but we have some other reasons or some other purposes and these are social. So we peddle this thing as a cure-all for overcapacity and so on, but although we have more effort now than before, there are these broad social reasons why it is a good deal. I heard Ciem

Tillion say that in Alaska they are trying to find some scheme that is legal and even if they have thirty or forty lawsuits a year, if it will accomplish the social objectives they want, it is okay. He says that is really their purpose for limited entry, and it is real neat because they are getting away with it. This morning I heard Mr. Green say, and I think he is right, that limited entry is really special interest legislation designed to produce a black bottom line for whomever is favored.

What really bothers me in this discussion is that accomplishing these purposes will cause a fundamental change in our approach to fisheries. One of the speakers alluded to the importance of fishing as a way of life for artisan fishermen in the Caribbean. What do you think it is with my fishermen? That is all my fishermen go fishing for. They live the way they do because it is a way of life they like. What you are saying with limited entry is, we are going to change that way of life. Don't forget and don't overlook that what we are talking about here is a fundamental difference in the approach to the way we prosecute fisheries. I think we have just as much right to buck limited entry on this basis as somebody else has to tout it. I think Jim Douglas was right that, ultimately, fisheries will become public utilities. It is nice to talk about an elite class of fishermen millionaires and so on but that is not really what we will end up with under limited entry, because an elite class will stimulate somebody to say that it is wrong. Eventually somebody will convince the government to say how much each fisherman should make and how much return he can get on his investment. To go out there and gather this resource that belongs to society—that is what the fisherman's job will become, just like anybody else who works for the town, shoveling sand. It seems to me that that is the ultimate of limited entry.

Laurie McHugh said some very good things yesterday. He emphasized *laissez-faire* and flexibility. But Laurie is part of the same dog and pony show that created the surf clam plan for the Mid-Atlantic, and this to us is the first part of great inflexibility. Where is the flexibility when licenses are frozen and boats are allowed to fish only one day a week? Instead, there should be some kind of plan where those boats can fish surf clams some of the time and do something else another part of the time. In New England, we pleaded not to be made inflexible along with them. The Mid-Atlantic council labored long over that, but said, sorry, fellows—we can't accommodate you. That is about as much as we got out of the flexibility of that plan.

I would like to emphasize some things I heard this morning. Allan Adasiak, as I understood him, said that the profits in the king crab business could greatly assist in the development of other fisheries in Alaska, and I think we should look at this general principle. Some people call it "overboating." In prosperous segments of the fishery, perhaps we should overboat or overcapitalize to some extent. This could allow us to better develop some of the other species. I think that it is important to keep in mind that we could cut things off too quickly in fishing certain species, which would have a detrimental effect. Also, he spoke about the rush to grandfather into a fishery that is being considered for limited entry. In New England, there are a lot of boats being built right now and they will come into the fishery. I talked to these guys and they believe that the council and the feds are going to do something pretty quick to lock them out. The runaway

boatbuilding in New England and other parts of the country is not happening for any other reason except that these guys think that if they don't get into the fishery now, they won't be able to later. I think that there could be a reverse effect operating here, in that just talk of limited entry stimulates overcapitalization.

Mr. Bishop's paper doesn't deal with the real problems with multispecies fisheries in New England. He said that they have some ways of allowing for some incidental catches, but wait until you get into a fishery like we have, and the simple solutions don't count. Mr. Newton said one of the things that could be done is to put a net across the mouth of a river and stop whatever amount of salmon was wanted out of the run. He thought this would have to be done by the government. This intrigues me, because I think that is substituting one political solution for another. I am not sure that we would need the government to do this. There are some big corporations that, given the proper incentives and guarantees, could build a much more sophisticated structure in the mouths of the rivers and they could absolutely and carefully control escapement. They could have the fish swim in the plant without having to handle them in any way. I don't see why it isn't possible: it would be a great thing. You could store the fish, create great employment, and do all kinds of wonderful things. It isn't just putting a net in the mouth of the river and having the government work it. If we wanted, we could find somebody willing to invest, but I think this points up that these are social and political solutions that we are talking about in any kind of management.

Now I'll go to the situation in New England. We have a crisis in the groundfish fishery in New England. We have a groundfish plan that has been in effect for some time but we still have a crisis. Some people say that we have a crisis because the council and the groundfish committee have been unwilling to bite the bullet. Well, we are so sick and tired of spending day after day, and sometimes half the night on this problem, we would each bite a box of bullets if it would bring a solution. It isn't that simple. It sometimes amuses me and sometimes infuriates me that people talk about the FCMA and quote line and verse, because I was a part of the process of putting it together and I know how this process works. You see, there were some staffers who wanted some extensive domestic management measures in this legislation. As they always do, they planted questions with the legislators to ask of various witnesses at the hearings. Many of those questions had to do with domestic management. After the hearings were over, the lawyers said, "Gee, look at this thread that runs through all this testimony. Isn't it strange that these same domestic management issues keep coming up?" But of course, it was because of the answers to the planted questions. So it wasn't surprising that it just happened that they had the solution already figured out. That is the way a lot of what you people are laboring over got into the bill. It is not unusual; it happens in a lot of bills. Anyway, I think that to be the root of our problem.

When the New England Fishery Management Council was formed, we had given to us a number of preliminary management plans. This particular group of fish, the groundfish, was the only resource on which domestic fishing seemed to be in trouble. Nobody at that time said that maybe laissez-faire would be a good thing. Instead, the feds told us that we had better get on the stick and hurry,

because if we didn't the Secretary of Commerce was going to do it for us. So we started. We were brand new and we didn't know what we were doing, but we tried to get something together. Each time we came up with something, the feds would say that they didn't think it was acceptable to the secretary; and the council, a lot of them being new, bowed from the waist and said, "Okay, we will change it." We began to get kind of a mishmash. We tried to do something about it and we finally sent something down to Washington and the secretary eventually started to implement it. Now, some of the things that were done to implement our plan we couldn't recognize, but you know, we tried to work with these people. Communication was bad and so on, but we went back and forth. Finally, we got very exasperated and we sat down one day and said, "The heck with what anybody thinks, why don't we just put together a bunch of amendments to this plan to make it look like what we want?" That is what we did, and we sent it down to Washington. It was a long time before we heard anything, but when we did they said they would implement this, this, and this, but certain things had to have public hearings and others were not appropriate at all. So they implemented a small portion of what we sent down and that amounted to breaking up the package and screwed up everything royally. Then they turned around and said, "Gee, those guys sure are stupid, they screw up every time they send something down here." That is about where we are now.

We have been wandering around trying to patch this thing up and correct it. Everybody has told us, the feds and the politicians have told us, "Look, if you guys don't quit fooling around putting bandaids on that plan and come out with some longterm goals that we can grab hold of, you're in real trouble." That gives us some problems again. In this groundfish fishery, there are three species under management: cod, haddock, and yellowtail flounder. Their management is complicated because they are part of the mixed trawl fishery. Altogether there are some thirty species caught in this fishery, some more important than others. Nobody catches just cod, haddock, and yellowtail. They catch many other species too. Now, here we are sitting down to make longterm goals. The first thing that we have to decide is whether we are going to continue to have longterm goals for a groundfish plan or are going to have a multispecies plan. I submit that we should have a multispecies plan for this reason. Suppose our goal for groundfish in 1982 is to have the stock at optimum size and species composition. I don't mean optimum as in optimum yield, I mean biologically optimum. This is the goal we have stated at times. The problem in a mixed trawl fishery is that to attain this we would have to decimate some species and let others go almost completely unharvested. What do we do about that? Now, somebody says we have to decide on a level of effort. This must be done in conjunction with what harvests we want on underutilized species, as far as I can see. So the next question is, do we want limited entry? If so, are we going to limit entry into the groundfish fishery or are we going to limit entry to the mixed trawl fishery? If we limit entry just into the groundfish fishery, we have all kinds of bycatch problems. I won't go into them all, but they are pretty horrendous. So I submit that we have got to talk about whether we are going to have limited entry in the mixed trawl fishery. Now we go back to the things people have been saying here like, "Let's look for flexibility." How are we going to have flexibility? Let's take lots of

time and make sure we do it right. Hell, we haven't got any time at all. You know that all of these things that sound nice here don't relate because we have our backs up against the wall. We have to decide whether we are going to have limited entry and what our longterm goals are. I don't see any way we can get long-term goals without deciding whether we are going to have limited entry and deciding right away.

We have so-called underutilized species in this mixed trawl fishery. If we want to build boats to fish specifically for the underutilized species, we know that in catching these underutilized species we will also catch the stressed or overharvested species. There is no way that I can see to allocate those species without getting into a pile of trouble. A guy who is in the directed fishery for the so-called stressed species doesn't want the guy who is fishing underutilized species catching a lot of his fish, but so far we have no solution for this. In the meantime, what do we do? While we have already this year overfished the groundfish and the Secretary of Commerce put in regulations early this month that amount to closures, the boats are tied up because it is unprofitable for them to go to sea for groundfish. Since there was a lot of political pressure, as I understand it right now, the secretary has agreed to go back to trip limitations that allow for some kind of a meaningful fishery. But the secretary has not agreed to do anything that might be construed as exceeding the optimum yields (OY), so in the meantime we have just temporary regulations. We still have a problem to decide what to do. If we overfish the OY, we can impose a closure. What does closure mean? The only thing it can mean is that we tie up all of the boats in the New England fleet. If you don't want any more cod and haddock caught, then the only way is to tie up the whole fleet, but this is not feasible. In New England, the groundfish landings are about fifty to sixty thousand tons a year at the most and, at times in the same area, the foreigners, I think, took as much as three million tons. They are allowed 1.2 million tons or something like that, so the domestic catch is a very small part of the total fishery. But if you don't tie up the whole fleet and you don't want any cod or haddock harvested, then the fisherman who was, say, catching ten thousand of flounder, twenty thousand of cod, and twenty thousand of haddock per trip has to throw the cod and haddock overboard, most or all of them dead. Now, to catch his ten thousand flounder and enough other species to make his trip pay, he has to kill, say, one hundred fifty thousand cod and haddock. So he runs one hundred fifty thousand over the side instead of bringing in twenty or thirty thousand, and that is conservation. We have some real problems in New England, and how we are going to solve them by limited entry, I don't know. If somebody can tell me how we can institute limited entry to solve our problems, I would like to hear it.

## **EDWARD P. MANARY:**

First I would like to thank Professor McKernan and the Institute for Marine Studies at the University of Washington for the opportunity to appear here. I would like to talk just briefly about the charter boat industry in Washington State, the basic ingredients of our moratorium, what we are doing over and above the moratorium as we approach another legislative session, and the rea-

sons we decided to take these actions. I do not profess to be a messiah of limited entry and try to convince anybody that I can walk on water. We have been very fortunate in that we have drawn on the expertise of academic and legislative people as well as the practical experience of the people I represent in putting together a program we think makes sense for our industry, while fitting into the overall scheme of management and allocation for salmon.

The charter boat industry of Washington State has about 485 licensed vessels. That number also includes about thirty river guides. The majority of the charter fishery occurs off the coast and is targeted at a single species, namely salmon. We have a slight incidental catch of bottomfish under certain current conditions. The industry is conducted mainly out of four ports. Most important are Westport and Ilwaco, which account for somewhere around four hundred of the total vessels I mentioned. In 1976, Dr. Crutchfield of the University of Washington made a study of the economic aspects of our industry. In that year we carried between three hundred fifty and three hundred seventy thousand passengers and accounted for roughly seventy percent of the total salmon catch taken by recreational fishermen off the coast of Washington. The industry is large and it has expanded rapidly in the last twenty-five years. It has consequently become a subject of discussion and concern for some people.

The salmon is an interesting creature inasmuch as it is conceived and lives the early part of its life in state waters, but then migrates to the ocean. In the process it passes through national and international waters and feeds in the high seas before it returns to state waters. The salmon fishery has had tremendous problems, precipitating the moves we are making now. Among these problems are environmental degradation, particularly from logging, dams, and the effects of civilization. But there are other significant problems. Yesterday, Senator Tillion alluded to the fact that approximately 30 percent of the troll catch off Alaska comprised Washington- and Oregon-reared salmon. Our Canadian friends to the north also have found a way to get a cut of the action and they take 65 percent of the total harvest of some species out of Puget Sound. In 1974, we had what is now, I guess, a landmark decision in the United States in which a federal court held that certain Indian fishermen were entitled to 50 percent of the resource. Consequently, this put a tremendous squeeze on all the non-Indian salmon fishermen in the state and in Oregon. A federal judge in Portland, Oregon, had ruled in an earlier Indian decision, using the "fair-share" principle. But when Judge Boldt came out with his 50 percent principle, the judge in Portland thought that wasn't such a bad program and subsequently adopted that on the Columbia River. So the Indian issue affects all the salmon fisheries in the state of Washington, including the Columbia River, which we manage in common with the state of Oregon. The Indian issue brought to a head another problem we have to be honest about, which is overcapitalization or overcapacity. I am not going to argue the distinction between those words, but I think both of them are present.

When I started work for the charter boat industry in 1976, it became obvious that as the song says, there was trouble in River City. We had to sit down and decide which way we were going to go. Not only did we ask what can we do, but more importantly, what do we need as an industry if we are going to



survive economically? First, while it might be contested by some people in this room, it had to be acknowledged that our industry is reliant on the whims of the public. Second, we had to have stable seasons. Third, we had to have an adequate length of season to allow us to transport enough sport fishermen to get a return on our investment. Fourth, we had to have the opportunity for bag limits that would allow our customers to justify their cost in terms of the chance to catch an amount of fish equal in value to their costs. Finally, we had to have people if we were going to be successful. I think that this segregates us a great deal from other groups who make their living on the ocean because we can have the best fishing in the world; however, if we don't have any anglers, it isn't going to do us much good.

The moratorium on commercial salmon licenses started in 1974, as Mr. Martinis has already described. The study for phase II of the moratorium had taken place before my time as a charter-boat industry representative. Although a representative was included in the study group, at that time the attitude of our industry toward moratorium, limited entry, or anything like that was not what you would call positive. However, during the period from the summer of 1976 through April, 1977, there was a tremendous reversal in the charter boat industry's attitude on moratorium. It came about not because we are philanthropists but, very truthfully, because we got the hell scared out of us by Public Law No. 94-265 (the FCMA). This law meant that for the first time in history it was possible to have domestic regulatory authority over ocean salmon fishermen. That is the most singular element. We eventually saw other reasons for pursuing this path and the Washington State Legislature gave us tremendous cooperation in instituting what might be called a simple moratorium. The basic ingredients of our moratorium are as follow:

1. The licenses are issued to those charter boats that were licensed in either 1974, 1975, or 1976. Vessels that were not licensed in either 1974, 1975, or 1976, but were under construction then or purchased in good faith between April 16, 1976, and the date the act was signed on May 28, 1977, are also eligible for licenses. A three-man appeals board was formed, which has heard about forty cases at this time and has worked out very well.
2. Each vessel is entitled to one license.
3. Qualified vessels are entitled to renew their licenses annually; however, if they fail to renew their license in a given year, it automatically expires and cannot be renewed.
4. The licenses are fully transferable. The reason we went that route was to allow orderly entrance and exit into the charter boat fishery.
5. The licenses are on the vessel. This was precipitated by the fact that vessels in the Washington charter boat industry cost from one hundred ten to three hundred thousand dollars, and without having the license on the vessel, we found bankers very reluctant to loan us money in what amounted to a single-signature note. That is kind of narrow-minded on their part, but that is what we ran into.

6. The legislation has a self-destruct clause that becomes effective January 1, 1980. However, it provides for the Department of Fisheries to devise a phase II approach to extending the program's effectiveness.

What we have at this time, then, is a simple moratorium somewhat along the lines of the Alaska program. However, it has not done the one thing we felt it eventually had to do if it was going to be effective and reach its stated goals. That is, it did not put a limit on the amount of effort. Yes, we designed a mechanism that locked in the total number of licenses. Within that given number of licenses, however, it was possible to increase effort, for example, to double our passenger carrying capacity. We are currently in the process of developing legislation to change that so there would be a real effort control. We think that our approach to this problem is unique. We surveyed our fleet and broke it into two categories: the uninspected charter boats, those vessels not inspected by the U.S. Coast Guard and carrying six passengers or less; and inspected vessels. We asked the Coast Guard first how many persons each inspected vessel was certified to carry, and second, what was the official length on each inspected vessel? We then asked our owners the same questions: what is the length of your vessel, and when you are loaded, how many people will you carry on that vessel?

The results were very interesting. We found in the vast majority of cases our skippers do not carry what they are fully entitled to carry under Coast Guard regulations. We took this information to some statisticians and computer operators and asked them to see if they could fit a correlation between the size of a vessel and the number of passengers it carried. They came up with one formula that applies to vessels from thirty-one to fifty-nine feet and a second formula that applies to vessels sixty feet and over. Our plan is to attach numbers of passengers to licenses as they are issued. Hence, there will be a certain number of passengers that can be legally carried on any given day, but full transferability would be maintained. For example, say a forty-three foot boat would be licensed to carry sixteen persons and a fifty-foot boat would be licensed to carry twenty persons. If the owner of the forty-three-foot boat wanted to grow to a twenty-two-man carrier, we allow him that flexibility. However, he will have to purchase an extra six-angler capacity from someone in the existing fleet. We are not going to be changing the total number of anglers carried. This is what we are in the process of developing at this time.

There are several reasons why we are doing this, a couple of which I have mentioned. First, in the Crutchfield study in 1976 were found that over 70 percent of our skippers were fulltime operators. In other words, this was their sole income. Our operating season is legally six months and most of our skippers run from 110 to 125 days out of the year. We want to retain a fulltime professional class of skippers in the charter boat industry. Second, it became very obvious to us that there are changes coming in the salmon industry and we have two choices. Either we can design the changes that we can live with, or we can have someone else design the changes. In a commercial fishing newspaper, I read a statement to the effect that bureaucrats who have no experience in your particular fishery could be a hazard to your economic health. I think we have accepted that philosophy also. We are interested in controlling our own destiny. We think

we know the charter boat industry, we think we know what our people want. We think we can design a program that fits into the total management scheme that makes sense, that is based on the concept of optimum yield, and that considers food values, social values, recreational values, and economic values. We need stability in our industry and, to just be blunt about it, we have to look at the political facts of life. All of us are working on the same stock of fish and we fully recognize that there is not going to be a complete wiping out of one fishery for the benefit of another. We had to accept it and, believe me, that was a bitter pill for us to swallow. This does not mean that we are laying down and dying. It does not mean that we see limited entry as a panacea. It does not mean that there are not going to be further internal squabbles. What it does mean is that we are doing our damndest to keep our own house in order in the context of the total management scheme. We do not anticipate that we are going to have solved forever all problems of our industry through limited entry. Instead, I guess we look at it the same as if we were in the business of breeding elephants. It's going to be done on a high level. There's going to be all kinds of yelling and screaming. And we recognize it's going to be quite a long time before we see the final product. But we are not going to adopt the attitude that we'd rather bitch than switch. So we are looking positively at limited entry. We think it is a tool and that it will work in our fishery, given our particular conditions. This doesn't mean it will work in every fishery, or even that it is necessary or desirable. We think, very frankly, that it is the course we have to take for the economic survival of our industry.

## DAY III

### ALLEN E. PETERSON:

I am not going to make any predictions about what will happen in the New England area with or without limited entry. I would like to pose a couple of thoughts on the problems that face us and some of the considerations that we might want to make in terms of limiting entry in the New England fisheries. Before going into that, I should let you know that I have biases regarding limited entry, primarily on the con side rather than on the pro side.

Although we have heard a lot of discussion about some of the pros and cons of limited entry, I don't really believe that it has brought us any closer to really determining whether or not it is a feasible tool. We have heard some good case histories of some of its accomplishments, but important questions have been raised. As the discussion developed, particularly in the latter part of yesterday, I felt that we were probably coming back to polarized positions of the haves and the have-nots and that some of the better points of the conference were being lost.

One point that was brought forth during the discussions related to recreational fisheries—whether we need limited entry in the recreational fisheries if we are going to have it in the commercial fisheries. While I certainly would not dispute this in principle, from my point of view that is not a concern that we will tackle in the New England area for some time to come. We have considerable problems with our recreational fisheries. We have recently raised the license issue and if we started talking of limited entry, I am afraid we would never get off the ground on any of our management plans. So, I don't see the New England council addressing limited entry for the recreational fisheries for some time.

We have two fisheries, however, in which limited entry is of concern. Yesterday Mr. Dykstra spoke of some of these concerns with limited entry in regard to the groundfish fishery. One important point is that the mere discussion of limited entry has caused considerable new entry into the fishery by people trying to stake their claim. It has been really pronounced in my own state of Massachusetts in the small inshore gillnet fishery, which was operated by only a handful of people prior to the time of the development of management plans. Now, if they are able to go out in a bathtub, people are literally buying a few boxes of gillnets and setting them, causing acute gear conflict problems. Much of the entry into that fishery has been precipitated by the fear of limited entry—by people wanting to stake their claim. Whenever we start talking about the subject, we start getting into trouble.

In the groundfish fishery, we are facing very severe problems and we are trying to come up with a viable management plan. I am not at all sure that it is even possible, but certainly the council is trying to address it. The question of limited entry has been raised many times, and restricted quotas or OYs will mean absolutely stopping new entrants to the fishery.

Two points from the discussions we have had are, I think, pertinent to further discussing limited entry in the groundfish fishery. One relates to the need for data. Certainly, we want to get all the facts and figures put together and be sure

of what we have, and then try to make some good, intelligent decisions. We have a fundamental problem with the scientific assessment data in our area. While I personally have very little problem with the assessments coming out of the Northeast Fisheries Center at Woods Hole—I suspect that they are the best we will ever get—that opinion is not necessarily shared by all council members and it certainly is not shared by industry. I think that the problem is not that the data are inadequate but that the interpretations of the data are doubted. Basically, our fishermen and scientists admit that, to a degree, there are a lot of groundfish. Our stocks have rebuilt substantially, not as a result of a management plan, but as a result of mother nature doing her thing. The fishermen see these fish, they can catch them and, in many cases, they have a hard time not catching them in the mixed trawl fishery. The scientists say that we need to conserve these stocks, not so much to rebuild total biomass, although that certainly can be increased, but to change the stock composition. The fishery is presently very dependent on a few single-year classes.

I don't know how we would bridge this data believability gap in a limited entry program, because the whole issue at this time rests on the fact that the OYs are restrictive. If we went with the fishermen's point of view that we could harvest these stocks at a much greater level, limited entry is nowhere near as necessary as it is with the scientists' point of view. Unless we can come to an agreement on what the data mean and what quantities of fish are truly there and what needs to be there, I don't think we can ever get to a realistic discussion of limited entry.

The second point is that we haven't solved any problems even if we had adopted a moratorium on entry, given the position that the council is presently in, that is that the stocks are not sufficient to maintain a viable fishery for all the people in it now on a year-round basis. We may keep the problems from getting worse but we haven't solved them. If we want to look at limited entry as a tool to resolve the problem of too many fishermen, it means we are going to have to kick out one hell of a lot of people and I am not quite sure how we do that in our groundfish fishery. I don't think that this is similar to the Alaska or British Columbia situations. When we have to start picking and choosing how 30 percent of the people will get out of the fishery, we are going to have some very traumatic problems that will make the problems we have today look very insignificant. So limited entry through a moratorium is not the answer.

The other fishery I would like to make a brief comment on is the sea scallop fishery. Right now we have a lot of boats going into the scallop fishery partly because of problems in the groundfish fishery, but primarily because there is a lot of money to be made in the scallop fishery. In fact, it would probably challenge those Chignik fishermen as far as profits and returns on investment are concerned. Since the scallop fishery is very lucrative right now, a lot of boats are getting into it, and there is a tremendous increase in capital. The profits are there to be had. It seems obvious to some of us that this is a one-way street. As that effort increases, we can almost predict that it is not going to be very long before the fishery is in tough shape. The scallops will not be able to bear that pressure. In fact, it is a bone of contention in negotiations with our neighbor to the north as to whether or not we are overfishing the stocks right now. If we decided that

limited entry was necessary in the scallop fishery, we would have to face the problem of windfall or excess profits that was discussed previously.

How do we deal with this? Do we want to create another "millionaire's club?"—and that is not too figurative an expression, it may be quite real—and deny people a shot at those excess profits in the name of management and preservation of the stocks: or do we want to tax those profits or somehow take those profits and plow them back into the development and expansion of other fisheries? I think that those are the questions and the concerns that will face us if we are to entertain a limited entry proposal in that fishery. I don't think we have the information nor is it politically feasible in the New England area at this time. Not that we are any different from the rest of the country, but we do have a long heritage of individual freedoms in our area. Limited entry, I think, is going to cause us problems, particularly if it sets up an elite class.

I would like to conclude with just one brief comment as head of the state fisheries agency. I have some experience with limited entry programs. Dr. Leah Smith mentioned one, the lobster fishery. I could talk to you for the next three hours on why that program, in my eyes, is not particularly good and why it has not accomplished its objectives. But it has existed for nearly five years and it hasn't had a court challenge. It is now being accepted and that is one of the things that bothers me about a limited entry program, whether it is good or bad. They can become a way of life, not based on merits but just on a test of time.

### **WILLIAM R. PELL III:**

I would like to start by telling you a little about my background. I am not employed by a state or federal government. I am self-employed. I operate three fish packing facilities on the eastern end of Long Island, New York. One is in Greenport, one in Montauk Point, and one in Shinnecock Canal. We service the fishing fleet. We supply them with the ice, the fuel, the docks, the trucks that transport their goods to the different markets. In this way I am involved with the fishing industry.

The remarks I am going to make are my own thoughts and not those of the Mid-Atlantic council. The only thing the Mid-Atlantic council ever agrees on unanimously is a motion to adjourn after two days of debate. So I am not speaking for a majority of the council at all. There are many fishery management tools that are available to get to the same objective.

An interesting fact of fisheries in the Mid-Atlantic bight is that the commercial industry only produces six thousand metric tons more than the recreational fishery in seafood overall. Excluding the shellfish, that is, scallops, clams, oysters, and other mollusks, the recreational fishery produces three times as much food finfish as the commercial industry. When we consider limited entry, limited fishing, or any other tool, we must also consider the effects of the recreational industry. Recreational industry means all the people fishing from the shoreline, from private boats, and from charter boats. We have to consider how we are going to control or even get the statistics from this large fishery that is mostly within state waters not under council jurisdiction.

An example I would like to give in regard to this is our mackerel plan. Based on the best scientific information available we set aside nine thousand metric tons of mackerel for recreational fishing and five thousand metric tons for commercial fishing. We found that the recreational fishery catches almost twice as much as the commercial fishing. But sport fishing for mackerel is done in Long Island Sound, in the bays all along the coastline as well as way off shore. If we are going to effect any form of limitation on the mackerel fisheries, we need to have more information on the recreational catch in cooperation with the individual states.

I service probably seventy-five or more commercial fishing operations. If I listed all of the commercial fishermen I deal with, and if I make another list of the recreational fishermen that will come to me to sell their fish and ship it on consignment to the various markets, the recreational list would be four or five times greater than the commercial list. What statistics do we have on these recreational fishermen? I am only one of many fish packers up and down the coast. I think that we have to recognize much more the input from the inshore recreational fishermen before we can consider what tool we should use to achieve our fishery management goals.

We heard Mr. Leitzell say that he cannot see many more funds coming to the enforcement of plans that we recommend. Any sort of limited entry or moratorium to conserve the fishery stocks must consider the economics of enforcement. This enforcement angle is very important because regulations have to be enforceable if any of our management objectives are to be met. The state and federal enforcement efforts have to be closely coordinated, perhaps combined, and enforcement must be even-handed between the commercial and recreational fishermen.

For the surf clam fishery we chose a moratorium. I do not consider a moratorium and limited entry one and the same. Our plan has a self-destruct provision and has to be reviewed yearly to decide if it should continue. The plan was made somewhat easier because there was no recreational fishery involved. The surf clam fishery is strictly commercial. New York State has one set of regulations for surf clams caught within its waters and New Jersey has separate regulations. They are similar to what the council's recommendations were. The states were asked to try to put their surf clam regulations in concert with what the council had done. In New York I know we amended our surf clam regulations to go along with the council's plan.

Basically, what I would like to get across today is that each council will have to evaluate and be on-the-spot managers of the resource while it is in its waters. As I have said, we have the responsibility of mackerel which goes north up to Canada and south. We have to work with the other councils as they work with us on plans for stocks or species of fish that will need to be put under limited entry schemes or perhaps some other kind of tool. We feel that we found the right glove for the right hand in the surf clam moratorium plan. If and when we find that another species under our responsibility will have to be regulated by use of limited entry, limited fishing season, or whatever tool is available, then I as a council member will be willing to bite the bullet, and use the best scientific information available to develop management that will be best for the species and the fishery.

## **J. ROY DUGGAN:**

Like most of our members of the South Atlantic Fishery Management Council attending this meeting, I came here with only a very foggy idea of what limited entry meant and its use in the context of our responsibilities on the FCMA. After these two days of extensive discussions, and the airing of various concepts of limited entry, I feel that the fog has lifted a bit but I still find it hard to apply it to our present situation in the South Atlantic region.

I think that we have learned valuable, practical experience lessons from the people who are really having a real world experience with limited entry and are not talking from theory. We have laid that down alongside the varied concepts and theories for the application of limited entry. This will help us when the problem may come to our region. In considering all this, there is one idea that has come through to me about limited entry, and that is that we must approach it very carefully and use it only in the very serious situations that require such a powerful tool. In trying to review some of the learned statements that have been made here and in the papers, one of the papers stood out to me as a very lucid and compact statement about how limited entry should affect our responsibilities. I refer to the paper of Dr. Biliana Cicin Sain. I don't want to repeat her words with my words, so with your indulgence I would like to quote directly a few short paragraphs from the summary of her paper.

"The major considerations that councils need to take into account in evaluating alternative management arrangements include biological effectiveness, social equity, economic efficiency, legal feasibility, political feasibility, and administrative feasibility. All of these considerations are either rooted in the objectives and requirements of the FCMA, or, as in the case of political feasibility, are mostly called for by pragmatic reasons. The point to be stressed is that the FCMA contains multiple goals and objectives that need to be taken into account by decision makers. Moreover, there are multiple rights and interests impinging on fishery management—many of which may conflict with one another.

"Fishery management decision-making thus entails a political process of making difficult choices among competing values and priorities. There are no universally applicable solutions. For each fishery at different stages of economic development and biological degradation, there will be a different combination of human factors to consider, and different legal, political, and administrative implications. Each fishery will thus entail a different set of calculations and call for different management solutions. Many observers argue that the wholesale adoption of limited entry in America's fisheries would fundamentally alter the nature and structure of the fishing enterprise. As such, it is a step not to be taken lightly. Limited entry pits many competing rights and interests and calls for the making of very difficult choices as to who will lose and who will benefit, to what extent and with what spillover consequences.

"Because of its potential to fundamentally alter America's fishing, limited entry is a management option that needs to be considered very carefully in the context of specific fisheries taking into account the evaluative criteria elaborated above."

I take her words very seriously. In short, limited entry is only one of several tools available to fishery management councils to be used in carrying out their responsibilities under the FCMA. If we choose to use it, we should be sure that



the problems we are trying to correct are indeed bad enough to warrant such serious and potentially far-reaching action. I am glad that I have had a better understanding of limited entry through hearing what has been said at this conference. I believe that we have no need for limited entry in our region at the present time. I can see that situations may come up in the future where it would be a valuable and perhaps the only effective tool to correct certain problems. However, I think this course of action should not be taken by itself but in combination with other management tools to correct our problems. Since limited entry has so far-reaching an effect and so many indirect effects on other fisheries, we should be sure that we use it only in very, very serious situations.

### **HECTOR M. VEGA-MORERA:**

You have a saying in English, "You cannot see the forest for the trees," that describes the condition I find myself in at this moment. I am going to need a lot of meditation on the things I have heard at this conference and how they apply to the realities in which the Caribbean Fishery Management Council must function. Based on my experience as a commercial fisherman, I am sadly aware of what the application of even some of the most basic technology means to the future of our fisheries. I believe that we have at the present time enough boats in Puerto Rico alone to fish the entire region. These boats are manned by professional skippers well versed in the application of modern fishing technology, and have the potential to cause irreversible damage to our resources. As we increase our knowledge of the fishery resources and come up with OYs for many of our fisheries, I think some type of limited entry will be necessary because most of our fisheries are depleted already. I hope that the scientists will tell me I am wrong in the lobster fishery anyway.

When I hear the problem with the groundfish plan in New England, I wonder what our programs will be in the reef fisheries where we have around two hundred species. About twenty of these are currently made available to the local markets and maybe fifty species are used by the fishermen directly for food. The reef fisheries catch a mixed group of species mostly with fish traps. Some species like groupers and snappers may need some sort of immediate protection. The fishermen involved have no economic alternatives or other fisheries to move to. Massive unemployment is already present in our islands. Under these conditions will limited entry be a partial solution?

The fishery stocks must be managed throughout this entire range. From a biological standpoint this concept is extremely important, especially in our region where the best available data show that recruitment of some species might be dependent on the spawning of fishes and lobsters in other nearby areas. Our council's jurisdiction is part of a much larger system of islands involving foreign countries. It is difficult if not impossible to develop FMPs without considering the effects of this particular situation. Can we, in all justice, limit our fishermen's use of a partially migratory resource and make them sit and watch the results of their efforts for conservation being enjoyed by a neighbor two miles away? We talked about renewal of living resources on land like grazing resources and others, but how much real influence do we have in the future replenishment of our explo-

ited marine resources? Maybe by limiting fishing effort we can do that. I know that we can plant trees, seed the land, and control grazing a lot easier than we can control fisheries. Fish stocks must renew themselves.

I would like to finish by giving you an analogy that describes how I feel about this whole fishery management process. I compare it to a symphony orchestra. We play a tune written by the U. S. Congress, P. L. 94-265. We all have our own instruments and we must learn to play those instruments in concert. In the end we must come up with melodies and sounds that work well together. This I consider very important. We are working very hard now to make sure that the final product of this work is that the United States' fisheries grow and become a central and powerful figure in the world fisheries.

### **ROBERT P. JONES:**

The first day of this conference it was said that there would be no national policy developed here. I perceive that there might be a national policy recommended here that states that limited entry schemes should be developed only on a regional basis and only if needed and wanted by those who would be affected. I think that this is a policy that each of the councils can live with. I want also to remark on the definition of limited entry. This pertains solely to limiting the number of people or vessels that appear in any particular fishery. It has been stated that there are other forms of limited entry, such as restrictions on gear, seasons, and sizes of fish. But I would like to refer to those as limiting effort rather than limiting entry. So, in my remarks on limited entry, bear in mind that I am speaking about deciding how many people or how many boats will work in a particular fishery.

Limited entry is a restriction on our free enterprise system. Now these restrictions may be good or bad, but they are nevertheless restrictions. As such, they may stifle innovation, which I feel is a vital and important ingredient to our fishing industry. For example, I wonder what might have happened in the Gulf of Mexico shrimp fishery if we had introduced limited entry many years ago. I believe that, in a report to Congress in 1945, an eminent biologist described the Gulf of Mexico as a biological desert and said that the maximum sustainable yield of shrimp had been reached. This was in 1945, prior to the discovery of pink shrimp in 1949, and prior to the commercialization of brown shrimp that occurred in the 1950s. These two species today account for 75 percent of our current landings in the Gulf. In 1977, over 296 million pounds of shrimp (heads on) with an exvessel value of over 296 million dollars were landed in the Gulf Coast states. This represents nearly 18 percent of the total exvessel value of all fishery products of the United States. Suppose we had a limited entry scheme for shrimp in 1945. Would we have had the innovations and the capital investment necessary to make this the most valuable fishery in the U. S.? Would limited entry have stifled such innovations as fiber glass and steel trawlers, freezer vessels, and double-rigged boats, or, now, four-rigged boats? Would we have developed our domestic fisheries for pink and brown shrimp, our Latin-American shrimp fishery, and our U. S. markets that last year consumed half a billion pounds of shrimp? You might think that shrimp is the only exception, but I think

that the tuna fishery also had quite a technological change come over it, even though it may have been considered overcapitalized before the power block was developed. Today, I think that it is the third most valuable fishery in the United States. If there had been a limited entry scheme in the tuna fishery, maybe we would still be fishing with poles, hook, and line. I don't know, but it is conceivable.

Looking over the 1977 commercial fishing landings put out by the Department of Commerce, I wonder if the Alaskan king crab fishery might also be an example. I am sure that some biologists and economists might have advocated a limited entry scheme for king crab a few years back on the basis that the fishery was overcapitalized because of declining production in catch-per-unit effort. But is it not possible that these conditions resulted in the development of the snow crab fishery, which last year yielded over ninety-eight million pounds worth nearly thirty-one million dollars to the U. S. fishermen? I don't know but it may be possible.

I think that we must proceed very cautiously with imposing limited entry schemes on our southern, domestic, commercial fishing industry. I wonder how we will handle, for example, the highly interrelated fisheries. For instance, in Florida the same fisherman may fish for mullet, stone crab, spiny lobster, pompano, and Spanish and king mackerel in any given year. Different types of gear are used in each of these fisheries. In addition, there is incidental catch that includes bluefish, sheeps head trout, drum, permit, jack fish, blue runner, red fish, and others. I don't know how we would limit entry into these fisheries that are so interrelated.

I think that the advocates for limited entry are probably those who believe that only through a limited entry scheme can we achieve an effective utilization of the resource in the most economically efficient manner and, in the process, provide consumers with the greatest variety of high quality seafood at the lowest price. The central thesis of these advocates seems to be that most of our fisheries are overcapitalized (a word we have not been able to define in our part of the world yet), a situation where a smaller number of vessels than currently exist can land the same quantity of fish. Those who hold that view have to make a number of assumptions. First, it is assumed that the surplus capital and labor will be used in other sections of the economy. It is implied in this assumption that our economy is currently producing at capacity, with full employment. Reduction in the number of vessels can be accomplished without a reduction in total production. This may not be so. Second, it is assumed that fishermen are willing to do other types of work and will relocate to other communities, and it also assumes, sometimes, constant rather than fluctuating abundances of fish stocks. I think that it assumes many things that may not be true. There are other advocates of limited entry that want limited entry for everybody but themselves. For example, if a limited number of permits are issued, a select few could end up with most of the permits by purchasing them from others. The only way to prohibit this is for the government to allocate the permits, which results in having government officials rather than private entrepreneurs make economic decisions for the fishery. I know that I am probably ultra-right, but to me this borders too much on socialism. A third group of advocates for limited entry are the govern-

ment officials. They have a plan to rent this publicly-owned resource to private enterprise and use the proceeds to more effectively manage the resource. I think that you have seen many of these plans for many years. I doubt if any of these will work.

I would like to pick up on Mr. Adasiak's suggestion that if it is not necessary, don't do it. The southern way of saying that is if it ain't broke, don't fix it. I submit that our free enterprise system, as it relates to the southern commercial fishery at least, ain't broke and it don't need fixing. I think that the present and the future provides unparalleled opportunities for our U. S. commercial fishing industry. Under P. L. 94-265 we have gained access to between 10 and 20 percent of the world's marine fishery resources. We have the opportunity to become the world's foremost fishing power, with all the political, social, and economic benefits that go with that. Limited entry is a mechanism that gives the government awesome authority to allocate resources and thereby make economic decisions. I submit that a free enterprise system already has the built-in mechanisms wherein the best economic decisions are made. In my view, government has two responsibilities, two basic responsibilities. First, it has to protect the fish stocks. That has to be number one and I emphasize "protect," not allocate among commercial users. Second, the government has to provide an environment conducive to a prosperous commercial fishing industry. There are many other services that government is in a position to provide and has a responsibility to provide, including exploratory fishing, gear research, biological research, statistics, marketing services, and international negotiations to reduce or eliminate tariff or non-tariff trade barriers. In conclusion, I would just say that I believe that our economic system, or free enterprise system, is the marvel of the modern world. It has served our people well. Instituting limited entry means tinkering with this system and I contend again: if it ain't broke, don't fix it.

### **PETER E. REID, JR.:**

Aloha. This word expresses our greeting to you from the Western Pacific Regional Fishery Management Council. We have the longest name but the fewest fisheries. The council consists of Guam, American Samoa, Hawaii, and, soon, the northern Mariana Islands. Honolulu is our headquarters. But, to give you an idea of the vastness of our area, Guam is about thirty-four hundred miles to the west and American Samoa is about twenty-four hundred miles to the south. Due to these widespread geographic locations, there exist social as well as economic differences. In spite of the great vastness in the area, we, as a council, are working smoothly together to solve our common fisheries problems. This cohesiveness is referred to by Sir Albert Henry, Premier of the Cook Islands, as the Pacific way.

We island people are not very complicated; however, I was not aware of our simplicity. You see, my concept of limited entry was inherited from my forefathers. Basically, when a chief says, "Hey, you no go fish today," it would not be wise to disobey this limited entry directive. As a consequence of breaking the law, you might find your canoe drifting away with the next high tide. Because our council is presently working on management plans for billfish, precious

coral, seamount fisheries, and spiny lobster, we decided that some of us should attend this very important workshop and listen to some expertise on this very old problem.

Our islands are small, with narrow inshore areas commonly surrounded by fringing reefs. Although we have many beautiful species of fish that support artisanal fishing, to a great extent we must depend on highly migratory species that we share in common. For example, in each island area we have a large supply of fish species we in American Samoa call "paala," the Guamanians call it "tosa," the Hawaiians call it "ono," and those of you from the mainland probably know it as "wahoo." I mention this to point out the cultural differences that exist between the members of our council. However, the differences may not be as great as those we may find between the members of our council and those on the mainland. Our problems are different, and perhaps unique. Therefore, we do not wish to be compelled to apply certain management measures that may work very satisfactorily in Maine, Alaska, or California, but would not be understood and may not work in our diverse island culture.

We came to this meeting to listen and to learn more about limited entry. I must say that the many different viewpoints expressed by the mainland experts have not helped to clarify this management tool. However, we appreciate the viewpoints and reservations expressed by Laurie McHugh and, in particular, we believe that our council must keep all of its options open and remain flexible. We concur also with the summary and conclusions reached by Allan Adasiak that any specific form of limited entry should vary to fit the situation and need. I appreciate Jim Douglas' views and agree that the Western Pacific council should carefully examine the points he made. Specifically, we should all ask ourselves to what extent should we attempt to manage economics—where do we start and when do we stop in attempting to manage the income of individuals? It appears to me also that the goal of all our endeavors is to manage our resources in a manner that will minimize the economic, social, and cultural impact of our management actions.

As I said, we came to listen, to learn, and to participate. We shall continue to watch with great interest your efforts at attempting to deal with limited entry. It is our hope that we will profit from your successes and avoid your mistakes. I am sure that this has been a most educational conference for those who don't know anything about limited entry, those who are in it, and those who can't get out of it.

### **GEORGE J. EASLEY:**

I first became exposed to limited entry nine or ten years ago. There was a serious consideration in my region among crab fishermen to try some kind of limited entry. I got out of the crab fishery shortly after that and have not been in since. After my initial look at limited entry, I withdrew rather rapidly. I did not like what I saw and I can't say that I have really changed my mind too much over the years. Although I have poked around and read a lot, I still don't like limited entry. It seems to me that a lot of the approaches the university and government people take are similar in concept to public utilities. I am not really sure that this

is applicable to fisheries. It seems to me that fisheries are a resource more like timber than electricity. Perhaps we should look at some of the management concepts that are used in forestry rather than the concepts that are used in public utilities. I would like to see a little more done on that before making any final decision on limited entry.

With that personal bias out of the road, I will try to be objective about what the Pacific Fishery Management Council is doing and where I think limited entry is definitely going to have some effect. We do not have limited entry now, but it is certainly going to be talked about and certainly is going to have some effect in the salmon fisheries in the Pacific Northwest. The salmon fishery is complex. It is pursued out on the ocean and on inside waters. It has many and varied users. The common question asked by most fishermen is, "Why don't you increase the fish instead of limiting the fishermen?" Well, if we had an all out enhancement program and lots of money, maybe ten years from now—and I emphasize *maybe*—we could get a substantial increase in fish.

A major problem we had thrust on us was the federal court's decision that says we have to reallocate our salmon resource. It says that a group that was getting approximately 10 percent of the fish or less is now entitled to 50 percent. To give them 50 percent, we have to take it away from somebody else. I think that this special group is up to something like 20 percent now. Another effect of this is where we have traditionally had one salmon fishery on our coast, we now have two: the Columbia River and north fishery to which these decisions apply and the fishery south of the Columbia River to which they don't apply. Now, how do we maintain a viable ocean fishery over that whole region if we have to chop it in half and make special allocations but still keep everybody in? I don't see how we can do it. We are really talking about some kind of effort limitation somewhere down the road.

These are inside-outside fisheries. That is, they work in and outside of state jurisdiction waters. After we considered this, we didn't think that council-instituted limited entry would really solve the problem. In addition, we had some doubts about instituting a federal licensing system. So we are asking the states to institute a moratorium. We've let the contracts for the necessary social and economic studies and we hope to have some answers within a year to look at to make a decision. We hope that it will be a limited moratorium. If the fishermen decide in the end that they don't want limited entry, I don't think that the council is going to institute any limited entry. I want them to have that ability to make a rational choice on which way they are going to go. They must decide if it is going to be a dog-eat-dog show—very restrictive, and seasons chopped down to a point where no one can make a living at it because of allocations—or if we are going to have some kind of effort control through limited entry, and accept the fact that some people are going to have to be weeded out.

There is no sense in fooling ourselves. Somebody is going to have to be weeded out. I don't like the position we are in but we are in it. We can't get out of it unless Congress rewrites a bunch of Indian treaties, and in my opinion that is not a very practical thing to hope for. But I don't think that there will be any limited entry instituted in our area unless there is a majority of support from the fishermen. I don't see how any program could succeed without it. If the fisher-

men don't want it, my inclination is to let them hang by the rope and starve to death slowly if that is what they want to do.

I would like to point out something else, and that is the collection of user fees for access to what the government considers public resources. There is a move towards doing that in various natural resources, and we fisheries people are the last ones on the ladder. At the same time, there is a move underway to limit government involvement. If we choose to run our fisheries on the public utility concept, we are going to increase government. There is no way out of it. Anybody who thinks we can institute a user-fee kind of a program and have less regulation should at least say it with his tongue in cheek, because he is kidding himself. I would much prefer some other system if fisheries have to be treated as a natural resource for the public good. The public should have something out of it other than a return to the economy and the food to eat.

There is also a desire in Congress to increase U.S. fisheries production to offset our negative balance of payments in fisheries. This will mean some big changes have to be made, and change, if it isn't well explained or understood, creates fear. I can't stress this need for communication too much. It is a lot easier to walk into a dark room if it is in your own home and you know where the furniture is than if you are in an unfamiliar house. The first thing you would do is to try and get some light and see where you are going. This applies in fisheries too. We need that information, we need to make it public, but communication is always a problem. We have had our problems in our council and we will continue to have them I am sure. We need more information and time to talk about it to make some rational decisions.

## **JIM H. BRANSON:**

I am not a council member. I work for the North Pacific Fishery Management Council. The council member who was slated to talk today is currently practicing his profession in the Bering Sea catching crab. I am sure that some of the things he would have said here are different from what I am going to say. What I would like to do is reflect the council's experience and philosophy to date with limited entry and my views of how the council arrived at some of its decisions. Then I'll add a few of my own thoughts on limited entry and some of its possible uses.

The North Pacific council has said it wants limited entry considered in every fishery management plan (FMP) that it writes. To date it has completed two plans that have been approved by the Secretary of Commerce. Two others will be before the council at its next meeting. Five more, for a total of nine, are currently in the drafting process. In addition, we have identified six other fishery management units for which we will develop management plans when time and necessity require. Two of the first nine plans are for multispecies fisheries, groundfish in the Bering Sea and groundfish in the Gulf of Alaska. They are very similar in species composition to the groundfish fishery off New England where five or six species comprise the bulk of the catch and another fifteen or twenty associated species are caught incidentally and are little utilized. However, our situation differs greatly from that in New England in that there is virtually no

U. S. fishery on these stocks at this time. The current catch in the Bering Sea is about 1.5 million tons a year. The American portion of that catch this year will be probably about fifty tons and will be used mostly for bait in the crab fishery. The other plans vary. Many of the FMPs are for single species such as tanner crab, clams in the Bering Sea (which is a fishery that we think may have potential but are not really sure of yet), herring in the Bering Sea, and others. The two plans that have been approved by the secretary do not contain limited entry provisions nor did they consider limited entry in anything more than abstract form.

One of the two plans that will be before the council at its next meeting has a limited entry provision, in fact, a number of limited entry options. That FMP is for the high seas salmon fishery off Alaska, which really means the troll fishery off southeastern Alaska. This is a very complex problem in that on one hand there is a good argument for not allowing this fishery at all. There is no biological justification for it and, in fact, there is a rather strong biological justification for closing it entirely. On the other hand, it is an existing fishery that supports a large number of fishermen and is the main support of several communities. Obviously, we can't just eliminate it. The offshore troll fishery catch of king salmon is approximately 85 to 90 percent dependent on fish spawned in other areas, that is fish from Canada, Oregon, and Washington. The remaining 10 or 15 percent of the catch are fish that come predominantly from thirty-three river systems in southeastern Alaska. The fishery is viable and profitable but it is sustained on stocks from other areas that mask the relatively poor condition of southeastern stocks of king salmon. How to sort those out, how to reduce the fishing mortality on those very critical and endangered Alaska salmon runs is a real problem.

The council wants a lid put on that fishery so that the catches will not increase. We want effort limited to no more than was allowed in 1977. I think that was 117 boats. To do this, the council established a cutoff date of December 1, 1977, beyond which fishermen cannot accrue any more interest in the offshore fishery. It is not a moratorium in a strict sense. It simply says that you can fish in 1978 and in 1979 if a limited entry scheme is not in effect, but you are not going to get any credit toward a permanent permit under any future limited entry system if you do. The council will have a number of options to consider in the draft troll-fishery plan. One will give two classes of licenses. The first class is a permanent permit that would give a property interest in the fishery, the sort of thing that Allan Adasiak talked about in Alaska's limited entry program. The second would give a lifetime nontransferable permit. Upon relinquishment, the permit would come back to the government. This is an attempt to get the number of boats and units of gear back to their 1977 or prior level. There are problems, of course. The council's limited entry scheme will undoubtedly be tied in very closely with the state of Alaska's limited entry scheme, and we have worked very closely with the Commercial Fisheries Entry Commission and with Mr. Adasiak in developing the separate offshore program. For example, if the state and council licenses were separable, could one be sold and not the other, or do they have to be sold together? What about those Washington boats that have never had an Alaska entry permit, but have fished regularly on the offshore grounds off Alaska? They come directly from Washington, make their catches, and return to Washington to sell. They will have to be covered if we use a grandfathering



scheme. These questions and others should be decided during the public comment period before any final solution is sent to the secretary as the council's recommendation. In any case, limited entry will be only one aspect of management that will be necessary in that fishery. There will still have to be time and area closures, size limits, and perhaps gear restrictions.

The council has identified some research needs that are very pressing and has financed two of them through contracts with other agencies. One is a tag recovery program for the southeastern Alaska area and the second is an observer program on U. S. salmon trollers in the same area. In addition, we are working very closely with the Salmon Trollers Association on a logbook program that will give us additional data that we hope will enable us to refine our information. We are working with the University of Washington to see if it is feasible to determine the stream of origin for the fish taken in the offshore troll fishery. This new information may permit refinement in management, eliminating some of the need for limited entry or the other management measures now necessary.

The second plan to come before the council at its next meeting is for groundfish in the Bering Sea, and that is a completely different animal. Here is a tremendous resource that is not used by the U. S., although it is certainly not an unutilized fishery. Foreign fishermen are there and have been for many years. This particular plan is the first to generically address limited entry in response to the council's request that limited entry should be considered in all of its management plans. I would like to read part of this plan.

"No program of limited entry is presently necessary for this fishery. It is indicated in section 8.1 that domestic catch for human consumption and crab bait is not large compared to the foreign harvest. In the event that the domestic fishery develops further, no program of limited entry should be implemented until all foreign fishing has been terminated. As long as there is such foreign fishing, there is a portion of the optimum yield that is not being utilized by the domestic fleet. Entry limitation under such conditions is contrary to the purposes of the FCMA" (1).

The council continues by specifying in some detail the things that should be considered in this plan and during the development of this fishery to lay the groundwork for an eventual decision on whether or not limited entry will be necessary and, if so, when and by what parameters.

"In addition to developing and evaluating definitions of the fishery in the context of the limited entry systems that might be applied to them, a host of other factors must be considered before determining whether entry limitation is necessary. No one factor is significant enough to answer the question by itself, nor on the other hand must all factors point to a need for limited entry for the council to conclude reasonably that entry limitation is warranted. Rather, the factors to be considered are indicators of the degree of various problems, if any, that may be appropriately addressed by a form of limited access system. Some of the more relevant factors are:

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(1) Section 14.3.1.6 Limited Entry, in: Fishery Management Plan for the Groundfish Fishery in the Bering Sea/Aleutian Island Area, North Pacific Fishery Management Council.

- extent of domestic utilization of the fishery resource;
- interrelationships with other fisheries: extent of nontarget species catch and mortality; degree of dependence upon other fisheries;
- any trends in the precision or effectiveness of conventional management techniques that indicate a serious risk of major overharvest due to management error;
- trends in the number, efficiency, and capacity of the vessels in the fishery;
- degree of excess, unutilized or underutilized capacity in the fleet;
- adequacy of economic returns to fishery participants;
- extent to which regulatory measures necessary for reasonable biological management of the fishery impose artificial inefficiencies on the fleet;
- onshore effects from any of the above factors, including quality of standard of living, degree of unemployment, dependence on transfer payments, and labor force retention problems" (2).

They go on to say that the developing fishery should be monitored and data collected on all of these aspects in order to eventually make a decision on limited entry and other management measures.

Those are really the two ends of the spectrum on limited entry, at least as it applies to council functions in Alaska at present: one fishery—the southeastern offshore troll fishery—overfished, overcapitalized, and overused; the other one—the Bering Sea groundfish fishery—not touched yet by the American fishermen. I might emphasize that the council has not reviewed that particular section on limited entry in the plan and it may change in final form, although I believe it is a reasonably accurate reflection of their thoughts to date (3).

The council has surfaced a number of concerns in limited entry discussions. You have heard the views of our eminent council member, Senator Tillion, and the order of precedence he has established on how fishery resources should be used. But generally, I think, the council has considered limited entry as a management tool. The windfall profits that have occurred in the salmon fishery have also occurred in some of the fisheries that had unlimited access. Those profits have not been a subject of concern in council discussion. There is a feeling in the council that limited access can alleviate some of the management problems.

Several years ago Professor Bevan wrote an article that I still treasure, in which he compared salmon management with forest management. He superimposed some of the things that we have done in salmon management on the forest industry. I think that it went something like this, and I paraphrase rather broadly: If we were to manage timber as we manage salmon, we would tell the

(2) *Ibid.*

(3) The language was approved by the Council in July, 1978.

logger that he can enter the woods at six o'clock Thursday morning carrying a single bitted axe with a handle not more than twelve inches long, he is then allowed to cut all the trees he can until six o'clock that evening, when he is done for the week. That sounds ludicrous but it is not nearly as ludicrous as some of the things we have actually done to the salmon industry (4).

We had some questions from the audience yesterday that asked if the catch per unit of effort hadn't increased with the inception of limited entry in Canada and Alaska and whether limited entry had actually improved the fishery. I don't think that is the right measure. Limited entry in Alaska probably hasn't improved conditions over the 1973 situation; it simply kept them from getting worse. That, in itself, is quite a large accomplishment. With the increased demand on the world market and subsequent increase in salmon prices, we probably would have three times the amount of gear in that fishery today if Alaska had not had limited entry. As Clem Tillion pointed out, some fisheries are probably not even possible without some form of limited access. Specifically, the herring fishery in Prince William Sound had a forty-five minute season and still went 50 percent over the quota. A herring-roe-on-kelp season in the Craig area lasted thirty minutes and destroyed the resource for several years. Obviously, limited entry would be a help in the management of fisheries like these.

The council has very definitely considered the effects of limited entry on the infrastructure of fishing; not just the harvesting sector, but the industry and communities that are based on the harvesting sector. There are a good many coastal areas of Alaska that have no other resource base. If they don't have fishing, they don't have anything. There is a form of limited access in Alaska in a couple of areas that has been reasonably successful. For example, there are exclusive registration areas for Cook Inlet and Prince William Sound. If you want to fish for crab in these areas, that will be the only place you can fish. You can't shift to other areas during the season. This has succeeded, at least in part, in stabilizing the industry in those areas and lengthening the entire harvesting period. Crab and shrimp have been the stocks involved to date. It has developed a much more stable economic base and has eliminated the need for a flood of workers and activity for a very short period, allowing a reasonably stable work force that is locally based. These results are considered desirable by many of the council members.

There are many kinds of limited entry or limited access available. Limits can be on boats or fishermen. The share system gives the harvester an exclusive right to a specific portion of the harvest. I think that we have an advantage in Alaska in that it is a great deal easier to put limited entry on a fishery that is not fully utilized than it is to move into a fishery where you are already bleeding from a number of different places and try to staunch the wounds. When there are so many vested interests, it is almost impossible to do anything. As Joe Easley pointed out, the problems in the salmon fishery seem almost insurmountable at times.

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(4) Prof. Bevan commented later, "I would like to add to Jim Branson's use of my analogy about the forest. He forgot that the logger would not be allowed to take trees with cones. Also, if a logger, in cutting down a fir tree that was within his quota, knocked over a cedar, he would be required to prop it up and leave it in the woods."

In summary, I think that the North Pacific council considers limited entry a useful management tool. It is possible to influence far more than the harvesting sector with limited entry, but it should serve primarily as a conservation and management tool, not as a control on economic return, overcapitalization, etc. This has been discussed by the council and none of them, I think, believes that overcapitalization or poor economic return are particularly good, but they don't think it is their role to influence those factors, at least very greatly. It is the council's intention to consider limited entry as a component in every management plan they work on. My personal impression is that there is a thread of commonality running through limited entry problems around the United States, which is that limited entry should be developed on a regional basis. It has got to be done on a need basis, probably at the individual fishery level, and it should be tailored for specific problems. One thing that is very obvious is that the approach to limited entry should be made cautiously and with forethought.





## **Discussion**



## **CONFERENCE AND WORKSHOP DISCUSSION**

The transcribed discussions from the workshop held at Lake Wilderness, Washington, in May, 1978, and from the conference in Denver, Colorado, two months later are presented here in different formats. Each meeting's transcript amounted to over several hundred typed pages in its original verbatim state. The transcripts then went through several iterative refinements, in which the editors distilled the most representative and cogent expressions. The workshop distillate is presented in an interpretive and narrative format, while that from the conference is in a dialogue style, using the actual words of the participants as much as possible.

The reason for this difference in editing the workshop and conference discussions relates to the respective themes and views of the people attending. The workshop was attended by a small group of mostly academic experts in the fields of law, economics, and the natural and social sciences. Their task was to critique the solicited papers that appear in sections V and VI of this volume. Their views were naturally theoretical and empirical. Their discussion was based on the points made by the authors of the papers. In the process of discussing the papers, however, workshop participants explored a number of issues that either were not covered in the reports or were treated only briefly. The summary of the workshop discussion, which begins on page 144, brings together those issues. It is not a summary of the workshop per se, nor a statement of the most important points made in the papers, nor the most important issues relating to limited entry. It is an accurate representation of the views expressed at the workshop. Further, these views appeared, perhaps not surprisingly, along disciplinary lines. Thus, the discussion summary is organized as to the legal, biological, sociological, and economic aspects of limited entry and experience with limited entry programs.

As the workshop was designed to elicit the views of academics, the conference was designed to elicit the views of those who are involved in fisheries in a more practical way as fishermen, industry representatives, and fishery managers. Unlike the workshop participants, most conference participants represented a fishing industry constituency of some kind. Although the papers served again as an intellectual framework for the conference, most persons in attendance at Denver had not read the papers, and their authors were not encouraged to present lengthy and detailed reviews. Instead, conference participants were provided with short, printed abstracts of the papers. Also, Fred Popper and Edwin Joseph summarized the theoretical and experience oriented papers respectively in their special addresses. A further but very brief summary of many of the papers was given by their authors or other experts. The points made in the authors' summaries were then commented on or questioned by panels representing a broad spectrum of interests and by participants from the floor. The brief authors' summaries and the panel statements developed as the primary basis for the conference discussion.

The summary of the conference discussion is a compilation of the dialogue among participants on the panels and on the floor. This dialogue is not presented as a real-time record of what was said, but is organized into the six topical



areas that represented the greatest concerns of the participants. To achieve this organization, individual comments and questions were often moved great distances from where they appeared in the original transcript. Comments that do not naturally follow each other because of this reorganization are separated by stars. Great care was taken not to change the context of anyone's comment or question by virtue of its juxtaposition to other comments or because of the editing of verbiage common to spoken statements. The emphasis in this presentation of the conference discussion is to highlight major concerns as expressed by those most likely affected by any limited entry form of fishery management.

# CONFERENCE DISCUSSION

## THEORETICAL AND TECHNICAL ASPECTS

### Lee Anderson:

I don't think there is any economist with any practical experience who is going to suggest doing a little research on the fishery, and then, after finding out where the total revenue and total cost curves are and the point of maximum difference between them is, going there singlemindedly. We may not want to go there at all. Economists will agree as much as anyone that people matter.

What economists are concerned with, and it is in their purview to say, if all else is equal, that using fewer resources is better. That is, fewer units of capital and labor used to harvest and manage the fishery are better than more because, all else being equal, that will free up capital and labor to produce other goods and services in the economy. Now, when things are not equal, then we should consider the social goals and other things that have been discussed here. I think that the economist has a role in discussions of this sort, in that we should be very explicit in what we are giving up in terms of economic efficiency to gain these other social goals. Essentially, we should understand the costs of giving up one social goal to obtain another social goal. It is still an economic problem.

Speaking in this regard, the councils are going to have to state specifically their objectives. They are going to have to state the tradeoffs they are willing to make between these different goals, or else we can't get anywhere. What the social and economic professionals can do is to present information to the council. We should say, for example, if you do this, you will gain 40 percent more employment at a cost of so much economic efficiency or something else, and then let the council members decide whether what they are gaining in one social goal is worth losing in another, such as economic efficiency.

In an article for the *Journal of the Fisheries Research Board of Canada*, I wrote about the economic yield curve described by Dick Allen. If the demand for a fish stock is inelastic over the range of harvested yields being considered, the curve relating the value of landings to effort would have two maximum points. Under those circumstances, regulatory measures that, by reducing biological overfishing, increase the quantity of fish landed could so depress the price of the fish that the total value of landings could decline. However, a fishery operating in an inelastic portion of a demand curve is probably a very rare phenomenon. Joe Mueller and Lars Vidaeus tell me that, from the data they have on the New England groundfish stocks, they do not have a price-quantity relationship that would produce a curve like that. Even if it did, a management goal of maximum economic yield would necessarily imply a harvest level less than a sustainable yield, and with all the conclusions arrived at without this unusual demand relationship.

Another point that Dick made was that economic profit leads to entry, and entry is good. In general, according to Adam Smith and his invisible hand, the theory is correct. However, with the fisheries problem the invisible hand is all thumbs because fish are common property. All new entry can do in this case is to put more capital to the limited reproducible fisheries stock. In any other industry you can reproduce anything, with sufficient labor and capital. When there are

profits in a fishery you cannot double everything, that is, double the boats and double the fish stock. Because of this you get the tragedy of the commons. Dick's point that we should look at the fishing industry and compare its economic efficiency with other industries is correct, barring the common property problem. If there was a solution to the common property problem, then, indeed, the fishing industry should not be judged any harsher on economic efficiency than other industries, and there certainly are market failures in other parts of the economy. We all know that there are laws and regulations to control that, such as monopoly controls, etc.

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**Donald Bevan:**

I would like to see if I understood Dick Allen when he was talking about not increasing costs to fishermen by protecting spawning populations and other biological measures. I would agree with Christy's first law of fisheries management, which is that you always drive up the cost to fishermen with efficiency-cutting regulations. Perhaps Mike Orbach is better able to explain the anthropomorphic reasons for having regulations that protect spawning populations. It seems to me that, unless a spawning population aggregates in some way in which it is more economical to go after them, that is the only reason to protect them and that, in fact, does drive up the cost. I guess I would like to have an example of some biological regulation that does not drive up the costs to the fishermen.

**Richard Allen:**

Yes, Don, you could harvest fish at a lot less cost if you harvested them in spawning congregations. I would say that in the lobster fishery costs are not driven up by protecting lobsters below the minimum size. Various tools like that, it would seem to me, would be what a sole owner of a fishery would do. And that would be one you would use in the same situation where you were not driving up costs.

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**Lee Anderson:**

As a final point, Dick said that when people see limited entry on the horizon they jump into the fishery to get their name on the boat so they will have a piece of the action. This cannot be denied; it is a very accurate prediction. I think this behooves us to do something about it. We should make a decision on limited entry and say, yes, we are going to have it or, no, we are not going to have it. The more we postpone the ultimate decisions, the more difficult and the more numerous these problems will become.

**Ronald Poff:**

I have a few comments that might add to some of those that Dick Bishop made regarding the rush to get into the fishery before a limited entry system goes into effect. Even in our mini-project limited entry program in the Great Lakes we have seen this. Between the time the laws were published May twenty-second and went into effect July first, we saw a rush of licensees amounting to about 20 percent more than was projected for the new limited entry system. Limited entry applies to the multispecies fishery in Wisconsin, the various segments of which

concentrate on individual stocks, but the number of licenses overall is what is being limited. One comment that Dick Bishop made was that there was a reduction from sixty-three to twenty licenses. Part of this, perhaps 30 percent was due to a change in what our attorneys thought should be licensed. The sixty-three were vessels, the twenty are fishermen, some of whom have four or five vessels. There is a tendency to build up individual fleets, and we propose to handle that by issuing individual license quotas, not vessel quotas but licensee quotas, so that a man can have as many boats as he wants but his quota of a particular species is going to be only so many pounds. Our first test of the system won't be one of instituting a quota and limited entry on an open fishery: it will be the other way around. We have a chub fishery on Lake Michigan that is now closed. There is no harvest other than for assessment purposes under contracts. We are now proposing to open that fishery on a limited entry quota-controlled basis. These commercial fishing boards that Dick referred to have a real tiger by the tail when they have to come up with a method of allotting relatively small quotas among what amounts to about three hundred potential fishermen.

**William Hargis:**

There are two things that I would like to comment on related to this case. First, the concern for this grandfathering problem and the encouragement of new units into the fishery merely by the threat of introducing a management plan, with or without limited entry but especially with limited entry, I think is a real phenomenon. But it is not unique to fisheries. When we enacted our Wet Lands Act in Virginia, we provided for grandfathering and everybody rushed to get in under the grandfather provision. This occurs in every economic enterprise that is about to be regulated, but it is no reason to eliminate limited entry as a possible management tool. This is one of the things we have to recognize and deal with.

Second, all of us are going to recognize that limited entry is a tool in management of any natural resource system. That is going to be the outcome of the whole debate. The thing that disturbed me yesterday was that it seemed that several people who made presentations were setting up straw men. They were defining limited entry in ways that aren't theoretically or technically correct, in order to beat it down. In the last analysis, I would be willing to bet ten to one odds that the conclusion will be that limited entry is a useful tool, to be applied where it is necessary along with other tools.

**Sig Jaeger:**

I have a lot of questions about limited entry. One of the initial questions is on license transferability and overcapitalization. It seems to me that we come to a peak about the real problem here: that the economics or the profitability of the industry is always going to be there exerting pressure. If you limit the number of vessels and allow transferability of licenses, those licenses are going to go skyrocketing in price, so you still have overcapitalization except on a limited number of vessels. For example, a one million dollar boat is now, with its fishing privileges, worth three million dollars, and there is a fleet of fifty of these boats, rather than spread over the actual purchase cost of, say, one hundred boats under open access. But under limited entry, the license is an additional capitalization. You do not have the free entry of new men to actually put together to build

those vessels, because you are limiting the purchase of those vessels and the exercise of the fishing privilege to those who have the dough. The experience in Alaska has been that people who had fished in the salmon fishery are not now the ones who are getting into it. The fishing privilege goes to the people who have made their money in Texas or somewhere else. This may be overstated, nevertheless there is an inconsistency in the overcapitalization argument.

The other question relates to depletion. It did not really come through to me that depletion of the resource can't be prevented under any other management system.

**Francis Christy:**

The value of the licenses in Alaska under limited entry reflects the value of the resource. This is a value that has been dissipated under the previous system of uncontrolled access. Control over access, whether it is limited entry or a tax on fishermen, or establishment of quotas or a franchise, is going to create a value in the resource. This is the value of the privilege to fish, and there is no way to avoid it. The value as expressed in the tax is taken away. In the other systems, the value occurs in the right attained by fishermen. Now, when you referred to the limited entry system and the seepage effect, you are quite correct if you limit one input. If a system limits a single input into the fishery, such as a vessel or the tonnage of the vessel or something along this line, then fishermen will naturally and quite understandably seek to maximize their catches by substituting other inputs for the one that is limited. This has occurred dramatically in the case of the British Columbia salmon fishery. In Alaska it is less likely to occur, because you have already frozen technology by the gear limits and the area limits. In any case, when you limit a single input you are going to get that kind of subsequent effect, and overcapitalization will continue to increase.

The advantage of the fisherman quota scheme or franchise is that it provides a right in the resource itself, and fishermen are left alone to take their share of the resource in whatever way they wish to, short of using dynamite and some other kinds of very damaging techniques. The government does not have to control the vessel—its characteristics and gear—and adopt one restriction on top of another, as is done under other kinds of systems. Franchise kinds of systems might be quite preferable where they can be adopted, and they cannot be adopted in all cases, to those that limit inputs such as the license limitation scheme in British Columbia.

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**Robert Alverson:**

Dr. Christy, did I hear you say the value of the licenses under a limited entry scheme is equal to the value of the fishery?

**Francis Christy:**

I did not say it was equal but that it reflects the value of the resource itself or the access to the resource.

**Robert Alverson:**

Maybe that comes closer to my opinion, that it represents the amount of capital that would be invested in the fishery had it been an open access fishery.

**Francis Christy:**

Yes, that has to be true.

**Robert Alverson:**

Then on listening to the arguments on limited entry, I get the feeling that it is a one-fishery, one-vessel type of concept so far. If so, this is a big mistake in the North Pacific, where we have vessels that are designed for multispecies fishing.

**Francis Christy:**

Yes, I think you are right in a sense that there is a domino effect that is very important to consider. We shouldn't consider limited entry in one particular stock without considering the implications it has for other stocks. Your analysis is similar to that given by Wib Chapman in quite a different way. Wib Chapman used to say that the value of no control over access is to stimulate the fisherman to move to other areas, because once they depleted one stock they were forced to move to another one. I don't think that either case is proven true, because if there are resources out there of value, whether there is limited entry or not, they will be developed eventually.

**J. L. McHugh:**

Mr. Alverson, the point you are making is exactly the point that I was trying to get across. Limited entry or no limited entry, I think we, as council members, have a great responsibility to do the best we can to preserve the flexibility of fishermen and not to restrict them unnecessarily. Flexibility to me is the answer. It isn't easy to come by either.

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**Harvey Mickelson:**

Has there been any data gathered or any thought given to a relationship between restricting the entry of vessels into a fishery either by stock or geographical location and at the same time limiting the number of processors or distributors of the fish? Has there been any consideration given to the possible impact of a reduction in the number of vessels in a fishery while at the same time not limiting those that are involved in the distribution of the product because of the type of profits that would appear to be forthcoming?

**Donald McKernan:**

I think that most of the people who have advocated limited entry have considered that the limitation of entry would not limit the amount of the product going to processors, and that amount in some cases might increase under limited entry. I recognize that this is a debatable question that has been raised by some of our people here but in direct answer to your question, I don't believe that there has been any serious thought given yet to the question of limiting processing or processing capabilities on this basis.

**Carl Mundt:**

Just as a point of information, although I am not familiar with it, in the state of California licenses are issued by the California Department of Fisheries and Game to anchovy reduction processors. As I understand it, these licenses are not unlimited in number, and limitation serves to act as a restraint upon deliveries by the individual fishermen harvesting anchovies.

**Harvey Mickelson:**

Is the concept of limitation on distribution and distributors compatible with the concept of limitation on entry into a fishery?

**Francis Christy:**

I am not sure that it is compatible but I don't think that it is necessary. The problem fisheries face is that of a common property resource that offers free and uncontrolled access to the fish resources. This is quite a different problem from that which processors face. The processor operates under normal economic conditions with the satisfactory institution of property rights, which the fisherman does not.

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**Richard Allen:**

I have a couple of questions that concern cause and effect for Leah Smith and Chris Newton. In her paper, Leah makes the comment that in the sea scallop fishery in the Canadian Maritimes catches are increasing, so obviously their limited entry program is working. We have a U. S. scallop fishery with the same increases but without limited entry. If we put in limited entry and these things happen, can we say so simply that we are getting what we want from the program? The same thing appears to be going on in the B. C. salmon fishery. I think that at a previous conference at the University of Washington one of the industry spokesmen for British Columbia said it was his opinion that the high incomes being generated for the fishermen were not really the result of limited entry—they were just the result of market situations. We can see that in the New England scallop fishery. We've got a millionaires' club going there but it has nothing to do with limited entry. It is just a function of the demand for the product and abundance of the stocks.

Another question for Leah: I didn't get the relationship between fishermen in the Bay of Fundy herring fishery organizing and using marketing pressure and limited entry. How did they keep other fishermen out or just what was that situation?

**Leah Smith:**

Let me start with your question about scallops. I don't think that I said the limited entry program per se had caused the increase in the scallop catch. At the same time, at least around that same time in 1973, there was a size limit put on. Limited entry and a size limit may have worked together but I don't think that you can say it is cause and effect. One problem with evaluating the effect of all of these programs in Atlantic Canada has been that the information even on the number of licenses issued in each of the fisheries each year has not been available. Although they apparently are organizing the statistics now so that they will be available for 1978 and on, the general feeling is that, in the past, the number of fishing boats in each fishery has stayed about the same. We just don't have any specific information on them, so it is difficult to evaluate them.

On the relationship of the Bay of Fundy herring fishery to limited entry, the fishermen set a sort of self-determined quota, which I failed to mention, and they have allocated the catch among themselves. No one else has come into it, so it has effectively limited entry and the quota has limited, of course, what has been taken from the stock.

**Chris Newton:**

On those increased incomes to fishermen as purely the result of increased prices in the market, I would like to ask what would have happened without limited entry? We have had seventy-five years of watching this and should be able to draw quite good conclusions. If, in salmon, any one year was a good year in terms of quantity—1973 most certainly was an excellent year—fishermen would have made profits. People sitting on the shore would have seen these profits and all of them would have started building boats or anything that would float and getting them into the ocean ready for the following year, on the assumption that one good year is going to be followed by another. Some of those fishermen may not quite make it in the next year, so they will come in the year after. In the case of salmon, which is so highly cyclical, usually, if you have a good year, you have to wait another four years before that is repeated. So, from the good year you go to poor years, and at the same time you have twice as many fishermen in the following year, which is a poor year, half again as many in the year after that, which is just making the cyclical variations in supply magnified because the response to a good year was by many more participants. What I would say is that the market situation is improved. At least, you are not dissipating that profit from one good year with two-and-a-half times as many fishermen the following two years.

**Richard Allen:**

I would like to throw out another point that I meant to mention earlier. It is the upward mobility of crewmen. What effect would limited entry have, say, on unionization in the fishing fleet? Will unions become more prominent among fishing boat crews because crewmen would no longer see the opportunity of moving up to become skippers and vessel owners?

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**Sig Jaeger:**

One of the points I'd like to raise is the turnaround factor in management—that every aspect of management requires sometimes a very substantial investment on the part of the industry. At a council meeting recently, I attempted to point out that in every management plan we should identify those management costs that the industry itself bears. Once the industry has made an investment in a management plan, it becomes increasingly difficult over the years to turn that around if through some creative management thinking we find that there should be a change. The fifty-foot limit on boats in Alaska is a good example. When you start to limit vessels by size, you distort what is usually a natural process and you create a resistance to further change when later on it becomes necessary.

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**Gary Johnson:**

Mr. Martinis made a statement that he would like to eliminate processors from the fleet by only allowing them to operate when they actually operate at sea. Wouldn't this lead to a sort of mothership operation in which control of the fishing fleet by the processor may not change at all?



**John Martinis:**

I was addressing myself to the salmon fishing license moratorium. There is one segment of the salmon fishery that once was 30 percent owned by processors. In all practicality that amounted to a company store. The company store dictated who operated the vessel and all other conditions. That was my sole concern, that the processing part of the industry would not dictate controls to the fishermen. Under my proposal, the degree of processing is a matter of definition and could be chilled sea water, frozen fish, headed and gutted fish, and that sort of thing. What I would not want to eliminate would be the vessels that would process on board.

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**Mildred Nicholas:**

We have a joint venture problem on the Pacific Coast that is probably the same kind of problem Dr. Smith spoke of regarding Bay of Fundy fishermen sharing processing with Polish vessels. We are trying to upgrade the processing plants on our coast and at this time have only one converted vessel capable of handling Pacific hake. Understandably, if we are going to allow too much sale of hake caught by Pacific Coast fishermen to foreign vessels, processors are going to be reluctant to pour millions of dollars into new processing plants.

As to the price of salmon in British Columbia, quite possibly it would reflect the amount of fish available rather than the number of men fishing.

Fishermen are taking part in raising salmon in many different places on the Pacific Coast. I can think of three hatchery or ranching operations in addition to those already mentioned in Alaska.

Mr. Martinis' multiple license refusal to charter boat operators brings to mind that a good many charter fishermen in our area convert to crab fishing immediately as soon as the charter season is over. In my mind, this is the most economical way to utilize existing gear, and we should be careful about not allowing use of one vessel for more than one fishery.

In addressing Mr. Dykstra's runaway boat building, I wonder if perhaps some of this was not to replace boats that had been in use for a good number of years. People were wanting to build more boats and upgrade their fleet all along. It is no secret that in some fisheries our boats are obsolete.

**John Martinis:**

On my statement about one license per vessel, I meant one license of a type per vessel, that is, one charter boat license, but they can possess other types of licenses. Under the commercial salmon fishing moratorium there is no limitation. A Columbia River gillnetter could have multiple licenses for the Columbia River and hang onto those licenses for speculation purposes. I don't think that is fair and that is where my one license per vessel comes in.

**Leah Smith:**

I would like to clarify that the Bay of Fundy offshore herring fishery involved a legal arrangement. There are relatively few examples of that in the United States now, although it is a possibility.

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**William Hargis:**

Bob Jones raised the question of whether or not technological advance

would occur if limited entry is applied to a fishery early on. For those who are interested in that question, look at the oyster industry in Virginia. Historically, the resource was common and open to everyone. In the 1800s, a concept of limited entry that incorporated property rights was instituted. Grounds were rented to private operators to manage according to their own views. There were some restrictions, of course, and a significant portion of the grounds were retained for the public, and solely for the use of the public, with unlimited access. Two things have happened. One is that the public grounds have been and continue to be depleted, and technological advance has not occurred. They are still using oyster tongs. Second, on the private grounds there have been technological advances, some development of more efficient ways of harvesting, and application of crude culture techniques. So, the oyster industry might be one fishery that could be researched to answer that question of technological improvements under limited entry.

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**Francis Christy:**

A couple of comments that have been made prompt me to interject here and to express some disagreement with Clem Tillion, surprisingly with whom I have always agreed in the past, and his satisfaction in the Alaskan limited entry system. In regard to the groundfish fishery, he suggested (p. 128) establishing a limit on the number of vessels, based upon some rough estimate of the total ability to take the available stock even though foreign fisheries are taking it at the moment. That raises a question in my mind as to how to define that kind of vessel, vessels 1 to 264. I raise that question because I think that the Alaskan situation, while it seems to be working in some ways, is going to be damaging in other ways. The Alaskan limited entry situation has frozen technology. It does not allow for any changes in technology, at least as far as I understand it. There are gillnet licenses, purse seine licenses—licenses for specific kinds of gear. Those specific kinds of gear are also controlled in terms of the size of the vessel and a number of other characteristics, so there is no opportunity to allow the fisherman to move with changes in times and adopt technological innovations. This is one of the critical drawbacks of the limited entry system that limits the number of inputs. It is the kind of thing we will hear more about regarding the British Columbia salmon fishery where a limit on one kind of input creates an incentive for the fishermen to substitute other inputs for the one that is limited. Thus, they continue to overcapitalize and continue to put greater and greater pressure on the stocks. The ultimate result in Alaska is a frozen technology that does not allow for any kind of improvement, the kind that we can expect in the future and that should be allowed under proper rules and regulations. You might end up with the anachronisms that we have in the Chesapeake Bay, where you can only dredge for oysters under sail power. That may be a little extreme, but I think that if you go this route you have to watch out for that kind of a consequence.

**Clement Tillion:**

Our limited entry has frozen the number of licenses, but there are still so doggone many that if we took all the other restraints away the fish would be wiped out in about six hours.

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**Allan Adasiak:**

I am interested in the point on technological innovation. One of the effects we have seen in Alaska is that fishermen now are able to get money from banks easier than before limited entry. The banks can't loan money on the permit, but if a fisherman has a permit the bank essentially looks at that as a sort of assured channel of income. Since fishermen can get credit easier and since there are greater profits from the fishery, they are buying better boats and diversifying. Our records on permits in the unlimited and limited fisheries show that every year the trend toward multiple permit holders is getting greater and greater. Within the framework of our experience, there is definitely technological innovation under limited entry. I think that this is because limited entry has created a climate that didn't exist before.

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**Donald Bevan:**

Chris, what is the relationship between gears? Why not have a system where the fishing power of gillnetters can be exchanged for equivalent fishing power of purse seines? Let's say that six gillnetters get together, offering to surrender their licenses and fish with one purse seiner.

**Chris Newton:**

That is the system we have. We keep hearing that we have created the wrong input or that fishermen are maximizing on the vessels. We use tonnage just because that is convenient, but basically we started by saying that, if you want to put in a new seine vessel, you had to take out so many gillnets. In the old days, one seine net was equivalent to about three and one-half gillnets. Instead of going to the gear directly, we used the boat. To carry a seine net, you need a boat of a certain length and you couldn't start selling forty-four-and-one-half-foot boats if you wanted to put two together that would make you eighty-nine feet. So, instead of that, we used a tonnage criterion—it was just an arbitrary thing on gear. What has happened is that the seiners' efficiency has increased and we have not made an adjustment. Instead of three gillnetters being retired for one seiner, we need to say that if you wish to put in a new seiner you must take out ten gillnets. The fishing power of a new seine boat today is equivalent to that of ten gillnets. So the market and the way the whole industry reacts on this tonnage basis is really one step removed from the gear and it is freely transferable. If a fisherman wants to get bigger, he has to buy out somebody else.

**J. L. McHugh:**

Chris, you said that it is clear that the purse seine is more efficient than the other types of gear for salmon. What about the consumer and the distributor? As I remember, unless things have changed, purse-seine-caught salmon usually are canned. What about the fresh fish trade?

**Chris Newton:**

I say purse seiner because of the new technology in new vessels. This is the champagne system or the bubbleup system, which is refrigerated sea water. Other than a net mark on net-caught fish, I would argue that the quality of seine-caught fish held in a brine tank for fourteen days is superior to fish frozen at sea

on a troller. The only difference is in the market effect of the net mark. I would like to say, also, that the industry in British Columbia, which was traditionally a canning industry, has moved to a much larger percentage of frozen products.

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**Ralph Rayburn:**

I am a little confused. I was under the impression that in some areas of the country we were talking about fleet expansion and now it seems that everybody realizes that there is a problem in too-rapid expansion or too-rapid increase in effort. I am curious why Congress is not getting the message. They are still going through a program, as I understand it, to encourage fleet expansion by vessel obligation guarantees. These just recently went down to 12.5 percent down payment and the rest to be guaranteed by the government and the capital construction fund, which defers the income tax off the profits of the fisheries. Who is supporting this type of incentive to expand the fisheries and, as a practical matter, would we be better now to look at conditional fisheries? What effect will these have in different areas? What is the effect of this government stimulation in our fisheries by supporting submarginal producers? What effect is this having on stimulating fleet expansion? Are the managers in the various regional councils looking at the possibility of setting up conditional fisheries? It would do away with this government intervention that artificially stimulates the expansion of the fleet.

**Donald McKernan:**

Dick, do you want to try to answer the question about the advantages or disadvantages in New England of trying to upgrade your fleet through government intervention? I know that for some underutilized species this may be an advantage, but what is your view on that?

**Richard Allen:**

There is increasing concern about the programs that are designed to increase the fleet. A lot of people say that this is the last thing we need and that the first thing we ought to do is to make it harder to get money so that people will not keep building boats. A lot of people would rather see that than more artificial means of limiting entry. They would rather turn it back to the marketplace. On the other hand, looking at the underutilized species question, can we use programs like this? As Terry Leitzell pointed out, we have to have some kind of parallel program of managing the resources: on the one hand, retaining resources and, on the other, increasing our use and development of the underutilized resources.

**Donald McKernan:**

In terms of the Alaska situation that Fred Olson talked about, the large trawl fleet is the only trawl fleet in Alaska for groundfish and, of course, this is the foreign fleet. If United States fishermen are going to enter that fishery, either U. S. trawl vessels will have to be transferred from other areas, such as from the shrimp trawl fleet in Alaska, or from groundfish vessels from somewhere else, or we will have to build a new fleet.

**Clement Tillion:**

Our proposal in Alaska is not to subsidize fisheries directly. Although we

have some veterans loans and some vessel owner programs, they are fairly small. We do not subsidize either the processor or the fisherman, but put the state effort into developing ports, transportation, schools, and roads, where needed. Aiming directly at the bottom fisheries, we are developing ports where produce can be moved in areas that today are very isolated. The state has chosen this kind of support to the bottom fishery and not one that subsidizes the construction of vessels or helps the processing industry. What we found is that we basically have enough vessels to get started. What we really need is ports, harbors, and methods of transportation to get the products to market.

**Donald McKernan:**

Laurie (McHugh), what about in the Mid-Atlantic area? Does your council feel the need for upgrading the fleets through some government assistance program or do you have any such program now?

**J. L. McHugh:**

Perhaps some other members of the council who are here can answer this better than I can, Don, but I will try. On the Atlantic Coast, we've tended to go the route of developing regional fishery development foundations. We just established one in the Mid-Atlantic region. It was inaugurated in April and is barely getting going. The objective there is marketing, new product development, and the kinds of things I was talking about this morning.

**Donald McKernan:**

What Dick (Allen) is suggesting is a kind of moratorium on vessel construction by natural market place pressures, which is interesting.

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**Louis Agard:**

If I understood Mr. Rayburn's question properly, he is asking if the government is encouraging building of boats. It would appear that, in the New England fishery, they seemed to have a surplus of fish of some kind after the foreign allocations or the foreign allocations were cut back so they may have reason to build vessels. In the Pacific we have been encouraged by a possible albacore fishery developing off the northwestern Hawaiian Islands. Fishermen in Hawaii are encouraged to build new skipjack vessels, new longer range albacore ships, and so forth. The government is encouraging this new construction with the 12.5-percent-down program.

**Donald McKernan:**

Do you see that as a benefit?

**Louis Agard:**

Definitely. We anticipate many more jobs and much more productivity for our canneries. We are importing about 75 percent of our tuna because we can't supply our canneries. The increased fleet would certainly give more employment and more social benefits.

**Donald McKernan:**

That suggests that perhaps such a subsidy program ought to be very selective. Certainly, we shouldn't dump it on New England if, in fact, there is an overage of boats there, but we should put it into other areas. I recall that when the vessel construction subsidy program went into effect years ago, in the 1960s, we

were prevented from turning down applications for new vessels even though they were for a fleet we believed was already overbuilt.

**Paul Anderson:**

There are a couple of ways to look at limited entry as it relates to federal government help in increasing the viability of the fishery. For a number of years, the northwest purse seine fishery was able to enjoy the fishing-vessel-obligation guarantee program, until Washington and Alaska instituted a moratorium-type of limited entry. Then it was the government philosophy that, since we had a maximum number of boats, we should not have any help in increasing the viability of the fishery any further. But there is another way to look at this. Once we have this maximum, possibly optimum, number of vessels, what is wrong with helping the existing fishermen to develop the best possible equipment?

**Donald McKernan:**

Once more, what you are really saying is that we ought to do this subsidy business in a very selective, considered way, rather than use a broadbrush approach.

**Lucy Sloan:**

On this discussion of loan programs and other kinds of government aid, one thing has been very interesting to me in the last couple of years in board meetings, particularly on the West Coast. Inevitably in the discussion of what needs to be done to revitalize a fishery or to move into an underutilized species, somebody will stand up and say we need more government money. At first, that would make me nervous because he who has the gold makes the rules. But, now I don't have to say anything. Usually what happens is that several of his mates will jump on him and beat him because they don't want subsidies.

One of the things that we want to take a good look at are the alternatives. The New England development program is on the right track. Some of the development foundations are tending toward the kind of thing we want. On the West Coast there are several groups that may eventually come together to form some kind of foundation. These are talking about government seed money not unlike, say, Sea Grant money to get started. The idea is that within the first three to five years the government funding will become largely unnecessary. It will come from private sources, either the processors or the fishermen, or both, depending upon what the projects are. I think that something like development foundations, tax incentives, or that sort of thing are what we want. We want to make it very clear that trends in fisheries development are not in favor of subsidies. We have seen the problems subsidies have caused in Canada and we are not looking for them here.

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**William Hargis:**

Mr. Mundt raised the problem of the legal system, that is, the court's current system in judgments on matters relating to resource management. Is it inconceivable that special court systems could be developed to deal with these matters? There are, after all, such court systems in existence for other social activities, for example, admiralty courts and state corporation commissions that deal with limited entry into other economic activities. Is it inconceivable that we

could develop court systems that would deal with resource management questions specifically?

**Carl Mundt:**

We suggested that the fishery management councils themselves will have to set up what are called administrative tribunals that actually make judgments. That is probably going to be required under the legislation with respect to specific denial or granting of permits.

**William Hargis:**

Does the legislation as it now exists provide for or allow that?

**Carl Mundt:**

It does not provide for the kind of legislative hearing that I just described. What I said was that the paper I summarized suggested that this would be required by the Constitution in certain specific circumstances. You might be interested to know that in one of the earlier drafts of the FCMA, not the draft that eventually passed Congress, there was an institution provided for in the legislation called a Fisheries Management Board or a Fisheries Review Board. It was to serve as sort of a quasijudicial forum where questions stemming from the act could be brought as a matter of first impression. I think that they then had to go on to the federal court system. But in answer to your question, I don't think that it is inconceivable at all that we could set up some type of forum that would be more familiar with fisheries resource types of questions.

**Clement Tillion:**

Looking at it as a politician as well as a council member, I don't see us establishing courts at this time. It took a long time to establish our case law in agriculture and I don't see a property in fish being any different from one in farming in any case. I think that the present judicial system in the end will be able to handle it, though there will be some court cases that are detrimental and will require legislative bodies to go back to draft the laws to get around what the judiciary has done, and this in time will set its own precedent. I don't really see the court cases that came in after the Taylor Grazing Act, for instance, which is a form of limited entry for ranchers on public domain, as any different from what we will face in fisheries limited entry. We will have to watch very carefully that we don't violate the Fourteenth Amendment and we are not going to be able to do exactly what our constituency wants us to do in many cases. I think the present courts are going to be able to handle it and, even though it might make sense from Bill Hargis' argument to have had a different kind of court, I don't see one coming.

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**Christopher Weld:**

I would like to ask Mr. Mundt whether he agrees with Mr. Burke that the right to participate in the harvest of a common property resource is not a property right

**Carl Mundt:**

My one word answer would be yes. It is not a right for which compensation has to be paid if it is taken away.

## PHILOSOPHIES AND FEELINGS

### William Feinberg:

Except for Jim Douglas and perhaps one or two other speakers, I have heard very little about the philosophy of limiting entry into a fishery, and this is the point that, like Jim, gives me difficulty.

In this country we pay lip service to the idea that we are in a free economy which, of course, we no longer are. The concept of the free economy has been chipped away over the years, with the government moving in originally on those industries that were subject to police power, such as liquor, radio stations, and other things that were intimately connected with the public interest. Gradually, we have seen the intrusion of government into very many areas that had traditionally been private industry areas. Whether or not this is an evil depends upon your individual outlook and whether it is consistent with the philosophy of the majority of people. Based on what we read in our history books, I daresay our founding fathers probably did not envision the government telling us what industries we could and could not get into. Of course, times, governments, and philosophies change. Although I assume that limited entry as a legal concept would probably be sustained in court, that isn't the question. The question is, do we want it? And where do we go after we have regulated the fisherman?

Now I have talked about this in the halls and I am sure that that is repetitious to some people here, but there are areas in this country, and I am from such an area, where there is an overabundance of people in certain vocations. One of these vocations is teaching, another is the legal profession. I can tell you that there are many people who have gone to college and received degrees and advanced degrees and who now do things like go on unemployment because they can't find jobs in their chosen fields, or they become short order cooks or some such thing. People have said to me that this is a very wrong system; that our society should not allow people to decide for themselves willy-nilly what they want to do with their lives; that our government, which supports institutions and universities of higher learning with public funds, should dictate how many teachers we have. They just draw funds on unemployment, so we should close teaching until society has been able to absorb all those teachers now waiting for jobs and then open the profession again.

Now, this might seem extreme, but the question that bothers me is this: if we start with fishermen and say we have too many fishermen, where do we draw the line? Are the teachers next? Are the lawyers next? Are any of us next? I don't know. If we all want it that way, maybe it should be that way, but I think we ought to give it some thought. If we are going in that direction, I think that we ought to forget about some of the concepts we have historically put value on, such as freedom, and just think that the government can make decisions for us better than we can ourselves. I don't think that Thomas Jefferson would have agreed but maybe Thomas Jefferson is outdated.

I remember a quotation from, I believe, the Senate Commerce Committee regarding this limited entry concept, and it said that it was a tool to be used as a last resort. That is the way I envision limited entry. It is a bitter pill to be taken to remedy a bitter situation. I don't envision it as a way of life or as something per-



manent. I don't envision it as something like a cancer that is going to spread from the fisheries into everything else. Certainly, if I have anything to say about it, it is not going to be that way.

**Richard Bishop:**

To equate limited entry to the government telling people who can fish and who can't is perhaps a bit of oversimplification. It certainly could be that way, but if we write it off as something that simple we overlook a lot of alternatives that are really very much in keeping with the free enterprise system. I don't see these transferable stock certificates as being much different from what we were doing with homesteading a hundred years ago when we gave people property rights in a land resource. It is definitely a change in the rules of the game. It is not necessarily an abridgement of freedom as I understand it.

**Allan Adasiak:**

This may seem strange coming from me. I have been with a limited entry program for about five years. I don't like limited entry. If you want to talk about feelings, not about intellectual concepts, I don't like it. When I was a kid I could go to Yosemite and camp out and have a wonderful time. As time went on and more people came in, I saw the meadows paved and Yosemite become smogged. Now you have to make reservations to go there. You ride in on a bus. I prefer the bus to smog, paved meadows, and congestion in Yosemite. I would much rather have it the way it was when I was a kid but the good old days are gone.

In the fisheries we are looking at the same thing. The general assumption for years was that the sea was an infinite resource. It could support all sorts of pressure, all sorts of use. We are learning that this is not so. Something has to be done. There are a number of different things that can be done, such as controlling quotas, fishing periods, or other things. Limited entry is one of them. Philosophically, as far as telling people what they can do to earn a living, I think it is very important to realize that we are talking about a common property resource. Whether or not you are a commercial fisherman, those fish in some sense belong to you. They belong to you the way the timber on national forests belongs to you. They belong to all of us. Look at how timber is harvested. You can't go into a national forest and harvest timber commercially if you feel like it. You can't just go in and cut down some trees and sell them. There is a series of procedures that control access to that timber and regulate who can use it and who can earn a living harvesting timber commercially. The same thing goes for drilling oil. There may be federal oil lands, but you just can't go out and pull that stuff out and sell it commercially if you feel like doing it. There is a whole series of regulations, bonus bidding and all the rest, that controls who gets the oil because it is a common property resource. It belongs to the people.

The fish are the same, and what we are seeing is not that fishermen are the first to go as to who is allowed to harvest the resource, but rather that they are the last to go. We are seeing probably the last large common property resource gradually being transformed with some set of limits being put on the access to that resource. Water rights have gone that way, oil has gone that way, timber has gone that way, grazing lands have gone that way, and the transition has come last to the sea because it has been so expansive in what it could provide. We are in a stage of transition.

**Edward Manary:**

It is very hard to ask a man to change his philosophy. I look at this thing and I am like Allan. I have some personal reservations. But there are some fundamental facts and, whether we like them or not, we have to accept them. Let's take the case of a doctor. Is there free entry into medicine? Do you just hang your shingle on the wall? No. You must buy your way in. You buy your way in by going to school. Then you have the opportunity to set up your own practice from scratch, or you can buy out another doctor who is already in the business. When you buy him out, you are going to pay a certain price. Is that really so different? That is the way life is, and in fisheries it is changing. None of us likes change. I am not a longshoreman or a philosopher, but I can sure identify with Eric Hoffer when he says he likes the status quo because he is comfortable and knows what it is all about.

My job is to protect the resource and to represent my people, in that order, because, without the resource, there is no industry to represent. Limited entry is a tool that I can employ to protect my people and I think it ties into good management and conservation. It is like halitosis: I don't like it but it is a hell of a lot better than no breath at all.

**Donald Bevan:**

Pretty obviously this seems to be one of the key questions. I would like to suggest that maybe Mr. Feinberg's philosophy was turned around. It seems to me that free enterprise depends on private property, and limited entry can be a way of establishing private property. I agree that it can be done badly, but a system that does not have private property rights cannot be free enterprise and must be regulated the way societies who try to share things in common work. To me, a free enterprise system is a private property system, and limited entry can be a way of going back to a system that is proven in the American way of life.

In the spirit of improving communication, may I suggest that we all should go back and look at our terms. When some feel that going toward limited entry is approaching socialism and I feel that it is going away from socialism, obviously we are using different terms and different views. It seems that there is a vast difference of opinion whether establishing a property right will lead to more or less government interference. That is a researchable question that someone needs to write a paper about.

**Jim Wilson:**

I am very sensitive to the kind of argument Allan Adasiak made. But one thing that bothers me is the impression that the primary attainment of the limited entry programs we have reviewed today has been economic. Limited entry only makes sense if it also has that conservation goal or objective and attains it. The problem that Adasiak points out with regard to Yosemite is a problem in fisheries that can be dealt with by limited entry or by net size regulation—anything can be used as long as stock depletion is avoided. To make those strong arguments for limited entry in the face of the experience to date seems to indicate that its primary attainment has been purely economic and not conservation. This is not consistent. I think that we have to look closer at our limited entry programs and see if they can, in fact, produce this conservation objective. If they can, then we can make this kind of defense for them.

**Jack Davis:**

I would like to continue an enjoyable argument I have had with Jim Douglas over fisheries matters by commenting specifically on his concern that limited entry programs require a management agency to fix either individual or average income of fishermen. I think that we must be aware of the fact that limited entry is not the only sort of management that has that implication. Indeed, not imposing limited entry also can be looked upon as fixing average fisherman income; the salmon fisheries are an excellent example. Fisheries in which the individual fish have a high value and the capital cost of entry is fairly low have natural economic forces that drive the income to a subsistence level on the average. In these fisheries a laissez-faire management would also fix fishermen incomes. Practically any other management approach—seasons or size limits, gear regulations, and other common actions—also have economic consequences. I think that it may be dangerous to undertake management activities that have considerable economic consequence without being fully aware of them. One of the advantages of a limited entry scheme is that those who are designing it are forced to be aware of its economic consequences. In using many of the other management tools, the economic consequences have been overlooked and consequently they have not been very successful.

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**Allan Adasiak:**

I am concerned over comments from Jake Dykstra and Jim Douglas about the setting of individual incomes. We don't do that. We don't want to do that. If I gave anybody the impression that somehow the setting of individual incomes was at all involved in what Alaska has done, I want to set the record straight right away. The fishermen who strongly supported limited entry did so for a number of reasons; one was low incomes, and poverty is bad. If there is a way of ridding the system of poverty, that is fine.

The reason I am concerned is that we have heard it in king crab, too. The king crab fishermen are morbidly afraid that limited entry will fix their income, and I am appalled at that notion.

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**Richard Bishop:**

I am an economist by trade and yet I think that what Biliana Cicin-Sain and Mike Orbach are telling us makes sense from a social-economic point of view, as well as from the view of anthropology and political science. At the same time we have to recognize another aspect and that is, if one goal of fisheries management is to maintain local communities or cultural roots, then open access may be just as much a threat to these groups and communities as limited entry. Shouldn't we be just as suspicious of a continued policy of open access as you are to proposals of limited entry?

**Biliana Cicin-Sain:**

I think that what you are asking, Richard, is whether we really have enough data on who currently benefits and who currently suffers under existing systems of management. That is a very important question. We don't have enough information on that but I emphasize the potential negative aspects of limited entry

because it really has the potential of altering a lot of established patterns. My major argument is that before we choose limited entry we really ought to consider very carefully who will be affected, how and what we want to achieve, and then justify whatever system of entry we might want to adopt on the basis of broad societal goals for the future.

**Donald McKernan:**

I notice that Dr. Christy raised somewhat the same question that Dr. Bishop has raised, and that is when one does look at societal effects, one must try also to look at the societal effects of the laissez-faire considerations. I think that they would both agree that we need more studies of these effects. I think that they both were advocating systematic studies to lead to that knowledge so that we can make appropriate comparisons of management systems.

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**William Hargis:**

We have heard a lot of talk in the last two days about laissez-faire and philosophies of economic development in this country. We have heard also about the implication of limited entry as a relatively recent management tool. I want to make a couple of points. The first patent in North America was given to Sir Walter Raleigh by his girl friend, Queen Elizabeth. She gave him exclusive rights not only to the land but also to the fisheries. He was never able to capitalize on this grant. The next grant by the English Crown was made to the Virginia Company, and it included all of the lands between North Carolina and half of Maine west to the western ocean. It included access to all the minerals, forests, and pearl fisheries east of the coast practically to Bermuda. Now that is what I call limited entry. The charters to the New England colony were given in the same way with the same levels of control. We might look also at the New England experience with the control of clam grounds. That is, only if you are an Ipswichian can you get access to the Ipswich grounds by application to the town council. If you are a Norwichian or Plymouthian, you can get access very readily to clam grounds in those towns. That, too, is limited entry and that is the free enterprise system in New England, at least as far as clam grounds are concerned.

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**Allan Adasiak:**

As for free enterprise, one of the arguments raised against limited entry is that we don't need it because free enterprise competition will take care of everything. The good people will survive and the bad ones will drop out. While that might be true in a very closed system where there are no other options, although salmon fishermen dropped out in Alaska before limited entry, their boats stayed in. They sold the boats to others who went in and fished along with some more people, and there was a growing trend. We also heard, and I believe that it is very true, there is some sort of spirit that a fisherman feels that sort of compels him to fish even when things get bad. This is something you have to understand intuitively. This spirit affects fishermen's behavior in an irrational way. They like fishing so much that, rather than give it up when the open seasons get shorter and the money gets thinner, they get another job. They work as a telephone lineman, as a grader operator, or something else. The notion that free enterprise

and competition alone will somehow take care of everything has just not been borne out by what we've seen in Alaska.

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**Robert Rose:**

I listened to Mr. Agard when he spoke about the small shelf of Hawaii and related it to our zone off New England, which we thought at one time to be very large and is now getting so small. When we apply the number of vessels that are allowed to work in this area, it is very small. I think back to when my grandfather started to fish, when he came across from the old country and he worked off the breakwater. When he retired and my father took over they were fishing off of Seal Island which is at the southernmost tip of Nova Scotia. Now I am in the fisheries and work off the Grand Banks, ending up 110 miles south of Greenland. Unfortunately, we have lost all reciprocal agreements with Canada, which now makes our pond very small. If we don't start doing some proper management and looking at vessels and the number of vessels that are going to be allowed in these areas, then we are going to be in a lot of trouble.

We tried to talk management to the people presently involved in the industry, such as fishermen. We say we have got to conserve, we have got to have conservation, and these stocks have got to be rebuilt. But the one question Dr. Christy said keeps coming back to us, "Who are we saving it for?" If there was a moratorium or limited entry for a limited period until these stocks are at least rebuilt and these fellows are paid back for the amount of time they wasted by not fishing, it would be fine. But this doesn't solve the problem. If fishermen are asked to pull back and not catch fish, someone else down the road is going to build a boat. We all know that, when you start talking about moratoria and limited entry, these large corporate structures start being formed to enter the fisheries.

So how can we relate to this here? For myself and for the gentlemen who are in this room and are involved in the fisheries with an amount of money invested, we are in a very detrimental situation right now. We do need some type of program, whether it is for a limited amount of time or what. Even after these programs come, we are always going to have to come up with an equation relating a certain stock level with fishing effort. I started to write a paper on this. I called it the three commandments, which have to be social, economic, and conservation. Whenever you don't address all three of them, you have unbalanced the scale and you start losing.

The other thing to remember, and I am going back now to my grandfather's day, is the efficiency of his vessel compared to the efficiency of my vessel. When I walk into my whale house I snap a button and I get digital numbers on my loran. I don't take ten to fifteen minutes to find out like my grandfather, who had to use the sexton or a sounding lead. I snap on another machine and it tells me how deep I am. I snap on another machine and it starts scanning X number of miles of the ocean floor, which tells me where the fish are and where the hang-ups are. Technically, the vessel today has probably twenty-five times the efficiency of my grandfather's boat. With the pond getting smaller and the number of boats getting greater and more efficient, something is going to bend or break.

Whether people want to believe it or not, we have the ability to clean out stocks, and stocks that are in a depleted state right now will be cleaned out if this problem is not addressed shortly.

We have some draggers in the fishery today. If we don't have a moratorium and X number of new boats come in, say 50 percent of these draggers go down the tube. Who supports their families? If the boats are taken back on a loan, you know darn well that through the banks, the interest rates, or something, someone pays for what is lost somewhere down the road. I am tired of having someone's hand in my pocket while I work my butt off. It's time that everybody pays for his own.

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**Fred Olson:**

I have a couple of comments and then a question. One of my comments is on the use of the terms "rights," "fishing rights," and "fishing privileges." Clem is using the term "fishing rights" because the license has some value. If there is a value in it, we call it a right. If there is no value in it, as the lawyer said this morning, it would be a privilege.

I don't know exactly where we got the rights to this land here in Denver. It may have been the Louisiana Purchase or some other act, but ultimately we had grazing rights to the public land. We have talked about the Taylor Grazing Act. I have been looking at this recently and have found that it was the first time we charged grazing fees. By 1941, everybody that grazed on public lands of the United States paid a fee. We talk about the classes, those that are in and those that are out. All of us in this room, I suspect, are not grazing land here in Colorado, but we are benefiting from the fees that are paid by the ranchers that are grazing in Colorado. In about 1951 or 1952, Congress passed a little known act that I just discovered last month. It said that they wanted to have a return to the federal government for the use of public resources. About in 1959 or so, the Bureau of the Budget put out a little circular on user fees. It said how we should use the fees and it applied rules. The federal government, meaning mainly the Department of Agriculture and the Department of the Interior, studied this during the 1960s as to how they were going to apply it to grazing. Grazing is very much like fishing. Grazing land is a living, renewable resource, and on public lands it is common property. In 1968, the government decided they would charge a fair market value for the grazing land. But at that time they were selling the privilege of grazing from one person to another at a price determined by the regular market value. Now they are raising the grazing fees over a period of time so, about 1982 or so, the federal government expects to be collecting the fees at a fair market value.

Now I come to the point that Clem was making on the thirty-five thousand dollar value of his right to fish. Who does it go to, who gets that? This depends upon how the limited entry scheme is implemented and the way that it is done. In Alaska it goes to the current fishers. It doesn't go to the future fishers. His sons and daughters and grandchildren have to buy that right to fish. I am wondering if that is the best way to do it.

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**Alan Guimond:**

I am really concerned, Mr. Tillion, when you describe your rights to sell your license as it is issued to you. Some of us feel that we have an inalienable right to fish. It is interesting that one of the examples you used in favor of limited entry related to your four grandchildren. We are looking for that same right for our grandchildren. And as I read Chris Koch's legal interpretation (pp. 251-268), I fear that limited entry would deny you that right for your grandchildren, the very thing that you hold dear. I wonder if we are not after the same thing but our perception as to how to obtain it is different because yours is a current program that you are able to manage. It is a locally adopted program that only applies to your specific state and fisheries. We are now talking about developing a national policy. (Editors' note: developing a national limited entry policy was not an objective of the conference.) Other people in other parts of the country are certainly going to have different thoughts on a monopolistic type of control over a license once it is issued, passing the license on to following generations as a vested interest, attainment of crew member status to boat owners, and other concerns. I think that we are after the same thing, that is, the ability of people to try to fish in a fishery that will support economically and otherwise their entrance into it. If everything you say is true and could be applied nationally, some people would say that our concerns are unfounded. That is not what I see in the papers presented, it is not what I have heard in discussing this with other fishermen, and that is our concern.

**Clement Tillion:**

I have four grandchildren. I would rather have two of them make a living or one of them make a living than all four starve. So I am interested in maintaining the fisheries. We chose a property-right concept because of the ease of defending it constitutionally and also of getting the bureaucracy out of fisheries. Once a permit is issued, it is issued. Like the deed on a farm, we don't have to have the bureaucracy tell us whether to turn it in or not or how much we can sell it for. So we chose that route rather than have the permit come back in and then have the problem of deciding how the state would handle it. We also wanted the permits to be owned because, as the fishery declined, the value of the license declined. This provides a built-in conservation ethic for the fishermen involved, because his license upon retirement is worth more if the stocks are in good condition than if they are not. This has had a very noticeable effect.

I am not saying that limited entry should cover all fisheries. For instance, in trolling, I would not cover the hand trolling because there has to be somewhere for the high school kid to make some pocket money. You have to have some fisheries that anybody can get into. I would never advocate limiting access to all of them. I am just saying that many of the basic economic ones that are involved in our balance of payment and can really have impact on the food supplies of the world are too valuable to be solely a life experience. They have to be managed for maximum output. The hippies in our state really opposed limited entry because, to them, it took away a life style. They could go out and make a few hundred dollars easily. What we found was that, once they got into it, the license became too valuable. They invariably ended up selling it, and it went to somebody that was a no-nonsense fisherman. There are drawbacks to limited entry;

however, I hope that I did not paint the picture there were not and, as I said, there has to be something for the kid to run a few crab pots in the bay, or a trout line or something like this. There has to be some sort of open fishery.

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**Michael Peters:**

I hope you don't consider me a hippy or whatever. I am a fisherman. By vesting a property right in a license, and prioritizing economic objectives as the most important, and allowing fishermen's cooperatives and industry to participate in enhancement projects, why hasn't your state then gone to the most efficient way of harvesting salmon, that being fish traps?

**Clement Tillion:**

First, I am one of those few Alaskans who voted against the repeal of the fish traps. We don't use them because of the political realities of distribution. With fish traps, we would either have to turn the fishery over to a very few individuals and tax them severely, which could suit me just fine, or we would have to allow the present system. Seeing that the majority of Alaskans prefer the present system of harvest, far be it from me to pull that out from under them. It so happens that the majority of Alaskans also prefer limited entry by nearly two to one in an initiative to repeal it. As far as hippies are concerned, about three quarters of the young people in my district have long hair. As long as they don't have their hands in my pocket to buy food stamps, then they are not hippies. They are just working fellows with long hair.

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**B. J. Putnam:**

You made a statement in your remarks about selling the farm. Where the hell did you buy it? If you are going to sell these limited entry permits, you must own them first. I don't see how you can sell the farm if you really don't own it.

**Clement Tillion:**

If I want to fish again commercially, I am going to have to buy a license.

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**J. Roy Duggan:**

I would like to make just one statement on the side of limited entry. The protection of some fishing families in our population is important. In some fisheries, if we don't take some steps to limit part-time commercial taking, some families who have fished for generations may not be able to make it any longer. People who have fulltime jobs go out in the peak of the season and catch such a large part of the resource that those who are at it the year-around have a hard time of making a living. There are some things to be lost if we don't take action in situations of this type. It is not the same in all fisheries but some fisheries do have this characteristic.

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**Unknown speaker:**

These limited entry arguments seem to center on either commercial fishing or the balance between commercial and recreational fishing, and little comment is made about the consuming public. I think that we make a great mistake if we



don't really look at these fishing problems in terms of these three groups that have an interest in what the fisheries will produce. Of our total population there are, I guess, about less than 1 percent commercial fishermen and about 7 or 8 percent recreational fishermen. That leaves over 90 percent of the people who have no commercial or recreational interest in these resources. They don't ever go fishing, but they want those resources used for the best interests of the public, not just for commercial fishing and not just for recreational fishing. In approaching this problem, we must always keep this in mind, because if we make regulations that tend to drive certain species out of existence for those who want to buy that fish in the marketplace, they are out of luck unless they go buy a fishing pole. On the other hand, we have this overall national interest in trying to get as much out of our fisheries as we can. Right now we are two billion dollars in the hole in fishery-products trade alone, and I think that the public would like to see some relief by using these resources wisely and maybe in a way that doesn't totally suit the interest of commercial fishing. We must remember that there is that other 90 percent of our country that is involved in the use of these resources.

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**Michael Orbach:**

I would like to make a general comment. I may be restating the obvious, but so many of the issues that have come up in the discussion here are cases of seeing all black or all white. We talked about Don Bevan's question that regulations add costs to the fishermen. Yes, but they may add a very tiny amount or they may add a very large amount relative to the regulation, to the fisheries, and to a lot of other things. Regardless of whether we can think of a situation right now when this particular curve occurs (which Richard Allen described, cf. p. 34, and Anderson, p. 81), the point is that a curve like this is configured differently for every fishery. In some, we may need different kinds of regulatory inputs and in some we may not. The point is that we ought to derive the curves instead of taking the old standard one and using it all the time. Dick was very correct in that kind of criticism. With the business of the capital construction fund, it was clearly pointed out by the discussion that it is going to differ in every case and in every fishery as to whether that is applicable or useful.

There was comment made earlier about what the national policy is going to be on limited entry. I have a hard time with that concept. Limited entry is simply a tool for obtaining an objective. It can look different in every situation and achieve a lot of different objectives. I think that we ought to avoid thinking in these terms of either we control the economics or we don't; either we have limited entry as a national policy or we don't. I don't see this approach as productive. I think that it is all relative to the fisheries and I think that it is what the regional fishery management councils were meant to address.

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**Ralph Rayburn:**

I am happy to hear most of the managers in the panel express, what I gathered to be their opinion, that limited entry should be considered on a case-by-case situation. Bob ably pointed out that in the Gulf of Mexico we have a

situation that I do not think directly correlates with what is happening in Alaska, because of the seasonality basis on which it operates. Basically, I appreciate the openmindedness of the panel and I hope that you will continue to look at it as another management tool, just as many other tools that are available to you, and not cite pro or con or make it a personal issue as to whether you utilize limited entry or not.

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**Fred Popper:**

I would like to speak to two aspects of the debate. One is this question of the objectives of management. I am quite unrepentant about what I said before (pp. 5-12). I may not have used the right terminology, but I am unrepentant as to the concept. I believe that there is a distinction between what I called the principal objectives, maybe I should have called it the actual objectives, and other objectives. That you have management at all, I think, is for at least two main reasons. One is that there are commercial fishermen who are unhappy and the other is that there are recreational fishermen who are unhappy. It is perfectly true that if you manage the fisheries, you affect other values such as social and cultural values. It is also true that you could have management directed principally at some of these other social values, but I don't think that it is the situation today. If you want to be realistic, you have to take, as a base or starting point, mainly the commercial fisheries and to some extent the recreational fisheries. You start from that. Then you ask what are the implications of doing a particular thing or doing nothing, because doing nothing also has implications. Try to see how much it will cost you to pursue the other objectives or not to pursue them. How much would it gain you not to pursue them? And then you get some kind of a rational way in which you can weigh these different objectives against each other. Then you might get away from, or might confirm, the sort of emotional rating that you give to these objectives. As Senator Tillion said, the fish go to those who eat them first, sell them second, and play with them last. Maybe that is the correct way, but you want to test this in each case.

The second point I wanted to make is that I am perturbed by the emphasis in the debate today on the differences between different fisheries, amounting almost, I felt, to giving up on any general policy or general principles that could be applied. I think that this is going too far. I quite agree that there are big differences, but there are also basic factors that are the same and for which you want a national policy. To say that everything is different and, therefore, in each case we have to start from zero will get you nowhere, just as the related excuse for not having a policy, namely, that you need more data, will get you nowhere.

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**Mildred Nicholas:**

The Columbia River gillnetter is definitely an endangered species. I can't quite make up my mind whether, in being on the Columbia between Oregon and Washington, we are being squeezed between the two states, or whether we are a dividing line, but we are definitely in the middle of the whole works. We have eleven dams on the main stem of the Columbia River. We lost much of our precious spawning grounds when the Grand Coulee was built without fish lad-

ders. The downstream migration through the eleven dams of the Snake River and the eleven dams on the Columbia have almost eradicated the upper Snake River runs. Work is currently going on to save what is left of them and many innovative techniques have been tried. Some we hope will work better than others, because fish soup going through the turbines is an awful waste of money in raising salmon.

Another thing we have to contend with is the Marine Mammal Act. For years we have been telling the people who like to write papers that the seal and sea lion population has proliferated to the point where they are getting more salmon than the people who raise them. I think that no one wants to see any mammal absolutely eradicated, but when they were kept under control our fisheries did not show a 50 percent damage rate from seals. My daughter and her husband delivered 110 pounds of salmon one night and in the bow of their boat they had an equal amount of salmon heads and carcasses that were mutilated and could not be used for anything. We think that it is time for something to be done in that respect.

It is no secret that men who make their living from the sea are usually tough-minded and independent. While much is expected from this conference and a great deal of useful information and many good ideas have been exchanged, I wonder if I am the only one who has the feeling that we have been more talking *at* each other than *with* each other. The tension that I feel is deeply rooted in the very real need to communicate the most urgent problems facing our respective areas and an equal need to feel that we will have the opportunity to participate in the solutions to these problems. With this in mind, it would be useful to have each regional council study these proceedings and evaluate them in the light of their respective areas and, having done this, they could then go as far as possible in applying this information to the most pressing problems in their respective regions. If this were done with sufficient input from those engaged in the industry, then perhaps an enlarged information base could be formulated.

The greater degree to which fishermen input is integrated into any limited entry plan eventually adopted, the more at ease they would feel with that plan. While it is true that we cannot turn back the clock, the habit of independent thinking is not an easy one to break. Those of us who are thoroughly conditioned by a lifetime of living within the free enterprise system can, I hope, be forgiven for reluctance to take that first step down the road that appears to me to lead in the direction of the eventual socialization of the fishing industry.

Mentioning lifestyles, my daughter is the fourth generation of her father's family to fish the Columbia River. There are several fishing families in their fifth and sixth generations. It is a lifestyle that we don't care to give up. Any man who has fished for a living doesn't need to be told why he is out there. As Mr. Dammann said, fishermen are not out there entirely for the money. There is more to it than that. If you have fished for a living, you don't need to have it explained to you. If you have not fished for a living, no number of words that I can say will explain it.

It is necessary that we recognize that any decision made for one fishery affects all fisheries to some extent, where economic and social programs are concerned. Closing Washington and Oregon waters to trolling resulted in over-

crowding in California and southern Oregon ports. In one port, some fishermen had to wait as long as five days to get ice. Worst of all was the serious overfishing on already depleted stocks. I have a letter from an executive of the Columbia River Fishermen's Protective Union endorsing limited entry for a moratorium. This union celebrated its one-hundredth anniversary in 1975. It isn't a Johnny-come-lately organization. The Columbia River Fishermen's Protective Union believes that a moratorium on new licenses for salmon fishing is a must and will be working for it in the next session of the Oregon legislature. The Columbia River has become a catchall for those men needing to find new territory in order to comply with the Boldt and Baloni decisions, and who absolutely have to get their nets in the water in order to make a living. Also, care should be taken not to hamper new boat building that upgrades the fleet, so that the new and usually larger boats that begin on salmon will be able to go for tuna also. This would take considerable pressure off the salmon resource. The industry needs new boats to compete with sophisticated foreign competition.

I hear the term buyback from every source. In order to buy something back you have to own it to begin with. Rather than buying back a man's right to fish and buying back his boat, the term buyout would be more correct.

The consumers are being shortchanged and I can't say this too often. Ninety percent of the hatchery program in the states of Oregon and Washington is paid for through federal taxes. On the Columbia River, since November 1, 1977, to the present we have had eight days to fish for salmon. Who gets those salmon? Sport fishermen. The Indian fishermen were denied even two thousand for their commercial fishery. They were allowed fish for ceremonial and subsistence purposes and that is all. This is the year that the Willamette Falls has seen the best return in many, many years, and not one of those salmon was taken by a commercial fisherman. The Lewis, the Toutle, the Cowlitz, the Kalama, and all the lower rivers had good salmon runs this year, and not one of those fish was taken by the commercial fishermen. We were the only user group denied participation and we don't like it.

**Donald McKernan:**

You mean the gillnetters were the only user group denied participation?

**Mildred Nicholas:**

Yes, the gillnetters.

**Donald McKernan:**

We are talking now about the salmon that are fished along the coast first by Alaskan fishermen, then Canadian fishermen, Washington troll fishermen, sport fishermen, charter boat fishermen, and then, of course, gillnetters are one of the last groups to have access to these fish after they enter the large Columbia River. This is certainly one of the conservation problems that has been borne very heavily by the people you represent.

I want to make the point that in terms of the moratorium or any of the limited entry concepts that we are talking about here, implementation would be by the Pacific council that serves your fishermen, so there should be no conflict.

**Mildred Nicholas:**

It would serve the whole fishing community best if the two plans (council and state) could be coordinated.

**Joe Easley:**

The direction we are taking now in the Pacific council is to set up some guidelines for the states to consider in dealing with the moratorium issue. We are encouraging the states to act rather than having the council establish a federal licensing system. We prefer to stay within the state system. We are going forward on that basis and there will not be a moratorium set by the council separately.

**Zeke Grader:**

I would like to comment and actually enlarge on Joe's comments in regard to salmon fisheries and limited entry. I know that in California and the trend in Oregon, is that the plans are actually being developed by the fishermen. The fishermen are not going to somebody and saying, develop a plan for us. They are actually doing it. In fact, fishermen from our organization have developed their own plan, and I think that will be the plan that will be accepted by California. From what I have heard so far at this meeting this is unique, but it is an approach that should be looked at more. It is a better way to avoid some problems if a fisherman who has a background and knows something about the management program can develop a limited entry plan. I know that this may be heresy to a great many here who are looking at limited entry as something more to study and write papers about; I think that there is still a place for you certainly in an advising position, and perhaps this is a reversal of roles when fishermen are asked to comment on what is being done to them. Perhaps there is room for academicians and bureaucrats to comment on these things. Through the goodwill of our fish and game department we are developing our own programs, and I think that these are going to be much more palatable to the fishermen.

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**Benjamin Chiancola:**

Back in the 1940s and 1950s we had our own limited entry. Many got into the industry but could not make a go of it, and the fleet diminished by itself. There were many hangups on the bottom as a result of this.

Now I would like to ask what you do in the case of family boats where a fellow has two or more sons? Usually as soon as a son becomes capable, somehow or other he obtains another boat. More often than not, it is a secondhand boat. How can this be handled under limited entry? Also, I would like to know what would happen to the incentive for the immigrants we have in our fleet. I am talking about Boston, Massachusetts. Most of the fleet out of Boston comprises these fellows. They come over here with hopes of bettering themselves. Without them we wouldn't have any crews. Now, each port has its own specific problems and I think that if limited entry is put into effect that it should consider these differences between ports. Also, there should be plans to go along with the limited entry. We should not go into it and stir up the same kind of commotion we are having over governing the species. How many species are regulated under limited entry in Alaska?

**Clement Tillion:**

At the present time, all five species of salmon and herring.

**Benjamin Chiancola:**

You do not regulate groundfish?

**Clement Tillion:**

We do not have a groundfish fishery.

**Benjamin Chiancola:**

Well, when you get it, watch out.

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**Robert Rose:**

First, I have heard it several times and it bothers me: when we say limited entry we say fewer fishermen, fewer fishing vessels. Actually, I am assuming that we are talking about at least maintaining present status quo, not reducing numbers. I think that when we say fewer fishermen everybody gets the feeling that we are going to throw some by the wayside.

Jake, you made the statement that limited entry changes the way of life for a fisherman. Well, without it, or at least a management program that will bring some sanity to what is happening in the groundfish fishery in New England, you are changing my way of life. The day before I left to come here my father made the statement to me that he was thankful that he got out of the fishing industry. He could not maintain his sanity under what is taking place now.

I find that a lot of people and a lot of vessels that enter our industry on a part-time basis seem to have an awful lot of input into what should govern it. This disturbs people who are trying to make a living at it on a full-time basis.

**Jake Dykstra:**

I heard what you said, but at the present time there is no limited entry in New England and I think that you are complaining about what is happening now and perhaps confusing management with limited entry. It is not necessary, as has been pointed out here, to have limited entry to manage the fisheries. It is only one tool. You may have your opinion that it is now time to apply that tool to the New England groundfish fishery, but I think that it may not be the opinion of others.

**Robert Rose:**

I agree with you there, because the second thing I have to say is on the theory that the strong will survive and the weak will fall by the wayside. Before they fall, they deteriorate the vessel they had for a number of years to where they finally have to give it up. The boat is useless for anything else afterward. Do you agree with that?

**Jake Dykstra:**

I don't get your point. What is different about that under any kind of management? That has always happened. There always have been guys fishing in old sleds and presumably always will be unless we have some kind of capital construction program.

**Robert Rose:**

The difference is that we may have a kind of management that makes that problem worse.

Third, when you spoke of multispecies management, were you talking about groundfish with whiting and squid in domination or were you talking about haddock, cod, hake, and pollock?

**Jake Dykstra:**

It is my opinion that we will have to come up with a plan that encompasses all of the species caught in the mixed trawl fishery.

**Robert Rose:**

You are saying that whiting will have to come under the same management and guidelines?

**Jake Dykstra:**

Yes, I think that eventually we are going to have one plan that not only has whiting and groundfish in it, but every other fish that you catch in a dragnet.

**Robert Rose:**

Well, we spoke about developing unutilized species. Are not the foreigners working on unutilized species without any bycatch stipulations? If they are fishing the outside areas of the windows that they are presently working in and catching whiting and squid without having any effect on haddock or cod fish, then couldn't we do the same thing?

**Jake Dykstra:**

If you are asking if it is possible for someone to go trawling and not catch cod and haddock by not going into the areas south of Cape Cod, that is perfectly true. But I think that a lot of fishermen are tied up in the town of Gloucester, saying they can't.

**Robert Rose:**

With their present vessels they would have a hard time doing it and bringing the fish back in any kind of condition that would be marketable and, if they did bring them in in any quantity, the market would fall away.

The last thing that I have to say is more a statement than a question. If fish are a public property, such as has been stated here many times, then wouldn't it be in the best interest of the public to manage it properly, which possibly means controlling the effort? With all the intelligence we have, not only in this room but in New England, I think that we could derive some lessons from the experience with limited entry and come up with something that won't lock us into it for the future, but that would be a damned good limited entry program, particularly if it saved our groundfish fishery.

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**Daniel Arnold:**

In 1950, my immediate prospects for employment looked very poor and I turned to fishing. I have no heritage in fishing. At that time I hardly knew the bow of the boat from the stern, but over the years I have stayed with it and learned how to fish in my area. I see fishing as a very necessary part of our coastal economy. We find that people enter the fisheries and leave as employment conditions vary. Some, like myself, stay forever. Others have returned to what they were doing previously. I feel great concern that limited entry schemes in particular, and perhaps to a lesser degree other management schemes, will ruin this social value and change the nature of the coastal fisheries.

I was a very private person until the last couple of years when I began to perceive that along with the advantages of reducing and finally eliminating foreign effort we were going to have some real disadvantages written into the law—

that were necessary to be written into the law. So I changed my whole lifestyle. I have been one that has attended all of the New England council meetings, first as the token fisherman and now as one of a growing group of concerned fishermen who also feel their lifestyles are threatened. I have seen our meeting rooms go from being practically vacant to where in the future we may need to hire a hall or may end up in Schaffer Stadium. This participation I have done at considerable personal expense, as each of us has. I have lost many fishing days and had a lot of out-of-pocket expenses. But I don't feel that it is wasted. I am glad that I have been here. I appreciate the opportunity to have heard the academics and bureaucrats and, even more, I find that this last day has brought a breath of reality to some discussions that were pretty much over my head.

In closing, I would like to read a statement written by the president of our association, who is also a very successful fisherman in my area. His name is Frank Meracky. He is also chairman of the Massachusetts Marine Fisheries Advisory Commission.

"Limited entry is a mischievous concept which beguiles us with simple-appearing solutions to complex problems. Unfortunately, as we have seen, the solutions often beget greater problems. The Fisheries Conservation and Management Act mandates that we manage and conserve our fish resource. Nowhere, however, does it obligate us to manage the affairs of fishermen. If we can accomplish the former with a minimum of the latter, so much the better. The fishing industry, as with any free enterprise, has long functioned under the influence of certain economic principles. If pressure from the heavy hand of socialism can be relieved, these principles can be utilized to promote a harvest consistent with prudent conservation practices by a healthy cost-effective industry. Historically, competition has been the selective force which allows the efficient and innovative to prosper while those of lesser drive and adaptability failed. Even massive capitalization may not insure success. Like the dinosaurs and the Sea Freeze Atlantic and Pacific, these enterprises may succumb to overspecialization and high fiscal metabolism. Not all management schemes need tinker with the minute details of the fishermen's daily business. If not in fact, at least in the public perception, such paternalistic government intervention stands discredited. The more favorable response and willing compliance anticipated from fishermen to a management system which affords them a measure of the historical flexibility while assuring conservation of the fish stocks will make conservation implementation all the easier."

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### **Richard Allen:**

There is one problem that we all have overlooked here. The problem is not unique to fisheries but it is more apparent in fisheries than in the rest of the economy. The problem is overcapacity in the bureaucracy, that is, too many bureaucrats chasing too many fishermen.

The root of the problem is buried in the common property nature of the federal budget. We find that each bureaucrat acts in his own interests to increase his share of the budget without concern for the effect on the total budget. Over the short term, this process will reach a temporary stabilization as the total cost of



the bureaucracy equilibrates with the total resource available. However, passage of the Fishery Conservation and Management Act has created a temporary imbalance. Although the FCMA had the secondary effect of temporarily reducing foreign fishing effort, the primary result of the act has been to shift the demand curve for fishery bureaucrats or, as some Mainers term them, "fishcrats" to the northeast which, contrary to the effect of a northeast run of fish, brings fishcrats out of the woodwork.

While the recent increase in the fishery budget creates the impression that the field of fishery management is inexhaustible, the changing nature of the individual units applied to the field does not allow us the luxury of letting the number of bureaucrats reach its own level. A few short years ago, fishery managers were almost entirely a bunch of rundown, technically obsolete biologists who simply did not have the power to damage healthy stocks of fishermen. Within the past few years, however, biologists have been joined first by the economists and most recently by sociologists, anthropologists, and high-priced lawyers. If some controls are not placed on this ever-increasing bureaucratic power, the present number of fishery managers has the power to completely wipe out existing stocks of fishermen within a relatively short time. Although it may be possible to delay the inevitable through the use of such techniques as fishermen's quotas, that is, allocating each fishcrat a specific number of fishermen, without an overall limit on the number of fishery managers we will eventually reach the point where there will be more fishery managers than fishermen, and we will have to allocate less than one whole fisherman to each bureaucrat. It may be technologically and perhaps economically feasible to allow fishcrats to specialize and therefore divide individual fishermen into their component parts. I don't believe that this technique will be politically feasible, however. I submit that there is only one realistic solution. We must limit entry into the field of fishery management.

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### **J. Roy Duggan:**

Don McKernan, I want to give my personal thanks to you for your efforts in putting together this meeting. I think that we have all learned a lot more about limited entry that will be helpful in the future. In a meeting like this, there are things that come out sometimes that are not directly bearing on the primary subject. A few such things have occurred here that had me on the fence as to whether I should attempt to make a statement. Mr. Allen's statement convinced me that I should impose on you for a few minutes to get off my chest something that has been worrying me.

As background I would like to say that I am with a company that has been in this business a great many years. I have been in the industry for twenty-eight years. We don't own a single boat and never have owned a shrimp boat or fishing boat of any kind. But during those twenty-eight years I personally have spent many days and weeks and long hours and weekends working to help fishermen get a better break in some of the things we have faced. I do have a great deal of feeling for the fishermen, although we are not in that business *per se*.

Some sentiments expressed here worry me. They are sort of along these lines: "Leave the decisions about fishing entirely to fishermen"; and, "Let's let

fishermen's organizations draw the management plans and then have the management councils approve them." The management councils have been charged with a unique responsibility that lies between government and industry in the management of our fish resources. Even if they were agreeable to such an arrangement, they could not do it under the law. All of us must remember that the same law, PL 94-265, that worked to remove one of the most insoluble problems our ocean fisheries faced for many years, namely, depletion of stocks by foreign vessels, also charges us with certain other responsibilities.

The first claim on these resources is clearly given to American fishermen, but this law also charges that these resources be managed and developed for the benefit of all people, those with an interest in the fishery resource and the general public interest as well. We must remember that this is a public resource that we are talking about. It no longer is even a free resource. It used to be that very little money was spent in behalf of maintaining the resource, but we now spend money. All U. S. citizens contribute through state and federal governments to run hatcheries and to do research for the benefit of all fisheries. With the responsibilities under this law, we are also spending considerable sums of money to enforce regulations on foreign fleets. This gives the general public some interest in what is done with these resources.

I don't mean to say that discharge of this management job doesn't require maximum input from the fishermen who are involved. Without that input, a good plan cannot be developed. But that input requires that we communicate and not in just one direction. We must communicate both ways. We council members who are not fishermen must work hard to understand the problems of the fishermen and how we can best help find the solution to those problems. The fishermen, on the other hand, must realize that there are other responsibilities connected with this job, and they should be willing and eager to cooperate in the discharge of those other responsibilities so that, in the end, we can get the best plan possible—a plan that will give them as much freedom as possible while at the same time satisfying the broader responsibilities to the public. We need to work together; we *must* work together if we are going to do this job in a way that will bring the most fair and best results. We cannot use our energies in divisive attacks when cooperation is called for.

## **MORATORIA AND ALTERNATIVES**

### **James O'Malley:**

I hear many council members using the word "moratorium" and feeling fairly comfortable behind it. I would like to ask Mr. Burke or Mr. Mundt if this moratorium idea is just temporary, if it escapes any of the constitutional provisions, or if moratoria are in fact subject to the same restraints as a complete limited entry system.

### **Carl Mundt:**

The legal analysis of a moratorium law is precisely the same, for practical reasons, as any limitation of entry.

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**Don Bevan:**

Perhaps we could clear the air by recognizing that a moratorium is limited entry. It seems to me that it is difficult to argue that it is anything else. Although it is possible to recognize that limited entry is to a moratorium as proper medical treatment is to the doctor saying, take two aspirin and call me in the morning. But, as our lawyers have told us, a moratorium certainly has to go on exactly the same way as any limited entry scheme in which you are trying to take something away from someone. With regard to the probability of lifting a moratorium, I would certainly agree that the chances are very small. I would equate that with the probability of lifting the moratorium on homesteading in the oil fields of Oklahoma. That moratorium has been there for some time, and I think that the chances of lifting it are remote at the present time.

**William Feinberg:**

On a moratorium and limited entry being the same, I can only speak for myself, but our surf clam moratorium, in my opinion, is a temporary measure adopted to meet an emergent condition. It is not my intention—and I think that the other people on the Mid-Atlantic council will echo my sentiments—that this is going to be a permanent limited entry in any sense of the word. I am sure that if that concept were presented to us when this plan was originally devised, there would have been a different vote. The plan has a built-in, self-destruct clause of one year with a provision that the moratorium can be reviewed for an extension, and we have reviewed it. The moratorium definitely has given us problems. Jake Dykstra alluded to one, a geographical problem. We were concerned about the administrative and enforcement problems and other hardships that that would create. We decided that the lesser of two evils would be to have the moratorium in effect throughout the range of the surf clam.

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**John Martinis:**

I think that we have to realize that a moratorium is not a matter of government coming down on the industry. It is a matter of the government sitting down with the industry and saying that unless there is a limitation on effort, there will be further restrictions on the number of fishing days allowed. This is the way the moratorium was handled in the state of Washington. The industry was told: "if you are going to put more gear on the water, there is going to be less fishing time; take your choice." Our fishermen took the choice of the moratorium because the number of salmon licenses was growing by leaps and bounds and the managers never knew from one year to the next what the fishing capacity was going to be. We still don't know the numbers of licenses that were issued this spring or how many were issued last year. This is the first year they have to be qualified by a delivery. Since there is an unknown factor, the managers do not know how much effort there is going to be on the water this year but, after this year, we will have those figures.

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**Lee Anderson:**

I would like to make a point regarding the nature of limited entry schemes

that we have talked about today. They all have been on licensing limitation. In Chris Christy's remarks, he mentioned several types of limitation. Stock certificates and fishermen's quotas were two of those he listed. He pointed out that the certificates and the quotas will solve some problems, but not all. Laurie McHugh talked about a need for flexibility, the ability to go from one fishery to another, and we've also had the problem called seepage. That is, if you license boats, you are fixing one input, and the fishermen, in their normal profit-maximizing activity, will try to increase other inputs, and so you still get overcapitalization. Well, if you use a stock certificate program or a fisherman's quota, these two problems can be partially overcome. There would be flexibility because a fisherman could have a quota in one fishery and still go to another. Related to that, there would be no worry about controlling effort. A fisherman would know what his quota was—it might be an absolute amount or percentage of the total catch—and he could set his capital equipment and labor ratios to harvest it efficiently.

**Don Bevan:**

I would like to point out that while it does solve those problems, it presents some others that we will get to later.

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**Wes Silverthorne:**

I would like to ask Mr. Dykstra if he would elaborate on the tax system that he alluded to briefly in his talk, which appeared to be a substitute for a limited entry plan.

**Jake Dykstra:**

It is unfortunate that Virgil Norton or Kenneth McConnell is not here, since their paper has a scheme of the type that I am talking about. As I said, it may be a form of limited entry and it is not very popular with some of my own fishermen. But I made a proposal because people said to me, if you don't like the present set-up, what would you do? In my proposal, I say don't quarrel with the mechanics: let us try it on an experimental basis, which we have now been authorized to do. If you want to quarrel, quarrel with the concept. The concept would allow fishermen to go out from the harbor in the way they always have done, and have no gear restrictions and very minimum regulations of any kind, and let them fish for whatever they wanted. But then when they returned there would be a system like a sales tax. They would have to deliver to a licensed dealer who had a standard weigh-out form with an extension on it for a plus or minus amount. On the species you wished to direct effort from, they would be taxed a percentage of the purchase price. For the species you want to direct effort toward, the so-called underutilized species, you would add a certain amount to the purchase price. This way you would direct fisheries toward underutilized species and away from those species that are "stressed" or "overfished."

**Mike Justen:**

I am curious about Mr. Dykstra's scheme. If you tax the more popular species and subsidize the less popular species, are you not going to induce more effort overall unless you have a limited entry system also? If you don't keep the overall number of boats constant, will you not induce new vessels to enter the fishery for the less popular subsidized species?

**Jake Dykstra:**

This is perhaps more adequately addressed in Virgil Norton's paper (pp. 188-200), but the proposal that I made was for the New England trawl fishery. As I said, there are underutilized species according to the government. There are also species which are now at a low abundance level, but which are the kind of fish that can have explosive year classes. For instance, herring and mackerel are at a very low ebb now. The management plan proposes to take something like twenty-two thousand tons from the mackerel stock, but there were years when foreigners recorded taking something like four hundred thousand tons and we know that they took at least double that in one year. So there are possibilities of having relatively huge quantities of fish available to be caught in the trawl fishery in New England. Right now we have a big problem with groundfish, but the total take with the whole fleet is somewhere around two hundred fifty thousand tons. The National Marine Fisheries Service says that we could be taking eight hundred thousand tons. It has been proposed that the thing be managed on an ecosystem, or biomass, or modified-biomass basis, or whatever word you want to use. That would mean that when the fleet had used up the number of standard trawl days deemed necessary to take everything available from the stock, then some kind of restrictive measure would be introduced. This need not restrict directly the number of vessels. There are a number of ways you can discourage further fleet expansion, at that point, without putting a lid on the number of licenses.

**Lars Vidaeus:**

I would like to point out that the tax-subsidy scheme Jake Dykstra described is clearly not a substitute for limited entry. It is rather a complement to limited entry in a multispecies situation, as Norton and McConnell point out in their paper. If you wish to limit access to an entire ecosystem and if you are worried about maintaining some minimum floors of certain species that are highly valuable, then you might want to change the market signals so that you are not directing the limited effort entirely to the highly valued species.

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**Fred Olson:**

What do you think of Dykstra's landing fee scheme to make the fishing captains indifferent as to whether they go after the king crab or the tanner crab, or whether they go after the ocean quahog or the surf clam?

**Allan Adasiak:**

I have a few quick impressions. First, I think that fishermen are very unlikely to embrace a tax. They may be persuaded and they may see some reason to do it, but I think that you would have a good deal of difficulty putting that across and convincing them that it is to their benefit to tax themselves. Second, I am concerned generally about taxing because it is a crude tool. If you were somehow delegated authority to establish certain levels of tax on various species, you might find from in-season information on the fishery that those taxes are set at the wrong levels because of the condition of the catch, the abundance of the stock, or any number of things. Then it is desirable to change your level of taxation in season because you want to shift some effort. I am not sure that you

would be able to set up a system with that kind of flexibility. Third, I wonder about the bycatch problem. Once a fisherman has caught whatever seems to be an economic level of a species that is being taxed, and decides to round out his trip with a subsidized species, would your tax scheme encourage him to discard back into the sea, with possibly high mortality, the more taxable product caught incidentally, and just land the subsidized product? I think that there are several problems with the idea and it should be approached very cautiously.

**Don Bevan:**

Allan, I just have to interrupt to say that Fred picked the wrong species. This would be a perfect example of government mucking around with something they ought to stay out of. In the tanner crab and king crab fisheries we are dealing with surplus males only. Unless you are talking about some subsidy to encourage fishermen to get something that they are not completely harvesting, there is no reason to try to shift effort from king crab to tanner crab. We can take every single one that is out there without a conservation problem.

**Fred Olson:**

The Japanese are catching a lot of tanner crab that the United States is not able to catch.

**Don Bevan:**

Yes, if you want to have a subsidy that encourages harvesting underutilized species, that is different from a tax-and-subsidy scheme for conservation purposes.

**Fred Olson:**

I did not use the word "tax," I used the words "landing fee scheme." If it is a tax, it will go into the federal treasury; if it is a landing fee, it does not leave the fishing industry at all; in fact, it does not leave the fishing harvesting sector.

Second, if the limited entry scheme results in capitalized values of future economic grants, then fees that would reduce these capitalized values could go to the states or provinces if they are a state or province scheme, or to the federal government if they are a FCMA or federal scheme. My question is, could or should these fees, under different schemes, go to the regional management councils or back to the harvesting industry for development and social insurance purposes?

**Chris Newton:**

No question on that, Fred. The only question I would have is that if you were to try to create a disincentive for a fisherman to make an eight hundred thousand dollar investment, how high a license fee would you have to charge? If you are trying to turn off an eight hundred thousand dollar investment and tell him to stay where he is, I think you are looking at a forty thousand dollar license fee just to begin with and I doubt that even that would be sufficient. How high would it have to be if it were a total royalty tax or a landings tax? Of course, it depends upon the country you are in and the institutional arrangement in the fishery. In the United States if you put a royalty tax on, presumably part of that would be passed on to the consumer who, from what I've heard, has already complained about the price of fish. In Canada where we have a very structured industry between a very strong union and a very concentrated processing industry, it is difficult to see where the landings tax would be moved towards. In that

case it would be just revenue, but you could not use a royalty tax to control investment decisions or cool off the management problems. My basic answer is that economists had better quickly start looking at this whole area of fishermen's investment decisions, taxations, royalties, etc. In British Columbia a three hundred million dollar salmon enhancement program is expected to be paid for by funds from the commercial and sport fishery and processor sector.

**John Martinis:**

I would like to reach back to the question previous to that one on the theory of raising the license fees high enough to effect a limited entry scheme. I would question the constitutionality of that because as soon as you raise the license fees to where they would be restricting entry to the fishery, I think you are trespassing on the equal protection clause. The transferability provision takes care of this because the economics of the industry dictate the price. But when you set your price too high you are actually closing the door to any entry.

**Fred Olson:**

In grazing, fees are going up to reduce the capitalized value down to zero. Now this doesn't mean that there will be no more ranchers grazing land in Colorado, but it will mean that they won't be making a lot of money on it. If I am correct on the legal aspect, I think that the FCC could not tax more than the value to the holder of a broadcast license. I am not suggesting that you tax more than the value of the license but up to or at some level approaching the value of the license.

**Don Bevan:**

There seems to be good experience in other kinds of property. I think that California just recently established a lid on the amount a particular piece of property could be taxed and that seems to be about 1 percent around the country.

**Lucy Sloan:**

I am not sure that I followed all of what Fred Olson was proposing, but there are some points that I would like to make. One is that under the law the fees that presently a council can charge are only those necessary to defray administrative costs. There cannot be any kind of tax on additional economic rent. I am also puzzled about what Fred, as a bureaucrat, means when he talks about landings fees that would not leave the harvesting sector. I am not sure that I quite understand what those would be for and who would administer them. I think that the industry wants to look carefully at the implications of dedicated funds and sources thereof, and what the diminution or cessation of those sources might mean in the long run to other kinds of taxes for fishermen or other segments of the industry.

**Fred Olson:**

The fees that I am talking about are no different from what is now being done in the federal milk marketing orders. These have been going on since 1937, and now about 75 to 80 percent of the milk that we drink is marketed under a federal milk marketing order. We have a difference in prices for milk, where one goes as the high-priced milk that you drink, and another price is a low price that you put into butter, powder, and cheese. The dairy farmer gets a blend between the two of these. This is exactly what I am talking about in the fishing industry, except that it applies to the harvesting side rather than to the marketing

side. The money stays within the dairy farm industry except for about 2½ percent that is used for administrative purposes and this is done through a federal milk marketing administrator.

**Don Bevan:**

But Lucy is quite correct, you simply cannot do this under the law and call it a fee. It will have to be called something else, which apparently can be done.

**Lucy Sloan:**

There is another thing that we ought to look at if we are going to start talking about fees or marketing orders or anything else along these lines. There are a few fishermen who see what the agribusiness now has as being an advantage. I haven't come across many of these fishermen, but I have heard many more of them express real concern about how we went from small independent farms to the agribusiness and that the fishing industry may not be able to avoid the same scenario. Most of the fishermen with whom I have discussed this have no desire whatsoever to be paid for being tied up at the dock and not be fishing. Mildred Nicholas said it yesterday, "If you have been fishing, I don't have to explain it: if you haven't, I could stand here all day and it still wouldn't make any sense to you." What you should bear in mind is that the people whose livelihood and ways of living you are talking about administering and altering and so forth probably have a fair number of legitimate reasons and ideas about why they fish and why agribusiness for fishing is perhaps not the way they want to go.

## **EXPERIENCE**

**William Hargis:**

I want to make a comment to clarify the background of the development of the limited entry concept, that is, a moratorium, in the current surf clam and ocean quahog plan that the Mid-Atlantic Fishery Management Council recommended to the Secretary of Commerce and she adopted. The surf clam fishery and its problems had been under study for four years before the council came into existence. It took about a year for the council to consider the matter. The council decided to establish a moratorium that fixed the number of vessels eligible for admission to the fishery at a specific level, allowing for grandfathering and for new vessels under contract or with keels already laid. The concept of a moratorium, the need to limit entry, was recognized by the group that had been doing the analysis of the fishery and its problems before the council became involved. This was a group that consisted of fishery scientists, managers, and industry representatives. In fact, industry called this study group together in the first instance. Any implication or conclusion that the moratorium was adopted without considerable thought, debate, and involvement of industry just isn't true. It was well thought out. I think that a number of council members looked at the moratorium as a sort of temporary issue like a tourniquet applied to a patient who is bleeding to death. We have just recently concluded debate over whether to continue the moratorium and we are going to recommend that it be continued to the secretary.

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**William Feinberg:**

I would like to make two comments. One is rather specific and the other is somewhat general. The specific one is directed at Jake Dykstra's assessment of certain aspects of our management plan with regard to the surf clam. Bill Hargis has already mentioned part of it—I am not going to repeat what he said. When the Mid-Atlantic council was first organized, we faced a very drastic situation in the surf clam industry. It was not all the doing of the fishermen. The surf clam industry, particularly that part of it located off the coast of New Jersey, had suffered a very serious kill in 1975 and 1976. The kill devastated up to about 40 percent of the resource. We were faced with this problem and with many clam fishermen asking us to give them some kind of relief. As Bill said, this problem has been under study for years and, as bad as it had been, it wasn't as bad as it was when we were organized. We held many public hearings and heard the sentiment of the clam fishermen. They told us they had been trying to devise some sort of limited entry scheme on their own. They wanted some scheme that would permit them to reduce their own effort on a voluntary basis. They had retained counsel who informed them that if they undertook to do this, it would constitute an illegal restraint of trade and that they would subject themselves to civil or perhaps criminal penalties. They came in and told us that time was of the essence and would we please do something. We used the provisions of the FCMA and enacted this management plan that limited work days rather than let everybody fish, catch the resource quickly, and then turn to some other fishery. We asked the clam fishermen which way they wanted it handled and they said they would prefer to have the limited effort on the basis of days fished, because they didn't intend to refit and go into some other fishery. They preferred to stay in the clam fishery and reduce the work week as the quota was caught. That is how the surf clam plan came into existence. We were not pushed by anybody and I do not think that we took an unreasonable point of view.

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**Kenneth Beal:**

I have been involved recently with the licensing programs for surf clams and ocean quahogs. In that limited entry scheme, something has developed that I don't believe the original drafters envisioned. A virtual monopoly seems to be developing. There are only about fourteen or so processors and roughly one hundred seventy licenses in that fishery. With the restriction on the number of licensed vessels, if one vessel owner wants to get out of the fishery, he can only sell his boat to someone who is already in the fishery. Frequently, the people who have the money available to make the purchase are the processors. I am not throwing rocks at them. In effect, what has happened is that it has limited the free enterprise system. I think that a conference such as this may create an opportunity where ideas can be expressed that might prevent something like this from occurring in the future. I don't think that it was the design of the drafters of that scheme to create a monopoly among processors.

**Clement Tillion:**

We (in Alaska) were so afraid of processors monopolizing the fleet that we require that a license only be held by an individual, that he only hold one, and

that it must be aboard the vessel at all times while fishing. Now, this works fine in the small gillnet fisheries and in some of the seine fisheries, but for the larger vessels in the bottom fishery we are going to have to make modifications. We can't very well have a one million dollar vessel tied up because the one licensee is elsewhere. We allow transfer for sickness or injury, but these are the only reasons we allow and, therefore, with a bigger vessel it wouldn't work well. Some of us are looking into a division based on size, where the smaller fleet is linked to the individual. I don't see why you couldn't have gone into the ocean quahog fishery with two types of licenses, one to the individual and one to the company to insure that at least some segment of the fishery was individually owned. But, believe me, any system that you use has drawbacks.

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**Bill Aron:**

I ask this of the economists on the panel, what has limited entry done to the price of fish and the quality of fish to the consumer?

**Chris Newton:**

That question is a little awkward for me as a Canadian because we are a small nation of twenty-two million people. We could not possibly sit down and eat all the salmon we caught. In fact, in the early law of the maritimes it was said that you could not feed your workers salmon more than three times a day. We are basically an exporting nation. As such, the prices of salmon products are high, they are world price determined. I agree with you that they are beyond the reach of most Canadian households today and I suggest that I don't see how you can blame limited entry with a price increase that was determined by world shortages in almost speculative markets. The 200 mile zone alone and the Russian quotas in dealing with Japan have had an immense influence on the price of salmon. I can't answer specifically what impact limited entry had on the price of salmon. All I can answer is that by reducing the number of vessels and reducing the cost of catching, we did not expect to see an increase in the price of salmon.

**Richard Bishop:**

In terms of Wisconsin's Lake Superior limited entry programs being tacked on the price of fish, I don't believe that there has been a big impact. Perhaps it helped avert a big gearing-up process to get back into trout fishing when the lake trout began to come back. There would have been somewhat lower prices in that case, followed by higher prices as the stocks became scarce, but even this is kind of speculative. I think that the biggest impact of our limited entry has been on determining who shares in the income from the resource—not on the price of fish.

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**Francis Christy:**

We have heard the references to the creation of millionaires' clubs in Alaska and British Columbia. I wonder if this is not just a transitory phenomenon. That is, this property right does create windfall gains to those who have acquired the property right in the beginning, but I suspect that the millionaires may not be millionaires much longer. If fishermen have to pay fifty thousand to two hundred

fifty thousand dollars for a license, their costs of amortizing loans for that money may be quite considerable and over the long run are likely to chew up the extra returns they can get because of the limited access system. It seems to me that while a millionaires' club is created in the interim period, newcomers to the fishery later on who have to pay such a heavy front end cost for entry find that they are back in the same situation as before in terms of their net revenues and earnings. It would seem that the tax system—even though it appears to be an abomination and obviously something very difficult to establish at the moment—would provide more flexibility for those fishermen. Instead of paying a two hundred fifty thousand dollar entry fee, they would pay something in terms of taxes related to their profits. In a bad year their payments would be adjusted to that bad year, rather than having to amortize these very heavy front end license costs. I would like to find out if Allan Adasiak and Chris Newton feel that this is a transitional millionaires' club that is being created.

**Allan Adasiak:**

The millionaires' club in Alaska is sort of a two year club now: the second year hasn't been as good as the first. In the Chignik fishery last year, the preliminary indications are that the purse seine fleet, which is about eighty-three boats, had an average gross of about two hundred thousand dollars per boat, with the high boat close to five hundred thousand dollars. The catches this year are down a little bit and they are not making quite that much money. Some people already are concerned about the Chignik folks having too much money and they want something done. In the first place, they forget the early 1970s when average gross on the boats ran about twelve thousand to thirteen thousand dollars because of significant fluctuations in stocks. In the second place, one of the goals of the limited entry program in Alaska was to create a climate for professionalization and diversification, through creating a situation in which fishermen could earn more money. Now, in evaluating the two hundred thousand dollar gross, or whatever the net is, assuming it is fairly significant, I think that you have to look at more than the dollar amount. You have to look at what is being done with that money. If everybody is going off to Maui on extended vacations, the trend of high gross continues, and if we still want professionalization and diversification, then maybe the state is justified in leveling a tax. If, however, the fishermen are using that money to plough back into the fishery, to upgrade their gear, diversify, help construct processing plants, or other similar investment, then one of the goals of our program is being served. In this case I am not sure that it would be appropriate for the state to start meddling with what on the surface looks like a millionaires' club. I think that it is dangerous to get nervous too quickly about what looks like big money without examining more carefully what is going on. Our law provides that if there is a significant long term change in economic conditions in the fishery, we can issue more entry permits. Theoretically, one of the solutions to the Chignik problem, if folks continue to earn a lot of money for a long time, would be to pump out more permits and dilute the level of profit. The dilemma we face is not in Chignik. It is in some other fishery where there may be an economic justification for issuing more permits. For example, we may still be able to handle only eighty-three boats in Chignik, and in fact things are getting a little tough with eighty-three because of technological improvements over the

past four years. We can foresee a problem conceptually in terms of what you do with a long term high level of profit in a limited access fishery. But what you do depends, I think, on how the fishermen themselves are making use of that money. It may be appropriate for the state to do nothing.

**Don Bevan:**

I might add that Chignik is a special case in which the fishermen wait in line inside a rather small lagoon in order to take advantage of the few places in which fishing is possible. These are thirty-six-foot boats with three-man crews. I think you can see what the ratio is of investment to return. The Kodiak fishermen, by the way, who have the same size boats and gross something like seventy-five thousand dollars and who catch 15 percent of the Kodiak run in another fishing area obviously have an appropriate answer to Mr. Adasiak's dilemma.

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**Jack Davis:**

To get back to the problem of the millionaires' club, if it is a problem. A way around it, theoretically at least, would be to subdivide the year into units of time such as vessel-weeks or vessel-days instead of licensing fishermen to be totally in the fishery for a year or totally out of it forever. If these time units can be traded in fairly small numbers, then the very high cost problems, especially of original entry, can be ameliorated. This may raise other problems in other sectors that are worse and could defeat the good aspects of it, however. I want to know if anybody has had any experience with this sort of thing. Much of the experience with limited entry appears in the salmon fishery, and that season is so short that I guess it would not be appropriate. But is there any fishery in which this sort of approach has been taken?

**Chris Newton:**

I think that the Bay of Fundy herring fishery is that way, in that fishermen allocate their own quota among themselves. On the Pacific Coast, a herring food fishery plant had a capacity of fifteen hundred tons a day when we opened last November. We took in two thousand tons the first day and two thousand tons the second day, which completely destroyed the product quality. There is now a demand by the fishermen and the processors to work out a fisherman quota on a per-boat basis to get an orderly flow of fish landings. If that works, it is suggested to move into the herring roe fishery on a quota basis by gear type. These ideas seem to be coming along slowly among the fishermen. I think that they realize the race of hotdogging up and down the coast with all engines full blast may be self-defeating and that there is a better system.

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**Stan Wang:**

For the general information of the audience, I wrote my dissertation at Oregon State University on the Canadian salmon industry. I estimated the impacts of limited entry on the income of fishermen and on all other factors. The change in income for fishermen can be affected by many factors including prices, size of runs, or number of fishermen, but my results show that limited entry had a positive impact on fishermen's income.

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**Sig Jaeger:**

The first step in limited entry, as I see it, is an irrevocable step. The act of limited entry itself triggers more restraints right down the line, sort of like a concentric circle steadily closing in on fishermen. In discussing the merits of moratoria and limited entry, I see in a moratorium, at least, the possibility of a retreat. In limited entry I see no retreat. After we once pass those pearly gates and start trafficking in licenses, who is going to assume the liability if we change our minds? If we don't like living in it or it isn't working and we want to modify it, how can that be done? In that sense, limited entry is a management tool because it changes basically a way of life. Dr. Newton made the comment, I think, that there were three attempts at limited entry in Canada that were withdrawn. What were the withdrawal symptoms?

**Chris Newton:**

Monopoly profits were the withdrawal symptoms. In 1889, at the time of the first attempt, the fishery was characterized by the same old thing—too many boats in too congested an area. The next attempt was just before the first World War. In both of those cases we gave the licenses to the canneries. The canneries licensed their own fleet to catch their salmon. In the first instance, there was no restriction on growth of canning capacity, which caused distorted investments in new facilities. The government was not prepared for this problem and withdrew license limitation in 1892. In the second instance, profits got so high that pressure came on the government to increase the number of licenses, specifically to issue two more licenses in the Queen Charlotte Islands for dog salmon. The government found that when it issued two new licenses it set a precedent that it could not hold and therefore withdrew the system. Also, the War Measures Act of 1917 removed all restrictions on licenses because food was a commodity that was required for overseas shipment.

I think that you could withdraw from limited entry if salmon enhancement could produce marvelous things, or we could work out other ways. There is a lot of flexibility. It is not inconceivable, for example, to say to B. C. salmon packers, "We will lease you Rivers Inlet; it is yours; you look after Okeena Lake, you stop the logging, you do the enforcement, and no one fishes outside the mouth of Rivers Inlet." Conceivably, they could do a better job as an agency than we are doing. There is another way of doing it. We could conceivably ask a company to run a hatchery for us. There is no reason why we should not do that. So there are other systems that you can change to as you go through time. I don't think anything is locked in concrete. I think we have our flexibility. Sure, we have some problems but it is a dynamic process, as you know, highly dynamic. The question is, can it get away from you? Should the government interfere? Where does the dynamic process lead?

I think that I remember. Sig, yesterday you asked the question about those rotten Canadians who wouldn't restrict themselves on halibut and, if they would, that would resolve the whole halibut problem. There are halibut boats that would ask for protection from the salmon fleet now. In 1974 we had twenty-four boats. Conditions were so tough to rig for halibut relative to salmon fishing that no one even bothered to fish halibut. They didn't have to, they had made their

gold mine. Now look at it. I think that we had seventeen hundred boats fishing halibut last year. The problem is such that it is almost too late to approach limited entry programming in that area for you because we are starting at a seventeen-hundred-boat fleet and there is a long way to go down. So the balance with other fisheries is not because we have created something. What the halibut fishermen are saying is that we deserve the same protection from the salmon fleet.

**Don Bevan:**

Sig, we have an experiment coming up. The Mid-Atlantic council has indicated that they have a temporary limited entry program. We will see how difficult it is to kick the habit.

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**William Perret:**

I would like to address my question to Dr. Newton. I was particularly interested in your comments about the large number of part-time fishermen in the British Columbia salmon fishery. Is my understanding correct, that your definition of a part-time fisherman was one who earned twelve hundred dollars a year or less from the fishery? How did you determine the twelve hundred dollar figure? How did you find out from the individuals that this is what they made?

**Chris Newton:**

The figure of twelve hundred fifty dollars was equivalent to about ten thousand pounds of salmon, and this was based over a two year period. A fisherman didn't have to make it all in one year. This was an arbitrary figure based on what a fisherman would expect to make on a reasonable living. The reason that we had the information was that we had moved to a vessel license system two years previously with the issuance of a commercial fishing vessel license number. Attached to that, we had introduced a fish slip system where the fisherman submitted a copy of his fish slip showing his quantity landed. We had sixteen hundred appeals beyond the initial seven thousand fishermen we identified as fulltimers. The sixteen hundred appeals were handled by two people who only disagreed in two instances. It is amazing what comes out of the woodwork in these programs. As long as there was a keel or a piece of wood lying around, we gave that fisherman a license and then worked back. The twelve hundred fifty dollars was pretty well accepted. I don't think that there was anybody with \$1247 that was given a B class license—it was that kind of an arbitrary figure.

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**Gregg Erickson:**

I think that Allan Adasiak will probably agree with me that in Alaska it is unlikely that any fishery will have limited entry imposed in the manner which Dr. Newton seemed to indicate was the case in British Columbia. If the fishery really doesn't want it, it is not going to be foisted on them. Secondly, I gather that under the Canadian system, the federal government has the responsibility for fisheries. Would Dr. Newton comment on what the differences might have been had the province of British Columbia had the responsibility, and would he hazard a guess as to whether that would have been a better arrangement or not?

**Chris Newton:**

You are right. We have what Mr. Adasiak called rule by fiat. The legislation

is found in the Fisheries Act, which is in our constitution. It says that the Minister of Fisheries shall have absolute discretion in the issuance of all licenses, permits, etc. So in terms of the law, the minister just writes a regulation and says this is the way it will be. This doesn't mean to say that he can't be challenged in court. The minister's discretion has been challenged and successfully, but not in the salmon fishery case. We were challenged in 1969 by the halibut fleet and groundfish trawlers who were excluded from an A license. To avoid going into court, the then Minister Davis granted those vessels salmon licenses too. One of the reasons that we have twice too many seiners is that a lot of those guys put their salmon licenses on new seiners and carried on halibut fishing, in the same boats. So we don't have to walk around with lawyers, we've not been challenged as such. Now, on your question on provincial jurisdiction, maybe two years ago I would have said that we were fortunate we were under federal jurisdiction. You all know that Canada is going through some pains with speaking French and a few other things and the concept of federalism isn't working too well now. Maybe we should go back to provincial jurisdiction.

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**Don Bevan:**

Has Alaska seen any increase in support services as Newton did in British Columbia?

**Allan Adasiak:**

Our program has not been in operation as long as the B. C. program, and we don't have specific documented information. My general impression is that, yes, there has been an increase in support services.

**Don Bevan:**

You have certainly seen a vast increase in the quality of the fishing boats in operation.

**Allan Adasiak:**

We have seen an increase in the quality of the boats and in the quality of the gear. Fishermen in a number of fisheries have told me that the fishing is harder and more professional. The guys who buy permits have made a commitment and they want to earn back the cost of that permit and make a profit. The gentlemanly way that things used to be conducted isn't quite the same anymore.

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**John Green:**

The panel members have provided management with a number of options and I think that those options were dispassionately presented. I began to feel today, however, that a good definition of limited entry perhaps would be special interest legislation for a black bottom line. I may be unique in the room with that feeling but it will predicate my questions.

Professor Bishop writes that those who advocate limited entry will facilitate meaningful debate by stating the proposed objectives in clear, practical terms. Mr. Adasiak also states that a need must be identified in an attempt to define clear goals. We have had a reasonable dissection of the concept of limited entry and, I think, an inordinate examination of a regime in place in Alaska. We certainly have heard from two advocates and I wonder if the third leg of the triumvi-

rate might be present to give the adversary side of the experience in Alaska. Were these goals and objectives clearly defined before legislation was enacted in Alaska or was legislation enacted and then goals and objectives presented to justify the legislation?

**Allan Adasiak:**

Things have been done both ways in the past. Senator Tillion was one of the legislators who was part of the group that formulated the limited entry law. He can comment on the goals that were in mind. I was a member of the limited entry study group set up to work for a year before any bill was introduced in the legislature. I can comment to some extent also.

There were goals in mind before we set up the limited entry law. One of them—I discussed a number of them in my paper (pp. 271-299)—was not articulated in the law but was very clear in all our minds. We wanted to shift the balance of power between the canneries and the fishermen. We wanted to shift power from the canneries to the fishermen so that there was more independent control on the part of fishermen and less on the part of canneries. That is the reason that we gave permits to individuals rather than to vessels. That is why we said that permits go to natural persons only and not to corporations. That is why we said that a person can't hold more than one permit in a particular fishery—to prevent aggrandizement of permits and to prevent corporate or cannery control, which had existed in many areas of the state in high degree. We had a number of goals like that in mind when we designed this thing and put it together.

**Don Bevan:**

Mr. Green, in recognizing Senator Tillion next, I am certainly not suggesting that he is the man you are looking for to poke holes in this law. There certainly are some problems that have come along. There is no question that the goal to control effort has not been met since a man who has a licensed rowboat can escalate that into something far more powerful. Senator Tillion has been called the mother of this legislation. Obviously it had no recognizable father, from some of his opponents' point of view.

**Clement Tillion:**

That's right, Don. Adversaries in our state are quite vocal and were able to get one-third of the vote when they tried to overrule limited entry. The other two-thirds of the people preferred it.

One of the first objectives of the law was to make sure that the Alaskan resident had control, and not the processor, who invariably lived out of the state. This has been successful. Cannery fleets have all but disappeared. The average fishing boat is owned by an individual. This doesn't mean that this system will be transferable to the large million dollar boats—you would have to look for a different system of limited entry. We also had ethnic problems and floods of urban people moving into rural areas such as the Kuskokwim and the Yukon, and the natives there petitioned for help. Limited entry has kept it basically a native fishery, although whites that live in the area naturally are entitled to fish the same as the native. I talked to a fellow yesterday who had a neighbor with a Bristol Bay permit who fished every year and lived in Rye, New Hampshire. We did not purposely discriminate on the basis of what state a person lives in but, by the very fact that we chose limited entry for an area where 90 percent of the people



fish for a living, you would get that idea. Much of our aim was social. We had great difficulty with fishermen who had children—"What does my other son do?"—and some of them came down against limited entry. It isn't a panacea for the man who really wants to grow big in the fishery. You know, many of our highliners would have preferred to, as I call it, rape, rip off, and run, and then look for a new fishery when they depleted that one. Limited entry absolutely blocked them in that area. I think that the biggest benefit is seen in the age distribution of fishermen. In many of our salmon fisheries and other fisheries, we were getting an old man's fishery. I believe that this was also true in British Columbia. The average age of fishermen was somewhere in the sixties, but it is very noticeable today that it is the young people who are buying the permits and moving into the fishery. Because it has a future, it has definitely become a young person's fishery. It is very noticeable that while there was no future, the young people went to do something else and left the fishery, but as soon as there was a future you found the young coming back to fishing.

**Don Bevan:**

I am not a resident of Alaska but I spent some thirty years working in Kodiak, a small town in Alaska, which for the last dozen or so years has ranked in the top three ports in total landings in the United States. It is an important fishing community and I would like to point out that that community supported the initiative to repeal limited entry, so it is clear that there is opposition. There are people who have problems with the present system. I do not advocate that point of view. I suggest that Alaskan salmon fishermen who do not like the system—those who could speak against limited entry—are at work in Alaska, so you are not going to hear that opposition point of view.

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**Fred Olson:**

My question relates to foreign fishing off the state of Alaska and limited entry. When there is a large-directed foreign trawl fishery, a small-directed foreign longline fishery and a small-directed pot fishery, can you have limited entry under those three conditions for Alaskan fisheries?

**Clement Tillion:**

My answer is yes. I see nothing wrong with it. If I had my way, I would institute limited entry for trawling to be as large as I feel the American fleet should be eventually. It would give us a great growth potential, enough to totally push the foreign fleets out so that, in effect, you would not be cutting anybody out until sometime in the future. The first man would get permit number 1 and you would know that when permit number 264 came up, if that is the one you chose to stop at, it would then become a closed fishery. Calculations on the amount of permits allowed could be based on that size of fleet that would totally displace the foreign fleet (cf. Christy comment p. 89).

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**Robert Alverson:**

Clem, I would like to address my comments to you regarding limited entry in Alaska and its relation to other fisheries, primarily the halibut industry that I represent out of Seattle. Salmon fishing in Alaska is conducted with seines and

gillnets and these fishermen have the option of participating in fisheries other than those they have limited access to. Now, these vessels that are making from one hundred thousand to two hundred thousand dollars that you mentioned before, in my opinion, should not be entitled to participate in other fisheries. Since 1973, when your limited entry program began, the number of licenses in the halibut industry has gone from two thousand to about five thousand; that is including Canadian and U. S. licenses. As a result, we are really being cut down tremendously on our time we can fish. You are well aware of this; it is mentioned almost every month in the North Pacific council. This is one reason that I could not understand your comment in the North Pacific council last month when you mentioned that you were not in favor of placing halibut under a limited entry program at this time, and yet you are such an advocate of limited entry for salmon, troll salmon, king crab, shrimp, and others.

**Clement Tillion:**

I could be parochial right now. The Seattle fleet is catching most of the halibut. Most of the small boats that are taking it away from them are Alaskan. I have no intention of cutting my constituency out as long as they are taking a fishery away from you. It is very simple. On the other hand, your constituency, I should say Jaeger's constituency, has taken the king crab away from my boys. Non-Alaskans now catch 60 percent of the king crab, where it was 96 percent Alaskan ten years ago. It is just a fact of our life, but I assure you that we didn't cover halibut because this year is the first year we are going to be writing a plan on it. As long as the Canadians put the number of boats they want into it, there isn't any way that we could limit the United States fishermen.

**Robert Alverson:**

That is going to change as everybody recognizes in the near future, probably in 1979. Because of the impact the salmon fishermen are having on the halibut, our fishermen are in favor of some form of limited entry out of Seattle, along with Gordon Jenson's group out of Petersburg.

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**Patrick Jackson:**

I had quite a bit to do with the drafting of the limited entry bill in Maine. Even though it failed, I think that a couple of comments would point up a few things.

Massey versus Appollonio (387 F. Supp. 373 D. Maine, S.E., 1974) was the case brought against our limited entry, because we had a three-year residency requirement for taking lobster. Massey had lived in the state for a couple of years and wanted to be licensed to fish for lobster. He was denied that license and he went to court. We used this as a test case because we had some questions on our residency requirement. The court chose not to answer that question but struck down the statute on equal protection grounds. We now have a six-month residency requirement and don't know whether we can get by with a two year one or not.

The lobster fishery takes about 96 percent of catchable lobsters in any one year. We announced that we would institute a moratorium and, as has been pointed out, this brought on a great many license applications. Many of these

were not for licenses that were going to be fished in the immediate future. We had pregnant women who applied for licenses for the children they were carrying. We had three-year-old children applying for licenses. They felt that something was going to happen to the fishery and they wanted to be protected.

While the moratorium was in effect, we started drawing up a limited entry bill. The bill was relatively simple. I won't go into its details but almost everything you have heard about other limited entry bills in the last day or so, we had in that bill in some form. We attempted to protect the small villages that make their living on fishing. We even had an income thing designed to avoid problems of the fisherman who does not want to open his books to the IRS. We attempted to protect him and still have an income entry level. We had, I believe, three or four classes of licenses by the time we were finished.

Another problem we ran into we have touched on here. We had a sport fishery and a fulltime commercial fishery for lobster. One of the things that we saw happening was that as a stock is fished out, the sport fishery takes over from the fulltime fishery. If there isn't enough to support a fulltime fishery, a sport fishery can take up the slack, since they don't have to take the large amount of tonnage in order to survive.

When the bill was finally put together and we took it onto the floor of the legislature, we left theory and really got on the firing line. A potato farmer and his representative care very little about fish. The analogy I use is that our bill was like a Swiss watch, and bringing it onto the floor of the legislature was like putting it on an anvil and beating it to pieces. I am sure that other people have seen this. We tried to sell our idea to the fishermen. They had been complaining and they knew there was a problem. Possibly if we did this again, we could enlist more support but in this case we had a great deal of trouble getting support. They realized that there was a problem but they didn't understand the solution we were seeking and, I think, our solution was far too complex to be accepted.

In closing, I would like to say that in Maine we feel very strongly about solving the problems locally and at the state level. We are scared to death of the federal government coming into a fishery within three miles, a specialized fishery like the lobster fishery, and taking it over. We are very afraid that we would be lost in the shuffle and that many of the considerations and the flexibility that we would have on a local level would be totally lost if we had to deal with the federal government.

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**Ronald Poff:**

We have made some mistakes on the Lake Michigan program and they relate to criteria for fishermen to maintain their license. Prior to July 1, the Wisconsin Department of Natural Resources established those criteria, which required essentially that a fisherman had to have at least fifty days of fishing, that is fifty days of setting or lifting nets. One of our fishermen didn't meet this standard and this is the only one of several criteria to be met. He challenged us, was granted an administrative hearing, and our administrative hearing examiner ruled against us. He argued that fishing was a very difficult term to define. He used a definition from Massachusetts, saying that fishing was an individual's effort to seek the

denizens of the deep, and began when the hook or net was placed in the water and continued until the hook or net was removed, regardless of whether or not the gear was attended, and that it was generally accompanied by considerable blasphemy and mendacity. The gentleman won his case and he is still fishing.

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**Benjamin Chiancola:**

If Alaska, British Columbia, Washington, Oregon, and California all have limited entry, what happens to the mobility of the boats up and down the coast? Is it only the inshore part of the fishery, inside the three miles, that would be affected?

**John Martinis:**

Historically, the salmon fleet has been highly mobile on the Pacific Coast. There is no American fishery within British Columbia waters at this time, but mobility through Washington, Oregon, and California has been common and is present in the moratorium that the Pacific council is considering. This is not a moratorium by the council, however. The council has set certain guidelines. Washington has an acceptable one in place, Oregon is working on one. California has a mechanism that allows them to install a moratorium without further legislation, as I understand it. The fleets are mobile and will continue to be mobile, because if they have delivery permits or licenses from one state, they will be able to receive permits and licenses from any other state under the proposed moratoria. Alaska is much tighter. That is a single moratorium and, of course, those trollers in Washington, Oregon, and California who have fished off of Alaska and have licenses or landing permits will still be able to maintain those permits, as I understand the Alaska system.

**Benjamin Chiancola:**

If it is going to cost me two hundred fifty thousand dollars to get a license in one state and another two hundred fifty thousand dollars in another state, where am I going to get all this money? I like to be mobile because I have found that you have to be able to move around to survive.

**John Martinis:**

In the moratorium we would allow you a one-time delivery permit. At present you would pay \$100 but I will predict it will go considerably higher if you happen to be fishing under the council regulations outside of three miles. Yes, we want your product in our economy but if you do not have a license, you may buy a one-time delivery permit. The principle of the Washington moratorium is that we don't want you fishing off the Washington Coast.

**Benjamin Chiancola:**

I know that you don't. That is the problem. How would limited entry work if you had a multiplespecies fishery, different sizes of fish, and mesh regulations on larger species, with limitations on trip time and quantity of large species on board? For example, a vessel still has time to catch smaller species to complement a harvest of larger species. The fisherman attaches a smaller mesh gear and starts fishing in another area. He makes one set and catches the equivalent of all the other species that he already caught with the larger mesh. Since these fish are regulated and he can't land any more, what does he do?

**Don Bevan:**

That is not a limited entry problem, it seems to me. It is a problem that can exist either with or without limited entry. I don't think that limited entry makes it any easier or more difficult, depending on how many fishermen you have doing that.

**CONSERVATION****John Green:**

The question of limited entry is, as I view it, based on a need to maintain a resource. Even though socioeconomic factors are applied to obtain an optimum yield, from a council's viewpoint, what obligation is there to protect a fisherman who entered the business of his own free will and who, by his fishing pressure, is depleting a resource that is the responsibility of the council? What we are talking about, I think, in the question of whether or not we must consider limited access, is why can't we use season limitations much as we do in migratory waterfowl or weight limitations, and not create the monopolistic effect of limited entry that most surely will come about. My question is, what is the responsibility of a council member and what is your interpretation of the act to follow or adopt that position?

**Michael Orbach:**

My personal opinion is that it is perfectly acceptable to utilize quotas and closures to conserve the resource and to address the distribution of the resource. One approach is to let the economics go once you make sure that the fish are there in harvestable amounts. That's the freewheeling enterprise approach that can work out fine. I personally don't agree with the people here who say that overcapitalization is necessarily going to happen or that it is necessarily detrimental. I don't think that it is true. I think that there are plenty of examples not only where it is not likely to become a problem but where people can work it out quite equitably among themselves. There are legal questions about whether individuals can simply get together and decide something without having a government agency saying that it should be that way or not. It is an interesting question. But I think that the council members' first responsibility is to insure that the biological resource is going to be there and second to insure that they are as reasonably well educated as possible on the effects of having the regulatory system configured as it is. That does not necessarily say that there should be restrictions on entry and it does not necessarily say to leave it open, but simply to be able to tell people what is happening. Believe me, I am in the fishery management division of NMFS, and it would be a lot less trouble for us if we didn't have to put regulations on all this stuff.

**Don McKernan:**

Mr. Green, of course we ought to remember that on the other side are those who say that the achievement of optimum yield is not only desirable but that it is required by the act. Dr. Christy and Mr. Tillion hypothesize that this is difficult, if not impossible, unless there is some kind of limited entry. The law itself is pretty clear. It gives you as a council member very broad authority to recommend vari-

ous kinds of regulations for the Secretary of Commerce to consider. It also permits you, it doesn't require you, but it permits you to consider such tools and techniques as limited entry. Essentially, you have that in your arsenal, but it doesn't require it under any circumstances. Some experts have even questioned whether a good limited entry system could be applied under the current wording of the law. Mr. Burke and Mr. Mundt seemed to conclude that the FCMA wording is broad enough to permit an adequate system.

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**Donald Bevan:**

I would like to address one issue that I think I know something about on a worldwide basis, and that is conservation. It seems to me that this word has been misused a number of times in our proceedings here in the last two days. There are very few professional biologists who consider that any of the actions in any of the councils deal with biological protection of stocks. Mrs. Nicholas said quite appropriately that the only endangered species is the fisherman. What we are dealing with are ways to build up stocks to take better economic advantage. As a professional, I am not interested in the number of fish in the ocean. Quite frankly, I don't give a damn. I want to maximize the catch coming from the ocean and that is what we are all looking at. We have got to involve economics on this basis. By establishing a private property right in the fish stocks, does that bring us closer to the rest of American free enterprise or not? Does that increase government intervention or not? Those are the questions in front of us, it seems to me. We obviously do not have the answers.

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**Clem Tillion:**

I am sure that we may have a little battle on this one but I just wanted to point out that two years ago we set a tonnage limit on the herring catch in Prince William Sound. They opened the fishery with a flare signal. It was open for four hours and they went 25 percent over the allowable catch. The herring-roe-on-kelp fishery is closed totally today because they have no equitable way of operating it, even though there is a harvestable amount. The last time that it was opened everybody jumped in and in a few minutes yanked the kelp up by the roots. There was sand mixed in it and they had an inferior product. There was such a mad race to get it before somebody else got it that it resulted in the destruction of the resource itself. I realize that, like the cowboy who never wanted fencing of the open range, many a fisherman has difficulty with the restrictions he has to face. But if you study it long enough, you really don't have anything to worry about—it will be gone. In Alaska where the population is exploding, we have aboriginal cultures that depend on fish for their food, and a year's delay can be disastrous for them. I just wanted to get the one point across that if you allow enough people to enter a fishery, quotas by themselves will not save the resource. Limited entry, by itself, won't either, but you have to find some way to slow down that rush to harvest the resource.

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**Mike Shadbolt:**

I have heard a point of view often expressed that if the best know-how in artificial propagation of salmon were applied to enhancing the common property resource, and I emphasize "common property," limited entry schemes proposed on the salmon industry in Oregon and Washington would not have to be as severe as people are currently discussing. In other words, much of the depletion can be avoided, according to this point of view, through enhancement, and perhaps this would produce a more favorable climate to consider limited entry.

**Don Bevan:**

May I use an analogy of a difficult estate settlement in which the heirs are arguing over the distribution: is the problem simpler by increasing the size of the estate?

**Chris Newton:**

On a theoretical basis, because it is common property there is no incentive for a fisherman to fish conservatively, because he isn't assured of harvesting later the fish he saves now. We are trying to find a way where a fisherman can respect a piece of the geography on which he can use safe husbandry practices. We heard that in Alaska they are doing that. Unfortunately, in British Columbia we are down the road from Alaska, and they can nail some of our salmon on the way down. But we are really looking for a mechanism that automatically encourages conservation. A farmer lets his land lay fallow for a while; he fertilizes or he does something to regenerate his resource. A fisherman doesn't do anything. He just takes. We haven't provided an arrangement whereby he can put something back either. We are announcing a three hundred million dollar salmon enhancement program but I tend to agree with Don. Are we not just postponing our present problems in allocation by thinking that bigger is better?

**Allan Adasiak:**

This question of enhancement sounds like a variation on one of the themes in the election, when we decided whether or not to repeal limited entry in Alaska. The opposition was saying, "Don't limit fishermen, make more fish." On the surface that is very appealing. But take it one step further and ask, "What good does it do to make 20 percent more fish if you get 30 percent more fishermen?" The problem isn't solved. Also, if you are going to build a lot of hatcheries, you have the question of where is the construction money coming from. Is it going to come from the general state treasury? Is the general public going to feel that this is the most worthwhile thing to do to subsidize a growing fishery by building hatcheries? I don't know. These are some big public policy decisions and things get very complicated. In Alaska, the vote to retain limited entry by a two to one majority was followed in the same election by a vote almost that strong for something like twenty-eight million dollars of hatchery bonds. The general consensus was that the public would not have voted for the hatchery bonds if they did not believe that there was also going to be limited entry. They felt that the hatcheries and a limit on the commercial fishermen who were going to be cropping the fish were things that went together.

In addition, several years ago the legislature approved a nonprofit hatchery program under which fishermen can organize into regional aquaculture associations. They assess themselves a percentage of their gross, which pays for main-

taining and operating a hatchery. We have an association like that in south-southeast Alaska and one which is newer and just getting organized in north-southeast. There is one in Cook Inlet and another in Prince William Sound which, I believe, was organized even before this legislation went through. There are very nascent beginnings of a similar association in Bristol Bay. The fishermen feel that these associations are in their own interest. I am speaking generally because there are also fishermen who don't like these aquaculture programs and are suing to stop them. Nothing is universally well received but, generally speaking, the fishermen feel that with limited entry it is in their own interest to kick in some of their money to hatcheries to make more fish. Without limited entry, I am not sure that the public climate, either among fishermen or the general public, would be the same for hatcheries.

I will take one more brief shot at the applicability of limited entry as a conservation measure. It is not universally a conservation measure obviously. Ed Manary told us that his people got into it because they had an economic interest to protect. When I went to Bristol Bay in 1965, the salmon fishery biologists were working very hard, long hours and saying, time and again, that we need limited entry. They weren't saying it out of some philanthropic concern over the income levels of the fishermen. They were saying it because they were sweating over trying to manage a fishery with so many boats to get the escapement to preserve the run. They believed limited entry would be a useful conservation tool to have in that particular fishery. There are, of course, many sides to limited entry but that is one.

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#### **Ed Manary:**

Granted, I stressed economics. However, we see this very definitely as a tie-in with conservation. For one thing, this will facilitate managers in getting information on our fishery. Also, I think it is important for everyone to understand that the average age of the charter boat owner in Washington State is about thirty-two years. It is a pretty young fishery, and those involved are looking to the future. If they don't have a strong natural resource, there won't be any economics to be concerned about because there won't be any industry.

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#### **Don Bevan:**

I would like to correct something that was said about the king crab fishermen as ones to do the exploring. It seems to me at the moment that there is no evidence of that. The king crab fishery is a place for rich Chignik fishermen to sink some of their money in a new crab boat. Crab fishermen are in such a high income bracket at the present time that they are not willing to leave port and go exploring for the bottomfish fishery.

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#### **Fred Olson:**

My question has to do with fluctuating stocks that we have talked about here earlier. What level of effort would you determine appropriate for limited



entry? Is it that level necessary to catch the lowest amount of stocks that may exist in a five-year period, or the peak that may occur in a five-year period?

**Chris Newton:**

That depends on the fishery. I guess I was misunderstood on my question of the salmon trap with the net across the river. I just said that it was the bottom or base and for obvious reasons that was unacceptable. I also said you could work the fishery from one hundred fifty seiners as a base level of effort, and you would have to ask me how come we have forty-two hundred vessels fishing still. I think that it's a dynamic process, and salmon is a peculiar industry that way. Herring would be a different ball game. On a limited entry program, for herring you are dealing with roe herring, which has a highly inelastic demand curve in Japan. So there is no point in taking all of the herring that may be available in any one given year. You impose a market constraint, in our case eighty thousand tons, and if you have one hundred fifty thousand tons of herring, then you just don't touch it; you work at the bottom base level, which is probably about fifteen thousand tons above the minimum guaranteed supply you can expect every year under normal management.

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**Lee Anderson:**

I would like to point out that most of the limited entry discussion here, except perhaps for the surf clam in the Mid-Atlantic, has been about limited entry plans set up under something other than the FCMA. I would like to ask the people on the panel who described their limited entry programs and who are familiar with the concepts of the FCMA how they would go about doing a limited entry program under the FCMA and its concept of optimal yield. Do you set optimal yield and then have limited entry to obtain it, or is optimal yield determined at the same time as the limited entry program? It seems to me that if we are going to consider the economics of the fishery which we have to do according to the definition of optimal yield, we would have to develop both simultaneously. In brief, how can we develop a limited entry program under the concept of optimal yield as defined in the law?

**Donald Bevan:**

I am not sure whether you are asking a council to build a chicken which lays an egg or to build an egg which grows into a chicken. My personal view is that the optimal yield concept is sufficiently flexible that the council can tackle that problem from either direction.

**Leah Smith:**

It strikes me that, given the experience that people have talked about here so far, we cannot guarantee staying at or below optimal yield with a limited entry program alone, at least in the beginning. It is not that perfect an instrument, and all the experience seems to indicate that it takes a while to truly control effort and, in fact, control the amount of catch through a limited entry program. It must be done along with other more traditional management measures, but it is one way of getting started toward a long run equilibrium.

**Lars Vidaeus:**

To Lee Anderson's concern about whether the implementation of a limited

entry scheme fits into the optimum yield considerations of the FCMA, it is clear to me that there is a fairly direct relationship here. If you define optimum yield as the particular total harvest level that yields the highest level of satisfaction relative to the council's objectives, then it becomes clear that if the objective includes reducing economic waste or providing the greatest social benefits to the country, limited entry is a strategy to be considered.

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**Frank Alverson:**

Everyone has talked about the economics of limited entry but no one has addressed total catch, total effort, and catch per unit of effort. No one has presented a time series to show what has happened before and after limited entry came into effect.

**Chris Newton:**

We haven't got all the data to do this properly. It is not that we do not have the data—we have data that will go around the world two and a half times—we just don't have the people to put the data together. In the catch-per-unit-of-effort figures that I am familiar with, there is no doubt that in the gillnet fleet there has been an increase in the catch-per-unit-of-effort. Practically all other factors have remained constant except that now there are fewer boats and therefore more fishing time and increases in CPUE. Assessing CPUE changes for the seine fleet is more complicated because of technological change. Landings are hidden through the use of refrigerated sea water, which allows fishermen to hold their catches much longer, so the annual trend statistics we normally use to follow CPUE are affected. We need a thorough analysis of this question, but there is no doubt that the gillnet fleet has improved considerably, and I would say that the seine fleet has also improved.

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**Robert Tuck:**

My constituency is the Indian tribes that have treaty rights on the upper Columbia River runs, which are quite depleted. Maybe some of you don't know that some of the runs are being reviewed right now for possible listing under the Endangered Species Act. It is that serious. We have little or no commercial fishing on these runs anymore, which brings me to my question to Mr. Tillion. How do you think limited entry functions to help get more of the salmon back to their spawning streams? Is this a tool that can be used for that, or is it not applicable?

**Clement Tillion:**

If you build a dam ninety-two feet or higher, you are going to lose your salmon run. That is a pretty simple equation we had when fighting Rampart Dam in Alaska. We don't want any dams that go that high on salmon-run streams. I don't know what limited entry can do to prevent fish from getting into spots where immatures are killed in the turbines on their way down stream. You have a problem that limited entry isn't going to help. Limited entry just happens to be one of several tools.

**Donald McKernan:**

Putting aside the question of losses from dams, others have claimed that the

application of limited entry spreads the fishery over a greater period of time and thereby permits a more rational and easier allocation for spawning purposes. Therefore, at least in the case of getting fish to the dam itself, there are those who say that limited entry will help. On the other hand, we have a continued increase in troll fishing along the coast, including Canada. Of course, the regulations that are applied to protect the runs along the coast may also serve to protect the river runs as well. If this argument is true, why then, you ought to be thinking very seriously about limited entry as one possible tool. However, as everybody here today has said, it is only one of the possible tools.

## **RECREATIONAL FISHERIES**

### **Jim Douglas:**

By any definition, does any present limited entry scheme limit the entry of recreational fishermen?

### **Allan Adasiak:**

The Alaska limited entry program is applied to commercial fishing only, and is not applied to subsistence fishing or to recreational fishing. There is no legal authority to make those applications.

### **Richard Bishop:**

I know of no attempt to limit entry into a recreational fishery. The charter boat limitation in Washington is the first of its kind that I have ever run across. In the Great Lakes, suggesting license limitation for sport fishermen would be like waving a red flag in front of a bull. We think that these commercial fishermen are tough guys, but there are a lot of sportsmen out there who are well financed and know their way around the legislature. So, I don't see that coming too fast.

### **Donald Bevan:**

It seems to me that there is precedent in having special hunts for particular game species, making use of lotteries. If sportsmen get into a position where the quality of the fishing experience is lowered because of the number of people involved, it is not inconceivable to me to have something of that kind that is quite well used in the game management business.

### **Francis Christy:**

In response to the last question, I think that there are some areas where recreational fisheries are under limited entry. For example, the freshwater trout fisheries and others like that might bear looking into.

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### **Albert Jones:**

In the Lake Superior and Lake Michigan fisheries, how do you deal with the problem of allocation between sport and commercial fisheries? Do you have a growing sport fishery and does this threaten the commercial fishery, for example, by possibly reducing what is now an acceptable twenty licensees to ten or fewer in the future?

**Richard Bishop:**

With heavy stocking of lake trout following the control of the sea lamprey in Lake Superior, it was clear that some sort of allocation between sport and commercial fishing had to occur. This was at the time when the native Americans asserted and upheld their treaty rights in court. We used a quota system in which Wisconsin's total quota was based on the amount of stocking that had been done in Wisconsin waters. We have a total quota of one hundred fifty thousand pounds a year which is divided three ways—fifty thousand pounds to recreational fishing, fifty thousand pounds to the native American fishermen, and fifty thousand pounds to commercial fishing. This is the only species on which we have a great deal of direct interaction between sport and commercial fishing in Lake Superior. The lake whitefish, another basic fish, is not a particularly important sport species and the same would hold true for the other fish there.

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**Jim Cato:**

Florida is a state that has neither a salt water sport fishing license nor a salt water commercial fishing license. There are a number of recreational fishermen in the state of Florida who do not derive their income from fishing and could do without the additional income, but sell part of their catch when they come in anyway when they catch more than they want to take home to eat. Have any of the limited entry schemes dealt with this particular problem, that is, a definition of who is and who is not a commercial fisherman? I am not talking about a charter boat kind of recreational fisherman. I think that it was mentioned at one point there was a \$1250 guideline that defined a person as a commercial fisherman.

**John Martinis:**

I am going to answer that a little facetiously because I made my living in the retail fishing tackle business for twenty-three years besides commercial fishing. That statement reminds me of Dr. Bevan's definition of a recreational fisherman, and that is one who takes a picture of his fish before he sells it.

**Donald Bevan:**

I think that the answer to that question is going to vary depending on the area of the country. You heard from Lyle St. Amant earlier today. When he and Ted Ford told us of that recreational fishery for shrimp in Louisiana, I went back home to Seattle and tried very unsuccessfully to establish a sport gillnet fishery for salmon. Things are looked upon differently in different parts of the country.

**Joe Easley:**

Perhaps Oregon has taken an extreme view in the division between commercial and recreational fishermen. The view in Oregon is that if you sell any of your fish, you are a commercial fisherman and you must have a commercial license. If you are going to take your catch home, you are a sport fisherman. Likewise, you are not allowed to take your catch home if you are a commercial fisherman.

**Zeke Grater:**

We have had this "com-sport" problem in California where many of the people who traditionally sport fish have gone into the commercial fishery for cer-

tain tax benefits, and also to subsidize their recreation. The cost of a commercial license alone has not been enough to keep these people out of the fishery. A one hundred dollar expenditure for a commercial license is not very much compared to the tax saving and what they can make selling more than their three-fish limit as a sport fisherman. The money is there to be made by investing in a commercial license. Under our proposal—and this was something we proposed long before there was a Pacific Fishery Management Council—the fisherman defines himself. He is either a recreational salmon fisherman or a commercial salmon fisherman, but he or his vessel will not do both.

**John Martinis:**

The recreational fishery from California and I have had some differences on the definition of recreational angling and it wasn't until this last year, when great pressures appeared to be coming to the California recreational fishery from the council, that they changed some of their regulations. Basically, the California recreational angler can use on the ocean what we would define up north as commercial gear. It is true what my friend Joe Easley had to say about the distinction between sport and recreational fishermen as far as selling the catch is concerned. But there are also gear restrictions on the commercial and recreational angler. While California uses more commercial type angling gear than we do up north, our sportsmen can't sell their catch.

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**Jim Weaver:**

Our experience in Texas, through legislation and in part through regulatory authority in Parks and Wildlife Commission, has established for our red drum fishery, which is predominantly an inshore fishery a set of circumstances that in part control or define the recreational and commercial fishermen. For the sport fishermen, we require a license in Texas to fish in salt water. It is, however, combined with the freshwater license and the cost for that is \$4.25. There is a bag limit of ten red drum per day and a possession limit of twenty red drum per day, for the sport fishermen. No more than two red drum can be greater than thirty-five inches in length, and the recreational fisherman cannot sell his catch or he is denied a license. The commercial fisherman must purchase a ten dollar license and a fifty dollar red drum license. To receive the red drum license, he must sign an affidavit that states that at least 50 percent of his income is derived from commercial fishing. In addition, he states that he is and intends to remain a fulltime fisherman. There is also a quota established for the eight bay systems along the Texas coast of 1.4 to 1.6 million pounds for the total commercial annual harvest. He is further restricted to no more than two hundred pounds of red drum in his possession per day.

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**Mildred Nicholas:**

To Mr. Manary I would say that we do not guarantee a catch to any commercial fisherman. What has happened to the concept of sport in the recreational fishery that you feel that these people going out on charter vessels are entitled to a certain number of fish? If we are talking about conservation, what has happened to the concept of restricting the sport fishery also, if the troll fishery is restricted?

**Ed Manary:**

I hope that I did not allude to the fact that we were looking for a guarantee. I talked of opportunity; never can we offer a customer that comes aboard our boats a guarantee of three fish. I can't guarantee one fish; I can guarantee an opportunity for a good trip, and the best service that our people can provide, and the opportunity to catch three fish. In effect, we are already on a quota system because we are limited to three fish per angler. The potential is already limited. There is a tremendous difference between that and a guarantee of three fish.

In regard to the second question, I don't think that it would be fruitful for us to get into a discussion as to why commercial and recreational fisheries have been treated differently. I would simply say that management is an allocation process. Allocation is a large part of Public Law 94-265, which says that when you set the optimum yield for a fishery you must consider recreational, social, economic, and food values. I don't think that you and I would be able to solve that debate today. I am not being facetious because I am sure that, as much as I don't like the argument either, it is something that we are both going to be living with for a great time.

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**B. J. Putnam:**

I would like to make an admission that I am one of those that play with the resource (cf. Tillion's comment p. 39, third paragraph).

Also, I eat it and, given the opportunity, I sell it. Those who play with it create jobs, including use of motels, fishing equipment manufacturers, and marine motor manufacturers. If accurate data were available, they might show that those who play with it feed more people than those who sell it. I don't know why we have to put a handle on people, commercial or recreational or whatever they happen to be. The charter boat fisherman does it for a livelihood. He sells it. He also takes it home to his family.

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**Richard Bishop:**

There has been much concern expressed here over the allocation of fisheries between recreational and commercial fishermen. Some people would do away with that distinction for management purposes. This is becoming a major issue throughout the country, for example in fisheries for cod, lobster, some shrimp, abalone, and Great Lakes salmon. I think that any good economic analysis would demonstrate that the same common property issue exists in sport fishing that exists in commercial fishing. Commercial fishermen would be on firm ground to ask why limits are placed on their fishery, while the sport fishermen are left alone. I bring this out because I would like to challenge the group to think a little bit beyond Senator Tillion's hierarchy of preferences. I will agree that those who eat and are heavily dependent on the resource deserve some special attention. However, economists find it hard to swallow a broad generalization that those who catch fish to sell should always receive preference over those who catch fish to play, or vice versa. It is not so simple. Fish can be used to produce food on the table and they can be used to produce recreation. The economics of the situation is a matter of who is willing to pay more for the resource. I

would emphasize that I would be the last person here to advocate that economics is all that should be considered. But I still think that it should be considered and when it is, as it will have to be in so many cases around the country, there are going to be cases where the narrow economic consideration is going to point in favor of the recreational fisherman. In other cases, perhaps commercial fishing will prove more economically efficient than recreational fishing in the narrow sense.

**Clement Tillion:**

In answer to that, I would like you to know that I consider the charter boats that operate in my area to be a commercial use. They took about nine thousand halibut last year. I think that that is a commercial use of the halibut. They happen to sell them to individuals at so much a head and, therefore, it was just as much an economic issue as the commercial fishery. Also, I have taken action to close a number of areas to commercial fishing because the tourist industry has spent enough dollars in those areas to warrant the closure. Again, I made my decision based on economics. The difference in limited entry versus other methods for the sport fishery is that it is easier with the sport fishery, taking so few fish per individual, to work them through time and area closures. We have closed specific areas to the taking of fish by anybody and have closed much larger areas to taking by commercial means. But, believe me, any time someone makes a dollar from a fish, I consider it an economic issue and a commercial use.

**Richard Bishop:**

Why make a distinction between charter boat operators and the person who owns his vessel but uses it to fish recreationally?

**Clement Tillion:**

The biggest reason is the sport-commercial fisherman. As far as I am concerned, if a man has a commercial license on his boat, he had better not be caught in a closed area. The idea that he can take fish in a sport fishery on the weekend and then sell them commercially on Monday, if he has kept them on ice and nobody notices, is quite abhorrent to me. I still look at the economics of what will bring in the most to my state, and sport fishing has a value to it. You know, when I see somebody in a stream, pulling pink salmon out and having his picture taken and dumping them back in when they can't live any longer after being held through the gill, there is something that infuriates me. Of course, I get just as mad with a salmon fisherman who has caught something he can't sell and has to dump it. We have some tough willful waste statutes to prosecute him. The economics of the sport fishery is just as much an economic issue as anything else. I still look at it from the economic angle first because it is the simplest for me to get through my thick skull.

**Lucy Sloan:**

Clem and I may be coming close to the same point because many of our people are looking at the distinction between the economics of the food producing industry and the economics of an outdoor recreation industry. They obviously involve the same resource, and the management practices have to reflect that in terms of the management goals. I don't include charter boat fishermen with commercial fishermen because the charter boat fishermen are part of the outdoor recreational industry. The economic impact of this industry is frequently

significant, but I think that there is a difference between the food processing industry and the outdoor recreation industry.

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**Lyle St. Amant:**

I think that this question is going to need some further discussion because some of us don't have the answers. Perhaps in Alaska and some other areas there is a good handle on what the commercial and recreational people do, what they catch, and what their unit of effort of catch is, but this is not necessarily true in many areas. While the recreational interests are willing to accept the economists' position on what they are worth to the system, buying gasoline and boats and all, when we get around to finding out what they catch and where it goes, there is a problem. As an administrator and manager, I am willing to accept the proposition that if the resource goes to the recreational people, fine, but we also have to protect the stock. We have pretty good records on the commercial catch, but there is little or no information on what the recreational catch is and, while they would accept their economic value, they refuse to accept the validity of any statistics on their catch. In many instances, the recreational catch appears to be six and eight times as high as some of the commercial catches. If this is true, and I don't know whether it is true or not, then the fishery manager has a problem. It is a problem both politically and socially. There is also a problem in protecting the stock and until the statistics are taken in some acceptable manner, I don't think that we will get to the bottom of it.

**Ronald Poff:**

This is not the case in the Great Lakes. We have information indicating that our sport fishery in Lake Michigan currently exceeds the historic commercial harvest of the same species. We also have a handle on the value of these fisheries.

**Donald McKernan:**

I think that the leaders and students of recreational fishing around the country would dearly love to get a handle on accurate statistics. In some states this is coming about very rapidly. I see responsible people who have been talking about this and trying to get funds through the states and federal governments for statistical purposes. It is a very difficult problem.



# **WORKSHOP DISCUSSION**

## **LEGAL ASPECTS**

The paper prepared by Christopher Koch was not sharply criticized at the workshop. Specifically, a general agreement was reached, with the conclusion that no constitutional infirmities block the development of limited entry systems under the Fishery Conservation and Management Act of 1976 (FCMA). However, several issues were raised beyond the scope of Koch's paper.

A key concern expressed was the need for further legal analysis. The first issue suggested for research consisted of problems that could come up under the FCMA itself, apart from constitutional concerns. Challenges to limited entry systems can be anticipated on the basis that authorities did not comply with that act properly.

Another issue identified requiring legal research was that of state constitutional conflicts with state-imposed limited entry systems. Workshop participants noted that the Alaskan limited entry system was rejected on constitutional grounds, requiring an amendment to the state constitution.

While challenges to the Alaskan limited entry law have helped to clarify the relationships among states when one or more has a limited entry system, the group suggested that research was needed on the interrelationship between federal limited entry systems and state systems. The editors note that the North Pacific Fishery Management Council (NPFMC) rejected the concept of a separate limited entry system in the fishery conservation zone (FCZ) (3 to 200 miles offshore) in favor of a joint Alaska-FCZ system. Instead, the NPFMC developed a troll salmon plan that synthesizes state and council planning for the relevant salmon stocks. The issue of conflicting laws between state and federal jurisdictions may arise in other FCMA regions and should be carefully examined.

While most of the discussion related to legal aspects of limitation on the number of boats and vessels and/or on the number of individuals licensed to fish, legal aspects of quotas and fees were discussed briefly. The opinion was expressed that quotas which confer a privilege to take some specified amount of fish over a period of time would be constitutional, but that quotas worded to imply that rights were established in specific fish might not hold up in court. The important difference between rights vested in specific animals and privileges to fish from among specific fish populations would suggest that great care is needed in establishing quota systems.

Most of the discussion of fees arose over economic aspects of limited entry. However, the legal aspects were also examined. The key question arises from the wording in the FCMA that limits fees to administrative costs. Some legal scholars note that the provision referring to "administrative costs only" is in a separate section of the act from the section that establishes authority for limited entry systems. They conclude that this does allow use of systems of fees and taxes as discussed in the background paper on economic aspects of limited entry. Other scholars are less certain and urge that this issue be clarified in a specific amendment to the FCMA.

The legal difficulties of early versions of the Alaska limited entry act have

already been referred to. One of the troublesome legal aspects in early drafts of that system arose from the requirement for equal protection under the law. Koch examined this issue and decided that limited entry need not violate equal protection limits under the constitution. Discussion of this most sensitive issue brought out the concern that equal protection could easily be violated and that any limited entry system suggested should be initially examined on this ground specifically by competent lawyers.

The role of legal advice was generalized beyond the issue just raised. Persons trained in the study of legal institutions should be involved, from the very beginning, in the development of any part of a fishery management plan, but especially in any discussion of limited entry systems. This is not just to insure compliance with legal requirements of the FCMA, but to build the legal record and insure that the appropriate process is observed throughout. This process includes the issues that are considered, the way they are considered, and the type of criteria employed.

## **BIOLOGICAL ASPECTS**

High rates of fishing effort have significantly depleted several fish stocks. Recognizing this historical pattern, the Fishery Conservation and Management Act specifically bans overfishing on a continuing basis. The most important questions in this regard are: (1) Do limited entry systems reduce overfishing? (2) If so, can traditional fishery management measures, such as seasonal and area closures, achieve the same reductions in overfishing?

Two basic *biological* concepts of overfishing were identified and distinguished from the economic concept. The first is related to the reproductive capacity of the fish biomass. The second relates to the productive capacity of the fishery on an annual basis.

In a number of fisheries, failures to reproduce a stock (to generate an adequate number of new recruits) are more commonly attributed to environmental conditions than fishing mortality. For many of the cases where fishing mortality does affect reproduction, nursery area closures, season length, gear restrictions (such as minimum net mesh size or barbless hooks), such rules as no retention of females, and other "traditional" management measures are believed to provide adequate levels of reproduction. Workshop participants did give examples of cases where limited entry had to be included in management to allow any harvest and still maintain reproductive capacity. One example given was a very productive and valuable herring roe fishery that was limited in time and geographical scope.

Traditional fishery management techniques have not been totally successful in controlling the second type of overfishing, which has been termed growth overfishing. In many fisheries, effort is so intensive that fish are caught while their rate of growth still significantly exceeds the rate of natural mortality. Several management tools are used to reduce growth overfishing—minimum mesh size, minimum size limits, restrictions in harvest of certain species to gear which can be selective about size without inflicting wastage (such as using only pots or

cages with escape doors), seasons, and others. However, participants were concerned that always avoiding growth overfishing could be economically wasteful both to individual fishermen and to society. While forms of limited entry could also reduce growth overfishing, concern about the value of this criterion kept several workshop participants from pursuing this issue in depth.

"Overfishing" was not the only commonly used, but ambiguous concept discussed. "Conservation" was also addressed. Rather than resolving this issue, one aspect was singled out—the control of human use of a natural resource to avoid irreversible damage. This concept includes avoidance of the first type of biological overfishing (recruitment overfishing) and also investments to avoid human degradation of the environment.

Some workshop participants noted that certain public actions, such as the protection of endangered species, suggest a social commitment to conservation beyond that which a conventional economic rationale would dictate. Economists responded that conservation actions to meet noneconomic goals should be "cost effective" (provided as cheaply as possible). Further, some of these conservation actions may be more economically effective than is immediately apparent, i.e., just because society is spending a lot of money to conserve a particular resource does not mean that it will always have to do that.

Another concern expressed at the workshop was that once evolution of a fishery or several interrelated fisheries are curtailed by management, there are several consequences that are very difficult to forecast. Some individuals believe that overcapitalized fisheries have led to exploration and technological research in latent or underdeveloped fisheries. The particular case discussed most was the fishery for yellowfin and bluefin tuna in the tropical Pacific Ocean which, it was alleged, expanded skipjack tuna fisheries in the Pacific Ocean and the tuna fishery off the west coast of Africa. Those viewing this interpretation of the history of fishery development thought that limited entry should be used cautiously when the vessels in the fishery in question are also engaged in underdeveloped fisheries. The example used was the potential for Alaskan king crab vessels to open up groundfish fisheries in the Gulf of Alaska.

Other workshop participants strongly disagreed with this viewpoint. They argued that it would be cheaper to reduce the excess capital and then directly subsidize exploration and fishery development. In response to the counterargument that fishery development by fishermen is more productive than fishery development by government researchers, this group argued that much of what appears to be technological advance is itself a direct waste. Drawing upon the tuna history already mentioned, their interpretation was that the large tuna vessels opening up African tuna fisheries were so large because of the speed needed to move around the world, engaging in short seasons, rather than because size of vessel was important in lowering harvesting costs.

Biologists at the workshop emphasized the point that limited entry programs are ultimately aimed at controlling the expansion of real fishing effort. They did recognize that social values in recreation versus food, technology, and the availability of the fishery resource change over time, requiring different forms, location, and timing of fishing effort. Consequently, limited entry schemes must consider a need to transfer fishing power between various fleets (gear

types) and various user groups. They suggested that a limited entry program could standardize units of fishing effort and allow licenses to be traded in the market. Hence, a commercial passenger carrying fishing vessel (charter boat, party boat, or head boat) could buy "effort" licenses from commercial trollers. While the individuals discussing this approach argued for freely transferable licenses for effective effort, a similar approach to transferring fishing power among fleets and user groups could be adopted under nontransferable licensing.

Another workshop participant suggested that transferable quotas to catch certain quantities of fish would be only one step further in program design and would have fewer difficulties.

Still another participant argued that both approaches toward transferring fishing effort are really attempts to define some form of private property rights. Viewed in this light, such approaches are desirable but may have better alternatives emphasizing other forms of property rights. One example of great interest to workshop participants was the Bay of Fundy, in which a group of fishermen accepted responsibility to limit total fishing effort on a herring roe fishery. These fishermen shared the rights to harvest the roe and jointly agreed to return to a food fish harvest, due to changing prices, and also agreed upon allocation of rights to that fishery.

## **SOCIOLOGICAL ASPECTS**

The only individuals formally trained to deal with sociological information were authors of papers included in this volume. Most major points raised at the workshop are included in those papers and are not repeated here.

However, participants did note that the FCMA clearly requires that social factors be considered in addition to biological and economic factors. Appreciation was expressed to Orbach and Cicin-Sain for clarifying concepts involved in social sciences and for indicating the complexity of new information that will be needed for fishery management planning.

On the other hand, a number of participants expressed a fundamental disagreement over the detailed level of information called for by Cicin-Sain. Some felt that such information may be too costly, take too much time to collect, and be ambiguous and difficult to translate into management once received. Some even felt that much sociological information was arrayed to rationalize the status quo and that analysis of such information could be politically manipulated.

Criticism was made of sociological discussions concerned with the value of the fishing experience. The value itself was not questioned. The point was that limited entry programs might well enhance such values rather than conflict with them. There is ample reason to believe that the person who places a great deal of value on fishing as a way of life is also the highly effective fisherman most likely to qualify as the entrant in any limited entry program.

Several of the workshop participants took exception to Cicin-Sain's discussion of fishery management objectives. One strongly-expressed view was that, while limited entry programs affect a number of management objectives, the overriding objective is economic efficiency. While other effects must obviously be considered, they are complexities in what is primarily an economic issue. A

fear was expressed that social considerations other than economic efficiency may be confused with what are, simply, very narrowly focused partisan interests.

Concern was expressed about the discussion of protection of individual freedom by Cicin-Sain. To argue against limited entry on grounds of protecting individual freedom is to argue that the government should not protect the rights of people from damages inflicted by other people. One individual expressed this point by the saying: "Freedom to the pike is death to the minnow." While limited entry is a restriction on freedom of opportunity to those excluded, those remaining gain freedom of choice.

Cicin-Sain's criterion of biological preservation was criticized along lines discussed elsewhere in this summary. Namely, limited entry is not really the tool used to preserve fish (prevent recruitment overfishing, in biological jargon). Rather, the appropriate goal would be biological effectiveness. Limited entry can be a tool to lengthen fishing season and more broadly distribute fishing effort.

In the final analysis, there is no question what the law says about social considerations. Optimum yield requires consideration of social factors. Sociological data must be accumulated. Sociologists, anthropologists, and political scientists are in fishery management to stay, whether the economists and biologists want them or not.

## **ECONOMIC ASPECTS**

Many of the workshop participants were professional economists. On one issue, they were totally agreed: uncontrolled access to ocean fisheries tends to be economically quite wasteful. This issue was summarized for the national conference by Francis Christy (see pp. 201-210).

What the economists did disagree on were the difficulties presented by various forms of access control. As is the case with other aspects of the workshop, most of these comments were used to revise several papers. Only a few of the important themes will be summarized here.

Perhaps the most important disagreement was whether license limitation programs, both in theory and in practice, are inevitably as wasteful as open access. The argument critical of license limitation is that such a limited entry program does not deal with the basic problem, which is the rule of capture in the fishery.

License limitation controls only part of the economic dimensions of fishing effort. Theoretically, if one scarce input (eg. fish in the ocean) is not priced, other inputs are overutilized. If one of the other inputs is controlled through regulation, the remaining inputs are overutilized and any rent generated through the regulation will be dissipated.

In practice, fisheries with limits on the number of licensed fishermen generate a larger number of vessels and/or vessels with greater fishing power. Fisheries with a limited number of vessels generate larger, more powerful vessels. Fisheries with limits to tonnage generate new technology, creating more fishing power per ton.

This tendency to slip around controls, combined with fisheries made up of highly heterogeneous fishing units and a highly volatile catch opportunity,

makes it virtually impossible to capture any economic rent from the fishery resource. In the long run, any profits accruing to individual fishermen will be converted solely to investments in more sophisticated fishing technology.

The economic theory on which the dissipation of rents is based really boils it down more specifically than that. It is based on the idea that the aggregate costs of labor and capital employed in the fishery will rise to the value of the catch, and rent will be dissipated. The analysis really should be concentrating on costs—the aggregate factor costs of the fishery—that's what must be controlled in order to have an improvement in economic performance. Any scheme that does not reduce or at least control the extension of the factor inputs in fishing in terms of their aggregate opportunity costs will not improve the economic performance. So, one must first concentrate on the control of the aggregate costs or the real costs of the facts employed in the fisheries. Destructive technological change or disadvantageous technological change are the kinds that don't have any result in economic improvement in the sense that they don't increase the catch or lower the cost of taking a fixed catch. So, for example, if a control simply has the effect of adjusting the technology without either increasing the catch or lowering the cost of catching fish, there is no net advantage. This is reflected in the papers by Newton and Fraser on the Canadian salmon fleet control program. That program is based primarily on limitation of a particular dimension of fishing, namely the tonnage of vessels. There are several kinds of gear employed in this fishery. Economic analysis would lead one to the conclusion that, if a particular dimension like tons is restricted, the technology will be biased toward the kind of gear that brings the highest return per ton. That doesn't mean necessarily that that is the most efficient gear in terms of the cost of catching fish; it just means that one gets the highest return per ton, which is only one of a multitude of dimensions of fishing effort. So, when there is a shift toward a particular kind of gear in that fishery, that may be because seiners' gross tonnage is a more critical dimension, at the margin, for seine vessels than it is for trollers or gillnet vessels. In other words, if that is true, then the limitation of this particular dimension of fishing effort would have the effect of deploying the technology toward a particular kind of gear. There is no increase in economic performance resulting from that particular change and in fact it may well be a less efficient way of catching fish.

Other economists at the workshop strongly disagreed with much of this reasoning. While they accepted the tendency toward greater investment under limited entry programs, they challenged the extent to which these investments would continue and disputed the charge that the investments were wasteful.

Along theoretical lines, they disputed the existence of unlimited technological capabilities to expand fishing power. They also disputed the behavioral tendency of fishermen to always plow profits into additional investment. A boat is a fishing platform. Investment can make the boat faster, safer, and more comfortable, but these three dimensions have effects in terms of catching power that diminish very quickly. Very rapidly rising marginal costs would emerge with respect to investments in catching power.

In practice, this latter group of economists argued that most investments seen in fisheries subject to limited entry have been for safety and comfort. They argued that this was an appropriate tendency for an occupation recognized for

hazards to safety and for physical discomforts. Further, if new technology did appear to be wasteful, it could be outlawed or controlled, as has been done for a long time in most fisheries.

To summarize this disagreement among workshop participants, some felt that license limitation is a very effective fishery management tool. They believed that the shortfall in achievements with programs to date is due to the short experience with such programs and the gradual rate in which they have been introduced. Others have reservations about license limitation being used except in a package incorporating other tools such as quotas, taxes, and fees. The case for taxes and fees is stated in the paper by McConnell and Norton (see pp. 188-200). Some individuals at the workshop were critical of fees as a form of limited entry, based on skepticism about their effectiveness and concern about whether they were politically acceptable.

Participants at the workshop were well aware that the theoretical literature suggests that license fees on fishermen and vessels in combination with poundage fees on landed fish would be the most effective remedy to an excess of effort. However, that literature abstracts from the wide year-to-year variability in such factors as fish abundance and fishing conditions (especially weather). When fishery abundance is low, reduced effort is called for. Thus, in years of bad fishing conditions fishermen would be asked to pay high taxes, and in years of good fish availability they would face low taxes. To "hit someone when he is down" is not widely acceptable in United States society.

Further, public support for limited entry does not appear until a fishery has been heavily overcapitalized and many fishermen are in poor economic positions. It would be politically most difficult to substantially increase taxes in order to convince people who are just breaking even to get out of the fish business.

The workshop participants did recognize that the program of taxes discussed by McConnell and Norton, and later supported at the conference, was rather different. That program was intended to tax only certain species and subsidize others. This combination could tend to discourage fishing effort on some stocks without impacting fishermen's incomes so heavily. The skepticism voiced about this proposal is based partly on the frequent failures of price control programs elsewhere in the economy and partly on an understanding of the complex ways in which fishermen really receive payment from processors and other buyers. There was, at one time, a ceiling price on Pacific halibut, but none on groundfish. The halibut was paid for at that ceiling price, but incredibly high prices were paid for groundfish to fishermen delivering halibut.

In addition to avoidance of a well-meant twist in relative prices among species, it is not clear whether those price changes can be determined on a timely basis. Administrative requirements would force advance determination of relative prices. With the year-to-year variability in the abundance and availability of the fish stocks, the changes to prices may not be known until the season is actually underway. This problem would be worse with fewer year classes in a fishery.

Several workshop participants strongly supported some form of quota system. They felt that the workshop draft of the economic paper by McConnell and Norton was excessively critical of quota systems and that the McConnell-Norton view was biased by some unsatisfactory experience in New England.

The New England quota system is a very specific program intended to distribute the burden of industry catch restrictions through nontransferrable quotas assigned to each vessel. The supporters of quotas, on the other hand, conceive a system of transferrable rights to certain fish, which would be more analogous to private property rights.

The advocates of quotas did not give examples of good fishery quota systems nor did they claim that such programs would be without significant costs and administrative difficulties. Some argued that this general issue is the one in greatest need of theoretical analysis. They pointed out that much careful thinking has taken place in the general area of environmental economics but that the economic analysis of fishery regulation has advanced little in the last fifteen years.

Since the classic analogy to the overfishing problem is "the tragedy of the commons" in medieval Europe, participants suggested a careful re-examination of what really took place on those commons. When the pastures were overgrazed under open access, the first change was stinting of the commons. Some individuals were allowed to graze one cow each, others more. Water resources in the western U. S. have complex procedures for allocating access, which are forms of stinting. Development of various qualities of rights is also involved in unitization of oil fields, timber sales in national forests, and grazing rights on public lands controlled by the Bureau of Land Management. Careful examination of strengths and weaknesses of those systems of property rights could be most helpful in designing an appropriate quota system for fishery resources.

Among the several other issues discussed at the workshop was the concept of *laissez-faire* put forward by McHugh. The economists were impressed by McHugh's discussion but saw *laissez-faire* in a different perspective. Resolution of conflicts over scarce resources has historically been resolved through three approaches: administrative, legislative-judicial, and market.

When the costs of administrative, legislative, and judicial actions exceed the benefits from resolving the use of the resource conflict, McHugh suggests that serious consideration be given to some minimum government action necessary to protect public health and to prevent obvious excesses. The economists agreed that such an action should seriously be considered, but strongly urged that some form of marketlike approach be used as an alternative. Only if traditional fisheries management and possible limited entry programs fail to generate public values comparable to public costs, should this benign neglect of the fishery resources be considered at all.

## **EXPERIENCE**

While the workshop participants believed the papers describing limited entry experience were well prepared, they concluded that most programs are too recent to allow thorough evaluation. The few that have existed for a long time, such as control over fishing activity in Japan, have unique characteristics that make extrapolation of their experience to the United States most difficult. Other factors felt to muddle evaluations were the shortfall between programs as proposed and as they were actually conducted, changes in the biological environ-



ment, and the limited scope of economic and sociological data that had been collected before, during, and after limited entry programs were introduced.

Based upon the information available, economists at the workshop disagreed on certain aspects relating to the success of limited entry programs. The most important issues in contention have already been described briefly. They are set out in greater detail here, with special emphasis on the experience in Canada.

In the United States fishing industry, there is a view that limited entry is an idea being foisted upon an unwilling industry by arrogant college professors. This view is breaking down in some areas such as the Pacific Coast, where the Pacific Fishery Management Council defined general attributes of limited entry that would prove useful in fishery management, and encouraged limited entry programs to be designed by the industry and enacted by state governments. Nonetheless, the support for limited entry in the United States contrasts sharply with its support in Australia, where limited entry was introduced by and for the fishing industry several years ago (see pp. 391-415).

Some individuals at the workshop agreed with Frank Meany that limited entry has been very successful in Australia. Everyone agreed that the Australian program has been successful by the criteria put forward when the program was instituted, but some argued that the criteria chosen were not the correct ones. Specifically, the critics argued that the substantial investments made by the fishing fleets caused no reduction in the rate of expansion of fishing power. Second, no rents had been collected for the general citizenry of Australia. Further, the critics argued that the increased rent implicit in the rising value of Australian limited entry licenses was partly due to expectations of future earnings that may be unrealizable. Finally, they argued that the remaining rent to the industry can be attributed to lags in further expansion of fishing power as the price of the fishery products in question rises very rapidly, and that this rent will fade away in the future.

Supporters of the Australian program argued that it was clear that benefits were being realized by the industry and that the burden of proof is upon those who argue that this rent will not continue. They also contended that fisheries that were chaotic elsewhere in the world were managed in a way that is relatively satisfactory to the local parties involved.

A great deal of discussion also took place with respect to Canadian experiences. Fortunately, this volume includes papers by Fraser (pp. 358-381) and Newton (pp. 382-390) that set forth several of the arguments concerning the experience in British Columbia from different perspectives. The conflicting arguments were approximately the same as with other areas. Those critical of the programs saw the limited number of vessels or fishermen in the fishery investing in increased fishing power, leading to excess fishing effort, higher costs per vessel (or fisherman), and no resource rent. Those supportive of the programs identified several benefits from the programs and argued that any shortfall from program objectives was due to a lack of political willingness to carry the program out fully.

The experience in British Columbia was seen by the critics in the following stages: A moratorium on new vessels entering the salmon fishery was established. By the time legal and political struggles over eligibility were concluded,

more vessels were in the fishery than if the moratorium had not taken place. Then, although the number of vessels did not continue to increase, each vessel retired from the fishery was replaced by one of increasing tonnage, forcing a new program, which limited tonnage in the fleet. In the next stage, tonnage remained constant, but new regulations had to be imposed to prevent tonnage from drifting into gear types of highest fishing power (purse seiners). These critics argued that trends will now continue for technological change, supporting continuing investment in greater fishing power per ton for each allowed gear type.

In addition to concluding that this trend is one of dissipating rents (or profits depending upon method of calculation) and rising fishing effort (through greater fishing power), the critics suggest that conventional management techniques are still overworked. The trend toward an increase in real effort causes more pressure for seasonal closures by gear type, gear restrictions to retard certain technological improvements, and more area closures.

Finally, there was concern that license limitation programs bias technological change. When one dimension of effort is frozen, there is an incentive to develop new fishing technology, which expands other dimensions of fishing effort. The resources that are devoted to research and innovation are channelled in biased directions and are not devoted to searching out the most efficient gear systems.

On the other hand, supporters of the British Columbia license limitation program saw many benefits to that program. They agreed with Newton that significant new wealth has been created. That much of this wealth was a windfall to owners of vessels at the time the program began was not seen as an issue of concern. They pointed out that this is the nature of our economic system. Useful new road systems cause windfall gains to some property owners. New agricultural technology will lead to windfall gains to farm land suitable to that new technique.

The embodiment of new wealth in vessel investment also did not worry the limited entry supporters. That British Columbia salmon vessels are now safer and more comfortable than in earlier times seemed most appropriate to the supporters.

Substantial disagreement was expressed toward the analysis of experience by the critics. Several trends in the fishery that had not been previously mentioned were noted. At the same time that the British Columbia limited entry program began, all fish prices began to climb sharply. Salmon prices rose even more sharply than average fish prices. Consequently, strong incentives existed to expand fishing effort. While British Columbia fishing effort rose with limited entry, it may have grown much more rapidly without it during the 1970s.

Another neglected force that was pointed out is the bias in vessel and gear investment that has been imposed upon the fishery for many years. Seen in this light, the trend toward greater investment per vessel may be a movement back to more efficient vessels from a structure that had been biased through a history of regulation.

Finally, supporters of limited entry pointed out that the British Columbia buyback program died out before making much progress. The British Columbia program was instituted to ameliorate adverse economic conditions in specific

fisheries. Once the programs were partially successful, they were slowed down. Partial success prevented full success and left the whole concept vulnerable to criticism.

Workshop participants were eager to learn more about the Canadian experience in the herring fishery in the Bay of Fundy. They wished to learn what experience existed in a program of limited entry that was not based on license limitation. Assuming that the Bay of Fundy herring fishery did achieve success, they wished to know why and to what extent the successful features could be transferred to fishery management activities elsewhere.

Based upon the general understanding of the Bay of Fundy herring fishery held by two workshop participants, a few preliminary conclusions were reached. However, a general feeling remained that this fishery merited detailed study by social scientists.

In the Bay of Fundy, herring fishing is pursued exclusively by a fisherman's club. Their authority to act as a sole agent exists because of a temporary but formal government backing. Apparently a small group of processors maintained nearly exclusive buying power over the herring fishery, and this control passed to exclusive selling power in the formation of the club.

The power of the club appears to arise from the close social ties among fishermen, as well as the government backing. A small percentage of the value of the catch goes into a central fund. This fund pays administration fees for the club, including a manager. The manager negotiates with individual plants and takes orders. The orders are delivered back to the club, which assigns fishing in rotation among the club members. Once assigned all or part of an order, the fisherman harvests the assigned amount, delivers it to the plant, and returns for another order. Responsibility for enforcement of harvesting privileges was also thought to reside with the club.

The club also allocates the catch between domestic and foreign buyers. Apparently, the power shifted from the local processors to the local fishermen when government approval was granted for direct sales of herring from fishermen to Poles. Until the foreign buyers appeared, a low price was received by fishermen. When the foreign group appeared, sales took place at a much higher price. Now the club decides how to allocate the available stock between domestic and foreign buyers based partly, but not exclusively, on relative prices offered.



# **Summary of Major Concerns**



# Limited Entry Revisited

Jay J. C. Ginter and R. Bruce Rettig

Over a year has elapsed between the conclusion of the national conference and the conclusion of the editing of this volume. During this time we have had ample opportunity to reflect on major concerns brought out in the discussions at Denver. While fishery management continues to evolve rapidly, many of the key issues and problems identified in 1978 are yet to be resolved.

These concerns, doubts, or fears appear to be rooted in anticipated changes from traditional and widely accepted ways of managing living marine resources. For this reason alone the concerns are well justified. Regardless of how compelling new fishery management methods appear in theory, there is no guarantee that they will be implemented without new problems. However, some fisheries could face loss in income by commercial fleets, loss of recreational opportunities, social disruption in coastal communities, and, possibly, biological depletion while the debate continues over new management approaches. Arguments about efficacy, fairness, and effects of limited entry fishery management have become moot in an increasing number of instances. Many of our commercial fisheries already incorporate license limitation and/or landing fees, especially on the Pacific Coast. Individual fisherman's quotas have been used sparingly, but the use of moratoria on licensing new fishermen or boats is gaining popularity under certain circumstances.

These relatively new kinds of regulations differ fundamentally from traditional regulatory tools such as season and area closures, gear restrictions, and sex and size limitations. The issue at hand is whether to include or expand the use of these additional tools—license limitation, taxes and subsidies, and individual fisherman shares of a total fishery quota. Since some of these new tools appear inevitable, the question becomes not only whether, but where, how, and to what extent they should be employed.

This was the principal question posed to the conference participants in Denver. Of course, the answer was not given in specific terms for individual fisheries. What did emerge from the discussion was a wide variety of conceptual and practical problems relating primarily to the implementation of entry-limiting fishery management. There is a broad consensus that there may be a need for limiting entry in some fisheries. What remains contestable, however, is whose entry will be limited and how.

This question appears to be at the heart of a wide range of concerns expressed by conference participants. These concerns cannot all be enumerated and analyzed without consideration of the extensive differences among individual fisheries. Instead, we have attempted to identify why some people are interested in some form of limited entry, to analyze some of the commonly held perceptions of limited entry, and to suggest where further research and public discussion could be particularly useful.

## **What is limited entry?**

One of the greatest difficulties encountered in discussions of limited entry arises from lack of a generally understood and widely accepted definition of the

term. Many people perceive limited entry as a government program restricting the number of licenses to harvest a fishery resource. Laws instituted in the states of Washington and California limiting the number of licenses to harvest salmon and abalone respectively are good examples. Others hold a more general interpretation of limited entry as any management measure designed specifically to keep the level of effort in a particular fishery from growing as rapidly as it otherwise would. Like the more common techniques, such as time and area closures, limited entry is intended to retard the growth of fishing effort by controlling the number of fishermen, vessels, or units of gear that have legitimate access to certain fishery resources. Hence, limited entry is an alternative way of limiting effort; however, effort limitation does not necessarily imply entry limitation. We subscribe to this general interpretation: limited entry refers to any fishery management tool which controls, restricts, or limits the entry of new fishermen, vessels, or gear into a fishery.

Although license limitation is the most commonly known control over entry into a fishery, taxes and individual fisherman or vessel quotas (stock certificates) are two other methods of controlling access to fishery resources. These methods have been discussed widely in the fishery economics literature, so it is not necessary to repeat the standard comparisons. We mention them simply to emphasize that limited entry programs can be constructed out of tax incentives and quota systems also. Too frequently, the words "limited entry" automatically mean license limitation in the minds of fishermen and many fishery managers. Indeed, limited entry need not be instituted by some governmental unit to be effective. Among themselves, fishermen can discourage participation in their fishery by outsiders or newcomers through physical harassment of "the new guy," his boat, or his gear. Fishermen also organize to limit market access, form cliques, and use secret radio codes. In essence, this makes the costs of entering a fishery prohibitively high for newcomers and, as such, is just as much a form of limited entry as is license limitation.

In short, any control of a fishery that curtails or restricts the addition of fishermen, fishing vessels, or equipment is limited entry. If done by government, this control can take the form of:

- (a) direct limitations on the number of licenses or permits to harvest;
- (b) selective taxes on inputs or outputs to the extent that new entrants, and possibly some people already in the fishery, will not find their participation profitable;
- (c) dividing the total allowable catch of a fishery into shares or quotas, certificates for which may be auctioned (or given away) by the management authority to individual fishermen (who may subsequently trade them with other fishermen); and
- (d) any combination of the above.

With this range of alternatives, a limited entry program, when deemed desirable, presumably could be designed to meet the objectives of virtually any fishery management scheme.

We have noted two other problems which affect the meaning of limited en-

try. One has to do with the faulty notion that limited entry means no entry, or total exclusion; the other has to do with reluctance to consider license moratoria as a form of limited entry.

As to the first issue, it is important to recognize the context of words such as "new" fishermen and "addition" of fishermen or effort in our definition. Basically, limited entry has more to do with controlling growth of fishing effort than with forcing fishermen out of or preventing any new entry into a fishery. Limited entry programs usually do not prevent the continuing participation of fishermen who have traditionally and regularly participated in the fishery. However, certain kinds of buyback, attrition, or other methods may be instituted to actually reduce effort. Gear reduction may be necessary since limited entry programs are commonly used as a last resort to control the growth of effort when all else fails. Ideally, limited entry would be instituted before management problems reach crisis proportions. It is very difficult, if not impossible, for fishery management decisions made under crisis conditions to avoid adverse impacts to some or all fishermen in the fishery concerned.

Fishermen who have traditionally and regularly participated in a fishery in the past are among those who are licensed into an entry-limited fishery. Conversely, those who have never participated or have had insignificant involvement in the fishery are not licensed. The problem develops when decisions must be made on licensing those fishermen who fit between these two categories. Such decisions are dependent on precise and acceptable definitions of traditional, regular, and insignificant participation. Inadequate definition of these concepts caused implementation difficulties in both the Alaskan limited entry program in 1979 and the Washington program in 1936. These law suits and others, although costly, may be helpful in improving the equity and fairness of future limited entry programs.

An unfortunate side effect of determining what constitutes traditional and regular participation—i.e., who should be "grandfathered" into the fishery—is that the slightest suggestion of instituting limited entry prompts a rush of new effort into the fishery while it is still open. Naturally, fishermen who want to protect their future options in a fishery under consideration for limited entry enter it to establish eligibility for future licenses. Fishermen have also moved to newer, larger, and more powerful vessels suspecting that their opportunity to upgrade their vessels later would be limited by future license control programs. This may happen even if no such programs were actually being considered. Hence, a spiral effect may involve popular misinterpretation of limited entry, leading to controls not originally intended or needed. The solution to this problem may not be more secrecy about limited entry plans but more openness, public discussion, and knowledge of the problems and alternative solutions.

The second definitional problem deals with whether a moratorium on issuing fishing licenses to newcomers is the same as or something different from limited entry. This question caused substantial disagreement at the Denver conference and it continues to be unresolved. The basis for disagreement lies in the meaning of moratorium as a temporary deferment on issuing new licenses for a fishery. Sponsors of a moratorium may find it a relatively easy way to put a lid on rapidly expanding effort in a fishery. The idea is to provide a "cooling-off pe-



riod" of, say two or three years, after which fishing effort is stabilized and the fishery reverts to open access. However, unless the original reasons for the rapidly expanding effort vanish during the moratorium, e.g., the price of fish falls sharply, they will continue to affect the fishery after and even during the moratorium. Their influence during the moratorium is more important than after its end; increasing license values during the moratorium provide an incentive for never ending it. What fisherman holding an entry-limited license would want to see its value decline to zero when the fishery reverts to open access?

One way to prevent licenses from gaining value during a moratorium is to make them nontransferable. This would be difficult, however, since moratoria, like other forms of limited entry, must pass the constitutional test of not creating a totally closed class. That is, some means of gaining entry to the fishery by outsiders must be allowed. Usually this is done by permitting licenses to be sold or traded to anyone willing to pay this entry cost. Even if nontransferable licenses under a moratorium were legally defensible, a black market would probably develop for licenses if the reasons for outsiders to want to enter the fishery were strong enough.

Hence, under a moratorium, any increase in the value of a license over its nominal value under open access will result in an incentive to continue the moratorium. A moratorium of short enough duration could probably remove any value increases in licenses, but then it could be too short to be of any use as a cooling-off period. Regardless of the original intention of a moratorium to be temporary, we suggest that economic and political reasons will probably develop to extend its life span; in some future session of a legislature, or other decision-making body, an action will be made to that end. Reasoning along this line, fishermen tend to protect their future interests in a fishery by either buying into a fishery under moratorium or, better yet, making sure they are grandfathered in or are eligible for a license when the moratorium begins in the first place.

The effect and legal requirements of a moratorium appear to us to be substantially the same as any other permanent license limitation program. While admitting different fisheries may produce different results, we suggest that many, if not all, moratoria are synonymous in practice with limited entry.

### **Whose interests are served by limited entry?**

Exactly who decides when limited entry would be desirable and what form it should take is one of the most contentious issues of fishery management. The exercise of interests served by fishery management is a political phenomenon of the purest kind. Those who think that conservation of fishery stocks is or ever will be the business of science alone must be unaware of the lengthy history of fishery management. As the U.S. public in the future becomes more aware of the value of its enormous seafood resources, even greater exercise of special interests in the political arena will appear than exists today.

Fishermen will continue to play a large part in this political push and pull for fishing rights and privileges. In fact, fishermen have more opportunity now to influence the course of management decisions by becoming involved with the regional councils set up by the FCMA than they ever have had in the past. Of course, fishermen do not always speak with a united voice. Nor do the councils

always act only on fishermen's advice. Often, there are conflicting interests represented within the fishing community at large.

Although fishermen's interests in fishery resources are very great, they must share the stage with other parts of the fishing industry, fishery managers, consumers, and the general public—all of which try, in various ways, to influence the fishery management decision-making process. Each of the loosely-defined special interest groups has its own unique point of view of the commercial fishing industry, and all points of view must be considered under the law. Not surprisingly these viewpoints differ as to the usefulness of limited entry.

### **What is the fishermen's interest in limited entry?**

The fishermen's interest in fish abundance and the regulations that control fishing effort are obvious. The fact that fishing is their chosen life's work, lifestyle, and livelihood was made abundantly clear at the Denver conference. New or different fishery regulations are seen as directly impacting the lives and fortunes of fishermen and their departments. Naturally, they tend to oppose changes in the fabric of fishery regulations which imply an adaptation at variance with traditional practices. A change in management methods implies a change in the pattern of winners and losers. Since those who perceive themselves as potential losers under limited entry are present and able to articulate their views, while potential gainers are vaguely identified, an expressed desire to maintain the status quo dominates. The sentiment is often expressed, "If it ain't broke, don't fix it."

Forces beyond the control of individual fishermen will not, however, remain constant. One of these is the continuing natural fluctuation in stock abundance. Another is change in prices for fishery products. A change in either of these factors that causes fishermen's relative earnings to decrease over time will likely produce a chorus of contempt for the ineffective action by the management authority. In effect, management is called upon to protect the livelihoods of fishermen. Historically, this has been interpreted by management to mean protection of the fish so that more could survive and be available to the fishery. But as fish increase so too do fishermen increase, either in actual numbers or in effect through the aid of technology. When the number of fishermen or their fishing power increases faster than the net increases in fish and price, some fishermen perceive that their livelihoods are best protected by more direct controls—such as license limitation.

Limited entry may be instituted under the banner of conservation, but at the root of the issue is the desire by fishermen for economic protection from dilution of their earnings that might be caused, by either more fishermen or fewer fish than before, or by some combination of these two in the absence of compensating price increases. Thus, the inherent interest fishermen have in maintaining the status quo or in opposing radical changes such as limited entry is sometimes overridden by economic necessity, which spawns a special interest for limited entry.

The fishermen's collective interest in limited entry has also been articulated using quite a different rationale. This view begins with the observation that many commercially important species are overfished when there are inadequate con-

trols on fishing effort. Fishery biologists try to know enough about the life of fishes to estimate the level of effort at which fishing mortality will interact with other natural forces to produce the greatest volume of fish harvested on a sustained basis. Economists point out that harvesting the maximum sustainable yield may not bring the best return on investment in fishing. Because each individual fisherman has no incentive to take into account the increase in costs they place upon other fishermen, there is overcapitalization of the fishery, which, in turn, results from the lack of clearly defined property rights in the fishery resource.

Characteristically, academicians are involved in developing theoretical answers to these problems and applying tests concerning the efficiency of fishing as an industry relative to other pursuits and to its impact on fish populations and upon the people involved in the industry. The scientist would like to know why his theory does not work when applied; the fisherman would like to be assured of a good harvest. While academicians have diagnosed the potential ills of open or free access fisheries and they see certain kinds of limited entry as reasonable antidotes, explicit economic controls just don't make sense to many fishermen.

This dichotomy of purpose is indelibly cast on the limited entry programs instituted to date. Economists are interested in the industry's contribution to national economic efficiency. Fishermen are interested in protecting their individual livelihoods. Since limited entry rarely comes into effect against the wishes of the majority of fishermen, the protectionist theme dominates the program. That is one reason why license limitation is more popular than taxes or individual fisherman quotas, and that may be why so few of the theoretically-predicted benefits to society have materialized to date.

### **What is the public interest in limited entry?**

The interests of the general public/consumer are sadly neglected in many instances. The general public owns the fishery resources, pays for fishery management with their taxes, and pays again when they buy fishery products. This should be grounds for a substantial interest in fishery affairs. However, for the majority of U.S. citizens, commercial fisheries are viewed with curiosity and aesthetic satisfaction (something to look at and wonder about while on vacation at the seashore) rather than with serious concern. In certain coastal areas, of course, there is a high degree of public awareness. In other areas, commercial fisheries are viewed as obstacles to better recreational fishing. If the problems of commercial fishery management are not foremost in the minds of most Americans, this may be because the industry is of relatively minor importance to the national economy.

We will assume that the public has a major interest in how fisheries are managed, nevertheless, because fish are the property of the whole country—or are they? This question has appeared at the conference and since then continues to be a fundamental philosophical and legal point. Does common property imply ownership as in commonly owned property or does it simply mean property that is uncommonly free for the taking? To whom is the property common—fishermen or all citizens? Common property is property that belongs to no one and everyone at once. Does this mean that anyone can render the common

property resources to private ownership without regard for the cost that imposes on others? If the citizens of the U.S. own jointly the fishery resources in the fishery conservation zone established by the Fishery Conservation and Management Act, then they ought to have an interest in the benefits derived from harvesting those resources. Limited entry programs could be designed to accommodate the public interest by leasing private rights to public resources or by taxing use of the resource, although the ways that the federal government can tax fishermen is certainly constrained by the FCMA. If there is no public ownership of common property fishery resources to begin with, or if such ownership is not well defined legally, then limited entry programs have a weaker basis. This is the argument limited entry opponents sometimes make—if you don't own something, you don't give it away, sell it, lease it, or tax its use. To many fishermen, common property means no one's property, so no one can derive benefits from it unless they physically take it, making it their private property.

Fishery resources now seem to be among the few common property resources remaining where this ownership question has become a management issue. Oil companies drill for oil on the outer continental shelf only after they lease a drilling site from the public lands trustee, the federal government. Likewise, trees in national forests can be commercially harvested only after the right to do so is purchased from the resource trustee, again the federal government. An admission fee to use certain public parks or recreation grounds is not unheard of. Why should fishery resources be treated any differently? Why should the public interest in them be ignored?

Taxpayers can justly question the validity of supporting an industry with a net productivity nationwide that may be relatively low, with all management costs considered, simply to maintain the traditional free-for-all approach to harvesting common property fishery resources. They could justly question this, but they don't primarily because (a) their political interest to do so is too diffuse geographically compared to the political interest of the fishing industry to maintain the status quo, (b) the stakes are too low compared to other national concerns like national defense and the price of gasoline, and (c) the public interest in fishery resources under U.S. and state management authority is not well defined in terms of ownership. The public interest has generally been related to conservation, a nebulous objective having something to do with saving for future generations.

### **Some commonly held perceptions of limited entry**

Several criticisms of limited entry have surfaced in almost every discussion of limited entry we have attended or read about during the last two decades. Some of these were mentioned in the preceding section. Several others are analyzed in the following discussion. These criticisms seem to be the most pervasive and consistently used arguments against limited entry. For each one we offer up a counter argument or explanation of inconsistency in the criticism. We do not see our answers to the criticisms as the only answers or the right answers for particular fisheries. Other arguments can be found elsewhere in this volume and in related publications.

*"Limited entry is un-American"*

Synonymous with this feeling is that limited entry is anti-free enterprise. This idea is based on the tradition of assuring free access to fish for anyone who would catch them. It stems from recognition of half the common-property doctrine: that which states that no *one* owns common resources so no *one* need be paid for their taking. The open competition implied by free enterprise is translated into maximizing individual fishing efficiency, since to catch a little more than was caught last year or than was caught by the other guy always seems to be better than to catch a little less. Hence, the logic, "If I don't catch them, someone else will." Since there is no economic motive for individual fishermen to save fish which are likely to be caught in the future by other fishermen, some collective action may be necessary. This is not required as long as the fishery resource is large enough that the impact of fishing mortality on the resource is insignificant even when all fishermen are harvesting it at their peak efficiencies. However, when fishing effort, in terms of fishermen and efficiency of their gear, increases beyond the point of insignificant impact on the resource, government regulation also increases. Over time, government regulation increases more or less at the same rate as fishing effort, in order to maintain a balance between the effects of the fishery and those of nature.

This tendency toward increasing government regulation of fishing effort is actually the opposite of free enterprise. By definition, free enterprise is the practice of permitting private industry to operate with a minimum of control by government. Open or free access to fishery resources together with increasing effort virtually assures government control over fishing enterprise. Theoretically, conservation standards can be maintained with less government control over fishing effort only if control is shifted to access. To oppose access controls (i.e., limited entry) on grounds that they are anti-free enterprise is to confuse free enterprise with free access. The two freedoms are not the same. Free access begets the reverse of free enterprise or increasing government control through an increasing stringency in regulations: the proof is in the regulatory history of most American fisheries. Just because all fishermen in a particular fishery compete more or less equally under the same set of government rules and regulations does not make the system literally one of free enterprise.

The belief that limited entry or controlled access is un-American can be interpreted in two ways: it is not in accord with the American way of doing business (from whence the anti-free enterprise argument springs) and/or it is not in accord with the American way of commercial fishing. We agree with the latter but not with the former interpretation. The American way of doing business is based on private ownership of all raw materials, assets, and products. More to the point, you can't sell something or use something for profit unless you buy it first. Industry adds something to the value of what they buy before they sell it. This compensation for economic activity is called wages, interest, rent, and profit. For example, in addition to his tools and work space, a shoe manufacturer must buy his raw material—leather, thread, glue, etc. By contrast, fishermen buy their tools—vessel and gear, etc.—but they don't buy their raw materials—the wild fish—under open or free access. Of course, that is what free access means: free fish. Open or free access fishing takes place because the ownership of fish-

ery resources (the raw material) is not well defined or defended. However, establishment of private property rights over fish, if not impossible, is certainly too costly and impractical at this time.

Limited entry is un-American in the sense that it is not in accord with the traditional way of conducting fisheries. Change from traditional ways is no small concern especially when certain livelihoods are at stake. But what industry or human endeavor has ever made progress without change, from which emerged a different set of winners and losers? Introduction of limited entry *will* substantially change fisheries. An important question here is whether the cost of maintaining open access fisheries with their attendant tendency toward overcapitalization and excessive government control is greater or less than the cost of change to greater industrial efficiency. A corollary question is whether limited entry as it is practiced today actually leads to greater efficiency.

*"Limited entry will increase government controls"*

This argument is at the root of practically all anti-limited-entry arguments. Also, it is the most difficult argument to refute based on experience with limited entry to date. Perhaps the most oppressive future a fisherman can envision is that the heavy hand of bureaucracy will increase its weight, frustrating his independence, hindering his productivity, and removing nearly any chance to get ahead. This is a legitimate concern. The evidence does not prove that limited entry would mean less government intervention into the private enterprise of fishing than under open access management. But this could be because the empirical evidence of the effects of limited entry to date are based primarily on only one kind of limited entry, that of license limitation. Many of the fisheries which have been the first to employ license limitation have been subject to problems which may explain, in part, the large role government is still playing.

The study of economics tends to make one conservative. With many economists actively supporting public control, the truth in this saying may not be obvious. However, many students who marvel at a market that can move just the right number of Washington apples into Los Angeles supermarkets and permit the Chicago consumer to buy fresh milk every day, also become shocked at bizarre stories from noncapitalistic nations of long lines of consumers needing even standard merchandise such as food or clothing. The continuing media coverage of problems associated with poverty, crime, and disaster often dulls Americans to the amazing efficiency of most of their economy.

In a pure market, government's central role is to define and enforce property rights. Given clearly specified rights, production actions are undertaken to produce the most profitable output, which is then sold to the highest bidder. Consider a strawberry farm. With clearly defined property rights, the farmer can harvest berries up until the date when their sale brings the highest profit. The berries will be sold freely to anyone willing to pay the going market price. The market price will ration the berries by being just high enough to "clear the market," i.e., to equate the number of berries desired to the number of berries sold. If property rights were not well specified, the berries would be picked too soon and probably would not be replanted when the current plants died. If government regulation were substituted for enforcement of property rights, a scenario

of closed and open seasons on picking, maximum harvest quotas, restrictions on picking equipment, and so on could easily be imagined.

Comparisons to markets with clearly specified rights lead economists to suggest that those forms of regulations be chosen which most closely simulate market controls. A reluctance to accept these analogies would reject this line of reasoning. However, there are many other instances of regulation in the United States which reinforce rather than deny the appropriateness of such analogies. Indeed, the national movement toward deregulation is more an attempt to shape regulations closer to market forces than it is a desertion of the public interest. Thus, many argue for taxes per unit of waste discharged into water as a way to trim water pollution control, for transferrable development rights and system development charges rather than cumbersome bureaucracies to implement land use planning, and for either fuel taxes with offsetting reductions in social security payments or transferrable fuel coupons rather than a vast government bureaucracy regulating the domestic petroleum industry.

A limited entry system that simulates market controls could, theoretically, replace other government controls. This conclusion is based upon several premises: (1) that fishery regulation has grown to its current size to fill a vacuum caused by the absence of any market mechanism allocating scarce fish among fishermen, (2) that the government controls were devised for some purpose other than allocating fish among competing users, and (3) that some form of limited entry would be more effective because it would be designed specifically to simulate the market mechanism which is missing.

This conclusion assumes that the market failure produced by the absence of clearly defined property rights for fish is the only source of irrationality. As the 1980s begin a strong public feeling exists that this is not the case generally. There is a growing realization that government imposes many costs and becomes as much a part of the problem as it is part of the solution. An investigation of fishery management organizations, especially their dynamics, could be enlightening, but such a study must be based on a thorough understanding of the current system.

*"Limited entry means a loss of traditional independence and a severe change in lifestyle"*

Harvesting fish from the sea is a way of life which has a value beyond the earnings received by the fishermen and vessel owners. While any change in government rules causes fishermen to fear that they will lose some of the freedom to make their own decisions, this is particularly true about introduction of a new type of government regulation. On the other hand, fishermen's choices are also affected by such factors as fish prices, costs, fuel availability, investment financing, port facilities, new technology, and the availability of fish on the grounds. Many fishermen are concerned about the effect on their fishing opportunities of rapid expansion in fishing effort for fully utilized fish stocks.

In cases where limited entry does cause a change, the change may be an improvement. Some traditions are good and some aren't. Should regulations be instituted to return Georges Bank cod fishermen to their dories for the sake of tradition? The incidental catch problem would be solved but only at the cost of increased fishermen deaths. Comfortable and safe vessels are as appropriate for

fishermen as efficient tractors are to farmers and as better assembly-line working conditions are to automobile production workers. Progress requires change.

Fishermen are not unique in choosing their particular lifestyle and possibly sacrificing higher earnings of other work. Many small business proprietors forego the higher earnings of working for others to be their own boss and take a small chance at becoming a big success. College professors in professional schools such as business and engineering give up salaries as much as two or three times higher than they receive to experience an academic lifestyle. Far from being outside the mainstream of economic reasoning, fishermen are part of a quite general tradition of opting for a career with numerous objectives and diverse rewards. Fishermen should not be given special treatment which is not available to others also trying to preserve valued lifestyles. On the other hand, the fact that others share a concern for values in work beyond earnings received should influence the inclusion of such considerations in the evaluation of limited entry programs.

*"A few large firms will control the fisheries under limited entry"*

This concern is expressed using the analogy of agriculture, where large corporate farms have forced the family farm out of existence. The same responses used by those who have studied the issue of corporate farming appear to be appropriate here.

First, experience suggests that corporate ownership of several large vessels may be attributed, in part, to limited entry. This is also happening without limited entry, as in the Alaska king crab fishery, but limited entry may make this happen faster by offering greater opportunities for returns on investments. Fishermen who make investments in fishing vessels must be expected to choose vessel sizes offering the most advantageous returns. Given the scarcity of risk capital, large-scale operations will frequently incorporate. Just as is true in agriculture, though, the corporation may turn out to be an association of longtime fishermen, or several members of a family, incorporating to take advantage of certain legal and financial benefits.

There will be an optimum size for a fishing firm in a particular fishery, just as there is an optimum size for a tomato farm in Pennsylvania. That size may or may not be larger than the traditional size. Just as with farming or other businesses, in certain locations the family-run fish boat could be more competitive than a very large vessel run by some faceless industrial giant.

To a certain extent, the tendency to concentrate ownership can be controlled by limiting the percentage of interest any individual or firm has in a fishery. The effectiveness of such controls can be questioned, since similar controls have had mixed success elsewhere in the economy. There should be a parallel concern whether rules to keep any one from making too much money might keep many from making any money.

*"Limited entry is unnecessary for purely conservation purposes. Conservation (in this case, biologically-oriented) regulations do not deal with allocation and limited entry does. Therefore, limited entry should be used only when all else fails."*



"Conservation" is one of the those concepts that most people can agree upon because individually they define it differently. At issue is use of government regulation to reduce the current rate of harvest of a resource so that a better or larger harvest can be realized sometime in the future. Conservation of fish by fishery management ironically is not the management of *fish* per se but the management of *people* in the fishing industry. As such, all regulations are influenced totally by human interests and always have an allocational or distributional effect of some kind. Often this effect is exactly the design of a regulation or law even though it is publicly touted under the banner of conservation of fish. When domestic interests wanted to replace foreign fishing fleets by domestic fleets, they emphasized that the major goal of the Fishery Conservation and Management Act was to maintain healthy fish stocks. When anglers wish to gain a larger fraction of a recreationally and commercially harvested resource, they campaign for greater control of commercial fisheries to "save the fish." To get a larger "piece of the pie" for yourself, you simply have to prove that it is the other person who is ruining the resource. The tacit assumption is that you can "conserve" better than the other person.

Limited entry can be a way of dealing directly with allocation and distribution in the fair, open-market way that most other goods and services are distributed. Traditional fishery management techniques allocate fish through a political bargaining process. Does the general public prefer a system in which groups are allocated shares of a fishery resource based on the number of votes they can command, the level of protest made to authorities, and the degree of public emotion they can generate? For that matter, what system would fishermen prefer if they understood all of the processes in traditional management and alternative systems employing some form of limited entry?

Conservation benefits from limited entry are secondary to allocation but this does not mean that conservation is absent under limited entry. Conventional management sometimes reduces the real level of fishing effort by making it less efficient. A smaller number of fishermen and vessels might be able to operate in a manner leading to a preferred size and availability of biomass over time. For example, highly valuable fish resources which are fished during their spawning periods in tightly congregated stocks may have to be harvested under limited entry, or any season at all might lead to eradication of the stock.

*"Limited entry means the necessity of large amounts of startup capital because new fishermen have to buy into a fishery under limited entry. This means that our sons and daughters will not be able to get in, and crew advancement is stymied."*

The increasing difficulty of entering a fishery is a necessary consequence of a program intended to reduce the rate of new entry, but this does not reduce the anguish of those who are excluded. Two remedies have been put forward in discussions of limited entry. The first is to tax away enough profit so that licenses do not include speculative prices based upon expected future profits. The second is to make licenses or quotas nontransferrable. Entry would still be difficult, but would depend upon chance in a lottery, willingness to go through an apprenticeship program, or some other criterion, rather than upon financial resources.

The difficulty of becoming one's own boss and starting up a new business is certainly not unique to a limited entry fishery. A farm returning a modest living will cost hundreds of thousands of dollars, even in areas where the land is not being held for conversion to residential use. Consider also the cost to a young person desiring to operate a popular hamburger franchise. The solution to this problem may lie more in public programs to supply financial capital to people who are particularly disadvantaged in starting a small business rather than in prohibiting creation of valuable fishing rights.

*"Once we go through with limited entry we are stuck with it"*

Yes, once fishermen gain a valuable right to a fishery they don't want to see that right become worthless through reinstatement of open access. However, limited entry programs have come and gone in Maine, Maryland, and British Columbia. Few public programs inevitably continue forever in a democratic society if their time is indeed over.

### **What biological research is needed?**

The effects of limited entry depend critically on actions by people and activity in the biosphere. To predict the effects of limited entry, much of the same biological information is needed that is required for analysis of other fishery management measures.

While costly and difficult to research, many problems in population dynamics are of key importance to limited entry discussions. Among the objections to limited entry was the argument that limited entry does not impact conservation through control of overfishing as well as do other forms of fishery management. In several fisheries, information is lacking on the effect fishing has on recruitment. How can one assess the effect of license limitation, quotas, or taxes on stock recruitment if no one really understands the impact of fishing effort upon it?

Even when a relationship between fishing effort and a biological stock is well established, the association is specified for longterm, average environmental conditions. Annual or cyclical changes in the ocean environment may alter this relationship, especially for shortlived fishes. Consequently, new techniques in stock assessment and/or improved capability in forecasting changes in stock levels and recruitment patterns caused by changes in the environment are needed to trace the relationship between controlling fishing effort and resource conditions.

More elusive still, but of high importance, is an improved understanding of ecosystem relationships. Widely accepted logic suggests that controlling effort and catch in one fishery will affect other fisheries, yet disagreement over the magnitude of these effects can seriously impede decisions about limiting fishing effort. For example, in the Pacific Ocean, it is known (a) that pink shrimp larvae are found in stomachs of Pacific whiting and (b) that the pink shrimp fishery off the California-Oregon-Washington coast increased rapidly after foreign fleets began to harvest large quantities of Pacific whiting. Based upon this evidence, there have been speculations that Pacific whiting may play an important role in fluctuations of pink shrimp populations. However, this understanding is so fuzzy that such a relationship is omitted in calculation of the optimum yield for Pacific whiting.

### **What social research is needed?**

While the needed biological research is widely recognized (although largely because it is needed to evaluate the more conventional fishery management options), the usefulness of anthropological research in assessing the appropriate package of effort limitation programs has only recently become evident. The anthropologist can be especially effective in assembling information on fishermen's goals; in finding cultural explanations as to why some particular program, such as developing cooperatives which allocate fishing rights among its members, works in one geographical area and fails dismally elsewhere; in learning how information, such as new technology, is transferred among fishing communities; and in determining whether fishermen under a particular limited entry program are more likely to observe conservation regulations, to land fish of higher quality, to require less assistance from the Coast Guard, to cause fewer enforcement problems, and generally to be more "professional."

One handicap to anthropological research in fisheries has been the lack of longterm funding. The public has been educable about the need for longterm monitoring of certain fish populations. Just as it is useful to establish a life history for fish, it is also useful to develop life histories for fishermen. For example, in some communities, youths get their first experiences on their parents' vessels, buy small vessels in some nearshore fishery, and eventually move up to larger vessels in offshore fisheries as they grow older. In other communities, there are shifts back and forth from fishing to landbased occupations over lifetimes. To understand the changes which may be induced by fishery regulation into the total life patterns, anthropologists need to identify samples of fishermen and study them over their life spans. Such studies take much time and patience but can be most useful when combined with cross-sectional studies of populations of fishermen.

In addition to research on individual fishermen's lives (which we call anthropology simply because available work has been done by anthropologists), additional research is needed on the impact of limited entry programs on various social groups, especially coastal communities. Fishery management has not attracted the trained sociologists in the same way that such people have been drawn into problems of forest management, water resource management, and environmental management. Would an increase in commercial fishing increase or decrease aspects of social stability in communities? Indeed, is stability from year to year in community employment associated with other desirable social dimensions? What consequences emerge from civil disobedience actions such as destruction of mandatory log books and deliberate, open illegal overfishing? What is the basis for mistrust fishermen have for fishery managers and scientists and even other fishermen in some cases? The scientists and managers involved in fishery management programs may be making substantive errors simply because they are not trained to recognize the social consequences of programs such as limited entry.

In addition to research into the reactions of fishermen and fishing communities to regulation, studies are needed of administrative behavior and other political behavior. Critics of management actions are very quick to pose sinister motives to regulatory actions while those in public bodies are so overwhelmed by

the interactions of many policy actions and events outside their control that they frequently fail to see patterns in their actions. Detailed political studies, both theoretical and applied, have become very common in the management of other natural resources and have contributed to deregulation or changes in regulation. The political scientists who have examined fishery matters appear to have largely concerned themselves with international issues, especially the law of the sea.

One of the most important questions for the political scientist/political economist is: Does the addition of a limited entry program lead to more regulation (and possibly to a larger bureaucracy) than would be found without limited entry? This should be a researchable question although, to be frank, we have separately tried to examine it and have found relevant experiences to be so surrounded with changes in external circumstances, such as Indian fishing rights, rising fish prices, and shifts in other fisheries, that the causative force of limited entry cannot be identified. The issue is so important to the debate that its complexity must not hold off further investigation.

### **What economic research is needed?**

All the other research areas described above are important, but the key question underlying limited entry is whether it can enhance the economic wellbeing of society and what it will do to the economic wellbeing of certain groups in society. We believe that the experience chapters in this volume are particularly good examples of studies of limited entry, by economists. Other good case studies and theoretical analysis can be found in the July, 1979, issue of the *Journal of the Fisheries Research Board of Canada*. Still many important questions are yet to be resolved.

Among the issues at dispute are the indirect consequences of tax programs, the tendency for new investment to dissipate economic rent created in license limitation programs, and the public costs of creating an effective fisherman's quota program. The economic theory underlying fishery management analyses needs to be refined to consider dynamic processes, to take into account the issue of income redistribution, to consider market imperfections, to deal with uncertainty, and to deal with multipurpose fleets and mixed stocks. Contemporary work in the theory of fishery regulation has ignored the very real cost of data, has abstracted from real-world dimensions of the fishery, or has been formulated on the basis of outdated biological models.

### **Conclusion**

Our own assessment of the greatest contribution from the national conference on limited entry and the material in this book is that many complex and important questions were asked. Consequently, we conclude, not by making a case for or against limited entry, but with a few of the key questions. Some, but not all, have been discussed elsewhere in this chapter.

Will more or fewer limited entry programs emerge in the future? Fishing effort is rising more rapidly than can be accommodated by available fish resources. User group conflicts are becoming more common as are suggestions for formal programs to allocate fishing opportunities among fishermen. Yet, considerable concern has been expressed about the effectiveness of the limited entry programs which have evolved to date.

Is limited entry more than license limitation? What other forms of limited entry could be devised? Would they lead to better outcomes?

Are the difficulties with license limitation programs rooted in the way they are implemented? All limited entry programs do not have the same effects. Is that caused by differences in program implementation or in characteristics of the different fisheries?

Can some type of limited entry program be instituted which would reduce the need for current regulations, reduce conflicts among user groups, and allow fishermen more flexibility and independence? Would such a program be based on rights to fish in the sea as being analogous to private property rights? Does the creation of such a system, which allocates rights to fish as being analogous to private property rights, require a different understanding of public ownership of fishery resources?

As important as these questions are, the process used to address them is even more important. We agree with the fishing industry leaders who believe that one of the greatest contributions of the Fishery Conservation and Management Act was the creation of an open planning process. A decision to reject or accept limited entry and, if adopted, what type of limited entry program to employ may not be the "best" decision. But if the decision is based on a frank and open discussion including all interested parties, we believe it will be a "good" decision.



# **Contributed Papers: Principles**

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# LIMITED ENTRY AS A CONSERVATION MEASURE

J. L. McHugh

## Introduction

Opinion is divided on the merits of limited entry into fisheries. A major source of opposition is the fear that the concept is a form of monopoly or exclusion. Approval of, or opposition to, a limited entry proposal is apt to depend on whether an individual sees himself as a member of a privileged group or as an outsider. As it was originally conceived, limited entry was a medium for conservation of capital and labor and for maximum profit to the primary producer. Its possible effects on other segments of the economy have only recently begun to receive serious attention. Its possible effects upon conservation of living resources have not been considered adequately.

## History of Limited Entry

Limited entry, "controlled entry," or "regulation of access" is not as new a concept in fishery management as some people seem to believe. As Woelke (1975) has pointed out, limited entry, in the form of leased subtidal shellfish lands, has been practiced in the state of Washington for about eighty years. This practice is more than a century old in some places along the Atlantic coast of the United States. Usually the state or a local community owns the bottom and, subject to certain constraints, leases it to private planters. In at least one place, Great South Bay, New York, some shellfish grounds are privately owned, under authority of a royal charter of over two hundred years' standing. The earliest record of limited entry in the United States, however, goes back much farther than this. Kochiss (1974) reported that in 1679 the Town of Brookhaven, Long Island, New York, passed an ordinance to prevent destruction of oysters in Great South Bay:

*To prevent the destruction of oysters in South bay, by the unlimited number of vessels employed in the same, it is ordered that but ten vessels shall be allowed (1).*

Even in the modern economic sense limited entry is not a recent concept. McKernan (1975) attributed the first limited entry legislation in the United States to the state of Alaska, and introduction of the concept in the international arena to Crutchfield in the late 1960s at a meeting of the International Commission for the Northwest Atlantic Fisheries in Hamburg. Johnson (1975) stated that limited entry was "popularized" in the 1960s. Actually, a simplified form of limited entry was adopted by the State of Maryland in 1941 as the Maryland Management Plan (Bayliff, 1953). The principles were discussed in some detail by Nesbit (1944). This early attempt, which did not succeed, appears to have been overlooked by most authors. As with so many nonbiological innovations in fishery science and management, the concept was introduced by a biologist.

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The Proceedings of the Conference on Limited Entry into the Commercial Fisheries (Mundt, 1975), in which several of the papers cited above appeared, largely neglected the conservation aspects of limited entry, as pointed out by Alverson (1975) in discussion. Christy (1975a), however, observed that choice of level of yield is not relevant to evaluation of alternative entry limit schemes, because each scheme can be operated to meet whatever objectives society chooses, whether it be maximum sustainable yield (MSY), or any other desired goal. This is tantamount to saying that conservation per se is not an objective of limited entry, although there is nothing to prevent an MSY or optimum sustainable yield (OSY) management plan from also including optimum economic yield (OEY) or maximum economic yield (MEY). It is so obvious as to be trivial, however, to emphasize that conservation of the living resource is essential to the success of any management scheme, whatever its primary objectives. Christy, of course, was well aware of this. In an earlier paper (1969), he aptly described three major property rights in fisheries as the right to conserve, the right to control access, and the right to extract rents.

### **Limited Entry as a Conservation Measure**

Rather than dismiss limited entry entirely as a conservation measure in the biological sense, it is useful to examine the role of limited entry in conservation. Does the concept have unique features that might help to achieve the objectives of maximum or optimum sustainable yield? Or does it simply transfer ownership of the resource to an elite group, carrying with it no assurance of continued biological productivity or of reduced oscillations in abundance or availability of the resource?

In the first place, limited entry to achieve maximum economic rent from a fishery cannot ignore the need to preserve the biological productivity of the resource. Experience in British Columbia and elsewhere has shown that limits on entry have improved incomes of fishermen, which in turn has stimulated increased capital investment and increased fishing power. Despite reductions in numbers of participants, fishing power was not reduced (Houghton, 1975). Thus, biological management was not improved, and the threat of overfishing remains. MEY or OEY cannot long be sustained unless management also preserves or improves the biological health of the living resource.

In the second place, MEY may, if properly conceived, shift the point of optimum (or maximum) effort to the left on the production curve, so that the point of MEY or OSY is at a level of total catch lower than the estimated MSY level. This provides a safety factor against biological overfishing that should enhance biological management, while, at the same time, it conserves scarce resources of capital and labor. It could be argued that, in view of the world need for animal protein, this would be a waste of available and scarce living resources. In rebuttal, it also could be argued that the well-known uncertainty in estimation of MSY (Gulland, 1974; Anderson and Wilson, 1977) and the well-known variability in biological productivity of individual resources (Alverson, 1975; Cushing, 1974; Joseph, 1972), require the prudent manager to be conservative in setting limits or quotas. Thus, MEY can work in the interest of conservation by providing a buffer against errors in estimation of MSY, and by guarding at least partially

against adverse economic and biological effects of natural fluctuations in abundance.

In the third place, a limited entry system must require detailed and accurate statistics in its own right, to determine when desired limits are reached and to measure the success of the scheme. This can also be an advantage for conservation, for accurate records of catch and effort, among other things, are essential to understanding the effects of fishing on living resources. It is interesting that the first cooperative agreement in the United States between a state and the federal government to improve collection, tabulation, and publication of commercial fishery statistics apparently was between the state of Maryland and the U.S. Fish and Wildlife Service in 1942(2). This was generated by the need to obtain statistics necessary to administer the Maryland Management Plan, established by the act of the legislature of the state of Maryland.

In the fourth place, limited entry is conservation of a sort because it purports to conserve resources of capital and labor, two essential resources of the free enterprise system. Conservation of capital and labor should reduce the cost of fishing, benefiting the fisherman, all steps in the processing and distribution chain, and, ideally, the consumer. The advantages of conservation of capital resources should be obvious. The advantages of conservation of labor may be debatable unless manpower thus released from unproductive fishing can readily be employed gainfully elsewhere. If a limited entry scheme is properly designed to achieve its economic objectives, it should also inherently improve conservation of living resources.

### **Limited Entry as a Substitute for Conventional Controls**

Conservation of the living resource is inherent in the ideal limited entry scheme because, by definition, maximum or optimum sustainable yield is the basis for determining total allowable catch, which, in turn, is the basis for allocation of units of capital and labor. Thus, control of biological overfishing of at least the resource or stock in question, and probably control of effort at a level below that required for maximum sustainable biological yield, should be automatic outcomes of successful limited entry. It is possible that limits on entry could be an effective substitute for conventional restraints on total catch, thus simplifying the legal and administrative aspects of management and possibly reducing costs of administration and enforcement.

Conventional controls on fishing include catch quotas, closed areas, closed seasons, size limits, bag limits, limits on kinds of gear and methods of fishing, and licensing. All have been invoked in the name of conservation, but many have been enacted to protect special interests. The two objectives of control of total catch and allocation of the catch among users should be recognized as distinct and unrelated and be treated as such (McHugh, 1974), but they seldom are. Catch quotas usually are imposed to maintain or restore the biological productivity of the resource, but they may also be imposed by industry when the living resource is abundant and unlimited fishing may exceed the capacity of processing or storage facilities and market demand. Limits on entry should be an adequate substitute for catch quotas in domestic fisheries, but experience in British Columbia suggests that this is not necessarily so (Houghton, 1975; Newton,

1978), unless constraints are also placed upon fishing power of individual units of effort. Limiting efficiency is the very thing that limited entry was designed to avoid. It would be ironic indeed if constraints on efficiency were the final solution.

Sometimes it has been argued that limited entry will not work in international fisheries because the basis of economic profit may differ widely among nations. This does not appear to be a valid objection, because each nation is free to choose whatever method of control it wishes to exert upon its own fishing fleets, provided that the catch of each nation does not exceed its national share of the total allowable catch and that bycatches are not a problem.

Closed areas and seasons may be established for a variety of purposes, related or unrelated to conservation of living resources. In the first category are closures to prevent excessive catches when a resource is concentrated on spawning, feeding, or wintering grounds; to prevent damage to young on nursery grounds; to avoid excessive bycatches of other species; or to prevent harvesting at times or places that may reduce optimum yields per recruit or reduce recruitment itself. In the second category are closures due to interference with other fisheries or other uses of the environment, in the form, for example, of trawlers, or due to conflicts between petroleum exploration and fishing. Limits on entry per se would not necessarily resolve either set of problems. However, presence of fewer vessels and fewer units of gear on the grounds could indirectly reduce gear conflicts. It is also possible that, by creating an elite class of fishermen with incentives to fish conservatively, limited entry might induce permit holders to recognize the advantages of good conservation practices, thereby deliberately avoiding nursery grounds, places where bycatches are likely to be large, and so forth.

Minimum size limits usually are imposed to protect young animals, either to ensure them an opportunity to spawn at least once, or to allow an age group to reach maximum biomass. Maximum size limits have sometimes been proposed and have occasionally been established, on the ground that large animals produce more eggs, hence make a greater contribution to reproduction. This ignores the effect of mortality which, unless it is very low, causes a cohort to produce maximum biomass of eggs relatively early in life. Thus, if maximum number of eggs is the objective, optimum strategy usually would be to increase the minimum size limit rather than to establish a maximum. Limited entry per se cannot serve the purpose of protecting certain sizes of animal but, as pointed out above, if a need is understood, and the incentive is created, the new breed of fisherman might do voluntarily in a limited access fishery what he would dismiss as irrational in an open access regime.

Bag limits are usually used in recreational fisheries as one means of limiting total catch. Such limits are in effect for some species in some states, e.g., limits on clam catches by commercial and sport fishermen in California (McHugh, 1977a). Bag limits appear to be the only practical solution to regulation of salt-water sport fisheries, as discussed later in this paper, because limited entry into marine recreational fishing may be a practical impossibility. For various reasons, discussed in detail later, the problem of limiting entry into marine recreational fisheries, especially in a region of dense human population like the New York

Bight area, could defeat a limited entry management plan (McHugh, 1977a). Yet, as brought out in discussion at the workshop, control of recreational fishing appears to be working well in California. This critical issue requires detailed attention.

Kinds of gear and methods of fishing are controlled in various ways, for conservation, for allocation of allowable catches, and to serve special interests. Limited entry per se can satisfy none of these requirements although, as already noted, it may increase the incentives to do so.

Licensing is advocated as a means of identifying fishermen in a conventional management regime, with implications for law enforcement and provision of information on catch and effort, among other things. Routine licensing of marine commercial fishermen is common practice in most parts of the United States, although some states, e.g. New York, do not require that all commercial fishermen or gears have permits. Licensing of saltwater sport fishermen is less common, and in some areas of the United States coast it is still bitterly opposed. Licensing would appear to be a necessity if saltwater sport fisheries are to be controlled. As suggested above, control of recreational fishing may be a key ingredient of a successful limited entry program. Limited entry would probably require mandatory licensing of all participants, commercial and otherwise. As such, a successful limited entry program would have obvious advantages for conservation of the living resource.

### **Implications of Variations in Abundance**

As already noted, individual stocks of fish may vary widely in abundance. Alverson (1975) pointed out that in Bristol Bay, Alaska, the biological surplus of red salmon (*Oncorhynchus nerka*) can vary by a factor of thirty from year to year, and that this would have to be taken into account in planning a limited entry program. Cushing (1974) stated that fish stocks may vary in abundance by several orders of magnitude. In the Middle Atlantic Bight region of the United States, landings of some species like Atlantic croaker (*Micropogon undulatus*) have varied by as much as four orders of magnitude. There is little doubt that this reflected a real variation in croaker abundance (Joseph, 1972) from the historic high of nearly sixty million pounds in the 1940s to the 1968 low of only six thousand pounds. Recruitment of hard clam (*Mercenaria mercenaria*) in Maine has varied as much as eighteen thousand to one (Dow, 1972). Such variations are apt to have serious and adverse effects on the success of a limited entry scheme, especially if management plans are confined to individual species or stocks, as was pointed out several times in discussions at the 1974 limited entry conference (Mundt, 1975).

If limited entry is applied species by species or stock by stock, natural variations in abundance can cause serious problems. Under such circumstances it is obvious that if entry is controlled at a level that can harvest the resource at periods of maximum abundance, the stock cannot support either objective of limited entry: maximum or optimum yield in the economic or the biological sense. Even worse, attainment of these objectives may not be practically possible if entry is limited at the average sustainable level of biological yield. Absolute assurance of success might be possible only if additional constraints are imposed at times of

natural resource scarcity, but then a question arises as to whether the economic viability of the fishery could be maintained, especially if such periods of scarcity are of long duration as has been true for Atlantic croaker stocks. The only safe strategy for conservation of the living resource might be to limit harvesting capacity to that level necessary to take the smallest annual surplus. This would probably not be acceptable from any point of view, economic, social, political, or ecological. Thus, as a conservation measure, limited entry stock by stock, without maximum opportunity to transfer effort from one species or stock to another, could be a sure recipe for overfishing. If conservation objectives cannot be satisfied, economic objectives would appear to be impossible. As Christy (1975b) has observed:

The fallacy that I have seen in fishery conservation agreements is that they are all based upon present status in the fisheries, without any anticipation of the changes in supply and demand that are likely to take place. This approach leads us into trouble every time. There has to be some anticipation of the future.

An obvious alternative would be to encourage flexibility in fishing fleets. The first requirement is a vessel with maximum capacity to operate in shallow coastal waters or on the high seas, and if necessary, in distant waters. The second is a capacity to rig for different kinds of fishing, e.g. trawling, purse seining, potting, dredging, long-lining, gillnetting, and others, and availability of equipment and fishing gear to make the transfer rapidly and efficiently. A third is the knowledge necessary to succeed in various fisheries or the ability and imagination to adapt quickly. Absolute flexibility probably is impractical and unnecessary, but longterm success may depend upon maximum ability to adapt. Incentive to change might be stimulated by a sliding scale of taxes on catch of individual species, the tax inversely related to the health of the resource. This might work despite the political difficulties of restricting a depressed fishery. The prudent fisherman, adequately informed, might require no artificial incentive, provided he has sufficient advance information on relative abundance or availability of various alternative resources.

Maximum flexibility and transferability would obviously benefit conservation by placing effort on resources that are in good condition. Resistance to stringent control on depressed resources might be reduced by measures to encourage harvesting of underutilized or latent resources. Attention should be given to technological research and market development to broaden the resource base and provide economic incentives. Needless to say, an essential ingredient of a successful management program of this kind must be substantially improved knowledge of the status of fishery stocks and their interactions with the biological and physical environment. Another important ingredient is a program of consumer education to break down strong American preferences for a limited number of traditional seafood resources and products. Such traditional preferences have hindered fishery development in this country in the past and will continue to do so if they cannot be erased. It seems clear that conservation and development must be partners in any balanced fishery management program. The total amount of energy reaching the sea is much more constant than the proportion of it locked up at any time in an individual living resource. For this

reason, the total fishing power necessary to take the total allowable harvest of all species must be more constant than that fraction of total capital and labor needed over time to take the allowable and highly variable annual surplus of any single stock.

### **Saltwater Sport Fisheries**

The place of recreational fishing in any marine limited entry management scheme has too long been ignored. Although recreational fisheries were mentioned occasionally in the 1974 conference (Munct. 1975), their great importance was overlooked in at least two ways, by restricting the subject matter of the conference to commercial fisheries, and by including no obvious representatives of the saltwater sport fishing fraternity among the participants.

There is no question that in some cases recreational fishermen have seen the advantages of limiting entry into commercial fisheries. The limited entry program in the state of Ohio (Scholl, 1975; Full, 1975) was endorsed by sport fishing interests. According to these writers, this support was essential to passage of the necessary legislation. However, the interest of sport fishermen in limiting commercial entry and their support of such a proposition could have purely selfish motives related to the question of allocation of the resource among competing users, rather than to the more fundamental question of biological management or conservation. Conflicting interests of sport and commercial fishermen and some of the problems they create have been reviewed by Talhelm (1978).

Along most parts of the United States coast, saltwater sport fishing is a major source of added mortality of living resources, as well as a major business enterprise. In the Middle Atlantic Bight region, where marine recreational fishing pressure probably is greater than in any comparable section of the coastal zone, the sport catch of food finfishes is about three times the domestic commercial catch, not including shellfishes or purely industrial fish species. It makes little sense to regulate domestic commercial fishermen when a major recreational catch is unregulated. Uncontrolled recreational fishing in the Middle Atlantic Bight region may be as great a threat to continued productivity of the coastal fisheries, generally, as foreign fishing ever was.

As Chapman (1975) pointed out:

If the allocation question has not been settled, then limited entry may be seen as a way to reduce the shares of some at the expense of others, and naturally there will be objections. Allocation and limited entry are both very difficult questions separately and may become unresolvable if the two are intermingled. Therefore, I recommend that all concerned face the allocation problem directly and then move to the limited entry question.

From the context, it is fairly clear that Chapman was referring to questions of allocation among nations, states, and segments of the commercial fisheries. If recreational fisheries are included, another difficult complication is introduced, but it is a complication that cannot be ignored. One major difficulty is that the problems of commercial fisheries that limited entry proposes to solve are problems that probably cannot be solved by the same mechanism in sport fisheries. The economic benefits of limited entry will be dissipated unless biological pro-

ductivity of the living resources can be maintained, and biological productivity will not necessarily be maintained if a major segment of the fishery is ignored. If Chapman was right, this critical problem must be recognized and solved before limited entry can be effective in most, if not all, major regions of the United States coast. This could be a major deterrent, for the support of recreational fishing interests will be a necessary prerequisite for successful controls on entry, just as it was in Ohio, and recreational support is likely not to be forthcoming if sport fishermen see regulation, rather than what they consider to be fair share of the resource, as the reward.

This is not the only possible deterrent to support by recreational fishermen. Most methods of limited entry that have been suggested for commercial fisheries will be difficult or impossible to apply to sport fishermen. Any method that would discriminate among individuals, or indeed one that would bar anyone from the right to fish a common property resource for sport, is likely to be unacceptable. Thus, the only acceptable alternative might be an individual bag limit. That in itself raises many difficult questions about surveillance, enforcement, and allocation. Would a skilled, dedicated recreational fisherman be allocated the same annual, weekly, or daily bag limit as an unskilled, casual sport fisherman? If skill and dedication are to be criteria, how will this be decided, and how many categories of recreational fisherman will be necessary? If sport fishing participation continues to increase, will it be politically feasible to impose a reduced individual bag limit as participation grows? What if the condition of a resource is such that the individual bag limit must be very small, perhaps a fraction of a fish per person (a biological and political impossibility)? What if the available recreational effort is sufficient to take the entire allowable catch, or more, as has already been suggested for summer flounder (*Paralichthys dentatus*) by Brown (1976)? For that matter, how will equitable allocation between commercial and sport fishermen be decided, and what will be done about the "sport" fisherman who sells his catch? How will waste be controlled? These are a few of the knotty questions that must be addressed. All have a direct or indirect bearing upon conservation.

Hennemuth (1977) has suggested that anglers may be better at harvesting biomass than commercial fishermen are, because their exploitation rate may tend to be constant, hence they may take different stocks in proportion to their abundance. On the other hand, it was brought out in discussion at the workshop that when a popular recreational species is abundant, anglers may concentrate on that species. Ditton (1977) raised many of the questions asked above, and concluded that it is as important to understand the views and actions of people as it is to understand the living resources that they seek. Obviously, these questions need further study.

### **The Holistic Approach**

As it was originally conceived, limited entry anticipated few of the problems that make implementation difficult. For example, its economic benefits were primarily benefits to the primary producer; it conferred no direct advantages upon buyer, processor, or distributor (McHugh, 1970), nor on retailers, consumers, or other segments of commerce. Indirect benefits to such groups might accrue if limited entry by fishermen were to increase the probability of maintaining the

biological health of the resource, or if limits on entry would restore overfished resources to optimum levels of abundance. The state as owner of the resource might benefit. The consumer might benefit from more efficient use of the resource. On the other hand, without due attention to these other interests, many or all could be worse off than before, or might perceive themselves as worse off.

Another weakness of the original limited entry concept, which could also have had adverse effects on the economic status of fishermen, is that it ignored the universal phenomenon of natural fluctuations in abundance. As already pointed out, a scheme that ignored the effects of natural phenomena could create economic stress at times of scarcity of raw material, especially if the plan restricted licenses to one resource. Such a scheme could also lead to overfishing, or, if regulation were stringent enough to reduce the probability of overfishing to acceptable levels, could lead to a waste of a valuable food and recreational resource. Adverse economic effects might be felt all along the line of production and utilization and could include higher prices to the consumer.

From the point of view of conservation, the only logical hedge against adverse effects of natural fluctuations in abundance is a broad resource base, made up of as many species or stocks as possible. It is a basic principle of ecology that total biomass will fluctuate much less than biomass of individual species. This is implicit in the relatively steady total production of United States coastal fisheries and the history of total world marine fish and shellfish catches, despite wide fluctuations in landings of individual species from a variety of causes. If all segments of the fisheries are to reap maximum benefit from this knowledge, a holistic approach to biology and economics will be necessary. Flexibility and transferability from one resource to another must be preserved for the primary producer, and markets for species not now in great demand must be developed. The primary producer will benefit most from a good ecological intelligence system that can forecast abundance or availability of species and stocks far enough in advance for optimum planning of fishing strategy. In the face of scarcity of some traditional fishery resources in high demand, there are indications already that species for which demand for human food in the United States formerly was moderate, such as pollock, silver hake, and other resources, can be processed into excellent food products. Extended jurisdiction has stimulated other countries to seek American-caught supplies of squid, mackerel, and other species in limited demand in the United States. Acceptance of a broader variety of marine resources by consumers can promote economic benefit for everyone and serve the interests of conservation of living resources as well.

The interests of recreational fishermen will also be served by limited entry into the commercial fisheries, provided that the principles discussed above are followed. Enlightened limits on entry will also be conservation measures. Sport fishermen, however, must recognize that marine living resources are limited and that recreational fishing must also be regulated. The old idea of an ocean of unlimited bounty whose harvest need not be controlled has been replaced by a concept of limited and fragile resources that must be conserved. Between 1960 and 1974, recreational fishing effort in the middle Atlantic region of the United States coast increased more rapidly than did the total recreational catch (Rothschild, et al., 1977). This has reinforced the view that the resources are limited.



In developing fishery management plans for species or stocks harvested by commercial and recreational fishermen, the regional fishery management councils have had no alternative but to: (1) estimate the total allowable catch, (2) subtract the estimated annual recreational catch, and (3) allocate the remaining surplus to commercial fishermen. This inequitable sequence has been necessary because available information on recreational fishing is inadequate and because no adequate mechanism for surveillance and control of marine recreational fishing presently exists. The fishery management councils are seeking better ways of dealing with this problem, but this will take time, and costs may be very high.

### **The Laissez-Faire Approach**

The many difficulties in the way of successful application of limited entry to the coastal fisheries of the United States are also difficulties for conservation of the living resources. Correction of these difficulties could be costly, perhaps too costly to justify anticipated benefits. If so, the alleged advantages of limited entry may be economic and conservation illusions. All possibilities should be considered. What remaining alternatives need to be discussed?

One alternative seldom considered seriously, probably because it appears to threaten existing institutions and vested bureaucratic interests, is to do nothing at all (McHugh, 1974). This alternative is raised from time to time by the U.S. Federal Office of Management and Budget for the same reasons that limited entry proposals are raised, namely, that under existing regimes investment in fishery management brings no net return to the economy. Whenever the issue arises, bureaucrats react with frenzied and defensive energy. As a matter of fact, this alternative strategy, even if it were proven acceptable biologically and economically, is for political reasons unlikely to come about easily. Fishery research and management problems of the fisheries are hot public issues that receive generous legislative attention. Neither the constituency nor its elected representatives are likely to remain silent or refrain from tinkering, unless they clearly understand all the issues.

With some exceptions, legislative and administrative approaches to fishery management seldom address the principal issues, and thus hardly ever solve a fishery problem. In effect, most efforts at fishery management on the domestic scene end up as *laissez-faire*. The record of United States coastal fishery production bears testimony to this (McHugh, 1977b), and it is proper to ask whether we might not be better off economically, and probably no worse off biologically, if most funds being spent were diverted to other activities. In the sense intended here, *laissez-faire* does not mean doing nothing at all, but rather taking the minimum action necessary to protect public health and to prevent obvious excesses.

Except for successful management measures generated by the various international fishery commissions and bilateral arrangements, imperfect though they were, to which the United States has been party, fishery management along the coasts of the United States has been minimal, and with few exceptions ineffective. This historic *laissez-faire* attitude was not intentional, for the coastal states have enacted extensive regulatory laws and, reinforced with federal funds and sometimes with direct federal assistance of other kinds, are spending considerable sums on research and management. It is probably a conservative as-

sumption that the states and the federal government together are spending at least two hundred fifty million dollars per year on fishery research, development, and management. This is roughly 20 percent of the landed value of the marine commercial catch, and a much larger percentage of the net return to the economy, if indeed there is any net return at all. That this estimate is indeed conservative is suggested by Fred Popper (personal communication), who found that in Canada government expenditures on fishery affairs were about equal to the gross return to fishermen for their catch.

Smaller amounts are spent by government on saltwater sport fishery activities. Recreational fisheries undoubtedly bring important returns to the economy and they also yield added social benefits, but the costs of adequate control of recreational fishing may be relatively high. There is little direct evidence that government spending at present levels is maintaining or improving the condition of most fishery stocks around the United States coasts. If we can do no better than this with what amounts to a generous indirect subsidy of the marine fisheries, the wisdom of further expenditure might well be questioned. It is difficult enough to justify present expenditures.

Laissez-faire management as it is presently practiced is a higher degree of management than that defined above. It has not been disastrous for the fisheries as a whole, as has been demonstrated by the relatively steady production of domestic fisheries over the last fifty years or so, and by the increase of foreign catches off the United States coast until recently. In the North Sea (Gulland, 1974) heavy exploitation of the fish stocks for centuries has not destroyed the resource. The most noticeable trend has been an increase in cost of catching, rather than a decline in total production. Taylor (1951) hazarded the opinion that a fish stock would stimulate a shift to other resources before the stock was extinguished. This view has largely been rejected as naive, but the grounds for its rejection may have been equally naive. Taylor may have been looking ahead to broadly based fisheries and management of biomass rather than of stocks.

The other possibility, that energy transfers from heavily fished stocks to underutilized stocks might buffer the effect of fishing on the biomass as a whole, is valid ecological speculation supported by solid evidence in some places, although not an established practical fact (Smith, 1968; Soutar and Isaacs, 1974; Isaacs, 1976). If laissez-faire management does not threaten the living resources as an entity, then the best strategy might be to cut costs by eliminating unnecessary governmental activity and continuing only those services that are absolutely necessary. The principal obstacles will be sociopolitical, and, if the objectives of the present conservation philosophy are to be met, it may be just as difficult to produce convincing justification of the wisdom of reducing governmental spending as it has been to justify the need for a substantial increase in support.

If limited entry continues to gain support as a management device, as it appears to be doing, it is fairly obvious that laissez-faire has no place in the scheme. However, if biomass management catches on, the definition of limited entry will need to be revised substantially. Closer examination of the case for deliberate laissez-faire management and its economic and conservation implications should be a part of the total process of evaluation. The wry but pertinent comments of Isaacs (1976) challenged the very roots of fishery science. Dogma needs to be questioned. That is a healthy approach.

## Summary and Conclusions

A limited entry regime, properly designed and enforced, can be an effective substitute for some conventional fishery management measures like catch quotas. It can also provide incentives for voluntary observance of others, such as closed areas, closed seasons, size limits, and some other important controls. The probability of establishing limited entry regimes and their chances of success are perhaps somewhat better under the provisions of Public Law 94-265 than they were before. However, many states lack the necessary authority to manage effectively, and opposition to providing that authority is strong in many regions of the coast.

Limited entry probably is not a viable concept for application to most single-species fisheries, because fluctuations in abundance interfere. Flexibility to shift from one resource to another is needed for economic stability as well as for optimum conservation of living resources. Adasiak (1978) stated some of the issues as they developed in Alaska. Present understanding of energy flow between physical-chemical variables in the marine environment and living resources, and between individual fishery stocks, is still inadequate as a basis for planned flexibility. Much more attention needs to be paid to the complicated question of management of the biomass as a whole. The necessary research and development will be difficult and costly, but movement toward biomass management will reduce the urgency of limited entry, although in the long run limited entry may still be necessary.

Effects of natural fluctuations in abundance of living resources upon a limited entry scheme require major attention. Optimum sustainable yield, as compared with maximum sustainable yield, might be defined for the purposes of limited entry as that total catch which is sufficiently below MSY level to give reasonable assurance that the stock will not be overfished seriously at times of poor natural survival, yet offer prospects of reasonable economic returns in times of scarcity. A corollary might be that the fishing power of a fleet must be great enough to avoid excessive unused biological production when abundance is unusually high. The best strategy from the conflicting standpoints of maximum economic return, full utilization of the resource, and protection against overfishing, will be to provide maximum flexibility to shift from one resource to another. In this respect, the tendency for the regional fishery management councils to concentrate on species management plans is a weakness. A limited entry scheme based on single species or stocks either must control fishing power at a level of total catch considerably below maximum possible yield, or include a flexible catch-quota system, in addition to limits on entry, to respond to changing levels of biological production. Neither alternative would meet the objectives of limited entry fully. Economic as well as biological advantages could be eroded.

Sociopolitical opposition to limited entry is apt to vary directly with amounts of capital and labor already invested, and inversely with the biological health of the resource. The advisability of limits on entry at an early stage in development of a fishery, while opposition is likely to be at a minimum, should be kept in mind, tempered by an understanding of the practical obstacles to such a policy. The advantages of advance action will be negligible or absent in fully developed or overfished fisheries, another good reason to encourage flexibility.

Saltwater sport fisheries may offer a significant threat to the success of a comprehensive limited entry scheme. Some kind of catch-quota system, including individual bag limits, probably is the only possible way of controlling recreational fishing. It makes no sense to regulate commercial catches if significant uncontrolled recreational catches are being made. Control of saltwater sport fishing still offers formidable obstacles, including the possibility of prohibitive costs. The difficult problems of controlling recreational fisheries must be addressed and solved if any marine fishery management program is to succeed. Limited entry is no exception, and questions of allocation and control perhaps need to be addressed before other steps are taken.

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 consumer. Drastic revision of concepts and procedures may be necessary to provide an equitable solution. The problems are clearly much more complex than was imagined when present limited entry schemes were established. Recent experience should be utilized fully in planning.

These considerations suggest that a holistic approach to management, whether by limits on entry or otherwise, will be essential for success. An alternative that deserves more serious attention is the *laissez-faire* approach, which possibly could be the optimum economic approach for all interests combined. *Laissez-faire*, in effect, describes some features of the present management regime, PL 94-265 notwithstanding. The work of the regional fishery management councils is as yet in too early a stage to judge how successful they will be in improving the situation. Moreover, the councils do not have jurisdiction within the territorial sea, and the ability of most states to change their ways is doubtful. For sociopolitical reasons, *laissez-faire* in its ideal form probably will be impossible to achieve as a deliberate management strategy, no matter what merits it might be shown to have. In fact, PL 94-265 is inconsistent with a deliberate policy of *laissez-faire*. This inconsistency should not be allowed to prevent a thorough examination of all aspects of management, including those that appear to be contrary to present policy. The entire question of fishery management, including the topics of conventional approaches, limited entry, and the merits of deliberately doing the absolute minimum, still needs this kind of searching inquiry. It will be important to make full use of accumulated experience, and to be quick to discard old precepts and try bold, new approaches.

Limited entry is not the final solution to all fishery problems. Many segments of the fisheries may not be helped at all. Another solution offers what may be a better alternative in some cases, and it has the distinct advantage of relative simplicity. The details have not yet been worked out, but *laissez-faire* should not continue to be ignored.

# **AN EVALUATION OF LIMITED ENTRY AND ALTERNATIVE FISHERY MANAGEMENT SCHEMES**

Kenneth E. McConnell  
Virgil J. Norton

## **Introduction**

The purpose of this paper is to examine some implications of alternative techniques for the management of commercial and recreational fishing activity. The context for this discussion is the Fisheries Conservation and Management Act of 1976 (FCMA), which declares that

A national program for the conservation and management of the fishery resources of the United States is necessary to prevent overfishing, to rebuild overfished stocks, to insure conservation, and to realize the full potential of the nation's fishery resources. [Public Law 94-265, p. 2.]

There is ample theoretical and empirical evidence to illustrate that unregulated fishing effort results in biological and economic depletion of fish stocks. Hence, unregulated fishing is inconsistent with the objectives of the FCMA and is not considered as an alternative in this paper.

All fishery regulations affect total fishing effort and the cost of landing fish. Closed seasons, limited entry, quotas, or gear restrictions, for example, have the effect of constraining effort below what it would otherwise be. These techniques can have a significant impact on the cost per pound of landed fish. The choice of regulation, therefore, relates more to allocation (e.g., among few or many fishermen, large or small vessels) than to the question of constraining total effort.

The arguments in this paper are motivated by the premise that fishermen, acting in their own self-interest, are the best judges of how, when, and where to harvest fish. Direct regulations on individual harvesting firms have two ramifications: (1) they increase the cost of harvesting fish; (2) they force fishermen to less profitable positions, and thus encourage evasion. The theme of this paper is that the cheapest and most efficient way to achieve the goal of maintaining and increasing fish stocks is to utilize the profit-seeking motives of fishermen. Put differently, we assert that the further a management scheme departs from the equilibrium achieved by individual fishermen, acting without constraints on the absolute or relative amounts of factor inputs, the greater the administrative, enforcement, and research requirements to obtain the stated goals.

## **Considerations for Fisheries Management**

In this section we identify some considerations in selecting regulatory techniques. We develop these considerations under the assumption that the general objective of fisheries management is to maximize social benefits associated with

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the use of these resources. This objective includes benefits to producers and consumers and takes into account transactions costs (i.e., cost of administration, data collection, and research and enforcement). High transactions costs relative to benefits will result in net losses from the resource as well as in a redistribution of income. The redistribution occurs when transactions costs are paid by the public at large rather than by fishermen, fish processors, and fish consumers (1).

Considerations discussed below are freedom of participants, transactions costs, technological advances, and waste from discards. Other considerations such as distribution of fishing rights and economic rent and social and economic structure of state and local communities are important. We believe, however, that such considerations are more appropriately addressed through other frameworks.

*Freedom of participants:* Because unregulated fishing is not a feasible alternative under the FCMA, public decisions about the management of fisheries cannot choose between absolute freedom and constrained actions. Rather, the choices relate to the extent and type of constraints. We assume that, other things being equal, a situation of fewer regulations is preferable to a situation of more regulations. Freedom of participants will allow for decision-making by individual fishermen, based on marginal costs and returns of inputs and outputs. If combined with clearly defined ownership of resource use rights, this will provide for efficient use of factors of production and the fishery resources, the marketability of resource use rights, and the ability to pass on these rights to future generations. These are important to society, since efficiency in factor and fishery resource use affects costs and prices and, therefore, consumer benefits.

*Transaction costs:* We assume that, other things being equal, it is desirable to minimize transactions costs. These costs are incurred for data collection, research, administration, and enforcement. The more extensive and complex the regulatory methods, the greater the need for public information. Similarly, the greater the deviation from the operation of a market system, the greater the need for public information. Therefore, the choice of regulation should reflect current and future expected information requirements and costs.

Transactions costs are incurred by the regulatory agencies of local, state, and federal governments, and are usually paid out of general tax receipts. Thus, to the extent that taxpayers are not recipients of direct benefits from fishing, incurring transactions costs implies a redistribution of income away from the general taxpayer and to the fish sector (harvestors, processors, and consumers). Judging the merits of such a redistribution is beyond the scope of economics. However, society at large is trustee for the fish stocks, and should determine how the returns from fish stock utilization are divided. When society is financing management and regulation of fisheries, it may wish to see fish stocks utilized more efficiently. And if society wishes to redistribute income toward the fishing sector, it may find cheaper and more efficient ways of doing so than by incurring high transactions costs.

In general, enforcement costs are related to the complexity and pervasiveness of regulations and to the incentive for adherence to the regulations in force. While adherence can be encouraged by high penalties for violations, high levels of enforcement activity, and regulations that utilize the profit-maximizing desire

of fishermen as an incentive not to violate, only the use of incentives tends to reduce enforcement (and prosecution) costs. Other things equal, regulations that are enforceable on shore are less costly than those that must be enforced at sea.

*Technological improvements:* Allowing for technological advances should be an important objective of fishery management. The type of technological changes and advances fishermen seek depends on the regulatory techniques fishermen expect to encounter. Not all technical changes that are advantageous for the entrepreneur are socially desirable. For example, in a fishery where management occurs by closure, it behooves fishermen to develop faster vessels. But if all fishermen do this no one gains. Management techniques should not discourage technological improvements, but should discourage socially wasteful technical changes.

Regulations that artificially constrain or rely on real cost increases to offset technological advances eliminate an important method of generating benefits for society. Such regulations may limit consumer gains and cause a divergence from the producer choices dictated by the market. This divergence may require more public investment in information and enforcement to maintain stock sizes.

A more efficient approach would be to design a regulatory system that is self-adjusting, by allowing and even encouraging technological improvements, but by offsetting the effect of these changes by direct effort reductions rather than indirect reductions through real cost increases. Such a system would allow the consumer to gain and the industry to remain competitive with fleets from other nations.

*Waste from "discards":* Significant waste results from regulations that prohibit the landings of certain species caught unavoidably as bycatch. Waste also results when gear is not selective enough to permit fishermen to obey regulations on size restrictions and when landings of undersized fish are prohibited (2). The fisherman has no incentive to decrease mortality, because without specific property rights he has no assurance of gaining from increases in the fish stock.

### **Evaluation Framework**

To express more formally the implications of certain regulatory techniques, we present a general conceptual expression of social benefits from the use of fish resources. Our presentation of this objective function does not imply that we expect a regional council to formulate it explicitly, estimate its parameters, and maximize it. Rather, it is presented as an accounting guide.

Fish landed in U.S. waters can yield four benefits to the nation. These are: benefits from consuming the fish (consumers' surplus); benefits from the harvesting, processing, and sale of the fish (producers' surplus); benefits to recreational fishermen from catching fish; and revenue to the federal government from foreign fishing fees (3). To insure that the accounting is for net benefits, transactions costs are subtracted from gross benefits. If the market works smoothly and without lags, we can do no better than to maximize (4):

$$1. \text{ net benefits} = \text{consumers' surplus} + \text{producers' surplus} + \text{foreign tax receipts} + \text{recreational benefits} - \text{information costs} - \text{administrative costs} - \text{enforcement costs}$$

subject to

$$2. \text{ natural growth} = \text{commercial catch} + \text{recreational catch} + \text{foreign catch.}$$

The second equation indicates that to be sustainable, the quantity of harvest is constrained by the requirement that the amount harvested equal the natural replenishment. In our discussions below, we will be dealing basically with the objective function as given by the first equation (5). Long-run analysis requires consideration of the constraint of the second equation, while short-run analysis may ignore it.

### Evaluation of Regulatory Techniques

In this section certain common regulatory techniques for limiting effort are discussed and evaluated relative to the management considerations and net benefit function of the first equation. Techniques discussed here are gear restrictions, season and area closings, quotas, and price adjustments.

*Gear restrictions:* Gear restrictions reduce the total harvest of fish in the short run to the extent that they increase marginal costs of harvesting fish. Gear restrictions impinge on decision making by fishermen and represent a departure from private decisions regarding optimal factor use. Because gear restrictions work by directly increasing costs they do not, by themselves, produce long-run economic gains. Gear restrictions that result in temporary fish stock increases tend to lower harvesting costs and increase profits. The prospect of higher profits induces more vessels to enter and this, in turn, necessitates additional restrictive gear regulations.

The enforcement costs of restrictive gear use depend on the technical complexity of the fishery and the type of gear regulation. The requirement to use sails rather than engines for oyster dredging in the Chesapeake was rather easily enforced. However, mesh size restrictions are difficult to observe, and require patrolling and boarding to be enforced. The effect of gear restrictions on enforcement costs is shown in figure 1. Suppose, in figure 1, that  $mc_1$  is the initial marginal cost curve and  $p$  is the price. Then  $x_1$  is the initial harvest per vessel. A restriction, such as on gear, shifts the cost curve up to  $mc_2$ . The equilibrium output with the restriction is  $x_2$ . But the vessel has an incentive to avoid the enforcement. It can obtain additional producers' surplus equal to the shaded area

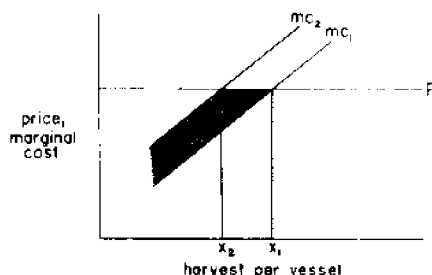


Figure 1.



between  $mc_1$  and  $mc_2$  by avoiding the gear restriction, and thus will be willing to risk the equivalent amount in fines in order to achieve the higher profits. Restrictions that increase stock size tend to shift the cost curves to the right. But, regardless of the location of the cost curves, benefits from evading the restrictions remain. Therefore, this system is likely to increase the cost of enforcement (as will any system that regulates behavior instead of changing incentives).

When gear restrictions are used as the sole regulatory technique, the effects of improved technology in fish catching may be dissipated through more restrictive regulations and, therefore, offsetting higher costs. Also, as long as entry is unrestricted, uncertainty about future returns to investment will be great. With high uncertainty, vessels are unlikely to take any but small risks, making technical improvements unlikely.

Though one can conceive of an optimal mesh size, the benefits to be obtained from implementation of social rules about uses of gear require that ownership of the fishery resource be clearly defined. In the first equation, even ignoring transaction costs, producers' surplus and profits are not enhanced by gear restrictions as long as vessels can enter in response to short-run stock increases. Hence, by itself, regulation of gear will not yield net economic benefits. Producers' and consumers' surplus will be dissipated as vessels enter. In addition, transactions costs are likely to be high, implying via the first equation that gear restrictions may yield negative returns (6).

*Seasonal and area closings:* The intent of closing a fishery is to eliminate effort on a species. The result is either to force fishermen to harvest a less profitable species or to tie up their vessels. In either case, the short-run result is lower net earnings or higher average costs. This form of regulation, like gear restrictions, moves certain aspects of decision making from the private sector to the public sector. Freedom of fishermen to decide when and where to fish is reduced.

Information costs for managing a fishery by closings are substantial. Assessment programs must closely monitor stocks, and harvesting data must be collected on a real-time basis. A free entry fishery that is regulated by seasonal and area closing will have a continually varying optimum yield (if this concept is interpreted broadly). Capacity to harvest can change dramatically by switching from other species, by more intensive utilization of existing vessels, and by entry of new vessels. With each capacity change, length of season and area closings must be altered. To monitor landings and determine the time and impact of closing, it is necessary to have continuously updated vessel lists, as well as bioeconomic models that allow for constantly changing numbers of vessels.

With regulations such as area and seasonal closing, which rely on penalties for its disincentives, profit-maximizing behavior does not coincide with the regulated situation. It is in the self-interest of each profit-maximizing vessel to fish in closed areas, elude enforcement agents, and sell fish but not accurately report quantities. Enforcement must involve the monitoring of vessels as they fish. Boarding capacity may be required. The need for monitoring and boarding capacity is substantially increased if fishing for a species is closed in one area and open in another.

Closures probably have little direct effect on waste of fish at sea. However, a closed season implies that landings of a certain species are illegal, and if that species is caught incidentally in other fisheries, waste will result.

There is an important relationship between closures and technological improvements. Technological improvements result in increased potential effort. If closed seasons or areas constitute the primary regulatory technique, they may have to be adjusted to increase average costs to offset the technical advances. This approach prevents society from gaining from technological improvements.

As with gear restrictions, the effects of closed seasons or areas can be traced through the first equation, the net benefit function. Since the effect is increased costs, the impact will be to reduce producers' surplus. Because of the complexities of this type of regulation, transactions costs would be likely to be high and net benefits would be decreased accordingly.

An important economic inefficiency generated by seasonal closings is the overcapitalization of infrastructure, including processing. Processing capacity and the average costs of fish can be lower when the same harvest is spread more evenly over time, rather than being concentrated during particular seasons. Other things equal, the artificial periodicity of harvesting results in a net loss of economic benefits, which occurs in the first equation via a reduction in producers' surplus and increased transaction costs.

*Overall quotas:* an overall quota by species or by vessel class must be enforced by closure and has the same implications as discussed above.

*Per-vessel quotas:* Individual quotas per vessel can be made with or without overall fishery quotas. Individual vessel quotas in a fishery with no overall quota will not restrain total catch. Additional vessels will enter as long as the per-vessel quota permits the representative fisherman adequate returns on his investment. Under an overall quota, there are two types of per-vessel quotas: (1) a quota on the maximum catch per vessel season, and (2) a guaranteed percentage of the overall quota per vessel. If the overall quota is to be attained, then maximum per-vessel quotas must be reduced upon the entry of each new vessel. A guaranteed proportion of the overall quota per vessel is a form of limited entry, since no vessel can fish without some vested proportion of the allowable catch.

Of all the regulatory techniques per vessel, quotas have the most direct impact on the freedom of participants in their harvesting decisions. This impact makes quotas an onerous form of regulation. Management of a fishery under a per-vessel quota, even when the quota is marketable, completely changes the nature of the activity.

Information costs associated with managing by quotas are substantial. A detailed knowledge of the industry is essential and may require catch histories for each vessel. To monitor the effectiveness of per-vessel quotas in achieving management goals, real-time catch records are unnecessary. In effect, management by quota involves the management of each vessel individually.

Consider the effect of a per-vessel quota system as it is explained in figure 2. Suppose that the initial stock size is such that the marginal cost schedule is given by  $mc_1$ . Let  $x_1$ , where price equals marginal cost, be the equilibrium level of harvest per vessel with no restrictions and  $x_2$  the per-vessel quota. If the per-vessel quota is adhered to, above-normal profits will be generated. These profits will

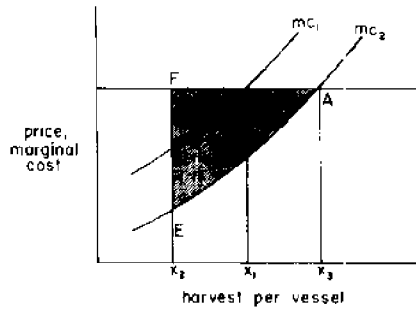


Figure 2.

tend to encourage evasion and additional entry. In the short run, each vessel will want to increase its harvest to  $x_1$ , and only the threat of penalty will prevent it from doing so. In the absence of additional entry, there is another inducement to avoid the regulations. If the reduced catch per vessel results in increased stock size, then the greater stock density lowers marginal costs. Suppose that the new marginal cost schedule is given by  $mc_2$ . Then profits per vessel are maximized when output per vessel is at  $x_3$ . Vessels are willing to risk losing, by incurring fines, an amount equal to the triangle AFE to avoid enforcement. Thus, the reductions in costs that occur because the initial quota is successful only make fishermen more unhappy with the quotas and more willing to evade them. Hence, to be effective, enforcement costs increase.

When bycatches occur, physical waste is endemic to the use of quotas. When a vessel has achieved its quota for a particular species, but brings on board some of that species as a result of directed effort toward another, the fish exceeding the quota will be thrown back, resulting in a social loss.

The effect of quotas on technological change depends on whether other management devices are used. With free entry, the uncertainty of future returns from technical advances is great, and there is little incentive for innovation (7).

The effect of quotas on the net benefits of the fishery is clear. The use of vessel quotas as the only management tool tends to dissipate producers' surplus as more vessels enter. In addition, the enforcement and information costs are higher, making it possible that the net returns to a quota system are negative.

Because it is a form of limiting entry, the main effect of stock certificate programs of fishermen quotas, whereby the right to land a certain quantity of fish is vested in a fisherman or vessel, is to preserve the producers' surplus. Regulation by vessel quotas, whether vested or not, creates transactions costs and unwanted bycatch. Only when quotas are transferable will socially beneficial technical advances be induced.

*Adjusted price system:* An adjusted price system would be designed to control fishing effort by reducing the price received by fishermen for overfished species and by increasing the price for underfished species. The adjusted price received by fishermen would be a portion of the actual price paid by buyers. The difference would be in the form of a tax paid by fish buyers. The purpose of the

price adjustment scheme would not be to set prices for consumers or harvesters at desired levels. The ample experience with rationing and price-setting boards suggests that fixing prices at desired levels is difficult to achieve. Rather, the purpose of the price adjustment system would be to change the marginal returns from fishing on substitute species, and hence change the effort applied to particular species or groups of species (8).

Without additional limitations, the price adjustment system represents basically the same approach as tax systems outlined by several economists. To work effectively, it would have to set taxes high enough to remove the rent from the fishery. Such a system has been labeled as totally unacceptable by administrators and the fishing industry and is prohibited by the FCMA.

*Implications of alternative regulatory techniques:* It follows from the above discussion that these regulatory techniques, without limited entry, tend to result in:

1. Continual movement away from private decision making relative to factor use, and increasingly complex and severe restrictions on fishermen
2. Benefits of extended jurisdiction being dissipated by entry of new participants
3. Increasing costs of gathering public information (social, economic, and biological)
4. Continually expanding expenditures on new and more complex enforcement systems
5. Increasing waste of dead fish at sea as species, size, and quantity regulations become more restrictive
6. Constraints on technological improvements in vessels and gear or artificially raised costs through regulation to offset technological improvements that do occur
7. Taxing of all producers' surplus in order to control effort

### **Limited Entry**

Our discussion to this point suggests that managing fisheries without limits on the number of vessels will have undesirable consequences. Hence, we propose that limited entry (where entry is limited by ecosystem and not by species) be an integral part of any regulatory scheme. However, limited entry by itself is not a satisfactory management scheme. In particular, serious problems arise when limited entry is proposed for a multispecies fishery, such as that for New England groundfish. It is not practical to set entry constraints for each species. If entry is limited on an ecosystem basis only, it is possible that certain species will be depleted economically and to such low population levels that recovery to commercial quantities will not be likely. This can happen for two reasons:

1. Catch of certain species may truly be unavoidable as an incidental catch with other species.

2. As the abundance and catch of one species drops, price will tend to increase. This may encourage searching out the "last few," especially in a multiple species fishery where other species are joint products.

Therefore, limited entry alone will not solve the problem if one objective is to maintain all species at population levels above certain "critical" levels.

In addition, limitation of entry without additional regulation dissipates producers' surplus because vessels will continue to increase their harvesting capacity as long as additional profits can be made. Unless adjustments are made to keep effective effort levels under control, technological improvements can have the same effect as increased entrants—increased effort that can dissipate gains made possible through limiting vessel numbers.

The key issue, therefore, is to develop a system that will overcome points 1 through 7 above, prevent excessive exploitation of any species, and, allow for, but adjust to technological improvements.

### **Limited Entry with Other Schemes**

From our analysis and from the practical experiences with limited entry, it is clear that limited entry alone cannot be an effective management technique. But management schemes that do not directly restrain entry will likely be a waste of public funds. Schemes that include free entry cannot capture the returns of management in the form of profits to harvesters or rents to society, yet entail high transactions costs and onerous direct restrictions on harvesting. Therefore, to be justifiable, a management scheme should combine limited entry with some other technique. It would be possible, for example, to combine limited entry with gear restrictions, closures, or overall quotas; we suggest, however, that these techniques, even with limited entry, will cause ever-increasing transactions costs. This is particularly true for enforcement costs, because if gear limitations, closures, or quotas are effective, incentives are provided for fishermen to violate the regulations. Certainly, overall quotas without specific constraints on technology will, even with controlled access, result in overcapitalization of the harvesting sector.

Two approaches are attractive alternatives for supplementary management within a limited entry fishery. They are a stock certificate program and an adjusted price system. Within a limited entry program, both schemes effectively regulate the rule of capture and produce fish efficiently. Hence, the choice between these two measures depends to a large extent on the transactions costs required to administer them. A marketable quota system requires that each vessel's harvest be monitored on a real-time basis. Though unknown, the costs of such monitoring seem great. A price adjustment system requires that exvessel transactions take place at adjusted prices. This would require monitoring fish buyers. The transactions costs of this approach are unknown but might be comparable to the costs of managing a state sales tax. An advantage of the marketable quota system is that authorities need not define or control fishing effort or fishing power of vessels within the limited entry system. Under a marketable quota system, a buyback scheme would be unnecessary, because a ves-

sel operator would only expand capacity when he had purchased existing fishing rights from another vessel.

Some critics of the use of an adjusted price system assert that prices would have to be adjusted rather frequently in order to control effort, and that such adjustments would create a climate of great uncertainty for fishermen. However, continuous adjustments would not be necessary. In fact, when this system is used in combination with the buyback program, it might be possible to adjust prices only annually or semiannually. Both the stochastic nature of fish stocks and unavoidable errors in the measurement of fish stocks suggest that it is unrealistic to try to achieve specific target values of fish stocks. Rather, it is more reasonable to use a management scheme to try to achieve a stable and economically efficient level for the catch-per-unit-effort. This would be the goal sought by a limited entry, price adjustment scheme.

Within a limited entry, price adjustment system, the problem of increasing capacity from a fixed number of vessels can be handled through a buyback program. Using proceeds from the price adjustments, managers can reduce effort by buying vessels and retiring them. Without a buyback program, this scheme will result in effort increases (from technology changes) that will have to be offset by price adjustments until average profits go to zero.

Limited entry with price adjustments on overfished species allows existing fishermen freedom of choice based on prices and costs. Fishermen may choose the type of vessel, size of crew, when and where to fish, what species to seek, etc., with the economic returns of their venture as their guide. And resource owners may enter and leave the industry under the same conditions found in the rest of the economy. They can purchase capital equipment and use rights to the resource.

We believe that transactions costs for this system would not be greater than for other systems. The enforcement costs relate only to ensuring that all sales are made at the adjusted prices and that no vessels sell fish without a license. At-sea capability would be needed only for the monitoring of foreign fishing. Domestic vessels would not need to be monitored for quotas, bycatch, or place of fishing. If prices were adjusted at the level of the fish buyers, there would be no incentive on the part of harvesters to avoid the regulations.

Under the limited entry, price adjustment system, waste from discards would be reduced because fishermen would not be required to throw back fish that bring them a profit. Harvested fish would always bring a positive price because the tax would be a percentage of the price. When a particular species is overfished and is also the bycatch of another directed fishery, the price adjustment on the directed species can be increased until the bycatch fishery recovers.

Technological change would not be discouraged under this management regime. In fact, because each vessel would have a vested interest in the resource, future returns would be less uncertain and vessel owners would become more willing to assume the risk inherent in innovation. The vessel buyback program would allow authorities to control total effort even though the fishing power of particular vessels or vessel substitutes might increase.

With respect to the first equation, the effects of this management scheme initially would be to increase producers' surplus, since the long-sought returns

from extended jurisdiction would accrue to fishermen. Returns to society would come in the form of lower information and enforcement costs. As cost-saving technical changes occurred, some relative price decreases would likely be passed on to customers.

### **Management of Recreational Fishing**

No management scheme can succeed without properly accounting for recreational fishing. McHugh has emphasized this in his paper in this volume. Recreational fishermen are important harvesters of some species. For example, cod in New England, mackerel in the middle Atlantic, and salmon on the West Coast are important commercial species that are highly sought by sports anglers. For reasons of both efficiency and equity, the management of recreational fisheries is an important consideration. No management scheme that limits entry to commercial fishing, yet lets sport fishing go unregulated on a commercial species, can be politically sustainable. Management that restricts the commercial but not the recreational harvest will be inefficient. To the extent that effort by sports fishermen responds to stock abundance, the returns to commercial fishermen will be diminished by recreational fishermen. Thus, it is necessary for fisheries management to develop some tools for managing recreational effort and catch.

While some form of regulation of recreational fishing may be necessary, such regulation can be enormously expensive. Recreational fishermen have diverse ways of fishing, and the cost of surveys, even with sampling, is great.

The dynamics of recreational and commercial fishing exacerbate the problems of efficiency and equity of regulating commercial but not recreational fishing. There is growing evidence, supported by the work of Stevens (1966) on the West Coast, Talhelm (1973) in Michigan, and Goodreau (1977) in Rhode Island, that recreational fishermen respond to higher catch rates by fishing more. A limited entry scheme in the commercial sector that increased the abundance of species sought by recreational fishermen would draw more recreational effort as expected catch rates increased in response to greater stock abundance. In effect, without recreation restrictions, the more successful the commercial management scheme is in stock rebuilding, the more likely it is that the benefits from such a scheme will be distributed to the recreational sector.

Thus, it is important to develop some type of management scheme for recreational fisheries. Managing recreational effort may involve one or more of the following approaches:

1. Bag and size limits
2. Quotas per vessel
3. Gear restrictions
4. Fees
5. Stamp systems
6. Lotteries

7. Limited entry by:
  - a. Vessels for hire
  - b. Fishermen
8. Closed seasons and areas

Each of these approaches could be supported by fines and other enforcement measures. Although a marine sport license evokes only lukewarm support, it seems a necessary first step and hence is not addressed as a separate management tool. The tradeoff between the cost of the management and its effectiveness is quite severe for marine sport fishing. The imposition of a per-unit tax on recreationally caught fish equal to the per-unit tax on commercial landings would assure an efficient allocation by inducing each sector to value its landings equally at the margin. However, such a tax would be astronomically expensive to collect.

In developing a management scheme for recreational fishing, it is useful to consider three kinds of effort: shore fishing, party or head boat fishing, and private and charter boat fishing. Most fish are caught from boats. According to the *1970 Saltwater Angling Survey* (U.S. Department of Commerce, NMFS) 75 percent of the weight of the recreational catch was landed in boats in 1970. Primarily because competition between sports and commercial fishermen comes from fishing in boats, but also because the cost of licensing and regulating recreational angling from shore is high, we limit our discussion here to policies for regulating recreational fishing from boats.

For regulating recreational fishing from boats, we suggest the following strategy:

1. All sports anglers fishing from boats must have a marine license.
2. Any sports vessel wishing to catch a species that is also caught commercially must have a permit.

Vessels would be required to purchase permits annually, and the permit fee would vary with the level of the tax on the commercial sector. It would also be reasonable to expect an end to vessel construction subsidies for newly constructed head boats and party boats. Perhaps in some areas a moratorium on entry into the head and party boat sector might be a desirable policy.

### **Summary and Conclusion**

In this paper we have evaluated the most commonly discussed regulatory techniques with respect to the most important management considerations. Our evaluation reveals that, for most considerations, any management scheme that excludes limited entry will create undesirable effects, especially if such considerations as freedom of participants, enforcement and information costs, and discarded fish are important. However, limited entry alone will not likely achieve any of the management goals. We suggest that the two most likely forms of additional regulations are stock certificates and price adjustments. While each approach has its merits, we suggest that the price adjustment scheme is the better



method of utilizing the profit-seeking motives of fishermen to achieve management goals. The main points of a limited entry, price adjustment scheme would be:

1. A moratorium on entry by ecosystem
2. A price adjustment system that effectively reduces the exvessel price of overfished species
3. A vessel buyback program, designed to maintain or reduce the quantity of effort
4. Marine licenses and permits for recreational fishing
5. Management of the fishery in a way that corresponds as closely as possible to the free enterprise economy

We feel that these elements provide a concise approach to fishery management. Fishery policy based on such a system could be administered through the federal government directly or through the regional councils.

The limited entry, price adjustment scheme presented here is not new. Economists in fisheries management have suggested such a scheme, or elements of it, for some time. Indeed, it takes no great imagination to design such a scheme on paper. The more important and more difficult task is to prepare a procedure that will move us from our current situation to a reasonable and workable fishery policy.

# THE COSTS OF UNCONTROLLED ACCESS IN FISHERIES

Francis T. Christy, Jr.

It is our purpose here only to point out that the existence of unnecessary and hampering legislation, whatever its origin or motive, is, to the extent to which it is enforced, an economic factor which must be taken seriously into account . . . However, human nature being what it is, rational and scientific legislation is hardly to be expected in a resource which is not subject to private ownership.

Harden F. Taylor

## Introduction

If there is no control over access (1) in fisheries and if demand for a stock (or stocks) of fish is increasing, then:

1. Overcapitalization (2) is inevitable and will become worse as prices for the product increase.
2. Measures to prevent depletion (3) will either impose or lead to increased costs of fishing to the fishermen, and these costs will become greater as prices for the product increase.
3. The costs of management, research, and enforcement will be borne entirely by the taxpayer.

This statement is designed to provide a partial basis for dealing with the question of whether some form of control over access should be adopted. The statement is not intended to make any judgment on the desirability of avoiding the consequences that are described. Instead, it simply points out that the described consequences are inevitable if there is no control over access.

It does not follow from the statement that the described consequences will necessarily be avoided by the adoption of a system of access control. Some systems of access control may worsen the consequences, while others may alleviate them entirely. Furthermore, it should not be assumed that the described consequences are the only ones of importance.

If the conclusions of the statement are accepted, the next step would be to examine different systems (and combinations of systems) of access controls to evaluate the costs and difficulties of adopting them and the full range of consequences with regard to all the relevant values to be sought from the use of our fishery resources.

Of the three consequences mentioned above, this paper focuses on the second, which states that in the absence of access controls the costs of fishing will increase as measures to prevent depletion are imposed and that these costs will be borne by the fishermen largely through the imposition of even greater restrictions on their fishing gear and operations.

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The other two consequences are of considerable importance, but their primary effect is on society as a whole rather than on the fishing industry. They do not, therefore, attract strong constituencies nor, unfortunately, do they have much influence on fishery management decisions. Overcapitalization is a waste to society because the excess capital and labor resources used in the fishery make no contribution to the economy, assuming, as is generally true, that there are alternative opportunities for the capital and labor. Although there are difficulties in calculating the amount of waste and different interpretations of the definition of waste, it is quite clear that economic waste exists where access is uncontrolled. The loss, however, is diffused throughout society and even though it is large in the aggregate, there is little incentive on the part of any individual or group to exert political pressure to prevent it.

Similarly, the costs of research, regulation, and enforcement, which may be very high, are borne by taxpayers in general and attract little attention except occasionally from the Office of Management and Budget. For most natural resources, where private property rights apply, these costs are borne by the property owners to a large extent, but in fisheries, where taxes on catch or license fees are nonexistent or negligible, the fishermen make no contributions to the costs of management. These costs are likely to rise as rules and regulations become more complicated and as more restrictions are imposed upon fishing and fishermen.

There are three reasons for focusing on the second consequence—the increase in costs of fishing. First, if decisions and plans continue to be made on the assumption that this consequence can be avoided, it will become increasingly difficult to remove the restrictions and superfluous costs. Second, this consequence has the greatest direct effect on fishermen. If fishermen and the regional management councils can be convinced of the inevitability of this consequence, it may then be possible to deal more directly with the issue of access controls.

Finally, this point has been seriously neglected in the past. Much attention has been given to the problems of overcapitalization since 1954, when Professor H. Scott Gordon first brought them to the attention of economists (4). The theoretical analyses have been examined in much detail and static models are being replaced by more refined dynamic models (5). Recently, some attention has been given to how the effects of different management systems are distributed among fishermen and society (6). But very little has been written or said about the relationship between uncontrolled access and the costs to individual fishermen.

Fishermen, of course, are painfully aware that regulations generally add to their individual costs and that this has been the result ever since conservation regulations were first adopted. This awareness has grown considerably in the past year, particularly in the New England area. The Fishery Conservation and Management Act (or 200-mile law) has not provided the escape that fishermen sought and hoped for. Instead, it appears to some fishermen that the act has simply worsened the situation. A leading New England fisherman said, "The 200-mile law talks of the greatest benefit to society, but I'm not sure anyone is benefiting. There's been too much hardship and heartache. The cure may be worse than the disease" (7). While suffering the consequence of uncontrolled

access, however, fishermen seek to lay the blame on other factors such as too many foreigners, inadequate markets, too much red tape, etc. They continue to look for a way out that will not cost them their freedom. No way exists.

The economic forces at work under the condition of uncontrolled access are described in the the next few pages, followed by a discussion of how conservation controls lead to increased costs of fishing. Some current efforts to escape this consequence are also discussed. On the belief that no escape is possible, the question is raised whether the prevention of depletion is desirable and, if so, what forms of access controls will lead to the minimum amount of government intervention and costs to fishermen.

### *The Costs of Common Property*

A common-property natural resource is defined as one for which access is free and open. There are no exclusive use rights and no controls over the amount of capital and labor (or fishermen and vessels) that can make use of the resource. Although there may be difficulties in entering a fishery for a variety of reasons, these difficulties do not necessarily change the condition of common property. For example, the costs of a vessel or particular kind of gear may be very high, it may be difficult to learn the fishing techniques, or the fishing conditions may be hazardous and uncomfortable. Although these may impede entry, the condition of common property will still exist. Access to the resource is still free and open, and the impediments are only relative. If the price for the product is right, the expensive vessels will be built, the techniques learned, and the discomforts accepted. The eastern tropical Pacific tuna fishery provides ample evidence that such difficulties may impede, but will not prevent access.

Resources other than fisheries have also been treated as common property. The air we breathe, large bodies of water, outdoor recreation areas, grazing lands, oil fields, the radio spectrum, and other resources have all been used freely and without restraint in the past. This freedom of use has led to waste in most cases. Some of the consequences are obvious. Broadcasters, for example, cannot use the same frequency in the same region. Free and unstinted use of grazing lands inevitably leads to damage of the grass and ground as demand for use increase.

Physical waste is a direct and inevitable consequence of free and open access to use the resource. If, as is the case with fisheries, there is no effective way to increase the supply of the resource, the growth in use will lead to depletion. Although arguments can be raised over the definition of depletion and its causes, they do not negate the fact that overfishing occurs and generally leads to annual yields that are lower than they could be.

The role of economic forces is critical in this development, even though they are not always recognized. Changes in the factors of demand and supply that lead to either higher prices for the product or lower costs per unit of effort will increase the degree of depletion. Fishermen quite rightly fish for a profit and not for a quantity of fish. If their profit increases because of higher prices or lower costs, they have little concern that their individual catches may be lower than they once were. As Dr. Harden Taylor said twenty-seven years ago, "Scarcity (of the resource) does not appear to have been a calamity to the fishermen" (8).

Changes in the factors of supply and demand have occurred in the past and can be expected to continue into the future. With an increasing population and a growing economy, prices for most fishery products will increase. Generally, a decrease in catch due to overfishing or other causes will also lead to a higher price. In addition, technological innovations will bring about lower costs per unit of effort, although they may be offset in some measure by higher costs for fuel and other factors of production. In short, economic forces will continue to exert increased pressures on the stocks and will exacerbate the problems of management. If decisions and plans are made as they often are on the assumption that such changes will not take place, then these decisions and plans may have short-lived effects.

If it is assumed that depletion should be prevented, an assumption that is examined later, and if the common property condition is maintained, then interference with the economic forces becomes necessary. It is unreasonable and unfair to ask fishermen to impose this interference upon themselves voluntarily and unilaterally. Under the common property condition, anything that a fisherman leaves in the sea for tomorrow will be taken by others today. No fisherman, by himself, can afford to restrain his present catch in the interest of future returns, because this will mean a loss rather than a postponement in earnings. Furthermore, if all fishermen cooperate in restraining present catch, there is no guarantee that they will be the ones to receive the future benefits. If their restraint means higher returns in future years, these increased returns will simply attract more fishermen and force average returns down to the level where they stood before the sacrifice took place.

Since fishermen are unable to exercise the restraints themselves, the interference with economic forces must be imposed by a public agency. This is done in a variety of ways. One is to prohibit technological innovation or to enforce technological inefficiency. Another is to limit the size of fish that can be taken. Others are to close seasons, close areas, and limit the total amount of catch. Each of these kinds of conservation regulations serves to make it more difficult to catch fish and to increase the costs of catching fish, either directly or indirectly.

With most of these regulations, the increased costs to the fishermen are quite clear. In other cases, however, the regulations produce indirect costs which, though they may be large, are not often fully felt by the fishermen. For example, restrictions against innovations, use of certain kinds of gear, or vessels beyond a certain length do not necessarily lead to direct costs to fishermen. Instead, the costs are incurred in lost freedom and, more important, in lost opportunities to improve individual earnings. The latter costs are insidious because they do not have to be paid directly by the fishermen as out-of-pocket expenses. They may, nevertheless, be very high.

As the Alaska salmon fishery developed, restrictions on almost every aspect of fishing were imposed. When limited entry control finally went into effect in 1976 technology had already been frozen, with restrictions on size of vessel, kind of gear, location of fishing, time of fishing, etc. These restrictions were not, of course, effected without opposition, but they were adopted gradually, in small steps, so that no one fisherman had to give up very much at any particular time.

In the aggregate, however, the restrictions have significantly reduced the earnings fishermen could have achieved if innovations had been permitted to proceed in an orderly fashion, with appropriate reductions in the amount of effort. These losses in potential earnings must be considered an increase in costs to fishermen, in addition to the direct costs resulting from other kinds of conservation regulations.

Conservation measures such as total quotas, limits on size of fish, and closed seasons also produce indirect costs for fishermen. In the case of the total quota where fishing must stop after the allowable catch has been reached, fishermen have an incentive to increase the size, speed, and number of their vessels to obtain the greatest share for themselves before the quota is reached and the season closes. Since all fishermen operate the same way, the net result will be a shortening of the season. This may lead to congestion on the grounds and interference of one gear with another. The roe-on-kelp fishery is an extreme example. More often, the damage to fishermen comes from the presence of a large quantity of product on the market in a short period of time, which creates a glut and lowers the prices paid to fishermen. This has occurred in the Pacific halibut fishery (9) and more recently in the surf clam fishery in the Mid-Atlantic and the groundfish fishery off New England. To avoid the glut and to spread the catch over a longer period, Pacific halibut fishermen adopted a voluntary layover program. Quarterly quotas have been imposed on the East Coast surf clam and groundfish fisheries. In the surf clam fishery, fishing has been reduced to one day a week. This leads to a considerable amount of idle time, inefficient use of vessels, and high costs of conversion if fishermen wish to move to other species.

A size limit leads eventually to the same results since there are only so many fish available in any one-year class. Closed seasons are essentially a variant of total quotas and also have the same consequences—higher costs because of the necessity to compete in a race with other fishermen and because of the secondary effects of market glut, idle time, or gear conversion.

In most though not all cases, combinations of conservation regulations are imposed. The net effect, however, is that fishermen bear increased costs, either directly or indirectly, and that they face increased restrictions and greater losses of freedom. These consequences worsen as prices for the fishery products increase. Most regulations are effective only as long as there are no changes in the net economic revenues to fishermen. Any increase in price greater than the increase in costs will produce a surplus profit that will simply attract more fishermen and put greater pressures on the resources. To prevent this, costs to fishermen must once again be increased.

This is not to say that all conservation controls are undesirable. Indeed, many of them are necessary to prevent abuse of the resource and should be imposed whether the fishery operates under the condition of common property or not. But as long as access is free and open, depletion can only be prevented by imposing greater and greater costs on fishermen. From this point of view, it is not surprising that fishermen tend to resent administrators and oppose regulations. Every regulation adopted means higher costs and less freedom for fishermen, for that, in essence, is the purpose of the regulation.

### **The Inability to Escape**

At present, two attempts are being made to escape these consequences and, at the same time, maintain the condition of free and open access. One is to decrease the amount of foreign fish catch within our 200-mile zone and the other is to develop or improve markets for species that are not currently being caught extensively by our fishermen. Whatever merit these approaches may have, they will not prevent the consequences of rising costs from occurring except possibly during a short period.

For those stocks of fish that have been used by both U. S. and foreign fishermen, the removal of foreigners can provide some increased catches for our own fishermen either now or in the future. The size of increase depends upon a number of factors, such as the proportion that has been taken by foreigners, the present state of the stocks, U. S. capacity, etc. Any increase will provide only temporary relief, however, because the additional catches will probably mean higher net revenues, which will attract more fishermen and place greater fishing pressures on the stocks. This will once again lead to the adoption of conservation measures that result in greater costs to fishermen.

The development of domestic or foreign markets for species not presently caught extensively by U. S. fishermen is an attractive proposal. However, the gains to fishermen, if any, will only be temporary and the costs to taxpayers may be high if the development is attempted through direct or indirect subsidies. The development of a market for a new species does little to change the economic characteristics of fishing for the old species. The profitability in fishing the depleted stock will remain. Higher profits in a subsidized fishery may attract some fishermen away from the depleted stock. But if there is no control over access, the profits will also attract new fishermen into both fisheries, driving net returns down to the original levels. Except possibly for a brief interlude, the pressures on the depleted stock will remain the same and respond in the same way to change in price.

Thus, neither of the approaches will provide an escape from the economic forces that lead to the misuse of common property fisheries. Where access is uncontrolled, this misuse is inevitable and, if depletion is to be prevented, it can only be done by the adoption of laws that raise the costs of fishing. Most often these costs occur in the form of greater restrictions on fishing gear, techniques, and vessels, and in the loss of freedom to choose efficient combinations of inputs.

### **Consideration of Depletion**

This raises the question of the desirability of preventing depletion. On one hand, this question has been answered by the Fishery Conservation and Management Act (FCMA), which has chosen "optimum" yield as a replacement for the objective of maximum sustainable yield. This choice recognizes the many difficulties associated with the objective of maximizing sustainable yields and admits that there may be some desirability, under certain conditions, in depleting a stock or in underfishing it. On the other hand, all the fishery management plans that deal with depleted stocks are designed to rehabilitate the stocks and reduce

the degree of depletion. In practice, the FCMA views depletion as an aberration to be tolerated only under certain circumstances and to be overcome wherever possible.

It may be desirable, however, to consider the possibility of permitting extensive, rather than moderate, depletion as a matter of policy. It is conceivable (although admittedly unlikely) that society as a whole would be better off by permitting fishermen to fish with as much freedom as possible subject to the constraint that they do not extinguish a species (10). The only controls that would be imposed would be those that are necessary to prevent extinction, that are the least costly to fishermen, and that are the least costly to implement and enforce. Depending upon the characteristics of the stock, the controls might include closed areas, size limits, total quotas, or closed seasons. There would be no prohibitions against technological efficiency except for those necessary to prevent destruction of the environment, such as through the use of dynamite or poison. In short, under this approach, fishermen would be able to fish as intensively and as freely as they wished up to the point where they threatened the continued existence of a species.

The net result of such an approach is likely to be similar to the developments that have taken place in the Great Lakes over the past fifty years (11). The total quantity of catch may remain about the same, but high-valued species will be replaced by low-valued species. Advantages might be found in a reduction of administrative and enforcement costs and in a reduction of restrictions against fishing techniques. Administrators presumably would not have to undertake the difficult tasks of estimating catching power of different kinds of vessels and would not, therefore, have to make decisions about the distribution of income. Fishermen would still be engaged in a race to maximize their shares of the catch but they would presumably be free from ever-increasing and burdensome restrictions.

However, there are likely to be a number of difficulties and costs associated with this approach. High-valued species would disappear from the market or become luxury commodities. If markets are developed for the species that are presently low in value, the price for these will tend to rise, and attract more effort until they, too, become fished down and acquire the status of luxury commodities. Thus, it is likely that consumers would bear high costs from such an approach.

In addition, it may turn out that the prevention of extinction leads to costs to management and fishermen that are just as high as those incurred in the prevention of depletion.

This discussion of the consequences of minimum controls is purely speculative. It is not suggested that this approach is either appropriate or feasible, but simply that it should be considered (12). The basis for its consideration lies in an examination of the costs and benefits of the alternatives. Without access controls, depletion can only be prevented by measures that increase the costs of fishing and that most likely also increase the costs of research, management, and enforcement. With the appropriate kind of access controls, it is possible that these costs will be reduced (as discussed below). However, if the objections of fishermen to the adoption of access controls are so great that the costs of imple-



mentation and enforcement are excessive, and if the extinction of species can be prevented at relatively low cost, then perhaps the best course is one of "benign neglect."

### **Access Controls**

This raises the question of the desirability of adopting some form of access control. This desirability should properly be examined with regard to the several objectives that are sought from the use of fishery resources. This paper, however, makes no attempt to do so (13). Instead, it continues its very narrow focus on one aspect of fisheries management—the effect of regulations on the costs of fishing to the fishermen.

Any form of access control means that fishermen will lose the freedom that they have had in the past to enter any fishery they wish. This does not necessarily mean that they will not be able to enter a fishery, only that they will not be able to do so freely (14). Those not already in the fishery will have to pay a price, either in the form of purchasing a permit or paying a tax or fee. This constitutes a significant loss of the freedom that fishermen have enjoyed. But it is no different from the cost of purchasing a farm, which a potential farmer must bear in order to enter farming.

The loss of freedom from the adoption of an access control system must be balanced against the loss of freedom from increasingly severe restrictions on fishing. As discussed above, in the absence of access controls, a fisherman's freedom to choose how, when, and where he wants to fish will become increasingly circumscribed, and the costs he incurs in meeting the restrictions will become greater and greater. Since there is no escape from the fact that the days of free fishing are over, the problem facing the fisherman is that of choosing the lesser of two evils.

Access controls will not necessarily reduce the need for continued government interference. They may, however, lessen it considerably, depending upon the form of access control that is adopted. With regard to the allocation of fishing privileges—the determination of who shall fish for what—access controls substitute the market place for administrative decision making. In the absence of access controls, the adoption of conservation regulations almost always has a distributive effect. For example, limiting surf clam fishing to one day a week discriminates against the owners of small vessels that are unable to fish if the weather is bad that day. Where a total quota is imposed, the distribution is in favor of those with the largest and swiftest vessels. As this has become apparent in the New England groundfish fishery, the Regional Management Council has had to make even more explicit decisions on distribution. For example, under the current regulations for cod on Georges Bank, vessels up to 60 gross register tons have a weekly trip limit of 4,900 pounds, vessels from 61 to 125 gross register tons have a limit of 9,800 pounds, and those over 125 gross register tons have a limit of 14,000 pounds (15). In essence, the administrators are determining the maximum incomes that can be received by different groups of fishermen. Furthermore, since there are no controls over access, additional fishermen may enter, forcing the administrators to reduce trip limits (and revenues) in the future.

One of the major benefits of access controls is that, once the permits or shares have been distributed, the determination of who can and who cannot fish is made by the marketplace rather than by administrators. The initial distribution of permits or shares is clearly a difficult task. But grandfathering techniques can be used to minimize the number of fishermen not receiving privileges. After the initial distribution, the privilege of fishing is allocated to those who are willing to pay the price. If a tax system were adopted, even the initial allocation would be determined by the market.

Another important freedom that must be considered is that of the choice of fishing vessel, gear, and technique. In this case, the effect on fishermen is dependent upon the form of access control that is adopted. Of the various controls, the licensing system that limits number of vessels or other inputs would be the least desirable in this regard. It requires continued government interference in fishing operations. A limit on any single factor of fishing automatically stimulates fishermen to substitute other factors for the one that is limited. For example, a limit on the number of fishing vessels provides an incentive for fishermen to use larger vessels. In response to this and to achieve the purposes of the controls, administrators must impose additional restrictions. Eventually, every aspect of a fishing operation will become circumscribed and technology will be frozen. The lesson of the "seepage" effect is clearly demonstrated in the British Columbia limited entry program for salmon (16). Here, the original limit on number of vessels was quickly replaced by a limit on tonnage, because of the transfer of licenses from small to large vessels. With the limit on tonnage, there has been a reduction in the number of gillnet and small troll licenses and an increase in the use of the more efficient seines. In addition, "the efficiency of seine vessels in setting and retrieving nets has increased more than four times" (17). As Dr. Newton has stated, "the concept of reducing regulations as the result of limited entry has been delayed indefinitely" (18). In the case of the Alaska limited entry program, most aspects of fishing were already restricted prior to the program's adoption. Thus, the present technological inefficiencies will be perpetuated into the future.

Except for a license fee, which operates in much the same way as a license limit scheme, the other forms of access controls would free fishermen to a large extent from government interference in their fishing operations. With a fisherman quota system, fishermen would be able to adopt any harvesting technique they wish, short of using dynamite or some other environmentally damaging technique. Given the right to take a certain quantity of fish, as well as the opportunity to lease or buy additional shares, fishermen can adopt technological innovations at an orderly rate free from the fear that an innovation may be outlawed. Under a franchise system, it would be up to the franchise holders to determine the kinds of regulations they wish to adopt and how much effort they wish to invest. A tax on catch, if levied at the appropriate level, would also free fishermen from most of the burdensome regulations now in effect. In short, though freedom of entry into a fishery is sacrificed, some forms of access controls can significantly reduce the amount of government interference in fishing operations and provide fishermen with a greater degree of freedom.

**Summary**

It should be emphasized that this paper has concentrated on only one of the many factors that need to be taken into consideration in the evaluation of alternative systems for the management of fisheries. Other factors that are equally if not more important are the contributions of fisheries to the national economy, the opportunities for satisfactory employment, the provision of a wide range of food commodities of high quality and low price, and the costs of research, management, and enforcement. It should also be remembered that fish are not a homogenous commodity, either in the marketplace or in the conditions of their production. They differ widely in demand, from low-unit-value menhaden to luxury commodities such as lobster. And the conditions of their harvest differ over an equally large range, from sedentary oysters to highly migratory tuna. Thus, the evaluation of alternative systems for management is complex in every regard and there are no simple and single techniques that can meet every need.

In spite of this range of characteristics, the conditions of common property is a common element that is critical to all fisheries. It has provided fishermen with a freedom unlike that of any other commercial enterprise. This freedom can no longer be maintained in all its aspects. No matter what management technique is adopted, the historic freedom that fishermen have enjoyed will disappear. If there is no control over access, fishermen will lose their freedom to choose when, where, and how they want to fish. If there is control over access, they will lose their freedom to enter, at no cost, any fishery they wish.

# SOCIAL AND CULTURAL ASPECTS OF LIMITED ENTRY

Michael K. Orbach

## Introduction

This paper is about the social and cultural aspects and effects of limiting access to marine resources, particularly fishery resources. The one central question that will run as a thread through the discussion is this: What are effects of limiting access to marine resources on individual human beings—their physical and economic well being, their social and psychological characteristics, and their interpersonal relationships—and on the social and cultural groups that these individuals form: families, tribes, organizations, communities, ethnic groups, and so on. I will not make an attempt to comment on particular configurations of regulations or systems that limit access, of which there are a vast number employing widely differing philosophies and methods, but will instead address the concept of limiting access in general as I will presently define the term. In doing so, I will take a conceptual rather than a survey approach. Although there is considerable literature and research experience in the fields of anthropology, sociology, psychology, geography, and political science that could be brought to bear on the questions at hand, my purpose here is not to provide a summary of that material. I will explore the broad question of the role of social and cultural variables in the limitation of access to fishery resources.

These social and cultural variables are interwoven with others such as the economic and the political. When we speak of an "income group," for example, we may also be addressing a racial or ethnic group such as blacks or Italians. This is particularly true as we narrow our discussions to particular geographic locations or to specific fisheries. Low-income fishermen in the Gulf or South Atlantic may be predominantly black. Lower-middle income trollers in the Pacific Northwest may be predominantly non-Native American. Upper-middle income fishermen in the Pacific Southwest may be predominantly Portuguese. Subsistence fishermen in Alaska may be predominantly Native American. This same interweaving may occur between ethnic and political structures such as we find with the Cajun fishermen in southern Louisiana. We must avoid the *presumption* of a correlation among these characteristics in any given population. However, it is precisely our lack of well-researched, documented, and carefully applied knowledge of the social and cultural characteristics of fishing populations, combined with the total set of considerations that we must address in limiting access to marine resources, that provides the impetus for this paper.

The statutory justification for the consideration of these variables is found throughout the Fisheries Conservation and Management Act of 1976 (FCMA). Under "Purposes" (S.2.b.4), we are directed "to provide for the preparation

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and implementation, in accordance with national standards, of fishery management plans which will achieve and maintain, on a continuing basis, the *optimum yield* from each fishery . . ." (emphasis added). Optimum yield, as set out in the FCMA (S.3.18.) and as developed through recent interpretation, is that amount and use pattern of the fishery resource "(A) which will provide the greatest overall benefit to the nation, with particular reference to food production and *recreational opportunities*; and (B) which is prescribed as such on the basis of the maximum sustainable yield (a biological measure) from such fishery, as modified by any relevant *economic, social, or ecological factor*" (emphasis added). Limited access systems are addressed specifically in S.303.b 6. in the following way (emphasis added):

Any fishery management plan . . . *may* . . . establish a system for limiting access to the fishery in order to achieve optimum yield *if*, in developing such system, the council and the secretary take into account--

- (A) Present participation in the fishery,
- (B) historical fishing practices in, and dependence on, the fishery,
- (C) the economics of the fishery,
- (D) the capability of fishing vessels used in the fishery to engage in other fisheries,
- (E) the *cultural and social framework relevant to the fishery* . . ."

The national standards set out in the FCMA also suggest some limitations on the use of social and economic considerations, and I will discuss these limitations as they arise in the discussion.

In addressing these issues here, I will begin with some of the general issues surrounding the concept of limited access, trace the potential effects of limited access systems on groups of people and on individuals, and conclude with comments on limited access and recreational fishery systems. Circumscribing the effects of limited access and entry, however, is only the first step in the process. Once we have an adequate, documented knowledge of the social and cultural characteristics of the fishery participants, we must decide how to put the knowledge to use.

## **Definitions**

The definitions of "social," "cultural," and "psychological" variables are complex and not universally agreed upon, even by those in the disciplines that deal with these concepts on a regular basis. For the purpose of this paper, I will offer some simple descriptions of what I mean to imply when I use these terms.

I will use the term "social" in the sense of the structure or organization of groups of people. The fact that a fishery is organized around participation by familial groups is a social factor, as is the fact that a cooperative, a fraternal organization, or activities at a community center facility are important in a particular fishing port or village.

I will use the term "cultural" to refer to a range of variables including religion; the traditions of a group as embodied in specialized residence or work locations, objects, or activities; and the moral and ethical values that are important to fishery participants.

I will use "psychological" and "personal" interchangeably to refer to the effects of variables such as anxiety, depression, fear, uncertainty, insecurity, pride, satisfaction, and hostility. These factors are only understandable when an approach that treats each fishery participant as an individual is used.

As is the case with social and economic factors, these concepts and their definitions will overlap in many instances. An example of such overlap is the term "ethnicity." Ethnicity may refer to race—black, Caucasian, Oriental, American Indian, Eurasian. It may refer to nationality—Portuguese, Polish, French, Italian. It most often refers, however, to a combination of race, nationality, culture, and, in most case, some form of language such as Cajun, Slavic, Indian, or Japanese. The term "ethnicity" is generally used to express some form of *commitment* to a group with a combination of these characteristics, a commitment that contributes to an individual's identity or self-image as well as to the activities of the group. If I intend my use of terms such as "ethnicity" to signify something besides a general reference to a combination of the above characteristics, I will specify my exact meaning.

Two final definitions are "limited access" and "limited entry." I will define *limited access, or effort*, as *any form of voluntary or mandatory restriction of the right or the ability of an individual or group to participate in the taking or landing of a fishery resource*. I will define *limited entry* in much the same way, but with one important addition: *limited entry* is any form of voluntary or mandatory restriction of the right or ability of a *specific* individual or group to participate in the taking or landing of a fishery resource. With *limited entry*, the emphasis is on the participation in the fishery system by individuals or groups with specific, definable attributes and characteristics.

In making this distinction between limiting access and limiting entry, I must make a further, very crucial point. *Limited entry* systems are *not* primarily concerned with the preservation of natural resources. If we are concerned solely with the preservation of fishery resources in the biological or ecological sense, then size limits, quotas, and time and area restrictions that deal with access and effort will usually suffice as management tools. However, with *limited entry* as defined above, our primary target variables deal in very broad terms with the allocation and distribution of the costs and benefits of the use of fishery resources, and the individuals and groups who bear those costs and reap those benefits. This requires a much broader range of management tools. We can discuss *limited access* or *effort* without reference to allocation and distribution; with *limited entry* we cannot. From this point on, I shall be addressing *limited entry* as I have defined it here.

The reader will note that these last two definitions could and perhaps should be much broader: they could include the right or ability of fishermen to fish and land their catch, of processors and distributors to sell their product, of consumers to buy or enjoy fishery products, and of recreational users to enjoy an aquatic environment. Although our alternatives for "limiting entry" to fishery resource systems will entail effects in all of these areas, this paper will deal primarily with these alternatives as they apply to participants in harvesting sectors. What we are concerned with are the effects of limiting entry on social structures,

cultural traditions and values, and individuals, and the ways in which we might put our knowledge of these effects to use.

As a final introductory note, we must distinguish between matters of effect and matters of intent. In many cases we can correlate one action or decision with another. In some cases we might suggest a causal link between two or more actions. When we use the word "intent," however, we imply a purposiveness and control that is, of all these relationships, the most difficult to establish and the most subject to misinterpretation. The distinction between these relationships will be addressed further below.

### **The Problem**

Why do we need formal limited entry systems at all? Why could we not simply set size limits, quotas, and time and area restrictions to address biological and ecological constraints, let Adam Smith's "invisible hand" rule the economics, and leave the rest of society, each subcultural group, and each individual to fend for themselves?

Part of the answer to these questions is based on a variation of the phenomenon referred to as the "Tragedy of the Commons" (Harden, 1968). Essentially, the tragedy of the commons says that in situations where a resource is exploited that is the common property of all the exploiters, people will tend to put their own self interest above their consideration of the common good. They will each attempt to get what they perceive as their own share of that resource, or of its use or derived benefit, unaware or heedless of the damage that will result from the *total* use of the resource by all of the participants in the system. The end result is the loss of a natural resource and its economic and social benefit to all. A corollary that I will add to this phenomenon is that as we deal with larger and larger systems, the problem is accentuated. There are plenty of examples where the opposite of this "tragedy" has occurred, where individuals have put the common good above their own personal interest. Military service, religious causes, voluntary conservation agreements among harvesters of fishery resources, economic and social service fishery cooperatives—all of these involve some form of sacrifice of individual gain for the common good. However, as the number of people who must hear of and agree upon the value of abstention or restriction grows, so does the difficulty of communicating the total effects and purposes of the group's action, and of agreeing upon specific remedies to specific situations.

There can be two very different primary causes for the tragedy of the commons phenomenon. One is the lack of awareness or communication of the effects of the total group's actions among individuals who, were they to have such information, would voluntarily restrain their activities. The individuals involved may not be ignorant in the pejorative sense, but rather may lack good information about the total activity of the system. This is the "optimist's cause," the belief that the problem lies in the system and not in the individuals. The "optimist's cause" occurs not only with a lack of knowledge of effects, but also with a lack of knowledge of alternatives. In this volume (p. 180), McHugh points out:

Resistance to stringent control on depressed resources might be reduced by measures to encourage harvesting of underutilized or latent resources . . . The prudent fisherman, adequately informed, might require no artificial incentive

[to redirect his effort], provided that he had sufficient advance information on relative abundance or availability of various alternative resources.

The other cause is the notion that, even given a very high level of communication and information regarding these effects, most individuals would in fact choose to ignore the information in favor of their own personal interest. This need not imply maliciousness, but simply that an individual acts as an independent decision-making unit. This is the "pessimist's cause," in that it is more difficult to deal with the belief that the problem lies in the individual himself. Depending upon which of these causes we think is dominant in a given case, we may want to approach the problem differently.

The menhaden industry on the Atlantic coast, for example, is a group of fishing firms that voluntarily restrict portions of their effort. The number of harvesters is small, and the communication among the users and the information about the total state of the system are relatively good. Much of this structure is an artifact of the bioeconomics of the industry, with its large initial capital investment requirement and specialized product forms. Other factors, such as the cost-efficiency of management systems and political relationships among various sectors, may also be important. At present, it may not be economically necessary, cost-efficient, or politically expedient to develop a formal, limited access or entry system for this fishery. In the Bay of Fundy, a cooperative club was formed for the express purpose of allocating rights to the catch among participants in the herring fishery there. According to Chris Newton, this allocation system is reported to be self-policing, with members of the club reporting transgressions of the commonly-agreed-upon allocation scheme by other members. The lobster fishery in certain areas of Maine, through the existence of "harbor gangs," maintains the traditional territorial boundaries of specific groups and thus effectively limits entry of new harvesters into these traditional territories (Acheson, 1975). On the other hand, in the Pacific salmon fishery the number of participants may be too large and the geography of the fishery too spread out for understandings of this sort to be effective in accomplishing management objectives. Each of these situations has a different character; in each, the role of organization, communication, and individual attitudes and behaviors takes on a different importance.

It is argued, however, that in many cases some formal restrictions may be needed to maintain order in the economic or social systems of a fishery. Once again, remember that limited *entry* systems are not primarily directed toward the preservation of natural resources themselves. Limited *entry* systems must always go hand in hand with quotas and other measures to ensure that biological and ecological conditions are addressed, but the limited *entry* component of the restrictions addresses the potential for economic or social, not biological "tragedy." The question becomes this: It would be nice if we could all agree among ourselves about how much of the resource to take and who should take it, but what if we can't? The tragedy of the commons generally addresses the "how much," but not the "who." Even if we could assume that adequate information and communication would be sufficient to conserve the biological resource, the question of who should bear the costs and reap the benefits would remain. With limited entry we are, so to speak, beyond the tragedy of the commons in its traditional sense.



### **The Economic and Social "Tragedy" Argument**

One primary justification given for limited entry schemes is the potential for economic ruin and social dislocation stemming essentially from an extension of the tragedy of the commons. If entry is unrestrained, the argument goes, people will build harvesting devices and processing plants and develop market channels far beyond the ability of the resource base to provide support for their activities. Then, according to this argument, at least three undesirable things happen. First, because the units in the fishery are not able to operate at efficient levels, their margin of profit goes down and the cost of their product goes up. Second, this process will lead to the financial failure or the dissipation of economic rent by many of the units, which in turn will lead to failure, distress, or inefficiency of many of the firms and entities involved in the economic infrastructure of the fishery. This creates unemployment, high transfer and conversion costs, and possible economic recession for that portion of the community that is directly or indirectly dependent on the fishing industry. Third, because of their inability to make a living from their traditional endeavors, the social and cultural fabric of the fishery participants is stressed as individuals enter other occupational channels or migrate out of the area altogether. This scenario raises two questions. First, how often do and how often have these things actually happened? And second, so what? Let's address the second question first.

The "so what" question has three parts. First, do resource managers have the right to attempt to control what could be termed market forces, forces that are themselves the sum of the preferences of individuals? These include the social and cultural preferences of fishery participants. A fisherman who accepts what others may consider a substandard income may be doing so because his occupation fulfills other familial, community, individual, or cultural needs and preferences. Second, who should be able to exhibit this control? Third, how do we decide on the "appropriate" levels of efficiency and other variables?

I am not sure that there will ever be a clear-cut answer to the first and second parts of the question. Some argue that the FCMA, in its sections concerning optimum yield and discretionary provisions of fishery management plans, gives the regional fishery management councils and the Secretary of Commerce the right to address and essentially control market forces. Likewise, these same sections give the councils and the secretary the responsibility and authority to monitor and address social and cultural matters. Remembering that the objects of limited entry schemes are primarily economic and social, others point to national standard number five in the FCMA, which states that "conservation and management measures shall, *where practicable*, promote efficiency in the utilization of fishery resources, *except that no such measure shall have economic allocation as its sole purpose*" (emphasis added) (S.301.a.5.) as an admonition against the incorporation of these variables as factors in management decisions. Virtually everyone will admit, however, that fishery management has economic, social, cultural, and psychological impacts. Either we monitor and address these impacts, or we ignore them. The present trend seems to be to admit that the control of these factors is legitimate, although a mixture of responsibility on the part of the secretary, the councils, the industry, and the public must be institutionalized in order to ensure that all of the factors and interests are properly elicited, documented, weighed, and incorporated into management policy and practice.

The third part of the "so what" question, the matter of how one decides on the "appropriate" levels of efficiency, profit, income, prices, and variables such as risk, uncertainty, security, and satisfaction, is perhaps the most difficult. Also included among these variables are social indices such as levels of health care and the availability of other social services that may be directly linked to the economic health of the industry or community, and psychosocial pathologies such as alcoholism, delinquency, drug abuse, and mental illness, which can be linked to stress in social or cultural systems. For fishermen, their families, and other in the fishery system these variables are all affected by management decisions. On the simplest level, however, if a business or industry fails or if it operates "inefficiently," with all of the attendant effects, but the owners, managers, and workers have been willing to take that risk in order to maintain their independence from regulation, or to maintain their residence and the ability of their families to work in a common enterprise regardless of the occupation in which they are engaged, how are we to say that they should not be able to do so? This part of the question is the most complex, and will be dealt with in detail later. We are often led, however, to the statement that "it is desirable to legislate the efficiency of a fish harvesting system because that system is based on the exploitation of a common property resource." Aside from considerations of biological conservation, this statement is a non sequitur; the conclusion does not follow from the premise. A more meaningful statement might be, "it is desirable to legislate the efficiency of fish harvesting systems because common property resource exploitation systems exhibit a high potential for inefficient investment and marketing behavior." However, even with this restatement of the issue we are left with a judgment about the most appropriate way to judge "efficiency," a very elusive concept.

If we leave the "so what" question for now and return to the query as to how often an economic or social disaster has occurred or is likely to occur in fishery systems, I think that we will find that we are dealing with essentially the same set of considerations. How do we judge such a "tragedy"? As it is felt by the participants? As it is understood by an economist? By a social worker or politician? Most of the critical fishery problems that come to mind were caused, for the most part, by resource problems that could have been addressed by limiting *effort*. Although all of us can call to mind particular cases where adverse economic or social consequences occurred even in the presence of healthy fish stocks under adequate biological regulation, to judge which of those cases could have been mitigated through limited *entry* we will have to await further explanation and documentation of individual cases.

Let us assume, however, that any and all of these "tragedies" are possible, or even probable. Let us assume that it is legitimate for some authority to decide what constitutes an efficient level of production, a proper threshold income for a participant, when the consumer is being treated unfairly, when economic recession is imminent, and so on. Assume also that there is a very real danger of adverse social and economic impact if limited entry schemes are not adopted. Assume, in short, that we must construct a limited entry system.

### **Limited Entry**

Before we consider the provisions and impacts of specific limited entry procedures, let me restate the definition of limited entry set out earlier. Limited entry

is "any form of voluntary or mandatory regulation of the right or ability of a specific individual or group to participate in the taking or landing of a fishery resource."

By "voluntary" regulation is meant not only cases such as that of the menhaden industry, where users have decided in the absence of formal requirements to limit their activity, but also cases such as the partial sharing of fish-finding information among certain segments of a fishing fleet, which effectively limits the ability of those who are not privy to the fish information to participate in the fishery. I included this voluntary aspect in the definition for two reasons. First, it may be the fact in more fisheries than we think that some *informal* system of limiting entry is possible, or is in fact presently operating. We should not assume that formal regulations are the only or even the best options available. Second, even cases of voluntary regulation raise interesting questions of legality, social and economic impact, and allocation. However, in this paper I will limit the discussion to those management tools that could be formulated by organizations such as the regional councils or government resource and regulatory agencies.

There are two general types of limited entry tools, direct and indirect. The primary and most direct form of a limited entry tool licensing. Control through licensing may address not only the total number of boats or licenses in the fishery, but other parameters as well, such as the experience or ability of the applicant (for example, see the papers by Bishop, *et al.* and Talhelm in this volume). With the requirement of a license, one can (theoretically) control who fishes, how many people fish, where they fish, what they catch, and where they land their catch. In like manner one could license processors, distributors (although at present this is infrequent and more problematic), and other users such as recreational fishermen. I am using "licensing" in a broad sense to include stock certificate programs, leasing arrangements, and so on.

On the other hand, there are a multitude of indirect methods for limiting entry. A high license fee or landings tax may limit the ability of specific fishing units, or of individuals in specific socioeconomic classes to participate in the fishery. A per-vessel quota system or a regulation that requires a specialized gear type may limit the ability of fishing units of a certain size or type to participate in the fishery. By setting optimum yield at a very low level, we may indirectly preclude the participation of any group that has not demonstrated previous "capacity" in the fishery, and even the participation of some that have. These indirect methods may be as influential through *lack* of regulation as they are by regulation itself. Some argue, for example, that the *lack* of a blade size restriction on the dredges used in the Atlantic surf clam fishery will eventually force small vessels out of that fishery. Since many of these smaller clambers are from distinct areas and communities, the impact of the lack of a blade size restriction will be localized. The absence of a loan obligation or guarantee program may limit the entry into any fishery of potential participants who do not have sufficient capital. Each of these kinds of indirect methods may effectively limit the ability of specific individuals or groups with common economic, social, or cultural characteristics to gain benefit from the use of the fishery resource.

For example, consider the use of the "butterfly" net in the inshore Louisiana shrimp fishery. This net has been outlawed in certain locations because it was held that it damages shrimp stocks at a certain stage of their life cycle, during

their yearly travel out of the estuaries. This had the effect of barring particular social groups—those inshore communities that had participated in the “butterfly” net fishery—from the shrimp fishery. The lack of an effective loan guarantee program in the south Atlantic prevents many black, low-income shrimp fishermen from developing their participation in that fishery. Restrictions on the commercial anchovy catches in southern California in deference to the argument about the importance of that species as a forage fish for recreationally desirable species have in recent years undermined the economic base of the Italian fishing community in San Pedro. The extremely high market price of licenses in certain salmon fisheries in the Pacific Northwest prohibits the participation of a large segment of the population in these fisheries. Each of these management tools has the effect of limiting the participation in or entry into these fisheries of particular individuals or groups who may possess common economic, ethnic, social, and cultural characteristics.

I have specifically used the word *effect* rather than the word *intent*. I do not mean to imply that management decisions were used to cause the effects that I mention, and in fact it is usually very difficult to use most indirect methods of this sort to gain specific ends. Partly because of this difficulty, and partly because most of the effects of indirect methods such as these can also be addressed in a discussion of direct methods, I will further restrict the following discussion to the effects and potentials of direct limited entry devices.

### **Who is “In”, and Who “Isn’t”?**

Licensing schemes serve two functions. First, for some specific period of time, they *permit* specific individuals or entities to participate in the fishery. Second, for *at least* the same period of time, they *prohibit* specific individuals or entities from participating in the fishery. This is simply a fact of limited entry. I say for *at least* the same period of time because once individuals are excluded from participation, even for a single year, they may not have the available alternatives or the capital reserves to maintain fishing as a viable option until their turn comes up again. The first step in tracing the social and cultural effects of a limited entry system is to identify who is “in” and who is “out.”

Before we can assess the impacts of limited entry in a given fishery, we must have an adequate description of the fishery participants. The table below lists some of the social and cultural characteristics and variables that we could use to describe the participants in a fishery system and the nature of their environment and activity. I will not attempt an exhaustive review of the way in which each possible direct limited entry option might impact each variable, or of the variables that might be particularly sensitive to certain kinds of restrictions, except to say that it is possible to target any one or any combination of values and weights for these variables as objectives for a system of limited entry. Rather, I will, through a series of example situations and issues, trace some of the interrelationships among these variables and limited entry schemes in general.

### **Social and Cultural Preservation: Who is “In”?**

In many limited entry situations we are going to be involved in what is essentially social and cultural preservation. This is not cultural preservation in the historical sense of preserving and maintaining relics of the past (although some

may make that analogy), but rather in the sense of preserving for the *future* social and cultural systems as they are constituted in the present.

In the Pacific salmon case, for example, a central underlying issue is the protection of the personal identity, social solidarity, and cultural heritage that constitute "Indian-ness," as they are found today among the tribes in the Pacific Northwest that have historically gained subsistence or profit from fishing. This case will be discussed further, but it is important to recognize that the Boldt and Belloni decisions, more than preserving economic opportunity or legal principles, preserve a human culture.

The Alaska limited entry systems exhibit a slightly different kind of social and cultural preservation. Through their transferability clauses, which permit licenses to be passed from parents to their offspring, and which are also found in various forms in other limited entry schemes, they are implicitly saying that certain *families* should have a privileged opportunity to participate in the fishery. They are saying, in many cases, that it may be more important for *specific individuals* to participate in the fishery because of their social (family) or cultural characteristics than it is for that fishery to be more productive or efficient. This tradeoff may not exist, but then again it may. And, as long as the social and cultural factors are researched, documented, and weighed along with the economic, there is not necessarily anything wrong with the judgment in favor of society and culture.

So-called "grandfather clauses," which distribute licenses on the basis of past participation, also tend to constitute the preservation of social and cultural groups, although they may also preserve the rights of relatively recent, highly capitalized newcomers to the industry. These kinds of statutory provisions may preserve not only the social and cultural structures of a group of people, but their environment as well. Christopher Koch (*see p. 261*) describes the case of *City of New Orleans v. Dukes*, 427 U.S. 297 (1976), in which:

The court found that the city's objective of preserving the French Quarter's charm and thereby aiding the area's tourist economy was rationally furthered by the ban on pushcart vendors (which created a 'closed class' of such vendors, a form of limited entry), and that the grandfather clause for eight-year veterans (pushcart vendors) was rational in that such vendors were more likely to be dependent on continued operation in the French Quarter and had themselves become part of the area's charm.

While these kinds of provisions may have the effect of being socially or culturally specific, this need not be so in a discriminatory sense. That is, they may simply be holding that those who have exhibited a commitment to a fishery, *whoever* they are, should have the right to maintain the continuity of their economic enterprise and the integrity of their social and cultural framework.

On the other hand, these same provisions may be very discriminatory. When certain individuals or groups are "grandfathered in" to a fishery, it behooves us to describe carefully the exact effects of our management action in this regard. For while a specific group may be "in," other specific groups may be "out."

### Who is "Out": Assessment or Advocacy?

Toward the end of 1977, the Secretary of Commerce received a letter from an individual concerned about matters of equal opportunity. Among the points which the individual raised was the following: "We run the risk, with limited entry systems, of 'institutionalizing' patterns of resource use and industry structure that will 'freeze' minorities out of ownership and management positions and into the lower-level laborer positions in fishing industries, or out of fishery activity altogether." A "minority" in the sense in which this individual was using the word is any economically or socially disadvantaged group. The individual cited as a case in point the heavy participation of blacks in the processing sectors of many of the fishing industries along the Atlantic and Gulf coasts of the U.S.; for example, in crab, oyster, and shrimp houses, and the noticeable lack of blacks in positions as owners or managers in the fleets that harvest these resources. With considerations such as these, limited entry systems step into the realm of equal opportunity and "minority" rights in the larger sense.

In many ways the situation is analogous to that of the Native Americans and the Boldt and Belloni decisions in the Pacific Northwest, but there are also significant differences. The most general and probably the most important question is this: Are we obliged simply to assess, document, and balance the *effects* of a management system, or are we in fact obliged to *advocate* the increased participation of certain individuals or groups because of their ethnic, social, or economic characteristics or conditions? A concept central to this question is that of discrimination and, more explicitly, the presence of discrimination as a *cause* or as an *effect* of a system of limited entry.

In any situation where decisions are made concerning the distribution of costs and benefits of a given management action, it is possible to assess, by categories such as income level, race, ethnicity, or locality, the *effects* of a management action. Thus, we can state that as an *effect* of a limited access system, one implemented through a fiscal restriction such as taxes or high licensing fees, individuals in certain social and economic categories will be limited in their ability to participate in the system. This may not have been an *intent* of the limited access program but simply an *effect* that one may or may not want to mitigate in some manner.

On the other hand, some decisions may be made with the *intent* of either including or excluding individuals in certain categories. For example, referring back to an earlier point, a grandfathering clause implicitly says that it is better for particular social—and, particularly, familial—groups to be able to participate in the system. Once again, one might argue that the target factors are economic, that we merely care that a specific set of individuals be able to continue to make their living from the system regardless of who or what they are. In the case of a familial-transfer provision, however, we are saying that a given social (familial) group should gain the potential to constitute the human component of fishery system in perpetuity. This is far more than an economic intent. We have in this case discriminated for a particular group that may very well, given the traditional familial nature of many U.S. fisheries, constitute a particular ethnic or even religious group—but we have also discriminated against others.

We must take care, of course, when we use the word "discrimination." By its dictionary definition, we "discriminate" any time we make a choice. We "discriminate" when we say that U.S. fishermen have a priority over foreign fishermen in the harvest of resources within the U.S. Fishery Conservation Zone (FCZ). It is the popular connotation of the word "discrimination" that conveys an undesirable weighting either for or against certain individuals as a result of their social, cultural, or physical characteristics, which concerns us here. Many limited entry systems run the risk of constituting *de facto* discrimination in this sense. Even if we believe that there is no undesirable *intent* in the discrimination inherent in these systems, we should certainly be prepared to describe the *effects* of this discrimination.

Our legal alternatives in addressing these issues are not clear. While legislation such as the Equal Employment Opportunity Act of 1972 presents both a mandate and a system for advocating increased participation by minorities in government employment, there is little legislation that deals with advocacy, as opposed to cases of active discrimination, in the private sector. Advocacy of increased minority participation in areas such as government procurement activities and the disbursement of government grants and contracts is growing, but this advocacy in general takes the form of policy directives and not legal mandates. Case law, such as the Boldt and Belloni decisions, yields precedent for the advocacy of increased rights to and participation in fishery resources by specific ethnic and cultural groups. Even though one of the primary legal issues in the Boldt and Belloni decisions concerns the obligations of various parties as expressed in formal treaties, the effect of those decisions may be to cause an increase above the historical participation of a particular minority group in a contemporary fishery system. The generalizable qualities of such case law approaches, however, are not well defined. More general rulings, such as the Supreme Court decision in the Bakke reverse-discrimination case, may eventually clarify the legal, if not the policy and other more pragmatic aspects of these situations.

We may assume at the very least, however, that through limited entry certain groups and individuals will be prohibited from participation in fishery systems, even though that participation may have provided a substantial portion of their livelihood for some time. The January 13, 1978, recommendations of President Jimmy Carter's task force on Washington State fisheries, that the "white" commercial fishing fleet be reduced from 5,847 to 1,940 boats, and that the "Indian" commercial fleet be increased from 320 to 452 boats, is a case in point. What happens to the white owners and crews of these 3,907 boats and their families, a group whose total population very probably numbers over ten thousand people? Using this particular case as a starting point, I will turn to the consideration of two related problems: Who, or what is a "fisherman," and what happens to "fishermen" as individuals when their activity is restricted?

### **Fishermen as Individuals**

An elementary definition of a "fisherman" is one who participates in the harvesting of a fishery resource. The matter of the *end use* to which this resource is put and the specific benefits that the harvesters derive from their use of the

resource has, of course, been the subject of considerable discussion: that is, what is the difference between a *commercial* and a *recreational* user, and how ought we to take account of these differences? I will not go into specific definitions of what constitutes a commercial or a recreational fisherman, except to comment on some generic qualities of marine resource users.

There are several uses to which marine resources may be put. They may be used to extract economic value through a currency or barter system to make a living or produce a profit. They may be used for subsistence or for personal consumption. The value of their use may be experiential: it may provide an opportunity for activity in a specific physical environment which itself yields value for the participant. The use of marine resources may fulfill the socialized mandates of a cultural heritage; one can uphold "tradition" by fishing.

All of these "values" attached to fishing, however, must be seen through the eyes of individuals. In this perspective, there is much less difference than one might suppose between "commercial" and "recreational" users. "Recreational" fishermen may value their surroundings while fishing; they may "subsist" on their catch in the sense that they consume it personally; they may value the right to fish as tradition and possibly even as necessary to their physical or mental health; they also derive social status and solidarity from sharing their catch with neighbors and others in their social network; they may also gain remuneration from the sale of their catch. What is often overlooked is that "commercial" fishermen value their fishing rights for *exactly* the same reasons, albeit in somewhat different mixes. In the past it has proven difficult to measure or represent derived benefits in certain of these areas. Part of this difficulty has been because of the lack of attention paid to the task by anthropologists, social psychologists, and others, but our inattention to the *range* of benefits derived by specific users—for example, *aesthetic* benefits derived by *commercial* users or *cultural* benefits derived by *recreational* users—has been a significant contributor to our confusion in addressing management issues. Once we identify the benefits and issues we are still left with the task of measuring and weighing—but the identification process alone can be significant in the structuring of a management decision process.

One of the comments one hears often in the context of limited entry discussions is that the "problem" is the "part-timers"—those who participate in a fishery for commercial purposes, but who do not depend entirely on the benefits from fishing to gain their livelihood. Part-timers, however, are only a problem if one assumes that there is more total benefit to be derived from certain individuals who are able to gain their entire living from fishing than there is from what often turns out to be a much larger number of individuals who use fishing as only part of a larger and more diversified occupational endeavor. This assumption is not necessarily valid. The notion of plural-occupationalism, for example, points out that for many people it is exactly the plurality of their endeavor that provides their economic stability and personal satisfaction and characterizes the traditional activity of their social or cultural group. This argument has been made strongly in the case of many foreign fishing communities such as the "outports" in Newfoundland. Does full-time fishing really take automatic precedence over part-time fishing, or have we perhaps been ignoring the value and benefits, both



to individuals and to fishery systems, of part-time fishing activity? Although one of the arguments typically expressed in opposition to part-time commercial fishing activity is that it is inefficient, in many cases it may be that the extraction of a given amount of resource by part-time fishermen provides a much broader economic input, both directly and indirectly, into the fishery system and related industries and communities than the extraction of that same amount of resource by full-timers.

The point, however, is not that this judgment should be made one way or the other, but that we may want to broaden our perspective and question some of the assumptions that we have made out-of-hand as we attempt to collect and weigh information for our formulation of limited entry systems.

Once again, all of these questions must ultimately be addressed through the eyes of individuals. What does it mean to an individual to be included, or more importantly, to be *excluded* from a fishery by a limited entry system? What it means will, of course, differ not only from commercial to recreational user, but also from individual to individual as he is seen as part of a particular culture or ethnic or social group, and as he is seen as an individual personality. I will try to outline briefly some of these possible meanings and effects from the perspective of a commercial user of the resource, one who faces the possibility of exclusion from participation.

We enter here what was defined at the outset as the personal, or psychological, realm of limited entry considerations. We will actually be discussing the entire range of what were defined as social and cultural variables, for these concepts only exist in the perceptions and understandings of individuals. Societies and cultures are merely collections of individuals with common values, goals, and ways of perceiving the world and reacting to it.

Individuals' involvement with fishing as an occupation tends to pervade their lives much more than most others' occupational involvement for two reasons. First, by the nature of its physical activity, fishing often involves long periods of absence, danger, uncertainty, independent activity, and other parameters that contribute to a particular personality configuration in those who participate in fishing for any length of time. Second, it is empirically true that fishing as an occupation is much more family-oriented than most other occupations. These two sets of factors, the personal and the social (familial), tend to produce a very strong "psychological contract" between the individual and his occupation.

If we would consider telling individuals that, because of a system of limited entry, they can no longer participate in fishing activity, we should be mindful of exactly what we are communicating to them. We may be telling them that they will have to change to occupations in which none of the values exist that have characterized their former activity—*independence and ability to deal with danger and uncertainty, among others.* We may be telling them that they will lose the ability to work in common endeavors with their family, thus undermining one of the primary strengths of the family as a social and economic unit. If we eliminate individuals from participation because their enterprises are not "efficient" enough, we are telling them that they were not good enough to remain in the system, a reflection on their individual ability, and possibly even their personal character. As I mentioned earlier, the implementation of limited entry systems may not have the *intent*, but it may have the *effect* of communicating these

impressions. The possible effects of communications such as this can be seen in the problems encountered in economic development in less developed countries, and in the acculturative process of populations such as Native Americans in general. A graphic illustration of the extreme socio- and psycho-pathological effects of the inability of many Native Alaskan groups to exploit their traditional resource bases is seen in their increased incidence of crime, alcoholism, personal psychoses, suicide, and so on.

I do not mean to paint an overly sordid picture of the potential effects of limited entry. Many limited entry programs, such as some of those in Alaska, do a respectable if limited job of addressing such things as family integrity. Man is a remarkably adaptable being, and pathology is more the exception than the rule in situations of social or economic change. However, it is incumbent upon any perpetrators of management-induced change, or management-induced institutionalization of economic, social, or cultural systems, to be aware of, document, and address the total effects of their actions.

Whether we eliminate individuals from participation because of their economic productivity, racial or cultural characteristics, or mode of prior participation (i.e., a gear type or part-time participation), we must also face the question of our responsibility to these individuals. Is our responsibility limited to compensation for their investment in equipment and materials? A limited entry system may have much more drastic effects than, for example, firing an individual from his or her job. It may totally prohibit that individual from participation in an occupation, which constitutes a much more total prohibition. Are we then responsible for, say, relocation and retraining costs? For low-interest loans or grants to help the excluded ones to make the transition to another endeavor? What is the nature of our responsibility to these individuals? The answer to these questions will vary with the particular case, but the generic question remains as yet unanswered.

### **Recreational Fishing**

Although I have already referred in several instances to recreational aspects of fishery systems, I would like to turn specifically to the subject of limited entry and recreational fishing. This is an important area first because of the tremendous number of recreational anglers and others who use the marine environment for recreational purposes, coupled with the constant, if not diminishing space and resource bases from which they derive their pleasure. It is also important because in some of the most problematic and contentious fishery situations in the United States (for example salmon and Atlantic cod) the activities of recreational fishermen have largely been spared the same regulatory duress that has characterized the life of the commercial fisherman.

How are limited entry alternatives and their effects similar for commercial and recreational fishermen, and how are they different? It is certainly true that overfishing by recreational fishermen can constitute a threat to biological populations. Once again, however, I would point out that limited *entry* systems do not primarily address biological factors, but rather social and economic factors through *allocation* decisions. This makes it especially critical that we include the recreational sector in our discussions of limited entry.

Many of the fiscal components of limited access, for example, use fees, have the same effects on recreational users as those discussed earlier with respect to commercial users. These fiscal measures may have differential effects on users in particular geographic locations and income levels, and even on members of particular social or cultural groups. We are not, in my opinion, at the point where we are ready to actively allocate among different recreational users through limiting entry. We are, however, at the point where we must deal with the effects of limiting the derivation of commercial versus recreational benefits from a given resource. Therefore, I will address the latter case.

I discussed earlier the ways in which limiting entry may perpetuate a particular social or cultural group or discriminate against others. An analogous situation may occur between commercial and recreational users. If we have a fishery where a group with particular ethnic or cultural characteristics constitutes the majority of the recreational users of a particular resource, any system that limits the entry of commercial fishermen while leaving the recreational activity unrestricted may constitute de facto discrimination in favor of the recreational users' group. A fishery that restricts ethnic Italian commercial fishermen, for example, while allowing non-Italian recreational fishermen unrestricted fishing would clearly place the burden of responsibility for the resource unevenly across these two groups. The potentials for this kind of de facto discrimination exist in situations such as *Corsa v. Tawes*, 149 F. Supp. 771 (D. Maryland, 1957), where, "... the Maryland legislature decided that commercial menhaden fishing was to be prohibited within state waters so that sports fishing and associated dependent economic interests would be sponsored and supported," as well as in the opposite situation such as *Massey v. Apollonio*, 387 F. Supp. 373 (D. Maine, S.E. 1974), where "The court . . . found that restricting the harvest of lobster to commercial fishermen at the expense of summer and recreational fishermen was an appropriate method of conserving the resource." (Both cases reported by Carl Mundt in unpublished communication.)

The situation is complicated by the fact that the end use of the resource may have similar purposes, if not similar forms. A Cajun commercial shrimp fisherman feeds his family through the sales of his commercial product. The non-Cajun recreational shrimp fisherman may view his catch as providing, besides recreational opportunity, a necessary food supplement for his family. Even though one's *intent* may be concern for the resource, the *effect* of restricting commercial catches disproportionately may fall very unevenly on different social or cultural groups who use the products of the fishery for the same ultimate purpose.

It is at least as often the case, however, that both commercial and recreational fishing are regulated in some manner and in fact derive somewhat different benefits from their use of the resource. In these cases we must pay closer attention to clearly describing the exact relative effects of limited entry measures. First we must discuss, as we did for commercial fisheries, the question of exactly why it is that we might want to consider limited *entry* as opposed to limited *access* in recreational fishing.

I have pointed out that one of the main functions of a limited entry system is to protect individual direct users from themselves, and to protect indirect users from "harm" through either the unknowing or the malicious acts of the direct

users. Does this argument, the result of the TOC phenomenon, apply also to recreational fishermen? Let us take the example of the "economic tragedy" theory, the corollary to the TOC phenomenon. Given that the resource itself is not harmed, wherein lies the potential "tragedy" from unlimited participation in recreational fishing?

One possibility is that there will eventually be so many recreational users who also gain some subsistence value from the resource that none of them will be able to fill his subsistence needs under total quota limitations. This may already be the case in some fisheries, although our information on subsistence use, whether combined with recreation or not, is so poor that we are not in a position to assess the nature and extent of the situation.

Another, much more likely possibility is that there will come to be so many recreational users that each one's *expectations* of the "pleasure" he should be able to derive from the use of the resource can never be fulfilled. A deep-sea fisherman may never be able to catch a "trophy size" fish, not because there aren't any, but because there are too many other fishermen competing for a given biological harvest. An inland trout fisherman may derive little pleasure from standing shoulder to shoulder with one thousand others on the banks of a small stream, even if he does catch some trout. A pier fisherman in southern California cannot compete for his "share" of bonita or perch because of the tangle of lines through which his own must go to reach the water. All of these situations are in a way "tragedies" for each of these kinds of fishermen, and each could be viewed as being caused by the inability or unwillingness of each individual to sacrifice some of his or her own benefit for the common good. In these cases, the expectations of the users, not the resource or the habitat, are the victims of the "tragedy." We should also keep in mind, however, that recreational catches are significantly more difficult to monitor than commercial catches, which makes the possibility of an unperceived biological or ecological problem somewhat higher in fisheries with heavy recreational participation than in fisheries that are primarily commercial.

So what do we do about it? One answer, parallel to the one in the commercial fisheries case, is to limit the entry of individuals into the fishery. We can examine this possibility by taking the method of limiting the issuance and transference of licenses as an example. Assume that only a limited number of recreational licenses can be sold. Assume that these licenses are reissued each year. Finally, assume that there is much more demand for these licenses than there is supply.

One possibility is to issue the licenses on a first-come, first-served, or even a lottery basis. This would work until the growing number of individuals who organize their yearly vacations around a fishing trip each year find that "their" licenses are being bought by "new" participants in the fishery: people who have migrated to an area as part of the exodus from inner cities and other centers of population, people with newly-found affluence who can now afford a charter trip after marlin, people from other areas whose mobility has increased with the availability of recreational vehicles to make their travels more comfortable. These "new" participants may as individuals or as groups have different socioeconomic or cultural characteristics from the traditional users. What would we

imagine the attitude of these traditional users to be to the idea that they may not be able to go fishing for the next one, two, or three years because of the luck of the draw?

This raises the possibility that fishery managers would be in the position of having to allocate rights to the recreational use of resources just as they now contemplate allocating rights to their commercial use. As we are now doing in commercial fisheries, we would have to decide both who gets the licenses and how long they can retain them. Most commercial limited entry programs hold the implicit value that we must give preference to full-time fishermen, that in fact we must ensure that a particular group has the ability to make a full-time living from the resource. Systems such as the San Francisco Bay herring fishery, which are run on a lottery system from year to year, are not generally in favor. Would we extend this thinking to the marine recreational fisherman? We would have to decide whether it is more important to give a smaller number of people their full pleasure, or a greater number some smaller amount of pleasure. If we took the former course, we would have exactly the same problems as we have in limiting commercial entry. Granting rights to a recreational experience to a particular group of people might discriminate against some on the basis of geography, against others on the basis of their economic status, and against certain cultural groups that have not taken advantage of recreational alternatives in the marine area in the past. Would we "grandfather" specific individuals or families into the recreational sector as we do in the commercial sector? Would we provide that individuals could transfer their licenses to their offspring? In that we do not have relatively objective criteria such as the notion of efficiency to aid us, these choices will be much more difficult with recreational than they are with commercial users. They may also, however, become just as necessary.

## **Conclusion**

All things considered, limited entry is basically the business of protecting people's economic, social, and psychological well-being from the effects of their own actions, or from the actions of others. To believe that any given set of individuals has the right to make decisions concerning the well-being of others derives from the republican and democratic forms of government in their classical senses, and of course from the basic tenet that orderly social behavior ought to obtain over chaos and confusion. In short, limiting entry to fishery systems is an exercise in social responsibility.

And therein lies the answer to a question which I posed at the beginning of this paper and have since neglected: How do we put our knowledge of the social and cultural aspects of limited entry to use? It is an answer that is at once deceptively simple and exceeding complex; we must record and document *all* of the potential effects of our management options (including that of no external regulation at all) so that those who bear the social responsibility can make informed choices. We must trace the effect of limited entry systems on as many of the items, such as those in the table, as we can. This is a complex undertaking. It involves sophisticated sampling procedures; the skillful elicitation of individuals' activities, values, and alternatives; and the ability to summarize, much as a bio-

logical ecosystems modeler does, all of these variables into one complete, integrated picture.

The social, cultural, and economic effects of limited entry systems are relative. They are only meaningful against the backdrop of the objectives that one has established. If our primary objectives are biological, we may not need limited entry as I have defined it. If our objectives are other than biological, we must define who will be "in" and who will be "out," and with what consequences.

### Table of Social and Cultural Variables Relevant to Limited Entry

1. Inventory of Resource User Groups, by Category
  - Commercial; by gear, vessel type, and species
  - Recreational; professional or personal
  - Subsistence; harvest or production for personal consumption
  - Consumers; retail or home use
  - Other users; shoreline residents, park users, boaters, etc.
2. Numbers of Individuals, by Relevant User Category
  - Fulltime
  - Parttime
  - Seasonal
3. Location of Users, by Relevant User Category
  - Residence
  - Home port
4. Spatial and Temporal Characteristics of the Fishing/Work Activity
  - Where the fishing grounds are located
  - Migratory patterns of fishery participants
  - User concentrations for recreational activity
5. Demographic Information Profiles, by Relevant User Category
  - Age/Sex
  - Education/Training
  - Ethnicity
  - Income (wages, shares, in kind, including measures of relative economic wellbeing)
  - Religious/cultural affiliations
  - Family characteristics
  - Sociopathological characteristics: crime, delinquency, alcohol and drug abuse
6. Alternatives in Employment and Residence, Including the Fishery Participants' Perceptions of these Alternatives
  - Are they in geographical proximity?
  - Are the participants trained or able to take advantage of the alternatives?
  - Are there social, cultural, or ethnic barriers to these alternatives?
7. Occupational Structures
  - Patterns of recruitment to fishery activity, commercial and recreational
  - Tenure in employment
  - Commitment to occupation or activity
  - Organization and composition of crews/fishing groups
8. Group Norms, Value Orientations, and Political Perceptions
  - Local norms concerning management policy
  - User group expectations/satisfaction thresholds
  - Interaction among special interest groups
9. Contextual Variables
  - Sociodemographics of larger community or area
  - Availability of health and other personal and social services to fishery participants
  - Significant economic or industrial activity
  - Population variables; density, total population, trends

# EVALUATIVE CRITERIA FOR MAKING LIMITED ENTRY DECISIONS: AN OVERVIEW

Biliana Cicin-Sain

## Introduction

Adoption of the Fishery Conservation and Management Act of 1976 (FCMA) marked the beginning of a new era of fishery management in the United States. It signaled, in effect, that new management systems had to be created to preserve threatened stocks of fish and to protect the social and economic benefits derived from commercial and recreational fishing.

Methods of fishery management are numerous, and they vary according to the peculiarities of a particular fishery—its size, history, stage of development, methods of catch, etc. In broad terms, three major approaches to fishery management can be identified: (1) methods that *limit entry* into the fishery (i.e. constraining the number of fishermen or boats by some means), (2) methods that *control access* to the resource (e.g. through the manipulation of fishing seasons, rotation of fishable areas, gear and quota restrictions, etc.), and (3) methods aimed at *augmenting the resource* (e.g. seeding, aquaculture, etc.). These methods are not exclusive of one another, but tend to be implemented in a complementary fashion. Programs of limiting entry into a particular fishery, for example, can be complemented by regulations controlling access to the resource and by scientific efforts to supplement the species artificially. The possible array of management options or combinations is vast, and it confounds efforts to evaluate the potential effects of alternative management measures.

Among the major methods of fishery management, limited entry has received the most attention and stirred the greatest controversy (1). The major reason for this possibly lies in the fact that limited entry represents an effort to restrict freedom of entry into an occupation noted for its tradition of independence. If one were to characterize the most distinctive features of the traditional fishing enterprise, lifestyle characteristics of freedom, flexibility, and independence would probably loom paramount. Thus, limited entry has been and will continue to be the focus of extensive controversy in fishery management decision making.

This paper describes and synthesizes the central questions or evaluative criteria which should be taken into account in considering limited entry as a fishery management alternative. The paper is divided into three major sections. Part I summarizes, in general terms, the central considerations which should be taken into account in making any fishery management decisions—i.e., biological effectiveness, social equity, economic efficiency, and legal, political, and administrative feasibility.

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Part II applies, both theoretically and empirically, the general framework developed in part I to the specific management technique of limited entry. First, given the general evaluative criteria presented, what are the specific questions/data needs which limited entry theoretically poses? Second, empirically, considering the variety of actual experiences with limited entry around the world, (2) what additional questions/data needs are suggested? The objective here is to raise a set of specific questions which policy makers should consider as they evaluate alternative fishery management alternatives. Part III is a brief concluding summary.

## **I. EVALUATIVE CRITERIA FOR MAKING FISHERY MANAGEMENT DECISIONS**

The vastly expanded scope of management and regulatory authority called for by the FCMA enters basically uncharted territory. The FCMA is a bellwether act marking only the beginning of a new era of fishery management.

As regional councils and the Secretary of Commerce begin to adopt management measures that may have longlasting effects on marine resources, multiple user groups, coastal states and communities, and the nation, they need assistance in refining decision-making tools and processes. In making fishery management decisions, councils should:

1. Work with explicit *evaluative criteria* so that alternative management options can be judged.
2. Consider the *feasibility and potential effects of alternative methods of management* in light of these criteria. Potential effects first have to be conceptualized and then measured, using whatever data are available. In some cases important data are not readily available. These data must be collected to establish a benchmark against which future changes brought about by management decisions may be measured.
3. *Monitor* fishery management measures that have been devised to *assess the extent to which intended consequences are being achieved and unintended consequences may be occurring*. Management plans must be revised accordingly.

The major considerations (or *evaluative criteria*) that councils need to take into account in evaluating alternative management arrangements include biological effectiveness, social equity, economic efficiency, and legal, political, and administrative feasibility. All these considerations are either rooted in the objectives and requirements of the FCMA and other laws of the U. S. or, as in the case of political feasibility, are mostly pragmatic reasons. Thus, it is important to stress at the outset that the FCMA incorporates *multiple* objectives and considerations which need to be taken into account by decision makers. It is also important that the pursuit of some objectives may not always be compatible with the pursuit of others; it is up to the decision makers, then, to weigh and decide among competing rights and objectives.



Three considerations (biological effectiveness, economic efficiency, and legal feasibility) are treated extensively by other authors in this volume. I will only discuss these considerations briefly here, focusing mostly on social equity and administrative and political feasibility.

### **Biological Effectiveness**

The biological effectiveness criterion, defined as the conservation and enhancement of fishery resources and the marine environment, runs throughout the FCMA (3). It represents a major reason for the enactment of the act (4) and it figures prominently in the legislative findings (FCMA section 2 (a)).

A key task in addressing questions of biological effectiveness is the definition of maximum sustainable yield (MSY), which serves as the basis for establishing optimum yield (OY). Compared to the difficulties inherent in establishing OY, the setting of MSY was supposed to be a relatively simple and neutral technical task. In council experiences to date, however, this has not proven correct. Many council experiences to date have shown that evaluation of biological effectiveness does not simply entail a neutral and technical process, but may well involve intense political conflict over divergent sources and interpretations of data. In a number of cases, biological data have become a political football and have attracted intense controversy. There are at least two reasons for this. First, biological data are often incomplete. We have insufficient reliable information about fish biomass stock migrations, fluctuations in stock abundance, interspecies and predator-prey relationships, and the effects of man's activities on habitat. Second, there are competing sources of biological data, i.e., the biologists and the fishermen, who each claim that they "know best" (5). In this respect, a thorny issue that the councils will have to address in the future is the extent to which alternative sources of biological data will be used in drafting management plans.

### **Social Equity**

Very simply, social equity refers to fairness in the distribution of benefits and costs derived from the exploitation of fishery resources. The social equity criterion underlies several of the objectives and requirements of the FCMA. For example, optimum yield is defined as

... the amount of fish which will provide the *greatest overall benefit to the nation, with particular reference to food production and recreational opportunities*; and which is prescribed as such on the basis of the maximum sustainable yield ... as modified by any *relevant economic, social, or ecological factor* (section 3 (18)) (emphasis added).

Another example is found among requirements for making conservation and management plans and regulations.

... If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be ... *fair and equitable to all such fishermen*, and ... carried out in such a manner that *no particular individual, corporation, or other entity acquires an excessive share of such privileges* ... (section 301 (a) (4)) (emphasis added).

Consideration of the social equity criterion is perhaps the most difficult aspect of fishery management decision-making. Just defining the variety of rights

or interests related to use of the nation's fishery resources is highly complex. To consider and weigh each right and interest systematically, using appropriate data and with fairness, becomes exceedingly difficult. As fishery resources are common property, all U. S. inhabitants have a right to them—to enjoy, harvest, and eat them. In addition to these rights which we all share, some sectors of society have particular interests in fishery resources, some because of capital or labor investment (e.g. fishermen, processors), others because of expertise (e.g. resource managers), and others because they serve as self-appointed spokesmen for the protection of certain environmental values (e.g. environmental groups) (6).

The potential effects of alternative methods of management are easier to ascertain for some of these rights and interests than for others. It is certainly easier, for example, to forecast the potential impact of a management measure on a discrete group of commercial fishermen who fish in a particular area and use particular fishing methods than it is to estimate how the management measure contributes to or detracts from "the greatest overall benefit to the nation." Yet, as guardians of the public trust, the councils at the regional level and the Secretary of Commerce at the national level are being called upon to make such estimations and to resolve such conflicts among competing rights and interests.

The first step in making such estimates is to ensure that all rights and interests have been identified. Table I represents an effort to do this. Relevant rights and interests to consider in making fishery management decisions are the following:

**Fishermen:** In addition to the rights shared by everyone else, all harvesters (whether sports or commercial) share special interests in the exploitation of the nation's fishery resources primarily by virtue of their labor investment. Among fishermen, however, there exists a multiplicity of interests or rights that may conflict with one another under certain management alternatives. Conflicting rights/interests that should be considered include:

1. Current versus potential fishermen: Some management schemes may lock certain people in and other people out.
2. Commercial versus sports fishermen: The rights/interests of commercial fishermen to preserve and enhance their livelihood may conflict with the value of recreational opportunities (for some sports fishermen, "value" refers to the pleasure derived from sports fishing, but for some it may refer to an important source of food).
3. Part-time versus full-time commercial fishermen: The livelihood and occupational identity of full-timers deserve protection, but part-timers also have rights to determine the structure of their occupational lives. In addition, part-time fishing may represent an important avenue of recruitment into a full-time fishing occupation (7). There may be, moreover, a societal interest in preserving particular part-time work opportunities as the economy increasingly moves toward more flexible work schedules and the four-day week. Part-time work

**Table 1: Relevant Rights/Interests to Consider in Addressing Social Equity**

<b>FISHERMEN</b>	<b>Competing interests in the marine environment</b>
A. Current Fishermen	<b>DOMESTIC</b>
1. Commercial	Use of fishery resources is circumscribed by competing uses for the marine habitat (other rights and interests).
a. Part-time	Marine transportation
boat owners/crew	Navigation
b. Fulltime	Habitat protection
boat owners/crew	Marine mammal protection
2. Sports	Marine mining
B. Potential Fishermen	Logging
1. Commercial	Road Construction
2. Sports	Energy generation (dams, nuclear power plants)
<b>PROCESSORS</b>	Waste disposal
A. Owners	Recreation
B. Laborers	Aesthetic environment
<b>SUPPORT INDUSTRIES</b>	Flood control
A. Boat Builders	Use of herbicides for agricultural purposes
B. Suppliers	<b>INTERNATIONAL</b>
C. Others	Allocations to foreign fishing
<b>RESOURCE ENHANCEMENT DEVELOPERS</b>	International negotiations
<b>RESOURCE MANAGERS</b>	Law of the seas
<b>SPECIAL GROUPS: TREATY INDIANS</b>	
<b>ORGANIZED PUBLIC INTEREST GROUPS</b>	
<b>COASTAL COMMUNITIES</b>	
<b>THE GENERAL PUBLIC</b>	
A. Preservation of resource for future generations	
B. Protein value	
C. Economic value	
D. Product price and availability	
E. Aesthetic enjoyment	
F. Recreation	
G. Preservation of independent life style option	
H. Preservation of part time occupation option	
I. Cost-effective management	
J. Public accountability in decision-making	

opportunities may be particularly important for the aged or semiretired, who will become an ever larger proportion of our population in the next fifty years at least.

4. Boat owners versus crew among commercial fishermen: Some systems of limited entry, for example, may perpetuate systems of ownership and hierarchy and not permit upward mobility (8).

**Processors and support industries:** The processing sector and support industries (e.g. boat builders and suppliers) share special interests in fishery resources by virtue of their investments of capital and labor. Interests that might potentially diverge under different management alternatives are those of owners and laborers in the processing sector where systems of hierarchy and ownership may be perpetuated indefinitely.

**Resource enhancement developers:** Resource enhancement developers (e.g. commercial operators of hatcheries, ocean ranching, and aquaculture facilities) represent a relatively new group with a special interest in fishery management because of their investments. Their interests and rights to the resource they help develop may clash with the rights/interests of fishermen in harvesting that resource.

**Resource managers:** Resource managers (e.g. federal and state fishery administrators, officials of interstate marine fishery commissions, fishery scientists, etc.) share a special interest in the resource by virtue of their expertise. This expertise has traditionally rested on a disciplinary base of biology and, more recently, of economics. Therefore, resource managers as a group have been primarily preoccupied with the "biological preservation" and "economic efficiency" criteria in making fishery management decisions. With new requirements for optimum yield and for the consideration of socioeconomic impact, the orientation of this group as a whole is likely to move away from a primary focus on the "conservation of fishery stocks" toward a more inclusive focus on the "management of human activity that impinges on the marine habitat."

**Special groups—Treaty Indians:** In certain parts of the U. S. (notably the Pacific Northwest), some Indian tribes have special interests and claims over fishery resources by virtue of judicial interpretations of treaties with the U. S. government. The Boldt decision which held that treaty Indians must be allowed unrestricted access to 50 percent of all the harvestable salmon in the state of Washington has pitted the rights of the Indians against those of other salmon fishermen. The ensuing conflicts among fishermen have caused serious problems in the salmon fisheries that have yet to be resolved.

**Organized Public Interest Groups:** Groups organized specifically to protect and enhance particular marine resources such as porpoises and sea otters have specific "interests" in fishery management decisions because of their status as self-appointed guardians of specific marine creatures. These groups claim to represent the interests of future generations in the continued preservation of particular species. These special interests often conflict with those of fishermen in harvesting stocks ecologically related to the protected species.

**Coastal Communities:** Coastal communities have special interests in fishery management because they lie close to the fishing enterprise. Sociocultural systems built around fishing help define their character and, in some cases, coastal town economies are deeply dependent on fishery activities. The potential effects of fishery management decisions on coastal communities are seldom considered, yet these effects could be profound. In the short run, for example, unemployment among fishermen brought about by some kinds of management could severely strain the capacity of local government agencies, such as welfare offices. In the long run, certain management measures could potentially strain familial, social, and community ties and result in cultural dislocation. This is particularly possible in the case of ethnically-cohesive fishermen communities whose familial and cultural systems are intimately intertwined with the fishing enterprise.

**The general public:** The interest/rights of the general public in fishery resources are many and varied:

1. Preservation of the resource for future generations (this is related to the biological preservation criterion)
2. Nutritional value—fishery resources represent a major source of protein bound to become more important in the future
3. Economic value, for example, in the number and value of jobs and economic activities involved and their contribution to the gross national product (this is related to the economic efficiency criterion)
4. Low-priced, high-quality fishery products and their steady availability
5. Aesthetic enjoyment and preserving this option for future generations
6. Recreational uses and preserving this use for future generations
7. Preserving the independent lifestyle characteristics of the fishing occupation as an option for future generations, particularly in view of increased societal preferences and pressures for more flexible forms of work organization
8. Preserving part-time occupational opportunities as an option for future generations, particularly in view of emerging changes in the age structure of the population. The proportion of the aged and semiretired will rise; lifestyle changes in the general population will create more demand for flexibility and multioccupational opportunities; and changes in lifestyle among women will draw greater numbers in the job market, many seeking flexible part-time occupational opportunities.
9. Cost-effective management of fishery resources (this is related to the administrative feasibility criterion)
10. Public accountability in decision-making about marine fisheries because the resources are common property

This list should make it readily apparent that some of the interests and rights of the general public may conflict with each other. For example, maximization of protein production may well be incongruent with preserving part-time job opportunities, because part timers are generally considered less efficient in their use of capital and labor.

Once the full variety of rights and interests impinging on fisheries management have been identified, the difficult task facing the regional councils and the Secretary of Commerce is how to reconcile and arbitrate among these competing rights, interests, and claims in a situation of increasingly scarce fishery resources. While the decisions made by the councils should rest on the best scientific data base available, there are no *technical solutions* to these issues. Rather, these are *political* questions involving important value choices as to who gets what, when, and how, and with what consequences.

As in other areas of public policy making, there is no easy method of weighing the importance of one interest versus another or of measuring its relative contribution to "the greatest overall national benefit." As Rivlin puts it in a related discussion, standard cost-benefit analysis is of limited value when we need to compare the relative merits of alternative societal goals; e.g., how do we compare the merits of a program to find a cure for cancer with those of a program to teach poor children to read (9)? Nevertheless, the councils and the secretary must arbitrate among competing interests and make difficult value choices that doubtless will not satisfy all of the people all of the time. As a member of the Pacific Fishery Management Council put it at one meeting, "We know we've done a good job if everyone is equally mad at us . . ."

It is difficult enough to arbitrate and decide among competing rights and interests that are well articulated and represented at some stage of the fishery management decision-making process—through council members, in public hearings, on advisory panels, etc. Some rights and interests, however, are better organized than others. Thus, it becomes even more difficult to consider properly those rights and interests that are not being fully articulated and represented in the decision-making process.

In this respect, the provisions of the FCMA go a long way toward insuring that the variety of interests involved in fishery resources are properly represented. *The structure and composition of the councils and the process followed in adopting and implementing their plans* are supposed to result in the definition of an "optimum yield" wherein the pertinent economic, social, and ecological factors have been considered. Moreover, implicit in the division of decision-making authority between the councils at the *regional level* and the secretary at the *national level* is the notion of different constituencies. The logic behind this approach is that regional organizations are best able to represent the full complexity and peculiarities of regional interests and conditions. The national level, on other hand, is thought best able to represent the full range of national concerns. However, a regional optimum may not always be the same as a national optimum—another important source of conflict in fishery management decision-making (10).

Assessing the extent to which fishery management decisions meet the social equity criterion and are responsive to the variety of interests involved is difficult though measurable through the use of social science methodology. Such an

analysis falls outside the scope of this paper but is explored in forthcoming work (11). Preliminary analysis indicates that the major representational mechanisms established by the FCMA (i.e., membership on the councils, membership on advisory panels, participation in public hearings, and secretarial review) are working imperfectly in representing the full variety of affected rights and interests. The interests of the general public and of coastal communities, in particular, do not appear to be properly represented (12).

A final factor adding to the complexity of fishery management decision making is that of competition with other uses of the marine environment. The interests outlined above, complex and variegated as they are, related to decision making about fishery resources only. Fisheries, however, form part of broader marine habitat system in which other rights/interests/users are active competitors. Some of these competing interests are marine transportation, navigation, habitat protection, marine mammal protection, marine mining, logging, energy generation (e.g. dams, nuclear power plants), recreation, waste disposal, and others (table 1). While the regional councils constantly have to deal with the interaction between fisheries and these other uses of the marine habitat, it is doubtful whether the conflicts that arise can be solved at the regional level. Inasmuch as these other uses involve different local and national constituencies and are regulated by multiple local and national government agencies, it is probably at the national level that multiple use conflicts will have to be resolved and priorities for use established (13).

### **Economic Efficiency**

Achieving economic efficiency in the utilization of fishery resources is a goal that has long been advocated by knowledgeable observers of fishery management, resource managers, and economists. It is an allowable objective under the FCMA, although under qualified conditions:

"Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no measure shall have economic allocation as its sole purpose." (section 301 (a) (5)).

Putting it very simply, the general argument about efficiency (defined as maximum output at lowest cost) in the exploitation of fishery resources is based on the notion that free entry and access to a common property resource inevitably results in "increasing amounts of capital and labor competitively pursuing an ever-dwindling supply of fish" (14). This inefficiency is seen as inconsistent with maximizing the general welfare.

In my view, the concept of general welfare underlying the economic efficiency criterion is a limited one. According to most economists, ". . . if, *ceteris paribus*, an action increases the gross national product, it improves the general welfare" (15). This is only a partial view of welfare, no matter what level of welfare one is referring to, national, group, or individual. As discussed above, the contribution of fisheries to the gross national product is only one of many rights or interests that the nation or general public has in fishery resources. At the group level, different sectors of society have a variety of rights and interests in fishery resources, besides the generation of income. As Orbach points out, the fishing enterprise may fulfill a variety of different needs for different groups (16).

For Indian groups, for example, it may fulfill traditional philosophical and cultural imperatives; for sports groups, needs for enjoyment and achievement and, in some cases, for subsistence; for ethnically-cohesive commercial fishermen communities, it may fulfill associational, familial, and status needs.

At the *individual* level, welfare comprises many components, only one of which is material reward. Psychological theory tells us that individual behavior is motivated by many and variegated factors, such as monetary inducements, needs for association, needs for self-expression and self-actualization, status recognition, and so forth. Moreover, in an activity such as fishing, nonmaterial incentives may play a more prominent role than they do in other occupational endeavors. Much as in academic life, work environment characteristics of freedom, independence, and "being one's own boss," which are also associated with fishing, may be crucial ingredients in accounting for recruitment patterns into the occupation and for high levels of work satisfaction (17).

These qualifications are not intended to suggest that consideration of economic efficiency is not an important objective of fishery management. On the contrary, attaining higher efficiency and productivity in any economic sector represents a valuable societal goal. One should recognize, though, that economic criteria represent only one of the multiple objectives and considerations that need to be taken into account in making fishery management decisions and, as such, ought not to be made synonymous with the general welfare, as is sometimes the tendency.

### **Legal Feasibility**

Alternative methods of management must also be judged by their conformance to the variety of laws impinging on fisheries management. These include state constitutional protections of the right to fish, jurisdictional divisions of authority between federal and state governments, clauses protecting discrimination against citizens of other states, federal constitutional guarantees of due process and equal protection, National Environmental Policy Act review requirements, and Indian treaty rights.

Legal problems that different management measures may pose should be anticipated to avoid the lengthy delays and administrative costs that suits invariably incur. Moreover, it is important that decision making about such complex issues as are raised in fishery management should not be relegated to the courts (18). The regional councils were created to arbitrate among competing interests and interpretations of data and, as such, they are supposedly best equipped to consider the interests and rights of all affected parties and to make equitable, sound decisions.

Anticipation of legal problems to avoid court action, however, should not be allowed to impede decisive action by the councils, as it has in some cases. Some councils have been notably reluctant to make certain decisions for fear of judicial challenge and have tended to frequently solicit the advice of NOAA attorneys on questions that more properly call for the making of sound value judgments than for legal interpretations. Some have suggested that one way of avoiding this problem would be to include attorneys on the councils' staff to provide for timely in-house legal advice.



### **Political Feasibility**

Alternative management methods must also be partially judged by the likelihood that they will be accepted by the range of affected interests. This political reality criterion is intimately related to the administrative feasibility criterion. Some management plans will so antagonize key actors in the political process that ultimate acceptance is impossible and unenforceable (19).

As a new system of government, the regional councils are not automatically endowed with legitimacy, but need time to establish their authority and develop a base of acceptance and support. Promulgation of ultimately unenforceable management measures, as well as frequent secretarial reversal of council actions, quickly erode a growing legitimacy base, and should be avoided (20).

Ultimately, the councils have to make the difficult bite-the-bullet choices as to who gets what among competing groups, and the councils must live by their decisions. There are ways, however, of improving the chances of political acceptability of their decisions. The first is through the systematic gathering of data on the management preferences of different user groups. The second is by perfecting the FCMA mechanisms for interest articulation and representation.

Systematic surveys of the opinions that different segments of the fishery have about the resource and its management (though costly) can be useful in at least two ways. First, they can provide useful information on how different groups define the root problems that account for resource depletion, and clarify potential differences of opinion on this key question. User groups may differ substantially in their assessment of the causes of resource depletion. Lack of consensus on definition of the problems will obviously impede agreement on management solutions. Second, information on management preferences may allow us to map areas of agreement and disagreement among different groups and to clarify the position of each group. This process can be instrumental in fostering consensus and, moreover, it can be useful in forecasting the feasibility of enforcing alternative management arrangements.

Political acceptability could also be increased by allowing for more extensive involvement of all affected interests at various stages of the decision-making process. This is a complicated question that we treat at length elsewhere (21), but briefly it involves the two major methods of citizen/user group involvement allowed by the FCMA: participation in public hearings and in advisory panels.

In my view, public hearings are not an effective means of communication between government and citizens. Essentially, public hearings involve a *one-way* flow of communication, either from government to citizens or from citizens to government. The very elements of the public hearing format—contact on a sporadic rather than a regular basis, a limited time frame, unilateral presentation rather than group discussion—militate against two-way communication. As a mechanism for relaying information from government to citizens, public hearings provide an important opportunity for informing and educating the public and, in the process, for legitimizing governmental decisions. The extreme complexity of legislation, such as the FCMA, and of attendant administrative regulations, however, militate against conveying a very accurate picture to the public. Information is inevitably distorted when it is complex and relayed on a sporadic, limited-time basis. Particularly when the public is not sufficiently organized and lacks

technical knowledge of the legislation and of administrative regulations, public hearings as a citizen involvement mechanism represent, at best, only a means for disseminating partial and limited information.

Similar problems underlie the use of public hearings to convey information from citizens to government. Public hearings do provide a point of access into the management system which organized citizens can use to register their protest, and to delay or obstruct implementation and provide grounds for action in other realms such as the courts. The "one-shot" approach, the unilateral presentation of interests and the limited time available in the public hearing setting, however, encourage the presentation of extreme, uncompromising positions. Few opportunities exist for compromise and reconciliation of divergent interests. Thus, while public hearings can be profitably utilized by government and citizens for their own purposes, from neither perspective do they provide an adequate mechanism for a meaningful *two-way* exchange of views and opinions (22).

Advisory panels, on the other hand, offer a potentially more stable and regularized means of providing ongoing public input into decision-making and a forum where divergent interests can be reconciled. It is not clear, however, to what extent councils are using the advisory panels in this fashion. In the Pacific salmon plan development process, for example, some contend that the specific ground rules set up by the council regarding the operation of the advisory panel actually prevented rather than facilitated the formation of opinion consensus (23).

### **Administrative Feasibility**

The final criterion which should be taken into account in evaluating alternative fishery management arrangements is administrative feasibility (24). Three major questions need to be addressed: (1) What is the likelihood of adequate enforcement? (2) What organizational adjustments will be needed to carry out the management plan? (3) What will be the costs of the program and who should properly bear them?

The likelihood of adequate enforcement is a question that cannot be considered in the abstract, but needs to be specifically related to a particular management method in a particular fishery. Fishermen will no doubt find loopholes in any regulation; hence, mechanisms to prevent and to close loopholes inevitably have to be fishery- and method-specific.

Enforcement needs should be carefully evaluated for each fishery, because adopting unenforceable regulations resulting from political opposition, logistical difficulties, or lack of adequate development may be detrimental to the growth of legitimacy of the regional council system which, as discussed earlier, needs to establish a base of authoritative compliance.

Enforcement of management plans under the FCMA is complicated by the fact that one set of actors (NOAA and the councils) formulates plans while another set (most prominently the Coast Guard and, in some cases, the states) is charged with enforcement. Coordination of management planning and enforcement carrythrough may thus be problematic, because these are dependent on voluntary cooperation among agencies, with the managing agency lacking the ability to authoritatively mobilize enforcement resources and personnel.

The particulars of alternative management methods may impact the managing agencies (NOAA and the councils) differently. Implementing management plans may require both *intra*organizational and *inter*organizational changes and adjustments. Some plans may necessitate internal adjustments of task, responsibilities, communication channels, or hierarchical relationships, while other plans may permit continuation of the status quo. Implementation of management plans under the FCMA inevitably involves interagency coordination and adjustments. Administratively, the regional system established under the FCMA is a highly unusual one without analogy in other policy areas. The regional system is empowered to make plans for fishery management but it lacks final approval authority or enforcement powers. While ostensibly autonomous, it is dependent for expertise, staff resources, and budgets on (among others) the National Marine Fisheries Service, the U. S. Coast Guard, the Department of State, state departments of fish and game, interstate marine fishery commissions, and contractual services. It is also a part-time system with most of its members performing other roles and having different organizational or professional allegiances/reference groups. As such, it is an unusual experiment in federalism marked by a high level of administrative complexity and uncertainty. Thorny administrative issues will be facing the FCMA regional system in the near future on the division of labor and authority between state and federal levels, the extent to which the full potential of the FCMA can be realized with current levels of funding and modes of organization, and the extent to which the councils will develop their own expert staff resources.

Minimizing the costs of conservation and management measures is required by the FCMA (section 301 (a)(7)). Enforcement requirements and the intra- and interorganizational adjustments which different management alternatives may entail must also be evaluated in terms of their cost-effectiveness. In addition, equity considerations as to who should properly bear the administrative costs of running and enforcing a regulatory system (currently being shouldered by taxpayers) should be raised. This issue is discussed further in the limited entry section.

### **So How Do We Decide?**

In making fishery management decisions, there is no easy technical method of weighing the relative importance of such diverse evaluative criteria as biological effectiveness, social equity, economic efficiency, and legal, political, and administrative feasibility. Neither are there any universally applicable solutions. For each fishery at different stages of economic development and biological degradation, there will be a different combination of human factors to consider, and different legal, political, and administrative implications. Thus, each fishery will entail a different set of calculations and call for different management solutions.

Fishery management decision making is a *political* process of making important choices among competing values and priorities. It is hoped that these decisions will be made after careful consideration of all the criteria discussed, in a manner that is responsive to all affected rights and interests, including those that are not being articulated and represented.

## II. EVALUATIVE CRITERIA FOR MAKING LIMITED ENTRY DECISIONS

Many observers argue that the wholesale adoption of limited entry in America's fisheries would fundamentally alter the nature and structure of the fishing enterprise. The following comments are illustrative of this view:

... the major objective to limited entry is that it takes the *guts out of fishing*. If you take the challenge out of fishing, you may be changing the way of life for those who fish. This is not a step to be taken lightly . . . (25). The person who will be unhappy with limited entry is the fisherman who expects to do better than last year. Since that includes almost all fishermen, that's a lot of people (26).

Whether limited entry actually changes the structure and nature of fishing is an empirical question that one hopes can be partially answered by the empirical experience that this symposium is synthesizing. At any rate, limited entry raises fundamental value questions about competing rights and interests and ultimate societal goals. For these reasons, it needs careful and thoughtful assessment in light of the evaluative criteria elaborated above. The following section summarizes the major questions that limited entry poses under each of the evaluative criteria.

### Biological Effectiveness

McHugh indicates that it is not clear to what extent limited entry, in and of itself, addresses the biological effectiveness criterion (27). The classical "tragedy of the commons" argument casts the problem of resource depletion in terms of overfishing and its solution generally in terms of restrictions on entry. Neither the problem definition nor the solution advocated are universally applicable. First, in some cases, resource depletion may be caused by reasons other than overfishing, such as pollution, habitat degradation, or careless fisherman behavior. Second, "tragedy" is not innately inherent to the commons. Rather, it depends on cultural orientations and socialized patterns toward the public good and toward man's relationship with nature. As Orbach points out, there are a number of U.S. fisheries in which members voluntarily limit their effort (28).

Third, limited entry in and of itself does not necessarily address problems of overfishing. The limited entry experience in the British Columbia salmon fisheries, for example, shows that a reduction in fishing vessels brought about by limited entry has not been accompanied by a reduction in fishing effort (29). This is because small gillnet or troll vessels have been "pyramided" into large purse seiners. Thus, the current fleet is composed of large boats capable of increased effort and increased efficiency.

In other cases, however, limited entry may be an effective method of addressing biological effectiveness considerations. In our survey of the California abalone fishery, for example, one of the causes of resource depletion most commonly cited was that of inexperienced divers who contribute to excessive abalone mortality by picking, measuring, and replacing undersized abalones (30). California Department of Fish and Game (CDFG) estimates, under laboratory

conditions, indicate that bar cuts as small as one-half inch in the foot of red abalones (caused by measuring) result in nearly 60 percent mortality. In the ocean, CDFG officials estimate a mortality rate approaching 100 percent. Limited entry in the California abalone fishery has been in effect since January, 1977, and no systematic data are yet available on its effects. Informal telephone interviews with key actors in the processing and harvesting sectors (conducted in May, 1978) suggest that limited entry has worked to professionalize the fishery by retaining the fulltime experienced divers and by driving out the part-timers. This, in turn, has had beneficial biological consequences for the resource. It is reported that abalone beds are being replenished and that mortality caused by undersized picking has been significantly reduced.

In addition, the sense of property rights over the resource that limited entry supposedly engenders may foster the advancement of resource enhancement. In this regard, some have linked the existence of limited entry in Alaska with the recent voter approval of a two hundred million dollar loan program for the construction of private hatcheries and a twenty-nine million dollar bond issue to construct state hatcheries (31). A similar effect is reported in Prince William Sound, where the fishermen have joined together and assessed themselves to construct a major hatchery system. "This would not have occurred," suggests Van Hying, "with unlimited entry, where their efforts and sacrifices would be diluted by newcomers and nonresidents" (32).

In summary, our limited empirical data on the extent to which limited entry addresses questions of biological effectiveness suggests the following hypotheses:

1. Much depends on the characteristics of the fishery.
2. Without accompanying harvest controls, limited entry does not ensure biological effectiveness.
3. Limited entry may not be biologically effective unless commercial and sports fisheries are limited at the same time.
4. Limited entry may have adverse biological consequences for related fisheries. (In the case of abalone, for example, limited entry appears to have resulted in increased harvesting pressure in the sea urchin fishery; there is now a move afoot to limit entry into this fishery.)

The bottom line in my analysis is that in cases where limited entry is not effective as a tool for pursuing biological effectiveness, one must scrutinize even more closely its desirability as a management alternative in light of the other evaluative criteria.

### **Social Equity**

A management measure such as limited entry pits many competing rights and interests against each other and calls for the making of very difficult choices as to who will lose and who will benefit, to what extent, and with what spill-over consequences. In this section, I outline some of the specific social equity considerations that limited entry poses. The subtleties and complexities of limited entry

in any particular fishery have to be determined separately by each council. The major social equity questions that are posed in considering limited entry are, in my view, the following: how to achieve a proper balance between full-time and part-time interests; how to achieve a proper balance between sports and commercial interests; how to create an equitable license allocation process; how to consider and anticipate effects on other fisheries; whether and how to provide assistance to those who are dislocated; how to monitor potential long-range effects; how to deal with windfall profits.

It should be emphasized that resolution of these issues cannot take place in the abstract, but rather within the specific context of each fishery system being considered. Devising an equitable limited entry system will require intimate acquaintance with the peculiarities of a fishery, its culture, its mode of operations, its relationship to other fisheries, and its relationship to the general society. Those who are most involved, the fishermen, can contribute significantly to this task.

**Balance between full-time and part-time interests:** I have outlined above the case for preserving part-time opportunities and Orbach discusses it in detail in his paper (33). The case in favor of the full-timer rests on the notion that, like most occupations, the fishing occupation should be considered as a profession that requires some type of previous schooling, accreditation, and/or apprenticeship. This view suggests that society stands to benefit from more stable, full-time, professionalized fisheries in terms of conservation (an experienced fisherman can reduce or avoid unnecessary fishing mortality) and more stable product price and availability to the consumer.

**Balance between sport versus commercial fishermen:** These considerations, I think, are aptly summarized by Orbach (34). The point to be reiterated here is that sport and commercial fisheries have to be considered jointly under most limited entry schemes.

**Equitable license allocation process:** There are three major issues here: (a) how to provide for *initial allocation*, (b) how to provide for *subsequent allocation*, and (c) how to *monitor* and adjust the number of fishermen or boats in accordance with increases in fishery stocks or improvements in harvesting efficiency.

First, there is a choice of whether initial allocation of licenses should be to boats or individuals. This will largely depend on the characteristics of the fishery. Second, equitable criteria for allocating licenses have to be established. Alternative methods of allocating licenses include grandfathering, auctions and lotteries, and point systems. While some methods of allocation seem more equitable than others at face value (e.g., a complex point system such as Alaska's seems preferable to that of simply grandfathering people in), allocation must be done within the context of each fishery. What is equitable in one fishery may not be equitable in another. For example, in the New England mixed trawl fishery, using the criterion of economic dependence on the fishery would prove disadvantageous to the most experienced fishermen, who do not owe anything on their boats, while it would favor newcomers who, following the enactment of the FCMA made

very large capital investments in the fishery (35). Using an allocation criterion such as past fishing history could profitably channel interfishery mobility away from overfished stocks and toward underutilized species. Such a system is currently being proposed for the California herring fishery (36). Finally, establishing an equitable allocation system will require very comprehensive baseline data on the characteristics of the fishery's human system— data which are not generally available. As Rickey puts it in reference to the Alaskan case, "some of the conceptual decisions on how to limit fisheries are relatively simple compared to the task of gathering the information necessary to make those decisions" (37).

The basic issues regarding subsequent allocations are those of providing for an equitable method of allowing new entrants into the fishery over time (e.g., through lotteries), establishing requirements to maintain continued participation in the fishery (e.g., setting a minimum level of landings per year) (38), and preventing license values from escalating in cases where licenses are transferable (as has occurred in British Columbia and Australia).

Finally, ensuring that a license allocation system is implemented properly will require close monitoring and feedback. The assumption should be built in that frequent adjustments, modification of regulations, and elimination of loopholes will be necessary and should be assumed.

**Anticipating effects on other fisheries:** The empirical experience to date suggests that limitations placed on one fishery, while enhancing that particular fishery, may have detrimental effects on other fisheries. The British Columbia case, for example, shows that limited entry in the salmon fishery has had adverse impacts on other fisheries such as the halibut fishery and Indian fisheries (39). Limited entry in the California abalone case is putting pressure on the sea urchin fishery. The interconnectedness among fisheries whenever limited entry schemes are contemplated is thus paramount. Data on interfishery mobility patterns are essential to properly monitor (and, one hopes, to prevent) detrimental spillover consequences in other fisheries.

**Assistance for the dislocated:** There are several questions here. First, to what extent should people be compensated for being deprived of their right to fish? There is certainly a case to be made for providing assistance to those who are dislocated. As Stanistreet puts it in reference to the Australian case, "... a management policy that does not provide any avenue for fishermen to get out of a fishery except by way of going broke, with loss of boats, experience, and capital to the industry, is no management at all; it takes no account of people as human beings but only as numbers in some kind of management chess game ... " (40). On the other hand, methods such as buyback are costly and their expense is generally borne by the taxpayers. Second, what about psychic costs and retraining and counseling needs? The extent to which these should be provided and who should bear the costs needs careful consideration.

**Monitoring potential long-range effects:** Potential long-range effects on sociocultural systems, coastal communities, and national interests should be anticipated to the extent possible by scenario building that considers first, second, and third order consequences of limiting entry. Actual effects should be monitored properly.

**Dealing with windfall profits:** Finally, the equity of creating a large capital gain for license holders through the imposition of limited entry needs very careful assessment. The recommendation of Canadian officials (where windfall profits have been a major problem) is to establish, at the outset, explicit mechanisms for extracting economic rent. Otherwise, once fishermen have attained very large incomes, the extraction of economic rent becomes politically difficult (41).

### **Economic Efficiency**

If limited entry does not represent a major means of attaining biological effectiveness, the first question that should be raised is whether government should intervene to regulate an industry primarily for reasons of economic efficiency. In my view, the answer is not self-evident. While the tradition of economic efficiency is as American as apple pie, other traditions, such as individual freedom of choice, are equally prominent. Economic efficiency represents only one component of individual, group, or national welfare. Efficiency, moreover, is only one of the allowable objectives of the FCMA, provided that "no . . . measure shall have economic allocation as its sole purpose." (section 301 (a) (5)).

Government intervention for purposes of attaining economic efficiency is more self-evident in some cases than in others, for example, if fishermen's incomes were generally so low as to warrant some form of government assistance (42) or if fishermen desired intervention and were generally in favor of limited entry (43). At any rate, in my view, a *prima facie* case for government intervention for purposes of attaining economic efficiency does not exist. As one fisherman put it:

. . . many of us opposed to limited entry believe that the government has no business regulating the *economics* of the fishing industry by limiting the number of boats so that fishermen can be "guaranteed" a good income. There are no guarantees in the fishing business—if a fisherman wants a guarantee, he's ready for a beach job and a time clock. If there is a poor run of fish, then we all probably have to rely on another fishery or alternate job, but if there is a fair season then the good fisherman and the average fisherman who works hard will make a living, and the poor fisherman will drop out, just like in most other businesses. That's where the free enterprise system must remain. We fish year-round in Kodiak, and we need the freedom and the flexibility to move from fishery to fishery—that's our security. We don't want to get boxed in by expensive permits and red tape. This summer in Alaska, for example, some areas are facing poor salmon predictions, but those fishermen no longer have the option of shifting to more productive areas . . ." (44).

The second question that should be raised is what happens when government does intervene for purposes of attaining economic efficiency? Economists typically point to a number of economic benefits that would accrue to society through the introduction of limited entry; for example, misallocated capital and labor in fisheries could be used for more productive forms of enterprise, economic rents would not be dissipated, costs of research, development, management, and enforcement would no longer be borne solely by the taxpayers, etc. (45). These *hypothesized* benefits, however, need to be tested carefully against *empirical reality* (46). Some questions in need of empirical testing include:



1. What happens to product price and availability? Does the consumer ultimately get cheaper fish? (Some argue that limiting a fishery to fulltime, professional fishermen will help stabilize product price and availability, which will ultimately help the consumer.)
2. What happens to income distribution patterns among fishermen who remain in the fishery?
3. What happens to income distribution patterns among fishermen who leave the fishery?
4. What happens to patterns of vessel ownership?
5. What happens to established patterns of fishermen/processor interaction?
6. In what kinds of economic activities do fishermen who leave the fishery become involved (e.g., other fisheries, onshore fishing-related activities, onshore nonfishing-related activities, etc.)? What are the costs of retraining individuals (including psychic costs) and of retiring vessels and/or individual licenses?
7. Do administrative costs increase or decrease and who actually bears these costs?

The very scant empirical evidence available to date provides some indications that economic benefits may not accrue to society as a whole. First, there is little evidence of lower fish prices. In the abalone fishery, for example, prices have increased significantly since the inception of limited entry (47). Second, in cases such as British Columbia, economic benefits appear to have accrued only to fishermen who have stayed in the fishery. Their incomes have skyrocketed, while fishermen in related fisheries have been hurt (48). In terms of administrative costs, the argument that the taxpayer will benefit also needs empirical verification. It is difficult to forecast whether administrative costs will be higher or lower under limited entry. It will be expensive to construct a good limited entry system and to monitor it; buyback programs are also expensive. It may not be politically possible to pay for these costs by extracting economic rent (49).

This is not meant to imply any particular conclusions about who actually benefits economically under a system of limited entry. We just do not have sufficient data to answer this question at this time. There are sufficient indications, however, that limited entry benefits only a privileged few. Thus, the question of who actually gains and loses in economic terms deserves very careful empirical scrutiny.

### **Legal Feasibility**

I have nothing to add to the legal considerations on limited entry outlined by Koch (50).

### **Political Feasibility**

Given that fishermen generally are opposed to or are at least suspicious of limited entry, depending on the fishery involved, care should be taken from the outset to involve all sectors of a fishery in limited entry deliberations. This is im-

portant for building political acceptance and, ultimately, insuring the enforceability of any system that is established. More importantly, industry participation is essential to properly tailor and package alternative methods of limiting entry to fit the peculiarities of each fishery.

Industry participation should be tempered by two considerations. First, care should be taken to insure that the interests being articulated do, in fact, represent the attitudes and opinions of the rank and file. Fishermen's opinions should be tapped as systematically as time and resources allow. Opinion surveys are one method of systematically ascertaining management preferences and are useful in mapping out areas of agreement and disagreement among competing groups. Insuring that all relevant interests are represented on advisory panels and using the full potential of the panels is another method. Second, industry involvement in fishery management decision-making should not be too strong. While taking into account the interests and wishes of the regulated, regulatory systems should not become captured by those interests.

### **Administrative Feasibility**

Among the most common arguments in favor of limited entry are that enforcement will be easier, and costs of research, development, management, and enforcement will no longer be borne solely by the taxpayer.

Under limited entry, enforcement officers will be more concentrated, conflicts between fishermen due to overcrowding will be decreased, monitoring and record keeping will be simplified with fewer licensed vessels, prediction of fishing effort will be easier, and the predominance of more productive and experienced fishermen (who generally have a better record of compliance with harvest regulations) will facilitate enforcement (51). To my knowledge, the empirical experience to date does not contradict these hypotheses. The ease of enforcement, however, could vary greatly according to fishery. For example, unless it is established on a multispecies basis, limited entry would probably be exceedingly difficult to implement and enforce in the New England mixed-trawl fishery. As Jake Dykstra pointed out in recent Senate testimony, "the 'you can fish for blue-nosed dace because you have two left feet—but you can't fish for sprat because your grandfather had red hair' limited entry programs would . . . strangle efficient operators in the New England fishery" (52).

In my opinion, we generally tend to underestimate the new information requirements and costs that limited entry would entail. First, if it is done properly, it will be expensive to construct an equitable system of limiting entry that takes into account all relevant considerations. A great deal of information that is not readily available will have to be collected to establish appropriate baseline data. Second, as previously argued, a limited entry system will have to be closely monitored to prevent, to the extent possible, detrimental consequences and to make the frequent system adjustments and modifications that will no doubt be necessary. This, too, will be expensive (53). Third, methods of compensation to those who are dislocated will require large public expenditures (54), as in buyback programs. Economists generally argue that such costs can be offset through the extraction of economic rent. Some of the empirical cases to date (e.g., Canada, Australia), however, point to serious political difficulties in attaining this objective (55).

### III. CONCLUSIONS

The management option of limited entry needs to be considered very carefully for each fishery in light of all the evaluative criteria outlined above. Depending on the state of the resource and on the characteristics of the fishery, limited entry may or may not be a suitable management solution. If limited entry does not effectively address biological conservation and stock enhancement objectives, its desirability as a management alternative should be scrutinized even more closely in light of the other criteria.

In most cases, limited entry will need to be complemented by other management measures to achieve biological objectives.

Limited entry should be approached from the perspective of multispecies management, taking into account from outset, all relevant interfishery connections. In some ways, multispecies management represents the real challenge for the councils as the first authoritative multistate management organizations.

Limited entry should address commercial and sports fisheries simultaneously.

Limited entry must be carefully evaluated in terms of how it will affect the range of relevant rights and interests and who will accrue its costs and benefits.

An instituted limited entry system needs to be monitored closely. In this respect, it would behoove fishery managers to recall some of the lessons learned so belatedly and costly in other domestic policy areas. One of the major lessons learned from efforts to introduce broadscale social action programs in the U. S. during the past fifteen years is that appropriate *evaluative* assessment components must be incorporated whenever new programs/methods of management are introduced. Otherwise, there are no means of scientifically judging the extent to which a management program is reaching its *intended* objectives and whether *unintended* effects are occurring. Rather, evaluation becomes a political football—one group's impressionistic assessment is equally as good as any other's. Given that fishery management has a variety of objectives, to assess whether and to what extent these goals are being fulfilled, *baseline data* on biological, economic, social, and political variables should be gathered at the outset of the management effort. Subsequent gathering of data on the same indicators should provide for systematic measurement of intended and unintended changes resulting from the management program.

As a concluding note, in considering limited entry or any other fishery management alternative, there should be explicit discussion of ultimate goals and future images. What kind of fishing systems do we, as a nation, want to have in the next ten, twenty, fifty years? And how do we get there?

# A CONSTITUTIONAL ANALYSIS OF LIMITED ENTRY

Christopher L. Koch

## **Introduction**

There are a large number of difficult social, economic, political, and administrative issues surrounding the establishment and implementation of limited entry fishery management systems. This paper, however, attempts to analyze some of the legal uncertainties that have been raised concerning the legitimacy of limited entry. The paper does not in any way attempt to judge the benefits or liabilities of limited entry, nor does it suggest that limited entry should be implemented. It does not deal in specific analysis of any actual or hypothetical access limitation system. It does set forth, however, an analysis of several major constitutional questions that have been raised concerning the legality of different aspects of limited entry under the Fishery Conservation and Management Act (Public Law 94-265) and sets forth the constitutional standards appropriate for analyzing limited entry systems (1).

The first section, "The Delegation Doctrine," analyzes the assertion that the FCMA's delegation of authority to establish limited access systems does not comply with the constitutional doctrine that requires that legislation have adequate standards to be constitutional. This paper concludes that the FCMA suffers from no constitutional infirmity in this regard.

"Substantive Due Process" analyzes whether there is legislative competence to restrain the right of fishermen to engage in a particular fishery. The paper concludes that there is such competence and that the constitutional doctrine of substantive due process is not a significant obstacle to limited entry schemes. "Procedural Due Process" examines what procedural rights must be afforded to those fishermen who will be denied access to a fishery.

The section on "Equal Protection" examines one of the most commonly asserted objections to limited access systems: that the classification of those fishermen allowed access to the fishery and those excluded from the fishery cannot withstand constitutional scrutiny. The paper sets forth the criteria involved in this constitutional analysis, examines several court decisions involving equal-protection challenges to access limitations, and concludes that a carefully drawn limited entry plan would be constitutional.

"The Taking Issue" analyzes the question of whether compensation is a constitutional right of those persons denied access to a fishery. Finally, the section on whether permits could constitutionally be made nontransferable concludes that such a provision in a limited entry system should be constitutional.

## **The Delegation of Legislative Power**

The Supreme Court of the United States has stated as a constitutional principle that "Congress cannot delegate any part of its legislative power except un-

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der a limitation of a prescribed standard" (2). In other words, Congress must accompany any delegation of legislative authority to an executive agency or other body with certain standards or guidelines to define the limits and scope of that authority.

It has been asserted that section 303(b)(6) of the Fishery Conservation and Management Act (FCMA), which sets forth the authority and standards for establishing a limited entry system in the fishery conservation zone, is an overly broad or standardless delegation of legislative authority, and thus is constitutionally infirm. This argument has little merit.

Section 303(b)(6) of the FCMA states:

Any fishery management plan which is proposed by any council, or by the secretary, with respect to any fishery, may establish a system for limited access to the fishery in order to achieve optimum yield if, in developing such system, the council and the secretary take into account—

- A. present participation in the fishery,
- B. historical fishing practices in, and dependence on, the fishery,
- C. the economics of the fishery,
- D. the capability of fishing vessels used in the fishery to engage in other fisheries,
- E. the cultural and social framework relevant to the fishery, and
- F. any other relevant considerations.

Section 304(c)(3) specifies further that the Secretary cannot prepare a management plan that includes a limited access system "unless such system is first approved by a majority of the voting members, present and voting, of each appropriate council."

The argument that section 303(b)(6) constitutes an invalid delegation of legislative authority appears to be based on the assertions that the section fails to address a number of critical questions before a limited access scheme can be promulgated and implemented. These issues thus must be resolved by the councils and the Secretary and not by the FCMA's terms. For example, the section does not dictate what kind of effort limitations there should be; it does not specify whether the permits should be transferable or nontransferable; it does not specify how a council should decide to allocate permits, etc.

These comments may be true, but they have little bearing on the constitutional issue presented: Is the grant of administrative discretion to the councils and the Secretary so standardless and unbounded that a court would find it unconstitutional?

The only two instances in which the Supreme Court has found an unconstitutional delegation of authority to a governmental agency have involved New Deal legislation of the 1930s that possessed grants of discretion to administrators which the Court found to be unbounded (3). These decisions came at a time when the Supreme Court had not yet emerged from the habit of engaging in substantive due process scrutiny or from its staunch laissez-faire economic philosophy. Although never explicitly overruled, these decisions have never been followed to produce a similar holding and now merely constitute constitutional history rather than persuasive legal precedents. Another feature, besides changing times and philosophy, that distinguishes them from the present analysis of limited entry is that violation of the regulations established under those laws

could result in a criminal sanction. Violation of a limited entry regulation results only in a civil penalty under the FCMA (4).

Most important, however, is the fact that the so-called "delegation doctrine" has been construed so broadly since the New Deal days that it is no longer a significant constitutional concern. The Court has upheld numerous delegations of authority to the executive branch of government in which Congress has entrusted vast authority over the economic activities of the nation (5). When the Supreme Court has determined that legislative standards are necessary, it has been diligent in searching for them. One commonly quoted formulation of the delegation doctrine is that stated by Chief Justice Taft: "If Congress shall lay down by legislative act an intelligible principle to which the person or body authorized to [establish regulations] is directed to conform, such legislative action is not a forbidden delegation of legislative power" (6). The "intelligible principle" has been held, however, to be satisfied by such standards as "just and reasonable" (7), "public interest" (8), "public convenience, interest, or necessity" (9), "unfair methods of competition" (10), and "due regard to economic and competitive conditions," and "without substantially curtailing employment" (11). In 1963, the Supreme Court in *Arizona v. California* (12), upheld the delegation of total discretion to the Secretary of the Interior to apportion water in the Southwest during times of shortage. The statute in question provided no formula or standard, and the court acknowledged that the secretary was able "to choose among the recognized methods of apportionment or to devise reasonable methods of his own" (13). The secretary was only required to reach "an informed judgment in harmony with the act, the best interests of the basin states and the welfare of the nation" (14).

It is thus clear that the Supreme Court does not require much from the Congress in the way of standards governing delegated authority. The minimum which the Court seems to require, but only sometimes (15), is that Congress establish a standard that "sufficiently marks the field within which the administrator is to act so that it may be known whether he has kept within it in compliance with the legislative will" (16).

The legislative intent regarding limited entry is ample to demonstrate that Congress was well aware of the types of access limitations and that limiting access was a management tool that had not yet been fully refined. Congress nevertheless realized its potential utility and thus provided for the use of such a measure. The most detailed language expressing intent of Congress in the enactment of section 303(b)(6) is from the Senate Commerce Committee's report on the bill (17):

Under the act, the councils, together with the secretary, would be authorized to, directly or indirectly, limit access to a fishery. Limited access is a management technique that is directed at economic as well as biological objectives. This technique is used to reduce the congestion and economic waste which often occurs from the "open access" condition of common property fisheries. There are three different techniques for limiting access. One is the use of licensing schemes, which limits the number of units in a fishery. This might be a limit on the number of vessels, fishermen, nets, pots, or other kinds of inputs. The second technique is to control the amount of capital and labor through taxes or license fees in an amount sufficiently high to dissuade superfluous fishermen from entering the fishery. The third technique is to divide the total allowable

catch into shares or quotas which are then distributed among the fishermen. Limited access is a rather novel fishery management tool, and is being tried on a large scale only in Alaska, British Columbia, and the salmon fishery in the state of Washington. Experience with limited access is still sparse and refinement of the technique is continued. The committee intends that limited access should be used carefully, and only when other tools fail to achieve management objectives. In structuring such a system, the councils and the secretary should, among other considerations, recognize: present participation in the fishery; historical fishing practices; dependence on the fishery; the value of existing investment in vessels and gear; the value of fishing privileges; the capability of existing vessels to direct their efforts to other fisheries; any state limited access systems; the history of compliance with applicable fishing regulations; the optimum yield of the fishery; and the cultural and social framework in which the fishery is conducted.

Congress indicated its understanding of the problems that limited entry systems are supposed to address, the various types of limited entry systems, the potential difficulty in promulgating and implementing such a system, and the potential benefits of such a system. Congress also set forth a specific list of factors to be considered in promulgating such a system.

Applying a constitutional analysis to section 303(b)(6) clearly shows that there is no constitutional infirmity based upon an improper delegation of legislative authority. In the Supreme Court's words, the legislation seems to convey a standard "as complete as the complicated factors for judgment in such a field of delegated authority permit" (18). The fact that a host of problems face the promulgation and implementation of a limited access system means that there are considerable administrative difficulties, not delegation doctrine infirmities.

### **Substantive Due Process**

The due process clause of the Fifth Amendment to the Constitution states: "No person . . . shall be deprived of life, liberty, or property, without due process of law . . ." (19). The due process clause has evoked two different checks on governmental action affecting individual rights. It has been recognized that this clause imposes a substantive constraint of some sort on governmental action; it also imposes a procedural check. This section will analyze the substantive due process doctrine, assess its present status, and then determine whether limited entry management schemes would run afoul of it.

The substantive due process doctrine presents one of the most interesting developments in American constitutional law. In the latter part of the nineteenth century and the early part of this century, substantive due process was frequently invoked by the Supreme Court to strike down governmental economic regulation of business practices and occupational access. The concept of "liberty" in the due process clause was found to grant every citizen "the right to live and work where (one) will," "to earn his livelihood by any lawful calling," and "to pursue any livelihood or avocation" (20). If this concept were applied to fishermen, it arguably would confer upon them a right of access to the fishery that could not be withdrawn or significantly impaired by legislative action, and thus would preclude application of limited entry programs.

Since the mid-1930s, however, the Court has expressly and repeatedly repudiated this judicial promotion of laissez-faire economics by upholding broad

legislative discretion to regulate or affect commercial practices that are perceived to be potentially injurious to the public welfare. Today, courts require little convincing before they are willing to uphold governmental economic regulation as meeting the modern constitutional test of being "rationally related" to a permissible governmental objective (21).

Several of the many Supreme Court decisions espousing the modern view of substantive due process involve unsuccessful challenges to governmental restraints on the right to engage in a particular occupation. These decisions strongly suggest that the concept of limited entry comports with any substantive due process requirements. For example, in *Breard v. Alexandria* (22), the Court in rejecting such a due process challenge, stated: "[W]e think that even a legitimate occupation may be restricted or prohibited in the public interest. The problem is legislative where there are reasonable bases for legislative action."

In another case involving a due process challenge to a state law restricting occupational access, *Williamson v. Lee Optical Co.* (23), the Supreme Court stated that "it is for the legislature, not the courts, to balance the advantages and disadvantages of the new requirement. . . . It is enough that there is an evil at hand for correction, and that it might be thought that the particular legislative measure was a rational way to correct it. . . . The day is gone when this Court uses the due process clause of the Fourteenth Amendment to strike down state laws, regulatory of business and industrial conditions, because they may be unwise. . . ."

Again, in *Ferguson v. Skrupa* (24), the Court upheld a state statute against a similar due process attack, stating:

The doctrine . . . that due process authorizes courts to hold laws unconstitutional when they believe the legislature has acted unwisely—has long since been discarded. We have returned to the original constitutional proposition that courts do not substitute their social and economic beliefs for the judgment of legislative bodies. . . . Legislative bodies have broad scope to experiment with economic problems. . . .

A more recent Supreme Court decision, *Hampton v. Mow Sun Wong* (25), suggests, however, that in at least certain narrow circumstances the present-day court may be willing to exercise more than minimal scrutiny when faced with due process challenge to employment-restrictive regulation. In nullifying, as insufficiently justified, a ban on employment of noncitizens in the federal civil service, the Court explained its more than minimal scrutiny by observing that the ban operated to the disadvantage of a group of persons already subject to disadvantages, and by stating that ineligibility for government employment was "of sufficient significance to be characterized as a deprivation of an interest in liberty" (26). One leading commentator assesses the significance of *Hampton* as follows (27):

The mode of analysis employed by the Court in *Hampton v. Mow Sun Wong* may provide a model for future cases involving governmental infringements of personal freedom to pursue a vocation. The Court considered (1) the breadth of the infringement, (2) the character of the group upon which it was imposed, (3) the nature and responsibilities of the body that imposed it, (4) the availability of less restrictive alternatives, (5) the reasons actually canvassed in the process of adopting the challenged rule, and (6) the arguments made in defense of



the rule's enforcement. Arguments not corresponding to considerations that actually led to the rule's adoption were disregarded; claims about the rule's hypothetical advantages were rejected where not supported by the record; and defenses of the rule cast in terms of interests beyond the delegated responsibilities of the body promulgating it were deemed irrelevant.

At least one commentator has urged a similar mode of scrutiny for economic regulation generally, but the likelihood that Federal courts will risk skating that close to the *Lochner* hole in the already thin ice of substantive due process is slim indeed. Nor is it at all clear that judicial scrutiny as active as that of *Hampton v. Mow Sun Wong* would be appropriate in dealing with regulations restricting economic options, but not intruding in any significant way on concerns close to an individual's sense of self.

The federal case cited most often to support the argument that due process is not an obstacle to limited entry systems is *Corsa v. Tawes* (28), which upheld a Maryland statute that prohibited the use of purse nets in the menhaden fishery. The rationale of this law was to protect the recreational fisheries that depended upon menhaden. The effect of the law was the abolition of the commercial menhaden industry in Maryland's waters because purse nets were the only economical means of harvesting menhaden. A three-judge federal court rejected the claim by the commercial fishermen that the law deprived them of liberty and property without due process of law. The court found that the state had a legitimate objective ("to sponsor sport fishing and the economic interest dependent upon it") and that the means chosen were rationally related to that objective. The Supreme Court affirmed the decision.

It is most unlikely that limited entry would be found constitutionally infirm on the basis of substantive due process, and *Corsa v. Tawes* gives great credence to this perception. The conservation and management of fish stocks, the enhanced ability to manage a fishery and enforce conservation and management measures, and the minimization of economic waste are clearly legitimate governmental objectives. Although the outcome of any judicial challenge will depend upon the facts surrounding a particular limited entry scheme, unless the details of a specific plan bear no rational relationship to the government's legitimate objectives, substantive due process should not be an obstacle to implementing limited entry.

One might argue, however, that Congress enacted a statutory obstacle to limited entry by its mandate in section 303(b)(6) of the FCMA, which states that limited entry is to be used "in order to achieve optimum yield." This language might be read to restrict the range of legitimate governmental objectives that could otherwise be used to justify limited entry. For example, while the optimum yield determination under the FCMA may encompass a wide range of biological, social, and economic factors, one might argue that the Secretary and regional council could justify the imposition of a limited entry system only if it were necessary to achieve a specific optimum yield figure. Other legitimate fishery management or economic objectives of the government arguably would then not be valid bases for limiting entry. It should be emphasized that if the FCMA were read narrowly in this manner, then the restriction on authority would be statutory and not constitutional.

The implications of such an argument could be considerable. A yield figure

can be achieved through a variety of management techniques without resort to limited entry; thus, a narrow reading of this language in the act might result in never allowing limited entry because it is not necessary to achieve optimum yield and because its purpose is not to achieve a yield figure. Such an interpretation, however, would render the entire section 303(b)(6) virtually worthless, and it would be inappropriate in light of the purposes behind instituting limited entry and the legislative history.

The Senate Report on the FCMA specifically recognized that limited entry "is used to reduce the congestion and economic waste which often occurs from the 'open access' condition of common property fisheries" (29). The objectives and purposes of limited entry are much more expansive than, and cannot be logically limited to, achieving a yield figure. While Congress obviously intended that limited entry "should be used carefully, and only when other tools fail to achieve management objectives" (30), the preferable reading of this ambiguous statutory language would be to allow limited entry to be implemented when it is needed to accomplish any appropriate fishery management objective that bears directly upon the economic, social, and ecological factors that may affect the fishery and the optimum yield determination—and not restrict it to achievement of a specific optimum yield.

### **Procedural Due Process**

In addition to the substantive restraint, the due process clause of the Constitution imposes a procedural check on governmental actions affecting individual rights. Procedural due process requires that when an individual's life, liberty, or property is significantly affected by governmental action, there must be adequate notice of the action and an opportunity, at a meaningful time and in a meaningful manner, for some type of hearing appropriate to the nature of the case (31).

Implementation of a limited entry management scheme thus raises the issues of whether a hearing would be required in connection with each license application, what kind of hearing would be appropriate, and when such a hearing would be held. Unfortunately, the Fishery Conservation and Management Act is silent on this issue.

Whether a hearing would be constitutionally required in connection with every license application in a limited entry scheme would seem to depend on the nature of the factual findings upon which the determination of each application is to be based. One leading commentator has stated (32):

Substantively constitutional regulations—usually those which are rationally related to legitimate governmental objectives—taking the form of mechanically applied general eligibility standards such as those of age, educational attainments, or residency, have not ordinarily triggered any requirement that procedural due process be accorded to each affected person individually. However, regulations which are structured so as to require more individualized determinations in their application—such as findings of 'good character'—can be validly enforced only in a manner consistent with the dictates of procedural due process.

Thus, if the criteria established by the regional councils and Secretary of

Commerce for restricting access to a fishery are applied evenly and without use of individualized determinations, there would be no hearing requirement for individuals denied access to the fishery. The excluded persons' remedy would be to challenge the regulations under the terms of the FCMA (33).

However, if the criteria used to determine participation involve the use of judgment or "individualized determinations," procedural due process would require some type of hearing "at a meaningful time" and "in a meaningful manner." It is likely that there may be some such cases should provisions be included in the entry regulatory scheme that would consider the "cultural and social" impact of access denial, an individual's "dependence on the fishery," and other such standards that do not easily admit of mechanical application. The number of such cases might be minimized either by trying to incorporate such factors in mechanical standards, or by "screening" persons eligible for such consideration through a set of mechanically applied standards; however, because the FCMA directs that such factors be considered in establishing an access limitation system, they must be taken into account in some manner.

The line between what is a mechanically applied standard and what is an individualized determination may not always be clear, but generally, the application of an objective set of facts should not require a hearing (e.g., vessel size, vessel capacity, years in the fishery), whereas a determination of whether an applicant meets more subjective criteria (e.g., dependence on the fishery, or potential social dislocation) is more likely to generate such a requirement.

Regarding the procedural due process issue, the Supreme Court has stated:

The extent to which procedural due process must be afforded the recipient is influenced by the extent to which he may be "condemned to suffer grievous loss" . . . and depends upon whether the recipient's interest in avoiding that loss outweighs the governmental interest in summary adjudication. [C]onsideration of what procedures due process may require under any given set of circumstances must begin with a determination of the precise nature of the government function involved as well as of the private interest that has been affected by governmental action. (34)

Because individualized determinations would turn on disputed questions of fact, the only "meaningful" type of hearing would be an adversary-type hearing. This does not necessarily encompass a requirement for formal procedures, for a particular order of proof, or a particular mode of offering evidence (35). However, the Supreme Court has stated: "In almost every setting where important decisions turn on questions of fact, due process requires an opportunity to confront and cross-examine adverse witnesses. . ." (36). In sum, while the specific minimum due process requirements cannot be specified in the absence of a concrete example, the hearing requirement is most likely to require, in case of disputed individualized determinations of fact, an opportunity for a fisherman who is being denied access to fishery to present his case orally, with some sort of "cross-examination" right, before a fact-finding tribunal. One should note that because the requirements of procedural due process are largely the result of a balancing of private versus government interests, an established fisherman denied access should be afforded more procedural protection (because he has more to lose) than someone trying to enter the fishery anew.

Whether the hearing takes place before or after the denial of access is another major issue. The general rule in this regard is that "the right to notice and a hearing . . . be granted at a time when the deprivation can still be prevented" (37). That is, the right to a prior hearing should prevail unless the government can demonstrate that "some valid government interest is at stake that justifies postponing the hearing until after the event" (38). The exceptions to this general rule that have been made are those cases where a prior hearing would have been in conflict with "a countervailing state interest of overriding significance" (39), because the delays created by the prior hearing could cause immediate and substantial damage to important public interests. Thus, in some situations where: (1) harm to the public interest is immediately threatened, (2) only summary action can prevent such harm, and (3) the private interest affected is of less importance than mitigating the harm, the government can take summary action pending a later hearing; however, such situations have not been common (40).

It seems unlikely that the government could convince a court that prior hearings for those fishermen denied access to the fishery in which they have previously participated would immediately threaten the resource, when the same fishery has been managed by more conventional means for decades. The potential harm to the public interest that would be avoided by prior hearings would be the continuation of the "economic waste" inherent in the open access system and the inability to implement the limited entry scheme expeditiously (41).

The Supreme Court has found statutory procedures for post-deprivation hearings to be constitutionally inadequate in numerous cases (42). A Supreme Court decision, *Bell v. Burson* (43), is somewhat analogous to the present analysis. There, a Georgia statute provided for a hearing *after* the state revoked an individual's driver's license for failing to meet financial responsibility criteria. The Supreme Court stated:

It is fundamental that except in emergency situations (and this is not one) due process requires that when a state seeks to terminate an interest such as that here involved, it must afford "notice and opportunity for hearing appropriate to the nature of the case *before* the termination becomes effective." (44) [emphasis in original]

In conclusion, while it is unfortunate that the FCMA fails to provide any guidance in the hearing requirements regarding implementing a limited entry program, there are several broad constitutional criteria that are likely to apply. First, there must be adequate prior notice of the access limitation. Second, if the limitation of an individual access to the fishery is based upon an individualized determination of fact rather than a generally applied administrative standard, there must be an opportunity for a hearing. Third, the hearing must be of an adversary nature (informal procedures under section 553 of the Administrative Procedure Act would not be adequate), which provides the excluded fishermen the right to be heard and to challenge the individualized determination upon which his exclusion is based. And finally, as to the timing of the hearing, the probable but not yet judicially pronounced constitutional requirement would be that the hearing be held before the deprivation of access is effected (45).

### Equal Protection

The Fourteenth Amendment to the Constitution provides that "No state shall make or enforce any law which shall . . . deny to any person within its jurisdiction the equal protection of the laws." By its terms, the Constitution applies the equal protection requirement only to the states. It is settled, however, that the Fifth Amendment's due process clause, applicable to the federal government and thus to the regional councils and the Secretary of Commerce, incorporates equal protection principles identical to those applied to the states (46).

By definition, a limited access system requires the classification of individuals into those permitted and those not permitted to fish. The equal protection question raised by this classification process is whether "the method by which access to the fishery is allocated unreasonably discriminates among the persons willing to participate" (47).

The present Supreme Court continues to adhere to a two-tiered equal protection standard under which a governmental classification is subjected to "strict scrutiny" if "fundamental rights" or "suspect classifications" are involved, and to a minimum rationality test in most other circumstances. It is most unlikely that the Supreme Court would apply a "strict scrutiny" analysis to a limited entry scheme that allocated permits on the basis of commonly mentioned standards, such as length of experience or extent of investment in a particular fishery, the degree of dependence on a fishery, the capacity of a fishing vessel, or the ability to engage in other fisheries. Such classifications are remote from the type of classifications which the Court has previously held to be suspect (48), and the right to pursue a particular vocation has never been held a "fundamental" right (49). Furthermore, the Supreme Court has shown no inclination in recent years to expand the existing list of suspect classifications or fundamental rights.

The applicable standard for equal protection analysis of limited entry schemes is the "rational basis" test, which

admits of the exercise of a wide scope of discretion in [the power to classify], and avoids what is done only when it is without any reasonable basis and therefore is purely arbitrary. . . . A classification having some reasonable basis does not offend [the equal protection] clause merely because it is not made with mathematical nicety or because in practice it results in some inequality (50).

Thus, as long as a classification of fishermen is rationally related to the statutory purposes of limited entry, and treats all parties within the class alike, it should comply with equal protection criteria. Furthermore, any challenge to such a classification must face a strong judicial presumption that the classification is valid, and a strong judicial tendency to accept any state of facts that can be reasonably conceived to justify the classification (51).

The previously discussed nonintervention policy of courts in substantive due process analysis of economic legislation appears equally strong in rational-basis equal-protection analysis of such legislation. In *Dandridge v. Williams* (52), the Supreme Court observed:

For this Court to approve the invalidation of state economic or social regulation as 'overreaching' would be far too reminiscent of an era when the Court thought the [due process clause of the] Fourteenth Amendment gave it power

to strike down state laws because they may be unwise, improvident, or out of harmony with a particular school of thought. That era long ago passed into history.

In the area of economics and social welfare, a State does not violate the Equal Protection Clause merely because the classifications made by its laws are imperfect. If the classification has some "reasonable basis" it does not offend the Constitution simply because the classification . . . in practice . . . results in some inequality.

Quite recently, in *City of New Orleans v. Duke*s (53), the Court seemed to extend to even greater lengths its rational basis deference toward economic legislation. Under equal protection attack was a city ordinance prohibiting pushcart food sales in the French Quarter, unless the vendor had operated in the quarter for at least eight years. This had the effect of creating a closed class of two persons allowed to continue vending in this manner, and the ordinance made no provision for new applicants. The Court found that the city's objective of preserving the French Quarter's charm and thereby aiding the area's tourist economy was rationally furthered by the ban on pushcart vendors, and that the grandfather clause for eight-year veterans was rational in that such vendors were more likely to be dependent on continued operation in the French Quarter and had themselves become part of the area's charm. This Court stated that it "consistently defers to legislative determinations as to the desirability of particular statutory discriminations" and that a modern-day equal protection challenge to economic legislation, where no fundamental interests or suspect classifications are involved, requires proof of discriminations of the most flagrantly arbitrary kind if it is to succeed (54). The parallel between the closed class of "grandfathered," licensed vendors sustained in *City of New Orleans* and limited entry fishery management should be noted, even though the facts of the cases are significantly different.

While the Supreme Court continues to deal formally in terms of the two-tier strict-scrutiny/rational-basis approach, the genesis of an intermediate level of scrutiny may be discerned in some instances. Under this standard, a court would be free to examine the means chosen to determine whether the classification of fishermen bears a substantial relationship to the avowed objective of the legislation, rather than to any conceivable governmental purpose (55).

[I]t seems clear that some [Supreme Court] opinions which purport to be based upon the minimum rationality standard do not actually seem to fit within that framework, suggesting at least that in some cases the traditional standard will be satisfied by the type of showing that would be sufficient in still other cases (56).

Important here, however, is the fact that the Supreme Court has employed this more intensified rational basis standard only in equal protection analysis of discriminations based upon interests such as marital status (57), illegitimacy (58), gender (59), and relatedness of household members (50). Such interests would appear remote from the area of economic regulation, where the minimum rationality standard has consistently been applied. It thus seems that the present-day Court would be most likely to evaluate license allocation standards for limited entry fishery management under the more lenient standard.

There have been several lower and state court decisions, however, that have invalidated certain license allocation criteria in limited entry fishery regulation on equal protection grounds. There is sound basis for argument that these decisions should be of limited persuasiveness in litigation to resolve the constitutionality of license allocation standards in fishery management plans promulgated under the Fishery Conservation and Management Act.

*State of Washington v. Huse* (61) involved an equal protection challenge to a state statute taking effect in 1934 and allowing issuance of gillnetting licenses only to those who held such licenses in 1932 or 1933. The court found "no rational basis" for the state's claim that this classification furthered the objective of avoiding hardship to persons whose sole means of livelihood was the licensed activity. For example, persons who were gillnetting when the statute took effect but who held licenses in 1934 or before 1932 would not be entitled to a license thereafter.

The court seemed also to find particularly offensive the idea of "erect[ing] a barrier which permits all persons, except a chosen few, from ever crossing [it] . . ." (62). This case was decided before the then-newly-adopted Supreme Court posture of hands-off in matters of economic regulation probably had time to take effect in the state courts. Its closeness of scrutiny does not seem appropriate under presently applicable standards, and the Supreme Court did not appear to be offended by the creation of a completely closed class in *City of New Orleans*.

*Massey v. Appollonio* (63) held that a state statute requiring three years' residency in the state as a prerequisite for issuance of a lobster fishing license violated equal protection. The statute did not further its stated goal of conserving lobsters by eliminating fishing by summer residents and recreational fishermen. (The law barred everyone, summer resident or not, who could not meet the three-year requirement.) The claim that the three-year requirement was a means of determining bona fide residence in the state was unavailing, since durational residence requirements have been rejected by the U.S. Supreme Court as a means of determining bona fide residence. The three-year requirement did not ensure that license applicants would have the skills of experienced lobstermen; it excluded under-three-year residents who may have been experienced and included over-three-year residents who may have been inexperienced.

In light of the disfavor with which the U.S. Supreme Court has looked at residency requirements, this decision possesses far more persuasiveness than the others. That persuasiveness, however, is based upon the rejection of the use of an improperly defined residency requirement and does not represent any constitutional infirmity in limited access itself. Residency requirements, of course, encroach upon the constitutional right to travel, a constitutional basis for challenge independent of equal protection.

A widely cited case for the proposition that limited entry violates equal protection guarantees is *Bozanich v. Reetz* (64)—a case which also apparently spawned the otherwise unsupported statement that a "closed class" is necessarily unconstitutional. The value of this case as precedent is virtually nil. This 1969 case struck down as violative of equal protection an Alaskan statute that required

possession of a fishing license for any three years since 1960 or a gear license in a year since 1965 as a prerequisite for a gear license for commercial salmon fishing. The court stated that such a requirement made an outsider "wholly dependent upon obtaining employment under a member of that closed class of fishermen who qualify for gear licenses." Thus, the court stated that entry is "controlled not by the state, but by local fishermen . . . . The power to permit competition cannot be visited in private interests whose own benefit would ordinarily not be served by assisting potential competitors to qualify" (65).

There are three major reasons why this case is of little, if any, value as precedent. First, the court placed heavy reliance on *Morey v. Doud* (354 U.S. 457 [1957]), which was expressly overruled in *City of New Orleans v. Duke* discussed earlier. Second, as to the court's holding that the Alaska statute violated the federal equal protection clause, the Supreme Court reversed the lower court on appeal the next year. Finally, the *Reetz* decision's last basis for decision was that the Alaska law violated Article 8, Section 15 of the Alaskan constitution, which stated: "No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the state." In response to the *Reetz* decision, the state of Alaska amended its constitution by adding to Article 8, Section 15 the following sentence:

This section does not restrict the power of the state to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood, and to promote the efficient development of aquaculture in the state."

Thus, the *Reetz* case had three now-worthless legal foundations. First, the Supreme Court precedent on which it relied has been overruled. Second, its holding on federal equal protection grounds was reversed by the Supreme Court. And finally, its state constitutional basis was overturned by a constitutional amendment to the state constitution.

The legal uncertainty over limited entry in Alaska did not cease, however, with the amendment to the state constitution. *Isakson v. Rickey* (66) was an equal protection challenge to the Alaskan limited entry statute taking effect in 1974, which restricted eligibility for fishing licenses to persons holding gear licenses before 1973. The state court said it had found a trend toward a stricter equal protection standard in recent U.S. Supreme Court decisions and, in adopting this standard, stated the issue in terms of whether the gear license requirement bore a "fair and substantial" relation to the statute's goal of segregating hardship from nonhardship cases. The holding was in the negative, for reasons very similar to those given in the *Huse* case. The court viewed an irrebuttable presumption (that persons not holding pre-1973 licenses would not suffer hardship by being denied a license in the future) used only for the sake of administrative convenience as unacceptable where the important interest of one's livelihood was at stake. More recently, an Alaskan trial court, in *Apokedak v. Alaska Commercial Fisheries Entry Commission* (67), in a confusing and muddled opinion, held that the requirement of having held a gear license in order to be eligible to apply for an entry permit was a denial of equal protection. This case is presently on appeal to the state supreme court.



The equal protection concerns presented by *Isakson* and *Apokedak* relate almost exclusively to equal protection requirements under the Alaskan state constitution and are not applicable to an analysis of federal law. As the Alaskan supreme court later acknowledged, the more stringent requirements in *Isakson* is not a federal constitutional requirement and cannot be supported by present U.S. Supreme Court doctrine; rather, it is solely an Alaskan state constitutional requirement (68).

The fact that the state equal protection test is inconsistent with and more critical than the federal constitutional standard is important for the purposes of the FCMA. If Alaskan state law were to continue to pose this type of obstacle to the implementation of limited entry, the North Pacific Fishery Management Council could adopt the same type of effort limitation plan under the FCMA, and be subject only to the far more permissive federal equal protection criteria. The problem with this approach, however, is that, absent preemption of the state under section 306, the council's authority would extend only seaward from the three-mile territorial sea.

A closer examination of the *Isakson* and *Apokedak* decisions reveals that perhaps the Alaskan courts' problem is not so much constitutional, as it is in construing legislative intent. As Justice Connor's dissent in *Isakson* illustrates, the court's opinion evinces an apparent unwillingness to acknowledge reasonable purposes behind the terms of the state limited entry law other than those specifically set forth in the statute's hortatory statement of purpose.

This possible confusion between constitutional scrutiny and statutory construction was compounded in the *Apokedak* decision, where the lower court, in striking down the requirement that a nongear license holder would not be credited with certain hardship points to be counted in determining whether he would receive a permit as a denial of equal protection, stated: "I find that the commission in requiring an applicant to be a gear license holder to be eligible for certain points has exceeded the power delegated by the legislature." Such a finding is irrelevant to the merits of an equal protection challenge. This case is presently on appeal, and it is hoped that the state supreme court will clear up some of the confusion that its *Isakson* decision has spawned.

In conclusion, U.S. Supreme court decisions of recent decades indicate that allocation criteria under a limited entry fishery management scheme would be evaluated under a lenient, minimum rationality standard. Existing Alaskan state law, however, is less deferential to such legislative judgments than Supreme Court decisions have held is appropriate in evaluating economic legislation. Nevertheless, the Alaskan limited entry scheme, presently is on appeal to the state's supreme court and some of the uncertainties around it may soon be clarified. Perhaps the most important lesson arising from the above cases is that a limited entry system must be carefully drawn, and the means chosen to accomplish the objectives of the system should avoid being oversimplistic in the interest of administrative ease. The easier the regional councils and the secretary (or a state commission) make it for a court to see the rational relationship between the means chosen to achieve an objective and that objective, the greater the likelihood that a reviewing court will ask no more.

(In February 1980, the Alaskan Supreme Court did attempt to clarify state

constitutional concerns over limited entry, and in the process narrowed and confined the *Isakson* ruling. In *Commerical Fisheries Entry Commission v. Apokedak* (Opinion No. 2011) the court basically followed the equal protection analysis set forth above, and reversed the previously discussed lower court decision.

The court identified the federal constitutional question as “whether the classification is reasonable, possesses some rational connection to the measure’s legitimate purpose and treats all within the class alike,” and noted that under this test, “legislation is presumed to be reasonable, and any reasonably conceivable facts justifying the classification will be accepted.” The court went on to uphold easily the gear license requirement for limited entry permit applicants against the federal equal protection challenge.

As to the state law challenge, the court maintained its more strict state constitutional standard by identifying the issue as whether the gear license requirement bore “a fair and substantial relationship” to the statutory purposes. Nevertheless, the court, while stating that the legislature could have provided a better classification system, acknowledged that equal protection “even under Alaska’s stricter standard, does not demand perfection in classification” and upheld the validity of the entry system. The court in its discussion equated the entry system with the establishment of “grandfather rights,” whereby those persons with previous engagement in an activity are authorized to continue in that activity, while entry of others is restricted, and noted the general constitutional approval accorded such grandfather rights.

While limited entry should not be faced with critical challenge under the U.S. Constitution, the *Apokedak* decision marks a significant clarification in potential state constitutional obstacles and hopefully helps clear the way for limited entry systems to be perfected through experience and administration rather than the uncertainty of the courtroom.)

### **The “Taking” Issue**

The Fifth Amendment of the Constitution states: “. . . nor shall private property be taken for public use, without just compensation” (69). A challenge to a limited entry system on the basis that there is a “taking” of a property right would have to be founded on one of the following three potential theories: (1) that fishermen have a property right in the fish, (2) that they have a property right in the “right to fish”, or (3) that the gear or other capital investment of persons excluded from the fishery under a limited entry system is “taken” (70). None of these theories would seem to have a significant chance of success.

There is no historical or logical basis for arguing that a fisherman has a constitutionally cognizable property right in the fish inhabiting the fishery conservation zone or state waters. Similarly, a claim that there is a property right in the right to fish is groundless as an abstract proposition; however, it is likely that fishermen holding fishing licenses under existing regulatory programs would argue that such licenses constitute property and cannot be revoked or not renewed without payment of compensation. As a general rule, licenses and permits are not viewed as property for eminent domain purposes because they are deemed to confer a privilege only and are revocable at the discretion of the issuing authority (71). Furthermore, because the FCMA does not preclude revocation or

nonrenewal of permits, there is no argument that a federal statute has created a property right in such an instance (72); in fact, the express approval of limited entry as a potentially appropriate management tool refutes the argument that Congress intended to establish such a right or perceived the existence of such a right.

The final claim, that the capital investment or business operations of licensees unable to renew their permits under an entry limitation system have been constitutionally "taken," also appears unlikely to succeed. Three well-settled principles of eminent domain law are pertinent to the issue as it relates to gear, vessels, and other fishing equipment: (1) where a regulation restricts the uses to which property may be put, there is no taking where reasonable, beneficial uses are left to the property owner; (2) diminution in property value occasioned by government action must be severe or total for a taking to be found; and (3) where the prohibited use is one that is deemed harmful to the public welfare, the prohibition is likely to be viewed as noncompensable.

Because the gear, equipment, and vessel of fishermen no longer permitted access to a specific fishery presumably might be used in another fishery or sold to someone else, principles (1) and (2) above indicate that there would be no taking under such circumstances. Furthermore, because the limited entry system is ostensibly directed at the elimination of evils attendant upon unlimited access to the fishery, principle (3) also argues against there being a taking.

Business opportunities, goodwill, or profits lost as a result of inability to renew a commercial fishing license would almost certainly not be compensable. A long line of federal cases asserts that such business-related losses are too indirect to be compensable (73), except in the special circumstance where it is the business itself that the condemnor seeks to obtain.

In sum, it is unlikely that a court would find a constitutional requirement for compensating a fisherman excluded from a fishery. It should be noted, however, that a moratorium alone could not give rise to a taking claim, because no existing fishing effort would be removed. It also should be noted that, while there may be no legal obligation to compensate fishermen denied access to a fishery that they have participated in, a legislature may nevertheless deem it appropriate to establish a buy back program to minimize the resulting economic dislocation of such fishermen.

### **Transferability of Permits**

An issue of potential importance in the establishment of a limited entry system is whether there is any constitutional problem with a limited entry licensing scheme that restricts the ability of a fisherman to transfer his license or permit to another person (74). One view that has been expressed is (75):

The provision [for entry permits] must not create a closed class . . . . The equal protection clause demands that the class be . . . relatively accessible to new entrants. The use of freely transferable entry permits appears to be a significant factor in "opening" otherwise closed classes.

It is interesting to note that this statement is unsupported by citation to any case law, but is probably based on the *Bozanich v. Reetz* decision discussed earlier. Stating that the equal protection clause "demands" that the class of licensed

fishermen be open to new entrants would seem to be both an oversimplification and an overstatement. As discussed earlier, the fundamental inquiry in equal protection analysis, where no fundamental rights or suspect classifications are involved, must be whether nontransferability of licenses is rationally related to a permissible governmental objective in establishing the limited entry system.

The United States Supreme Court has not spoken extensively on the "closed class"/equal protection issue. As noted earlier, however, against an equal protection attack the Court in the *City of New Orleans* did uphold a municipal pushcart ban containing a grandfather clause for eight-year veterans. The Court's opinion shows that it was well aware that the effect of this ban was to create a monopoly for the two vendors who qualified under the exception, and that new entries were entirely foreclosed (76). In another decision, *Kotch v. Bd. of River Port Pilot Comm'rs* (77), the Court was willing to uphold a state statute that required an applicant for a river pilot's license to have served six months under a licensed pilot, despite the alleged tendency of licensed pilots to hire only relatives and friends as apprentices.

Although the present analysis does not deal with any specific factual context, it seems likely that a rational relationship between restrictions on license transferability and legitimate governmental interests could be discerned. For example, if a fisherman were allowed to dispose of his license only to the issuing authority, the government could prevent the concentration of fishing license ownership in the hands of a few large corporations, and it could prevent license holders from capitalizing on the windfall increase in value of their fishing privileges through sale of the licenses. Furthermore, a moratorium coupled with a nontransferability provision might provide a gradual reduction in effort with reduced economic and social dislocation.

The fact that such legitimate objectives could possibly be achieved through means that might be somewhat less drastic than total nontransferability (e.g., by conditions in the license limiting the range of buyers or fixing resale terms) would not be offensive under a minimum rationality evaluation. It should be reiterated that the rational basis test applied to equal protective analysis of this type of governmental regulation is generally of the most lenient variety; however, even the "intermediate" equal protection analysis discussed earlier would seem to permit nontransferability. Thus, all factors considered, a strong argument can be made that a partial or even a total restriction of transferability of limited entry licenses—one that is reasonable and rationally related to a legitimate governmental goal—would not offend the equal protection clause of the Constitution merely because it created a "closed class."

## Conclusion

This paper has analyzed the commonly expressed constitutional concerns regarding limited entry fishery management. It has attempted to set forth the proper constitutional standard for analyzing any particular system, and has concluded that, although there is a possibility that the terms of a specific limited entry plan may be found unconstitutional if imprecisely drafted, the major problems facing implementation of limited entry systems are more likely to be administrative and political than legal. If the objectives of the limited entry plan

are within the scope of authority granted by the FCMA, then all that should be constitutionally required is that there be a reasonable and rational relationship between the objective and the means chosen to achieve the objective. When drafting fishery management plans that include limited entry, the regional councils should be aware of this required relationship and, to the maximum extent practicable, should build a clear record of the reasons behind each element of the limited entry scheme. By so doing, the regional council will make a reviewing court's task much easier and will enhance the deference the court is likely to grant the council's decisions and reasoning.

# Contributed Papers: Experience

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# THE ALASKAN EXPERIENCE WITH LIMITED ENTRY

Allan Adasiak

## Introduction

### Field of Activity

Alaska's limited entry experience has directly involved approximately fifteen thousand entry permit applicants of diverse cultural and economic backgrounds, who have participated in commercial salmon and herring fisheries stretching along perhaps twenty thousand miles of coastline and up the Yukon and Kuskokwim rivers. About two-thirds of those applicants have received or will receive an entry permit. For various reasons, a number of other participants in those fisheries did not even apply for permits. Less directly, Alaska's limited entry program affects crewmembers, families, communities, and businesses related to fishing. It also affects all remaining commercial fisheries not under entry limitation.

The magnitude of program impact must be seen in the context of a state with a total population of about 405,000. In 1976 the total exvessel value of the catch to the part of the state's workforce who were fishermen in limited fisheries (nearly all salmon and some herring fisheries) was approximately 125 million dollars. Another 118 million dollars in exvessel value to fishermen was generated in currently unlimited fisheries during the same year, of which ninety-seven million dollars came from Alaska's shellfish fisheries.

### Limited Entry—One Definition

Limited entry is a member of the broader family of ideas categorized as "effort regulation," or "effort limitation" (1). It works by fixing the number of participants in the harvest, whether the participant is an individual or a vessel. Such devices as quota shares and taxation have been referred to loosely as "limited entry," but they are more accurately other means for effort regulation that do not rely on directly limiting the number of participants in a fishery. The objective of all these devices is to stabilize the effort, but it is important to remember that not one of them can produce miraculous results all by itself.

### A Paper For Certain Groups

This paper is directed primarily to those policy makers and decision makers who may find themselves considering the application of limited entry to fisheries within their purview. Equally important, the paper is for fishermen and others who may be affected by limited entry. It reflects upon and generalizes from various aspects of Alaska's experience with limited entry; its purpose is to be both provocative and helpful.

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The point of view is that of an implementer providing personal observations and conclusions arrived at after having been involved with Alaska's limited entry program since late 1971, which was before the formal beginning. That beginning was marked by the establishment of a study group in 1972, which conducted research and developed the limited entry bill introduced and enacted in 1973 (2). My colleagues and associates should not be held responsible for these remarks.

The paper is impressionistic because of the complexity of the subject and because of the short span of actual fishery performance data available for analysis. In the best cases, only two years of reliable data are available. The paper is also practical, pragmatic, and in a sense "political."

A detailed exposition of the mechanics of the program is not presented here. (The reference list in Additional Suggested Reading, pages 451 to 455, includes available information on the program. Instead, an analysis of program goals and performances is followed by a discussion of some of the problems encountered and of some future challenges.

### **Alaska's Program: A Capsule**

Briefly, Alaska's limited entry system makes an initial allocation of entry permits to individuals on the basis of a complex ranking system that balances various aspects of each individual's economic dependence and past participation in a fishery. Permits are issued to natural persons only and are freely transferrable, although they may not be encumbered, used as collateral, or attached. Permits are issued by fishery and no fisherman may hold more than one permit per fishery. The term "fishery" has a special meaning, namely "the commercial taking of a specific fishery resource in a specific administrative area with a specific type of gear." Thus, for example, a fisherman may hold a salmon power-troll permit for Southeast Alaska and a salmon gillnet permit for Southeast Alaska, but not two salmon gillnet permits for that area. However, he may hold a salmon gillnet permit for Southeast Alaska and another one for Cook Inlet, since the permits are for different administrative areas. Interim-use permits are required for the operation of gear in all commercial fisheries not under entry limitation. Interim-use permits for these fisheries are issued to anyone with the present ability to participate actively in the fishery.

### **Alaska's Program: The Climate**

In the twenty-nine fisheries put under entry limitation in Alaska so far, one result has been a whole new answer to the question of *who* may go fishing commercially. In these fisheries, no longer can anyone become a commercial fisherman. No longer can all children get into a fishery who wish to. Now a parent may pass on his permit to a child. Now there is a price of admission: the price of an entry permit. There are only a fixed number of permits, and the prices in the views of some are high. In the wake of limited entry, there are those disgruntled people who feel that they should have gotten a permit, and a far greater number of people who have that feeling about someone else. In addition, there are others who are convinced that some people should not have received permits.

The people who received entry permits and believe that limited entry is nec-

essary tend to remain quiet about it now and do not crow about the system for fear of offending a neighbor or friend. This is a peacelul modulation downward from the intensity of feelings that tore apart Alaskan fishing communities in the months before the November, 1976, election (3), at which limited entry might have been repealed, but was not, by a vote of nearly two to one.

But memories remain, and fears still grow that limited entry will come next to this fishery, or that one, and worst of all that it will come before the person doing the worrying has had an opportunity to establish himself in the particular coveted fishery. Consequently, limited entry has created an added pressure to upgrade, to diversify, to get into additional fisheries "before it is too late."

Meanwhile, a number of those who feel that the present system has treated them unjustly have turned to the courts. There are currently thirty-nine lawsuits pending against the Commercial Fisheries Entry Commission. Several of them aim to change only an individual applicant's situation. Others contain seeds which, if they take root in high-court judicial reasoning, could leave thousands of permit holders in chaos and uncertainty while the limited entry law as seen by the courts is "reapplied" to currently limited fisheries, with ultimately, perhaps, some permits being revoked and additional permits issued.

On another front, critics point out that limited entry has not stabilized effort in the salmon fisheries (even though it was not intended to do this). Still others claim that rising fish prices have created a rich men's club of permit holders and ask how that can be fair.

### **Was It Worth It?**

Given all this and more, has limited entry been worth it in Alaska? The answer is, yes. Not a simple, unqualified yes, but in the style of a W.S. Gilbert exclamation, "Oh, modified yes!" At the very least, limited entry has prevented problems caused by increasing and excessive numbers of units of gear from becoming worse. Things have not worked perfectly, but they have worked quite well, and though the results are not yet easy to measure, some sense of these results will be given. Indeed, some of the challenges that lie ahead may be more difficult than anything yet encountered—but still, limited entry has been worth it.

### **Recipe for Alaskan Limited Entry**

In Alaska, a variety of elements combined to make limited entry possible. They include:

- Failure of early attempts at limited entry, providing the realization that any program must stand up in the courts and that an agency with a broad base of expertise would be needed to establish and administer a limited entry program.
- Pronounced, documented trends in the increase of gear: recent declines in returns; a general sense of crisis or disaster among fishermen in the late sixties and early seventies (4).
- A state where, until the advent of big oil, commercial fishing in all of its aspects was the largest single private sector employer.

- State legislatures with a significant number of members knowledgeable in fisheries and even more members concerned about fisheries.
- State government administrations that provide necessary support.
- Interest and support from a variety of agencies and individuals with expertise in fisheries management and other necessary disciplines.
- Concerned, active involvement by Alaskan fishermen. The importance of this activity deserves a paper of its own to chronicle the efforts of generally independent, politically uninvolved men who moved into new, unfamiliar arenas because they believed limited entry was important. Not all fishermen support limited entry, but fishermen lobbying the legislature for the passage of limited entry legislation were probably the most effective force possible. Fishermen, individually and in groups contributing more than one hundred sixty thousand dollars to an election campaign, walking door to door in their home towns, making television appearances, talking to neighbors and people of influence, were undoubtedly the reason why Alaskans voted by nearly a two to one margin to retain limited entry. While there is not universal satisfaction with all particulars of Alaska's program, the majority of the fishermen wanted limited entry, saw the need for it, and worked to keep it.

### **Three Conclusions**

This paper will attempt to abstract elements of broader relevance from the specific circumstances under which limited entry developed in Alaska. Three of them are obvious, yet easy to forget:

1. There is no form of limited entry that will ever satisfy everyone.
2. There is no single form of limited entry that is right for all situations. Rather, limited entry systems must be tailored to the particular fisheries and social and economic settings of which they are a part.
3. Different forms of limited entry will have different consequences. It is therefore important to work pragmatically, in the strictest sense, and to have as clear an idea as possible of the likely consequences of various limited entry alternatives.

### **A Word on Words**

Finally, it should be noted that incorporating limited entry into a fisheries management program brings social and economic objectives and considerations closer to the foreground, whether explicitly or implicitly. Consequently, terminology sometimes undergoes changes in meaning. For example, "allocation" to a fishery manager might mean either "catch versus escapement" or "distribution of catch among gear types." The distribution or allocation of the resource, however, also relates to the allocation of income or to considerations of access to the resource by different social and economic groups.

Similarly, "efficiency" can mean "harvest efficiency" or "economic effi

ciency." While the deliberate recognition of social and economic factors in fisheries management is laudable, more deliberate definitions of terms are also required to avoid misunderstanding.

## **GOALS AND PERFORMANCE**

Alaska's limited entry program has a number of goals related to economics, resource management, and social considerations. Some of these goals are explicitly stated in the state's limited entry law (AS 16.43), others can be inferred, and some have been assumed though not often articulated. The nature of the goals has permeated the program and has shaped the way it is implemented. Least explicit, perhaps, are the social considerations that interpenetrate things, though some may quibble as to whether they are "social" matters or matters of "economic welfare."

### **Shifting the Balance of Power**

In Alaska we chose to issue licenses, which we call "entry permits," to individuals rather than to vessels. This was in part the result of historic patterns of various salmon fisheries in our state. Traditionally, salmon fishing has been carried on predominantly on a one-skipper, one-vessel basis. Crew members were either part of the family or seasonal employees of the vessel owner or operator. In some areas, however, particularly where individual ownership was difficult, processors owned a larger number of vessels and hired fishermen for the season.

Although operating patterns were a major consideration, other reasons for issuing permits to individuals grew out of the history of the salmon processing industry in Alaska.

It is easy, but simplistic, to paint the salmon processors simply as villains. That is not the case. Over the years they have taken a variety of risks to establish and maintain their businesses. They have made vessels available where vessels might otherwise be scarce. They have performed many functions akin to banking in areas where there were no banks, including extending credit to fishermen and suffering losses.

Nonetheless, in Alaska there had been a long history of domination or significant influence over the Territorial government by the canned salmon industry (5). With the advent of statehood and of a broader economic resource and commercial industrial base for the state, that influence was diminished, although a residual resentment to "canned salmon" remained. In addition, the industry exerted a great deal of control over the lives of the individual fishermen who worked for it, although its nature and extent varied from area to area. If, for example, a man had made himself unpopular during price negotiations, he might find himself without a vessel or a market for his fish the following year. The ability to "import" nonresident fishermen was also used in connection with price negotiations. And there was control through the classic arrangement of the "company store," which made easy credit available and employed payment in demand notes.

In 1973, when the Alaskan legislature was considering the current limited entry law, there was a general belief that salmon processors still maintained a

significant hold over individual fishermen, both through credit and financing arrangements and through the untrammled power to decide whether a fisherman would fish for a particular company. The decision to issue permits to individuals was made primarily because people believed that it would strengthen the individual fisherman's bargaining position vis-a-vis fish buyers and processors. With only a fixed number of permits to go around and with the requirement that a unit of gear may be operated only by a permit holder, the need that the processor had for the individual fisherman was increased.

While the amount varied from area to area and processor to processor, the salmon processing industry owned or had indirect financial control over a significant number of vessels. Industry representatives protested that it was uneconomical for them to maintain their vessel fleets and that there was a trend to divest their interest in vessels. However, industry representatives also voiced strong concern that limited entry as proposed might result in a disproportionate and unreliable reallocation of the work force in relation to the needs of the various companies. Their concern over maintaining individual stables of fishermen suggested that their attitudes toward vessel ownership might change if permits were issued to vessels.

The legislature further decided to issue permits to natural persons only, prohibiting partnerships or corporate ownership. It also restricted an individual to holding only one permit of a given type to prevent individuals from controlling and parceling out permits for a fishery. And it provided that an entry permit may not be pledged, mortgaged, leased, or encumbered in any way; transferred with any retained right of repossession or foreclosure; or attached, distrained, or sold on execution of judgment or under any other process or order of any court. To the extent that then seemed possible, that made the permit belong to the individual fisherman and it made it extremely difficult to take it away from him against his will.

In addition to the social objective of tipping the balance of power a little more in favor of the fisherman, ownership and operating patterns in the salmon fisheries lent themselves to a system of issuing permits to individuals. A significant number of the vessels in the salmon fisheries were owned by private individuals, and those owned by processors were generally provided to company fishermen or leased to independent fishermen. Conventionally, a salmon vessel, whether a purse seiner or a gillnetter or troller, was operated by a single skipper, so that the number of gear license holders corresponded closely to the number of operators and the number of units of gear. Thus, issuing permits to individuals whose preeminent role in the fishery was that of skipper-operator and gear license holder recognized a specific type of involvement in the fishery and at the same time did not carry the risk of inflating the number of entry permits above the number of vessels that had fished.

### **Permits to Individuals: Some Results**

The results of issuing permits to individuals have not been researched, and some matters such as bank lending policies are not likely to yield to investigation, but these are my impressions:

- Industry fears that the balance of fishermen among competing companies would be seriously disturbed have proven unwarranted. The advantages of a steady market have provided a stabilizing effect. Beyond that, however, it is difficult to say what concessions and accommodations have been made by the processor on an individual or a group basis in order to maintain the desired levels of fishermen. The absence of visible dislocations and voluble complaints from processors suggests that nothing too serious has happened.

Processor control of permits may not have been completely forestalled, but such control is indirect and probably of relatively low incidence. Direct financing of permits is prohibited by law, since they cannot be used as collateral and then repossessed. Consequently, oblique methods are probably being used to finance other things or to lower operating costs in a way that allows the acquisition of a permit. But the realization that a fisherman can walk off with his permit and fish for someone else has probably inspired additional caution in those who would consider such arrangements. An entry commission survey indicates that some type of financing occurs in 50 to 90 percent of all permit transfers, depending on the fishery. Allowing for variations by fishery, sources in order of frequency generally are: the transferor, banks, processors, state loans, and credit unions. In the case of banks, state loans, and credit unions, other collateral is almost always required.

- Conventional lending sources, such as banks, are using the entry permit as a major touchstone in deciding whether to grant loans. While money is rarely loaned directly to purchase a permit (I have heard of only one case), the permit is being accepted more and more as a solid indicator of earning power, so that financing can be arranged for vessel improvements, new vessels, new gear, or other items. This is allowing fishermen to work more easily through conventional financing channels, causing them to rely less on processor financing. Even processors use the entry permit as a measurement of whether to extend credit.
- The bargaining power of the fisherman in relation to the processors has increased, at least in the view of some fishermen who have engaged in price negotiations. The extent of the change varies from area to area, depending on such things as processor attitudes, the number of processors in an area, and the degree to which the fishermen are organized. One negotiator has attributed the higher price received for salmon in 1977 directly to limited entry and "the fact that they cannot replace us with somebody else." Another, recounting victories in 1977 price battles, said that limited entry is "the best thing that ever happened to the fishermen."

This last matter could be interpreted to mean that limited entry has driven up the price of fish. However, the exvessel price of fish in fisheries not under

entry limitation in Alaska has also generally risen since 1973, as have fish prices elsewhere in the nation. Actually, market price (demand) is probably a much more important factor here, with limited entry increasing the margins to the fishermen, possibly at the expense of the processors' margins.

The added bargaining strength given to the fishermen must be recognized as a force, but the fishermen must appreciate the limits of that force, taking inventories, market conditions, run sizes, and other factors into account. A series of banner years in fish returns can mean that some fishermen might not even find an outlet for their catch. Additionally, bargaining strength is limited by anti-trust laws.

As an aside, members of the North Pacific Fishery Management Council and others involved in fisheries have noted that extended jurisdiction under the United States' Fishery Conservation and Management Act of 1976 provides, in effect, limited entry for foreigners. This allocation procedure may have international market ramifications affecting fish prices as well.

### **Social Considerations**

Social objectives or considerations were prominent in the decision to issue entry permits to individuals rather than vessels. The social and cultural aspects of Alaska's fisheries were considered in other ways as well.

To begin with, the legislature considered and rejected proposals to issue permits to individuals strictly on the basis of their catch records, which would have put permits into the hands of only the better performers. A primary concern here was the effect such a system might have in some native villages, where different cultural values and institutions sometimes resulted in relatively low catch levels. To remove less effective fishermen could deprive subsistence-oriented communities from a significant though perhaps relatively small amount of cash needed for the continued functioning of those communities.

### **Minimum Social Dislocation**

Viewed more broadly, there is the tacit objective of establishing limited entry with a minimum of social dislocation. This helps to explain the complex set of issuance criteria set forth under AS 16.43.250. While the participation standards reflect social considerations, some of the "economic dependence" standards do so even more clearly (as defined by the Entry Commission for the Salmon Fisheries), including especially "percentage of income derived from the fishery, reliance on alternative occupations, (and) availability of alternative occupations . . . ."

"Income percentage" does not deal in dollar amounts, nor does "reliance on alternative occupations." Both are considered in the entry commission's formula for determining income dependence percentage. This is defined as the annual catch value divided by the sum of the annual catch value and the nonfishing occupational income, with the result multiplied by 100. This formula excluded other fishing income so that a fisherman would not be penalized for being diversified.

"Nonfishing occupational income" does not include transfer payments, nor does it include such things as income from investments, so that the prudent fisherman is not penalized.

The "availability of alternative occupations" criterion could not be applied to each individual applicant on the basis of age, education, experience, job market, etc., because of the administrative impossibility of making such determinations. The standard applied was a general one of domicile in relation to population density, on the theory that a greater number of alternative jobs would be available in more heavily populated areas. While this approach troubled some, no one could suggest a better method.

Social considerations are also reflected both in the permit fee provision that allows a low fee for applicants whose net family income falls within federal poverty guidelines, and in the sixty-day waiting period mandated before a permit can be transferred. There was definite legislative concern that a permit holder running short of cash in the depth of winter might, especially after a few drinks, decide to ignore his long-term interest and sell his permit. Fishermen have made use of that provision to halt a transfer agreement that had been entered into.

The very issue of whether entry permits should be transferable or nontransferable was heatedly debated in the legislature and is still argued. Of social value to those opposed to transferable permits is that initial permit recipients benefit from what is perceived as a windfall gain. This opposition to transferable permits is voiced even by some fishermen who received permits under the initial allocation. While there were other considerations, the primary social value that seemed to carry the case for transferable permits in the legislature was the desire of fishermen to be able to pass a permit on within their families or to have the option of seeing that a crewman or friend received it. Reversion of a nontransferable permit to the state with reissuance by competitive bid or lottery seemed to pose the threat of too great a tear in the social fabric. Entry commission survey figures indicate that in 1977, 29 percent of all entry permits were transferred without remuneration (87 versus 302), suggesting that this social, nonpecuniary handling of permits is operative.

At the administrative level, the objective that limited entry be implemented with a minimum of social dislocation manifested itself in various ways. Briefly, some of these included an extensive public information program, more than forty public meetings and hearings to obtain public input before the first set of regulations was adopted, a similar procedure for other fisheries limited subsequently, the use of application assistance programs, continued help in developing or perfecting evidence after the submission of applications, and a nonadversary approach by commission hearing officers.

Sensitivity to the social aspects of limited entry has made it easier to implement a program that creates a significant change in social and economic patterns.

### **The "Rich Men's Club"**

The combination of limited entry, rising prices, and a few years of generally good salmon returns has provoked the first murmurs in Alaska of the charge that an exclusive "rich men's club" has been created. British Columbia heard that cry far more loudly a few years ago when, as I recall, the epithet was "millionaires' club."

A few tempering observations are in order. It is easy for the uninitiated to forget during good years that salmon runs can fluctuate widely and that the vari-



ables influencing these fluctuations are not all known, let alone currently controllable. Therefore, short-term judgments should be viewed with caution.

The uninitiated also tend to confuse gross returns with net returns, and the talk on the docks and in the bars always pivots around the high-liner—seldom about the fisherman who barely scraped by or went bankrupt. In addition, a number of fishermen still practice something close to “cigar box accounting,” inappropriately taking into account such things as opportunity costs of operating capital, investment, and entry permits. The result can be a ragged and imprecise picture of net returns.

Preliminary information from an entry commission 1977 cost and earnings study of the Prince William Sound salmon drift gillnet fleet does not show the existence of a rich men’s club. It shows in rounded numbers adjusted for an apparent bias in the sample an average gross of \$18,600 and an average net return to labor and management of \$8,700 (6). When workers on the Trans-Alaska pipeline were walking away with \$40,000 to \$70,000 a year, and in view of Alaska’s cost of living, that is hardly enough to precipitate justified cries of righteous indignation.

### **Dealing With “Excess” Profits**

And yet, those familiar with Alaska’s salmon fisheries will rejoice. “What about Chignik in 1977?” The Chignik purse seine fleet is the new instant legend. Official information is not yet available but preliminary estimates indicate that the average gross was approximately \$200,000 and the high boat grossed about \$500,000. Again, no one discusses net, just gross. And again, no one remembers the early seventies, when the average gross earnings in 1972, to take the low end of the spectrum, were \$12,573.

Still, a legitimate question that remains about Chignik is what to do about Chignik if things continue as they were in 1977. More generally, the proposition is whether limited entry inherently allows the creation of an exclusive rich men’s club. We have already begun asking ourselves that question and fortunately we have a few years to work out the answer, which at the moment does not seem to be simple.

Part of the answer is to be measured in relation to one of the goals of Alaska’s limited entry program. The state intended to create a climate that would encourage professionalization and diversification of the fleet. It takes money to upgrade, to make a boat more safe, to diversify, and to take steps that encourage the development of markets. In evaluating significantly increased earnings in a fishery, it seems appropriate to consider the use to which the additional money is being put. Assuming the goal of a professionalized, diversified fleet is still desirable, general patterns of the application of increased capital may offset, at least to some degree, what on the face are “fat cat” incomes.

Beyond that, Alaska law (AS 16.43.300(9)(2)) provides that the entry commission may issue additional entry permits in a fishery (increase the optimum number of permits) if there is “an established long-term change in market conditions,” which are taken broadly to mean “economic conditions.” Presto! The “solution.” People are making more than “a reasonable average rate of economic return to the fishermen . . . , considering time fished and necessary invest-

ments in vessel and gear." (AS 16.43.290(1)) and, based upon that optimum-number-criterion in our law, we issue more permits.

But, pursuing this feat in which the solution is produced, there may be an "Oops" in which we find that the rabbit will not quite come out of the hat. Another major criterion in establishing an optimum number of units of gear in a fishery is "the number of entry permits necessary to harvest the allowable commercial take of the fishery resource during all years in an orderly, efficient manner and consistent with sound fishery management techniques" (AS 16.43.-290(2)). Suppose the entry commission concludes that on the basis of economics the Chignik fishery can appropriately support 120 units of gear rather than the current 92. However, because technological innovations have made the fleet more efficient, Alaska Department of Fish and Game fisheries managers say that 92 is still the upper limit that the Chignik fishery can withstand before conventional management techniques break down and there is a serious risk of significant management error that could jeopardize the resource.

The numbers are illustrative only, but at the conceptual level we can anticipate the possibility of such a dilemma. Is the answer to increase the number of vessels but regulate the fleet into far greater inefficiency? That appears to be inconsistent with the goal of a professionalized, diversified fleet. Various possible solutions must be explored, since, if the dilemma does not emerge in Chignik, it is unlikely to emerge somewhere else. Fortunately, the law requires "an established, long-term change in market conditions," which allows the variables in a fishery to work themselves out over time and presently unrecognized factors to become explicit, and provides an opportunity to develop the best possible solutions.

### **A Professionalized, Diversified Fleet**

The goal of a professionalized, diversified fleet is not stated in Alaska's law, although it can be read as implicit in the "economic health and stability" purpose of the law. You can take my word for it as one of the drafters of the legislation and one of those who worked with the legislature in developing the final measure. Whether the goal is stated or not, few Alaskans would disapprove of it.

Once again, it is not possible to produce many study results measuring progress toward this goal or the other goals of limited entry, because of a shortage of time and money for such work and our limited experience with the program. However, power trollers generally assert that competition is keener than it was before limited entry. Prince William Sound fishermen sometimes wistfully look back at the days when fishing was somewhat more leisurely, noting especially that "those guys who buy their permits are really out there pushing." The trend statewide appears to be to take fishing more seriously, to invest in better boats and gear, because, at least in part, of the sense of "owning" a piece of the fishery.

The number of fishermen holding more than one permit in both the limited and unlimited fisheries is increasing year after year, indicating a growing interest in diversification. Not only is diversification being made possible by greater profits and easier credit, it is also being encouraged by the fear of limited entry in presently open fisheries. Many fishermen feel that they must move as quickly as

possible to get into promising or desirable fisheries before the door is shut on them.

### **Economic Health and Stability**

One of the stated goals of limited entry is to promote "the economic health and stability of commercial fishing . . ." (AS 16.43.010). It is easy to argue but hard to prove without formal studies and a longer period of implementation that limited entry is contributing to that goal. Perhaps a few indirect observations will be helpful.

Large salmon returns can hardly be attributed to limited entry, although it is probably safe to say that public support through bonding for hatcheries and legislative support for rehabilitation programs would not be nearly as strong without limited entry. The voters generally recognize that it makes little sense to increase fish returns by 30 percent if the number of units of gear engaged in the harvest is free to go up by 40 percent. Similarly, the Alaska legislature probably would not have passed a nonprofit hatchery act (AS 16.10.400.475), and fishermen would not have engaged in programs to assess themselves for hatcheries if it were not for limited entry. As it is, such assessment programs are operating in Prince William Sound and southern Southeast Alaska, and others are in the formative stages in various parts of the state. These programs are not without controversy and dissent, but their mere existence or struggle for existence is significant.

Beyond the economic considerations mentioned earlier, it is difficult to indicate whether increased gross earnings are attributable in some part to limited entry or simply to the increased price of fish. Perhaps the only argument that can be made here is a negative one. Especially, given the Judge Boldt decision in the state of Washington, which made mandatory a large reallocation of salmon catches from non-Indian to Indian fishermen, entry into many of Alaska's salmon fisheries by residents and nonresidents would have increased without the current program, so that both catch and earnings would be diluted and spread among more participants.

Hatcheries and rehabilitation programs, of course, may eventually contribute to the economic stability of the salmon fisheries. Improved incomes will allow fishermen the opportunity to get through lean years of the cycle more easily. And diversification will also create greater overall economic stability.

The best empirical measure of the generally improved economic condition of the salmon fisheries, whatever the causes, is the continually increasing price of entry permits. For example, consider the series of most frequently paid prices for the years 1976, 1977, and 1978 in the following fisheries: Southeast Alaska salmon purse seine: \$10,000; \$15,000; \$25,000; Bristol Bay salmon drift gillnet: \$2,000; \$10,000; \$25,000. The increase in permit prices itself has a number of causes, but the fact that fishermen will pay the price indicates that they feel it is worth that amount to enter, and that they expect to recover the cost of entry.

### **Conservation and Management**

Another of limited entry's stated goals is to promote "the conservation and the sustained yield management of Alaska's fishery resource . . ." (AS 16.43.010). It contributes toward that goal. Those who argue that limited entry is "an

exclusively economic measure” might as well claim that the sun provides light but not heat.

All fisheries regulations allocate the resource, although they generally operate at the level of the individual participant and the resource, regulating fishing time, area, gear, etc. Such regulations not only allocate but also affect the size of the harvest, which operates at a different level, governing total fleet size. Since the magnitude of the harvest effort is in part a function of the fleet size, control of that element through limited entry provides another conservation tool.

Alaska’s experience is that traditional management techniques lose their precision and effectiveness as the fleet increases. The risk of serious management error is greater with a larger fleet. Also, as the number of vessels increase, gear restrictions force a greater degree of regulated inefficiency, in that the use of more effective techniques is banned. There is also greater economic pressure on the individual fisherman to violate regulations. Limited entry has halted the increase in the number of units of gear; it has stabilized one of the variables in fisheries management; and it can provide the potential for other management methods to be used with greater reliability, especially with the reduction of large fleets to an optimum size through buyback programs or other means.

To cite an example of conservation justifying the limitation of entry, consider the herring sac roe purse-seine fisheries that we have limited. Salmon purse seine vessels engage in the fishery prior to the salmon seasons, using special herring seines. The fishery may not take place in certain years if the herring do not show up in sufficient abundance, or if the roe are not ripe enough. When the fish are there and the technicians decide the roe are ripe, forty or more boats may engage in furious activity, sometimes working in coordination with airplane spotters. They play an incredible roulette game in which, occasionally, six winners can wrap up more than six hundred tons of herring at nearly one thousand herring per ton, with the remaining losers often making nothing but “water hauls.” In some cases the quota has not only been taken but even seriously exceeded during the course of an opening measured in minutes, not hours. The economic conditions that warrant limiting entry into a supplemental income fishery of this nature do not appear to exist. But, for conservation and management reasons, the number of participants must be limited. The administration of quotas has been aided and a harvest allowed consistent with the goal of sustained yield management, where, otherwise, excess gear might have required total closures.

Limited entry is, of course, also an economic measure, but then any resource allocation tool has economic consequences, as the fisherman can tell you when he does not get an opening or the processor when he does not receive the right volume of product.

### **Control of Effort**

Alaska’s limited entry program did not set out to control effort at the individual unit level. The program is directed at the number of units of gear, but the efficiency with which those units of gear fish is controlled by the regulatory authority of the Alaska Board of Fisheries and the management authority of the Alaska Department of Fish and Game. This relationship requires a constant in-

terplay between the entry commission and the two management entities in arriving at decisions of effort levels.

Nothing especially recommends or detracts from this method of doing things; it developed from the situation existing in Alaska when limited entry was established. In fisheries that may be limited in the future, such as shellfish, a tie-in of limited entry to particular effort levels must be considered.

### **Buyback**

The entry commission has not yet instituted buyback programs in any of the fisheries under entry limitation. We are currently determining the need for such programs, which would be funded by an assessment of up to 7 percent of the gross attributable annually to each permit holder in a specific fishery. The commission would operate on the market as another buyer of permits and of vessels and gear where necessary to reduce the number of permits in a fishery to an optimum number. That number is identified in AS 16.43.290 as a reasonable balance of: (1) the number of permits sufficient to maintain an economically healthy fishery that will result in a reasonable average rate of economic return to the fishermen participating in the fishery, considering time fished and necessary investments in vessels and gear; (2) the number of permits necessary to harvest the allowable commercial take during all years in an orderly, efficient manner and consistent with sound fishery management techniques; and (3) the number of permits sufficient to avoid serious economic hardship to those currently engaged in the fishery, considering other economic opportunities reasonably available to them. If buyback programs are necessary, their results will be monitored to see what economic and conservation management effects might be specifically attributed to entry limitation at lower levels of participation. Such monitoring could define more accurately ways in which limited entry contributes to the goals of the program.

### **Goals in Conflict**

As was suggested earlier in the discussion of the Chignik purse seine fishery, over time some of these goals may prove to be in conflict with each other. If a fleet is decreased in size through buyback, professionalization and technological innovation may still prevent the Board of Fisheries from removing efficiency-reducing regulations because of management considerations (7). Rising fish prices may increase the rate of return to a point where additional entry is warranted from an economic standpoint but forestalled or reduced in scope in the name of conservation. Some conflicts such as these are solvable; others may not be.

### **The Benefits of Arrest**

The possibility that such conflicts may arise does not mean that limited entry should be abandoned because, in addition to whatever positive benefits limited entry may confer, it brings another benefit that can never be demonstrated. Limited entry prevents the problems caused by increased participation from becoming worse.

## **PROBLEMS**

In implementing limited entry programs, some problems seem to be inevi-

table while others can be avoided or at least anticipated so that they can be handled effectively. Fortunately, Alaska had the opportunity to review British Columbia's limited entry program and to benefit from a knowledge of problems encountered there. In some cases, problems encountered by Alaska can be inferred from observations made elsewhere in this paper. (In other cases, however, the observations describe the happy results of foresight and/or good luck.) Here are a dozen problems that I hope will be of general interest:

### **Necessary Information**

A broad, historical base of information on fisheries (including the fishermen in them) is an ideal starting place for considerations of limited entry. You cannot design and implement a good system without good information. If you lack certain information you must set up and implement the means to obtain it and, recognizing the goals and constraints of your situation, you must distinguish between necessary information and that which would be nice to have. The kinds of information available can set limits on the types of limited entry systems that can be employed and the criteria that can be used to allocate permits.

Concerning participation in commercial fisheries, data systems were already in place in Alaska for licensing vessels, commercial fishermen, and gear operators, and for catch-reporting on fish tickets. The Alaska fish ticket system is one of the best in the country. Its information was sufficiently accurate for many management purposes and for reaching conclusions on conditions and trends in fisheries prior to limited entry. However, available data needed to be brought to a far greater level of accuracy to be used for testing alternative limited entry systems for permit issuance and, most important, to be used as reliable evidence of various aspects of the individual fisherman's involvement in a fishery.

There was, relatively speaking, a shortage of economic data and much of it had to be acquired through cooperative agreements with state and federal taxing agencies, surveys, and other means. Surveys can be seen by fishermen as a burden from which they derive little, if any, benefit, and their resistance to providing information increases as they become the objects of study by a growing number of agencies. Providing fishermen with the results of surveys can relieve the feeling that their time and effort have vanished into one of the black holes of bureaucracy. Interagency coordination and skill in administration can also mitigate this problem.

Additionally, the time required to gather and analyze certain information sometimes suggests various problems, such as (a) whether the material will be outdated by the time it is ready, (b) how to update baseline studies, (c) whether a situation may deteriorate to a point that may warrant a decision without the information in question, and (d) what information to obtain and what to forgo.

### **Complexity**

Alaska's system for allocating entry permits is complex. It was made that way to avoid the social and economic dislocation that would have occurred if permits had been awarded on some simple basis such as level of catch. In terms of allocating between residents and nonresidents, the system has retained the prelimit balance to within plus or minus approximately 3 percent. To the extent that we have studied it, the system has also distributed permits to individual

communities almost exactly in proportion to the number and types of units of gear fished prior to limited entry.

The problem we faced was that of explaining the application process to fishermen with varied cultural and linguistic backgrounds. This required providing application completion assistance, working with fishermen even after applications were received in order to develop evidence, and holding hearings and adjudications on facts and issues that required interpretation to determine their conformity with Alaska's law and the entry commission's regulations. We believe that the problem of complexity has been handled satisfactorily. Alaska Legal Services Corporation believes that we did not provide adequate application assistance and is suing us. Adequate assistance must be provided to fishermen throughout any application process.

### **“Part-Timers” vs. “Full-timers”**

The problem of how to treat “part-timers” relative to “full-timers” was a job that appeared deceptively easy to some. In their view, the entry commission was to keep in the full-timers and get rid of the part-timers, or in the Alaskan sense of the word, fishermen with nonfishing jobs, such as teaching, medicine, and law. However, the task did not turn out to be that simple. The easy, comfortable distinction between part-timer and full-timer disappeared in a sea of facts whose configuration varied from fishery to fishery. Some fisheries had few part-timers, some had virtually all part-timers, and in others the nature of the nonfishing employment varied considerably.

The part-timer/full-timer problem was handled in each fishery by an application process that used a variety of standards to put the problem into a broader context tailored specifically for each fishery. The process entailed a point system under which different considerations were given different point weights, with the thresholds for certain considerations being adjusted to the character of each fishery. For some categories, points were weighted in favor of years closest to the qualification cutoff date, since remoteness in time indicated a lesser involvement in the fishery. In addition, allowance was made for applicants with unavoidable circumstances.

The results were not universally satisfying to all “full-time” fishermen, since some of those traditionally identified as “part-time’s” received permits.

### **Legal Constraints**

Obtaining public understanding and acceptance of the legal constraints that exist in designing or implementing limited entry systems is a definite problem. Some Alaskans believed for years that limited entry could and should keep non-residents from fishing and allow only Alaskans to participate. The perceived failure in court of a limited entry plan that might have discriminated unreasonably against nonresidents helped make the nonresident discrimination situation clear, although the point required continual re-explaining. Again, some people wished for a limited entry system that allowed only “a little bit” of transferability, so that permits could be passed on within a family but would otherwise revert to the state for reissuance. The notion of avoiding a closed class was helped along greatly by using an old joke, likening “a little bit” of transferability to being “a little bit” pregnant. Once Alaska's limited entry law was enacted, the problem of

legal constraints had to be addressed again in terms of the specifics of the law as compared with what people would like to see.

It would be grand, but false, to suggest that only the "public" has difficulty understanding and accepting legal constraints. In one form or another, the problem manifests itself in entry commissioners, fishery managers, economists, legislators, and government administrators, staff personnel—in fact, the person is rare who is untouched by it. Even lawyers disagree about what the legal constraints are.

What appears to someone to be a desirable approach may be legally unworkable. To build without a sound legal foundation is to build on sand. The Canadians, with a different legal system, created limited entry at the federal level with a broad stroke almost as simple as one from the Old Testament, although instead of "fiat lux," the pronouncement was "fiat limited entry." There have been no lawsuits over limited entry in Canada. In the United States, sound advice in establishing limited entry systems is always to work with a lawyer and to be sure to have a good one.

### **Allocation Criteria Litigation**

The legislature and the entry commission used the criterion of being a licensed gear operator to give greater weight to certain applicants. Since an entry permit confers the right to operate a unit of gear, licensed gear operators should receive greater consideration than crewmen in permit allocation. Crewmen may still continue to work as crewmen under limited entry. Several parties are suing the entry commission about various ways we used a person's status as an operator of gear to give more credit toward receipt of an entry permit. These suits, once resolved, could have a wide range of effects: on one end of the spectrum there could be no effect if we win; in the broad middle range the commission may have to issue some number of additional permits; while on the other end there is the prospect of chaos, in which the approximately ten thousand permits issued under the present system would all be invalidated because of a defect in the system. That is not to say that limited entry might be found illegal, but only that some aspect of the system that implements it might be. We do not believe that this will be the case. It is recognized that not all states have similar licensing systems. The lesson to be drawn is that one must be scrupulously careful about the allocation criteria employed in deciding who will receive entry permits.

### **The Litigation Workload**

Generally speaking, litigation can be a problem because of the staff time and costs involved; given the implementation of a new program with significant social and economic consequences, litigation should be welcomed as a legitimizing test of the program, but its effects should be anticipated and planned for. As of May, 1978, the entry commission had thirty-nine suits against it, with several more anticipated. Many of these suits deal narrowly with commission determinations regarding specific applicants; others raise broader issues such as the gear license matter mentioned above.

### **Entry Permit Prices**

The rising price of entry permits is argued by some to be a problem with



limited entry. With respect to most frequently paid prices during the first part of 1978, compared with 1977, a sampling of salmon fisheries indicates the following: southeastern purse seine, \$25,000/\$15,000; and Kodiak set net, \$5,000/\$4,500. Some permits trade for far more, some for less.

A number of things should be kept in mind about these prices. Most significant, perhaps, is that entry permits are still a new commodity whose certain continued existence was established only with the failure to repeal limited entry in the November, 1976, election. Consequently, many fishermen are still learning what a permit is worth, and some bitter experiences of paying too much and suffering a loss are likely to temper current upward price trends. While some fishermen may not have understood the nature of this type of investment at the beginning, they are catching on.

In addition, earnings in many fisheries in recent years have been good enough that a permit can be paid off in a year or two, with a profit remaining. Good runs and good predictions in many areas have caused prices to rise. Permit buyers generally expect to be highliners, not mediocre fishermen. And, to wrap up the list, during the first three months of 1978 a total of 193 people in 19 of the 25 limited salmon fisheries purchased permits, compared with 114 people during the same period in 1977, indicating that higher prices are not interfering with the rate of new entry.

### **Community Disruption**

There have been problems alleged concerning a significant number of entry permits being sold out of predominantly native villages, where fishing is a key factor in the economy. An entry commission investigation of permits in the villages in Southeast Alaska showed initial permit allocations corresponding quite closely to fishing patterns in the years immediately preceding limited entry. It also showed that, in all villages but one, while there were some minor fluctuations in numbers of permits, the overall patterns were stable. In the single community that was the exception, clear causes were identifiable, including the closure of two canneries that were the primary markets for the local fleet and a traditional sense of territoriality that discouraged fishermen from traveling too far from home. Overall, however, we have not yet found that limited entry has led to significant disruptions of community life.

### **Program Monitoring**

The general absence of established and ongoing social and economic monitoring systems in fisheries is a problem whose scope goes well beyond limited entry. In our program, the tasks and timing of implementation have not yet allowed us to develop the degree of monitoring that we believe is necessary. Monitoring provides deliberate feedback systems to indicate where adjustments to the program or actions to modify program effects may be appropriate.

The entry commission does monitor permit prices and certain other information relating to the transfer of permits. Such things as transfer patterns and their consequences should be examined more closely. The commission is also conducting some costs and earnings studies, but economical means to get such information reliably over time for all fisheries have not yet been devised.

Beyond that, the commission relies on its members and interested staff, concerned parties in other agencies, and the general public to bring matters of program performance or effects to its attention.

### **Effects on Nonlimited Fisheries**

To some extent the effect of limiting entry in certain fisheries but not others is like squeezing a long balloon: when a constriction is applied in certain areas expansion occurs in others. The difference is that the balloon is under increasing pressure from additional entrants to the fisheries. The areas of expansion are governed by availability of the resource, the cost of entry, the price of fish, and the availability of markets.

The anticipation of limited entry has produced effects of its own. Alaska's shellfish fisheries are typical of what is happening generally: an effort to achieve what is believed to be an enhanced position should limited entry be imposed. Each year, fishermen are purchasing interim-use permits for a wider variety of fisheries not under entry limitation; some are bringing in additional boats; some are engaging more or less seriously in additional fisheries; others are making token landings; others are just hoping that mere possession of a permit will provide them with some kinds of "rights."

Whether these effects or phenomena become problems depends in part on conditions in the fishery and in part on the consequences. On the one hand, it can be said that limited entry is encouraging professionalization and diversification in fisheries that can stand additional effort. On the other hand, it can be said that the prospect of limited entry is causing problems in already overcrowded fisheries and in cases where fishermen are extending themselves financially and otherwise taking questionable risks.

When we limited the salmon fisheries, we knew that some past fishermen would not receive permits but would wish to continue with commercial fishing. Other people would wish to enter commercial fishing but could not do so by acquiring an entry permit. As was expected, the size of the halibut fleet has grown, especially among small vessels that can use relatively inexpensive long-line gear, and the salmon hand-troll fleet has grown. An Alaskan limited entry program on halibut is preempted by the International Halibut Convention, which is currently under renegotiation. Entry limitation in some form on the salmon hand-troll fleet is not appropriately considered until the results of traditional regulatory methods can be seen and evaluated.

### **Staying Ahead of the Game**

The fond dream of every limited entry administrator involved in Alaska's program has been that in the next fishery to come under entry limitation we would not have to cut anyone out. The idea is simple: if you can put the lid on in time, everyone who has been in can stay in. So far the idea seems to be on the horizon, and like the horizon it recedes continually as you try to approach it.

A variety of problems discussed elsewhere are also involved in this one. Three interrelated matters call for specific note here: turnover, timely recognition, and information lag.

Over time, fishermen drop in and out of any fishery, sometimes repeatedly.

This turnover, which may run 30 percent or more annually, should be tracked and accounted for if a decision is anticipated that would, for example, sweep in everyone who fished in the last five years. Waiting until the current year's number of participants hits the saturation level ignores turnover and obviates the possibility of grandfathering in everyone.

Recognition of the saturation level generally does not take place until that level is reached. In any earlier year, there was no crisis and consequently no generally recognized need to limit entry. Timely recognition of the need to start limiting entry—on the part of a variety of affected parties, not just a program manager—is an essential prerequisite to broad grandfathering.

Finally, information lag hampers everyone's knowledge of trends and changes. Timely information is necessary to develop and implement limited entry systems before participation levels become excessive.

One of the purposes of issuing interim-use permits in Alaskan fisheries not currently under entry limitation is to allow the monitoring and documenting of trends. This system operates in conjunction with fish tickets, and, while it is useful, it presently has a time-lag problem built into it because of the time required for fish ticket processing. Price information takes even longer to get. As a consequence, in mid-1978 we cannot yet tell you with respectable accuracy what the exvessel value of the 1977 harvest was, let alone more subtle points of interest. The commission currently must utilize less formal information from fishermen, fisheries managers, processors, and others to refine its sense of trends and changes in fisheries.

Without the necessary means to stay ahead of the game, it appears inevitable that some form of allocating among past participants will be a part of future limited entry systems.

### **The Romance of Continuity**

One of the most pervasive limited entry problems is the romance of continuity in a world of change. It can take many forms. Those in a fishery can wish that it would continue without entry limitation as it has in the past, even though conditions in the fishery have changed. Those dealing with various models of a fishery can find themselves drawn to or using static models (which may be the only thing available) while dynamic models are more appropriate. Those considering social structures and cultural conditions can feel that the past should automatically carry over into a different and changing future. This is not to suggest that the past should be jettisoned in favor of some newly conceived future. Rather, the romance of continuity is a problem to the extent that it distorts our perceptions of changes that have occurred and are going to occur in fisheries.

## **FUTURE CHALLENGES**

From the perspective of those first considering whether to employ limited entry in a fishery, nearly everything is a future challenge. For the entry commission in Alaska, many of the matters discussed earlier become challenges once again whenever we move to implement limited entry in a new fishery. However,

commission consideration of the possibility of limiting entry into the shellfish, longline, and trawl fisheries off Alaska has brought some additional matters into focus that will be discussed here. They are, briefly: identifying a need for limited entry; determining if it is feasible; finding the appropriate form; obtaining input from interested and potentially affected parties; identifying steps that flow from a joint state-federal involvement; and recognizing the conditions required before implementation is possible.

### **Do We Need It?**

In each case to date the entry commission has responded to a generally recognized need for limited entry. No such need is currently recognized in Alaska's shellfish fisheries, which are considered to include king crab, tanner crab, dungeness crab, and shrimp. The question of need is further complicated by the potential for involvement of shellfish vessels in the developing longline and trawl fisheries. Naturally, limited entry should not be implemented unless needed, but it is so revolutionary in fisheries that a clear, generally understood answer to the question of what constitutes need must emerge before further progress can be made toward implementation.

The regional councils created by the FCMA are a recognition of regional differences. Such differences, as well as differences between fisheries in a given region, govern the relevance of various considerations bearing on the need for limited entry. What is highly important in one area may be safely neglected in another. The list of need considerations that follows is not intended to be exhaustive.

We have identified a host of factors to be considered in determining whether entry limitation is necessary. No one factor is inherently significant enough to answer the question by itself, nor on the other hand must all factors point to a need for limited entry in order to conclude reasonably that entry limitation is warranted. Rather, the factors to be considered are indicators of the degree of various problems, if any, which may be appropriately addressed by a form of limited access system. Some of the more relevant factors are:

- Extent of domestic utilization of the fishery resource
- Interrelationships with other fisheries: extent of nontarget species catch and mortality; degree of dependence upon other fisheries
- Any trends in the precision or effectiveness of conventional management techniques that indicate a serious risk of major overharvest due to management error
- Trends in the number, efficiency, and capacity of the vessels in the fishery
- Degree of excess, unutilized, or underutilized capacity in the fleet
- Adequacy of economic returns to fishery participants
- Extent to which regulatory measures necessary for reasonable biological management of the fishery impose artificial inefficiencies on the fleet

- Onshore effects from any of the above factors, including quality of standard of living, degree of unemployment, dependence on transfer payments, and labor-force retention problems

Fisheries should be monitored and data collected so that conditions such as those described above can be identified and measured. The following information would be useful:

- Investment in vessels and gear with detailed information on the number, type, and efficiency of the different units of gear
- The relationships between the various inputs into the harvesting of fish and the levels of output
- The costs of fishing at different levels of output
- The size, species composition, and spatial distribution of catch
- The marketing channels and demand and price structures
- The patterns of fleet diversification into other species of fish and into different areas
- Social and cultural data about the fishermen as members of the community of fishermen exploiting a fishery, and as members of shore-based communities
- Stock assessments

With such a monitoring program, if managerial and/or economic indicators signal the need for limited entry, much useful information will be available to allow timely design and implementation of the best program.

Means should also be established to determine the optimum effort levels for fisheries in order to provide reference points for evaluating changes. Two major considerations here are: (1) a level that allows effective resource management; and (2) a level that allows a reasonable average rate of return. These concepts and perhaps others would have to be elaborated and specified for each fishery. Other considerations bearing on optimum effort levels may suggest themselves as the concept of optimum yield is developed.

While Alaska has some existing information on the shellfish, longline, and trawl fisheries, determinations must still be made about the importance of gathering various additional information, and then steps taken to obtain it.

### **Feasibility With Multiple Species, Area, Gear**

Because of stock and price fluctuations, shellfish fishermen assert that they must have a certain mobility between areas and flexibility as to target species in order to remain economically viable. That being the case, the entry commission believes that a multi-species, multi-area approach to limited entry must be considered. Consideration must also be given to allowing multiple gear types. With stocks and effort levels varying from area to area and even within an area, the matter is complicated.

Crucial to these considerations is whether a limited entry system can be es-

tablished that does not stifle diversification. The king crab fishery in the Bering Sea, for example, is undoubtedly overcapitalized, and to some people that alone might warrant entry limitation. However, the tanner crab fishery is far from being harvested exclusively by the domestic fleet, although many of the same vessels participate in both fisheries, and domestic trawl fisheries are just beginning to develop.

Since king crab is such a high value product, it may be wisest in the interest of diversification to let the king crab fleet continue to expand and to provide a major source of the capital needed for growth into these other fisheries. Limited entry on king crab alone could cause this source to evaporate significantly. On the other hand, the absence of limited entry on king crab could pose a problem for potential domestic groundfish processors to the extent that a relatively constant supply of fish is required, since even fishermen brought up for the purpose might be tempted away from fishing 7-cents-a-pound pollock in favor of \$1.45-a-pound king crab.

Limited entry for a fisheries complex entailing not only varying participants, stocks, and areas, but also changing degrees of domestic involvement may not be feasible. Certainly a large task ahead is to see what kind of bridge might be built between theory and practicality.

### **Finding an Appropriate Form**

The feasibility of limited entry is connected with the specific form it will take, and the question of form is intertwined with questions of precisely what constitutes the need and what the goals and expected consequences are. Thus, in considering limited entry for Alaska's shellfish, longline, and trawl fisheries, we find ourselves examining alternative forms to meet different complexes of needs and to produce different patterns of results.

One reason why Alaska's current limited entry law works well overall for the salmon and herring fisheries to which it has been applied is that the permit issuance criteria (allocation standards) allow a high degree of flexibility. Flexibility in specific application to cover a variety of situations must be preserved in the design of future limited entry systems as well.

The goals for limiting entry in the salmon fisheries were also fairly clear in mind. There is a tendency to dodge the work of formulating goals specifically, since discussion can get hopelessly mired and seems to prevent everyone from getting on with "the real job" of creating something. But goals will help determine the form a limited entry system may take; they provide direction for the subsequent program; and they provide reference points for measuring progress.

To stimulate some discussion of goals, we have suggested the following for the shellfish, longline, and trawl fisheries:

1. The maintenance of an economically healthy fishery that will result in a reasonable average rate of economic return to the fishermen participating in the fishery
2. The promotion of the allowable commercial take of the fishery resource during all years in an orderly, efficient manner, and consistent with sound fishery management techniques

3. The avoidance of serious economic hardship to those persons currently engaged in the fishery who are considering other economic opportunities
4. The promotion of the continuing optimum yield from the fishery
5. The promotion of the development of underutilized fisheries
6. The incorporation of technological achievements applicable to the fishery

At a general level, the two forms of limited entry that we are considering entail the issuance of permits to individuals or to vessels. In either case, such questions as the following come into play: corporate ownership of permits; whether permits should be transferable, and under what conditions; whether they should be tied to specific effort levels or ranges, and if so, how.

In issuing permits to individuals, we have proposed that the same two basic standards be used that are in the current law, economic dependence and past participation, plus the opportunity to consider other relevant matters. In the absence of comment to the contrary, commission experience suggests that the present method of permit allocation to individuals could be applied to additional fisheries. We might also consider whether some form of apprenticeship system is appropriate, and if so, whether it could be established legally.

In issuing permits to vessels, however, the proposed allocation standards that we have been able to devise so far have become more complex and specific, as a result of which some flexibility of application may be lost. We have fifteen standards, plus an "other" category:

1. Size of vessels
2. Number of vessels
3. Horsepower of vessel
4. Holding capacity of vessel and nature thereof
5. Status of vessel owner as permit holder
6. Number of operators commonly employed on the vessel
7. Effect upon crewmembers if the vessel is excluded
8. Efficiency of vessel, both including and excluding consideration of gear
9. Extent of past participation (of whom? what?)
10. Extent of vessel construction if not currently employed in fishing activities
11. Commitment of vessel owner to future sale or vessel construction or modification
12. Degree of economic dependence upon vessel operation (whose?)
13. Availability of alternative vessel uses

14. Diversification potential of the vessel

15. Extent of incorporations of recent technological advances

If limited entry is needed for this complex of fisheries, some form of "segmented" permit may be in order, both for initial allocation and subsequent activity. If an initial permit were issued for more than one gear type, species, area, or whatever, then for transfer purposes portions of the segmented permit could be split off or additional segments acquired. For example, a person with a permit to fish king and tanner crab in the Bering Sea could sell off the tanner crab segment or acquire additional segments to allow him to fish king crab off Kodiak.

"Fixed term" permits resembling the Canadians' "B" licenses might also have some applicability. They would quite simply be good for only a fixed period of years and could be used for issuance to marginal participants with some investment in the fishery. The idea has its difficulties, but then for a number of people and vessel owners a durational permit might seem better than no permit at all.

Conspicuous by its absence from the discussion above is any mention of quota shares. I was threatened in Kodiak with shotgunning if the entry commission attempted to implement a quota share system of limited entry in shellfish. That is one of the practical problems encountered when attempting to implement theoretical concepts. However, the underlying reasoning of my would-be assailant is significant: as an individual who owns his own boat and does quite well, he feared being put in the position of having to bid for shares of the resource against large, well-funded corporations. He felt that the potential for his extinction was an undesirable social and economic consequence that would justify protective action.

There is also no discussion of taxation schemes (8). This silence as well is not an attack on the merits of the ideas, but merely a comment on what appears to be the present feasibility of their implementation in Alaska. The time is not ripe for the fishermen or others in the fishery to embrace taxation as something that will really be good for them. Neither would the state legislature move to enact such a tax.

### **Are You Out There?**

The job of examining and finally deciding upon goals and forms of limited entry is not something that should be undertaken by mutually consenting bureaucrats in the privacy of their offices. Comment, input, and insight are needed from all interested and potentially affected parties. The entry commission is seeking broad professional, industry, and public involvement in its considerations of limited entry for the shellfish, longline, and trawl fisheries of Alaska but, with three exceptions, the response after more than half a year has been nil.

Letters raising issues and requesting comments have been sent to a wide variety of people and organizations, as have copies of discussion draft legislation. Recipients include government agencies involved in fisheries management, academics and professionals with specially useful expertise, processors' organizations and individual processors, and fishermen's organizations and individual



fishermen. The same information has also been readily provided to anyone who has expressed an interest in the subject.

Perhaps the lack of response stems from a lack of perceived immediacy or urgency. Whatever the cause, it is handicapping effective planning and evaluation, and the entry commission is striving to change the situation.

The entry commission's attitude toward public involvement has been clear from the start. Its 1974 annual report notes that "limited entry is a new program with a direct effect on many people in the state, and there is a great need to disseminate information about it." The text following indicates that the means used to disseminate this information have included radio and television announcements, newspaper ads, posters, mailed circulars, and public meetings. Between September, 1973, and October, 1974, a total of forty-one public meetings and hearings were held at more than two dozen different locations. In addition, more than fifteen meetings were held with native organizations, fishermen's groups, and other interested groups. Questionnaires relating to the implementation of the program were distributed at many of the hearings and the results were made part of the hearing record. The commission also received hundreds of letters and comments on various aspects of the law and many more letters requesting information.

There are several reasons for seeking broad development:

1. It seems to be the best way to develop a comprehensive sense of the likely consequences of various limited entry systems. This is especially true for fisheries, such as shellfish or trawl, with short histories.
2. The parties likely to be affected must be consulted and their views considered: they are the ones to whom limited entry might apply.
3. Insights and innovations can come from many quarters and no one should reject the chance for a good idea.
4. Ideas are like living things—some abort, some grow, some metamorphose: time and conditions should be provided to see what happens to them and to reap the best harvest.

Through research and reflection, expert advice, input from the fishing community, and mutual education, it may be that some controlled version of quota shares or taxes will take the ascendancy, leaving variations on permits to individuals or vessels behind, or incorporating aspects of those ideas. It is hard to tell what combination of ideas may be necessary to arrive at the "best" solution, but it is premature to guess the future at this time and better to let what can be broadly construed as a democratic process work.

### **State-Federal Involvements**

Once we posit a multiple species, area, gear approach for the fisheries under consideration, it becomes necessary to develop a state limited entry system that is compatible with the Fishery Conservation and Management Act of 1976

(FCMA) and that is acceptable to the North Pacific Fishery Management Council and the Secretary of Commerce.

Alaska's shrimp fisheries occur predominantly in state waters, and there would be no legal problem in limiting them unilaterally, although current state law should probably still be changed before any such action is even considered. But such action is not being considered because of what we believe to be the operational tie-ins between shrimp fisheries and king and tanner crab fisheries. The king and tanner crab fisheries generally will come under federal jurisdiction, as well as that of the state once federal management plans are in place. Consequently, a multispecies, multi-area approach requires that a single integrated system of limited entry be considered.

At the legal level, this means that any state limited entry law must be in fairly explicit conformity with the FCMA, especially in connection with the federal law's national standards and its limited entry provisions. Since no such limited entry programs have yet been elaborated, the consideration of limited entry for the shellfish fisheries and others under joint jurisdiction will be developmental work of benefit to the federal government, as well as to the state.

Such joint efforts requires the recognition of all that is entailed in getting state laws changed or enacted, and, should some limited entry system be entertained that is not currently permitted by the FCMA, the need for congressional action.

At the policy and program level, this also means that the North Pacific Fishery Management Council will have to make coordinated changes in a number of management plans so that an integrated limited entry system may be implemented. And it means the designation or creation of a vehicle for implementation.

### **Prelude to Establishing Limited Entry**

Based upon Alaska's experience, the general political formula for establishing a limited entry system seems to be that it is not possible to get action before a crisis or a disaster. Webster's New World Dictionary defines "crisis" as "a time of great danger or trouble, whose outcome decides whether possible bad consequences will follow." And "disaster" is defined as "any happening that causes great harm or damage; serious or sudden misfortune; calamity." Absent a spur that sharp, it is not likely that there will be successful movement toward the establishment and implementation of limited entry systems.

This is an offensive formula, which should cause a number of people to rebel in the hope that preventive or timely action is possible to forestall crisis or disaster.

At worst, it can be argued that planning now for the coming disaster should be encouraged so that if or when it occurs a timely response is possible that would minimize ill effects. Otherwise, an injurious situation, even though finally recognized, may worsen over a longer period of time before corrective action can be taken.

At best, it can be argued that by identifying need criteria now, gathering information, and engaging the potentially affected public, it may allow more appropriate action to be taken on the basis of trends that have not yet reached a disastrous fruition.

## **SUMMARY AND CONCLUSIONS**

The complex and changing nature of fisheries makes it difficult to isolate effects specifically attributable to limited entry and to measure its contribution toward reaching goals. Limited entry is, of course, only one causal factor among many, ranging from national and international economics to foreign treaties and extended jurisdiction, social conditions, changing stock conditions, the state of the art in management and research, hatcheries and rehabilitation programs, and whatever else happens to be dear to any particular individual from his special perspective on fisheries. Limited entry should be viewed in this broader context, but because it is new in fisheries and because it brings about significant changes in the range and nature of social and economic behavior, it tends to stand out in the crowd.

To summarize some of the high points of Alaska's experience with limited entry: You must identify a need and attempt to define clear goals. You must have information on the resource, the users of the resource, and the likely consequences of various trends in a fishery. Public participation in the development of this information and public education concerning the facts and issues involved will facilitate the implementation of limited entry in a timely manner. Although such public involvement is time-consuming, it is important, if not essential, to the success of limited entry programs. An articulated need, clear goals, solid information, clear thought, and public involvement become even more important cornerstones in states where a sizable nonfishing constituency may be involved in various stages of the decision-making process.

The actual "how to" of implementing limited entry perhaps cannot be set down in general terms that will be useful. Economic, social, and political situations can vary, the nature of the need for limited entry can vary, and the specific form of limited entry should vary to fit the situation and need. Consequently, implementation becomes a function of these elements. However, I will hazard a brief checklist:

- There must be a high level of concern for people at all stages of the process. Limited entry programs affect people and how they can live.
- A limited entry system must be fair and must be perceived as fair. Those people potentially affected should participate in its development. Those actually affected should understand what is happening to them.
- Limited entry programs must be tailored to specific fisheries to minimize or avoid adverse social or economic effects.
- Competent experts should be engaged as necessary at all stages from conception through implementation to help assure a high standard of quality in what is being done.
- The entity implementing a limited entry program should have sufficient size, responsibility, and authority to carry out its task.
- Excellence should be sought, but perfection should not be expected

in implementation. This is only to acknowledge what everyone knows: the courts, for example, occasionally convict an innocent man or free a guilty one, but overall the system works well. The expectations for any limited entry system should not be higher.

Given the generally prevalent social, political, and economic attitudes, the establishment and implementation of limited entry systems currently appears likely to come about only after there is a crisis or disaster in a fishery. It will take extensive preparation and general education beforehand to create a climate in which timely action will be possible on the basis of reliable, understood trends and relationships. In many cases, the next ten years or less may tell whether it is possible to have action before crisis or disaster in our fisheries.

# LIMITED ENTRY IN MICHIGAN FISHERIES

Daniel R. Talhelm

## Preface

This review of Michigan's fisheries experience presents a view of changing societal values over time. It presents a view of a greatly contracting commercial fishery, of complex, somewhat unsatisfactory regulations, of an ecosystem greatly altered by man, of uncertainty about the future of commercial fishing, and of an enlightened plan for the future. It also offers a contrast between equity and efficiency in fisheries management. Finally, it surveys the development of an outstanding recreational fishery, studies the comparative economics of sport and commercial fishing, and analyzes comparatively public fishery values in Michigan.

## Overview

Michigan's fisheries have undergone many changes since they began in earnest almost one hundred fifty years ago. Not only have many of the first commercial species disappeared and new ones arrived, but the commercial fishery has taken a back seat to a thriving sport fishery. Current restrictions on commercial fisheries reflect the change in public values in favor of sport fishing and the great effectiveness of today's commercial fishermen.

Although limited entry and gear restrictions on commercial fishermen had been sought by Michigan authorities since 1883 and some restrictions granted in 1929, a serious limited entry program was not imposed until 1968, just after the beginning of the state's salmon stocking program. Since then the Department of Natural Resources (DNR) has restricted licenses to "full-time" fishermen, adopted a zone management program, developed stringent gear restrictions for individual fishermen, banned certain gear types in various zones and water depths, and allowed no commercial fishing in other zones. The program attempted to reduce direct and incidental commercial fishing effort for several sport species and some populations of commercial species, and to convert an overcapitalized commercial fishery into a greatly reduced but more efficient fishery. Although it greatly reduced the number of operations and its restrictions made fishermen less economically efficient, fishermen improved the effectiveness of their gear, with the result that some populations were still overfished.

The plan was revised in 1974 to eliminate the zones in favor of individual gear and location restrictions. The DNR also proposed to buy out all large mesh

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and most small mesh gillnet operations for a total of \$1.5 million, allowing voluntary conversions to a limited number of trap nets. Gillnets were to be banned primarily to eliminate an incidental fishery for lake trout, one of the important sport fishes. This program has still not gone into effect completely because of continuing court challenges. Some populations of certain species have declined so much that fishing for them has not been temporarily eliminated except for research permit quotas. Other populations are apparently still being fished past the point of maximum sustained yield. In 1975 a "quota shares" system was initiated for the Lake Superior chub fishery.

Since 1970, many commercial fishermen have resented the DNR for several of these rules and for the reorientation of the fisheries toward sport fishing. There also exist various degrees of resentment between sport and commercial fishermen. In addition, two Native American tribes are claiming in court the rights to most Great Lakes fisheries in Michigan.

Apparently Michigan's sport fishery is managed primarily for equity among anglers and secondarily for efficiency. In the plans for the commercial fishery, these priorities appear to be reversed. Optimum sustained recreational use is difficult to determine, and may never be realized very closely in practice with present types of regulation.

Overall public recreational values of the fishery resource are more than ten times greater than commercial values. The marginal values needed to evaluate specific tradeoffs between sport and commercial fishing are now being developed. Despite the great overall difference, sport fishing values do not outweigh commercial fishing values in all instances.

At this point, due to the uncertainty produced by legal battles, the level of resentment, the inefficiencies, and the continued overfishing, the limited entry program cannot be considered to be completely satisfactory. It is a start, however. Fishermen would seemingly be happiest with an inefficient fishery that kept more of them in business and gave them an opportunity to improve their business so long as they received a normal return on labor and investment. The DNR apparently prefers a system comprising a small number of efficient operations paying a significant catch fee, a special board to decide allocation questions, better monitoring of effort, and catch and market distribution. This system is similar to a franchise program and probably offers the greatest potential for optimum use of limited resources.

The remainder of this paper explains Michigan's experience in more detail. It begins with a short review of Michigan's resources, reviews how we got where we are now, discusses limited entry in commercial and recreational fisheries, evaluates how well the program is serving the public interest, and ends with prospects for the future.

### **Michigan's Resources**

The Great Lakes and Lake Baikal in Siberia are the two great reservoirs of fresh water in the world (Beeton, 1977). Each contains about one fifth of the fresh water in the world, but the Great Lakes have more than eight times the surface area of Lake Baikal. Lake Superior has the second largest surface area in the world after the Caspian Sea.

The Great Lakes have a surface area of approximately 94,710 square miles (statute). About two-thirds of the Great Lakes area is in the U.S. and about two-thirds of that is in Michigan. Michigan has jurisdiction over 38,575 square miles of the Great Lakes and over 3,100 miles of coastline. Michigan is second only to Alaska in coastline length and has about twice as much as the next largest state.

Michigan's waters are primarily in the upper three lakes, Lakes Superior, Michigan, and Huron. These lakes are generally cold, clear, and infertile. The primary exceptions are the shallow, fertile waters of Green Bay and Saginaw Bay. Michigan's portions of Lake St. Clair and Lake Erie are also shallow and fertile, and very productive of warm-water fish. These areas of the lower lakes are much smaller, but make possible an outstanding sport fishery in the urban Detroit area accounting for one-third of all sport fishing effort on Michigan's Great Lakes (Jansen, 1977).

The lakes vary greatly from place to place in productivity and in the species associations found. Because of this variety, many distinct races or separate populations are identifiable for most species. This fact confounds fisheries management because each distinct population differs in growth, susceptibility to various gear, proximity to sport and commercial fleets and market areas, market value, and other such attributes.

This accounts for much of the complexity of Michigan's management program. For example, taxes on catch or effort seem impractical as the sole means of obtaining optimum sustained yield because of the variety of growth rates and other factors. Different taxes would have to be imposed upon different populations of the same species. Taxes could still play a significant role in management, but the most efficient form of regulation would probably be taxes in combination with other restrictions. In addition, the number of licensed fishermen is so low that assumptions about competition and free entry may be questionable. There are now approximately one hundred forty licensed operations, while the optimum number may be as low as forty.

### **Evolution of Michigan Fisheries**

The total catch by weight in Michigan waters has remained remarkably stable over the last hundred years. Except for highs over forty million pounds in the first decade of this century and lows just over twenty million pounds fifteen years later, the measured catch has remained close to thirty million pounds (figure 1). However, the species composition has changed dramatically, and sport fishermen now harvest more than commercial fishermen.

Overfishing apparently is partially or entirely responsible for eliminating or endangering several species, including several species of ciscoes (chubs) and the very slow-growing lake sturgeon. Most other species have changed dramatically in abundance. Many of these changes may have been caused by environmental factors, including those produced by man, but some seem to have been caused or enhanced by overfishing. Studies by Jensen (1976) using a "surplus production model" with data from 1929 to 1973 showed that whitefish were being overexploited in most districts. That is, biomass was being kept lower than the biomass required to produce optimum or even maximum sustained yield.

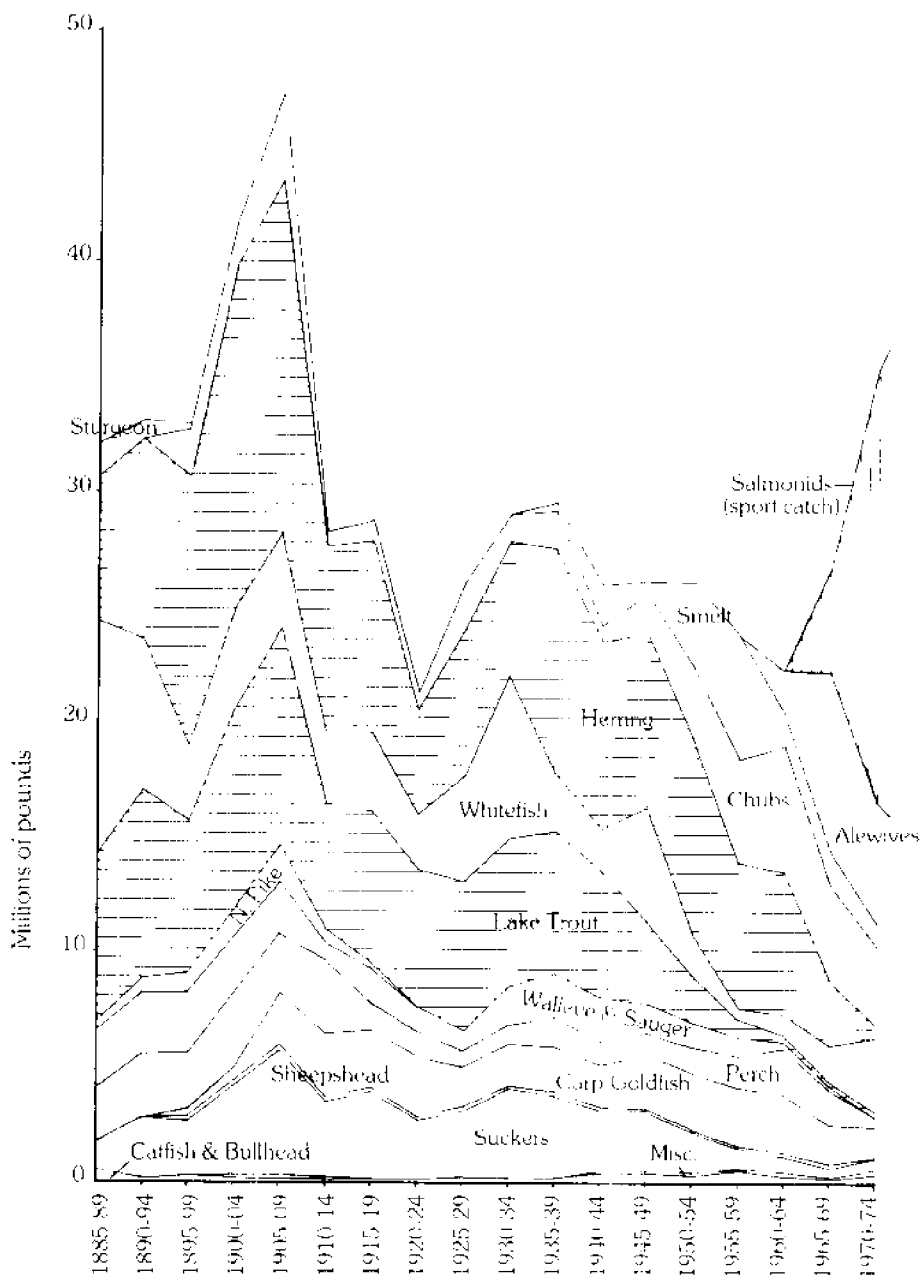


Figure 1. Michigan Great Lakes commercial landings, 1885-1974, and salmonid catch by licensed sport fishermen, 1966-74. Data based upon 5-year averages.



The most dramatic changes have occurred since 1940. Total commercial catch leveled off at about twenty-six million pounds for about fifteen years, then dropped steadily to the present fifteen million pounds. Sport fishing has more than made up the difference in total catch, but the species composition is strikingly different. Smelt, alewife, sea lamprey and, later, Pacific salmon are all exotics that have made significant impacts. Carp, introduced in the 1970s (as were steelhead trout), have also had an impact, but harvest has remained about two or three million pounds during most of this century. Sea lamprey and alewives apparently came by way of a shipping canal around Niagara Falls. By the late 1950s the lamprey had exterminated lake trout in Lake Huron and Lake Michigan, and was seriously affecting lake trout in Lake Superior and whitefish and other species in Lake Huron and Lake Michigan. In response, the smelt population increased greatly and became commercially important. The alewives increased dramatically in Lake Huron and Lake Michigan and they now dominate the biomass in both lakes. Alewives "devastated small forage fish such as emerald shiners and smelt, small market fish like lake herring, chubs and perch, and recreational fish such as walleye and smallmouth bass" (Tainter and White, 1977). Perch, walleye, and smallmouth bass have partially recovered, but the others have not. Commercial fishermen were also hard hit. The number of licensed fishermen dropped from eleven hundred in 1950 to three hundred in 1969, mainly because fish stocks were so limited.

After sea lamprey populations were chemically controlled in the mid-1960s, salmon were introduced into the upper lakes, lake trout were reintroduced into Lake Huron and Lake Michigan, and steelhead, brown, brook, and hybrid (splake) trout were heavily stocked. As expected, these salmonids successfully prey upon alewife and may prevent massive alewife die-offs like the ones that fouled the beaches in the 1960s. Also as expected, this new supply of salmonids was met by a great demand for salmonid sport fishing, which was just beginning to be felt when the sea lamprey invasion demolished the trout population in the 1940s (figure 2).

As if these invasions had not been enough, misfortune struck again. In the late 1960s and 1970s, DDT, PCB, mercury, and other poisons were found to contaminate many of the fish, particularly salmonids. These chemicals eliminated most lake trout from the market and cancelled plans for commercial sale of surplus salmon. Sport fishing has been allowed to continue, but sportsmen have been advised to eat not more than one salmonid meal per week. This situation is improving, but it is still a very serious problem, particularly for commercial fishermen.

Sportsmen now harvest thirty million pounds or more of Great Lakes salmonids annually (1). The average salmonid catch is about eight pounds per angler day, or just over one fish per angler day (Janssen 1977 and Jester 1978). The non-salmonid catch from the Great Lakes is probably at least half as much. Therefore, the total Great Lakes sport harvest is about three times the present commercial harvest. The combined sport and commercial catch is about sixty million pounds. In 1976 licensed anglers spent approximately 2.75 million angler days fishing for Great Lakes salmonids and 4.07 million for non-salmonids (Janssen, 1977). Surprisingly, that represents only about 35 percent of total an-

gling effort in the state (nineteen million days). Including nonlicensed anglers, there are probably over ten million angler days for Michigan Great Lakes fish. In contrast, there are only seventeen million angler days for salt water fish in all five Pacific states (USBSFW, 1972). The total marine recreational catch north of Point Conception, California was about seventy-nine million pounds in 1970 (NMFS, 1977). In 1976, commercial landings in the state of Washington were 131 million pounds, valued at about one hundred thirty million dollars (exvessel) (NMFS, 1977).

Since the 1930s or before, fisheries management in Michigan has been almost entirely paid from sport fishing and hunting license fees and excise taxes. The commercial fishery has contributed only nominal amounts. Employment in the commercial fishery has declined from over six thousand at the turn of the century (figure 2) to three or four hundred today (about one hundred forty commercial licenses). The number of licensed sport fishermen, on the other hand, has doubled from under seven hundred thousand in the 1930s to about 1.3 million today. The economic impact of the Great Lakes sport fishery on Michigan's economy is two to three hundred million dollars per year, and that of the commercial fishery is about twenty million dollars (Tahelm, 1977).

From a public decision point of view, net resource values are much more important than is economic impact. These values may be thought of as potential economic rent: the willingness of the public to pay for using the resource, minus all costs. This rent includes consumer surplus as well as producer surplus, includ-

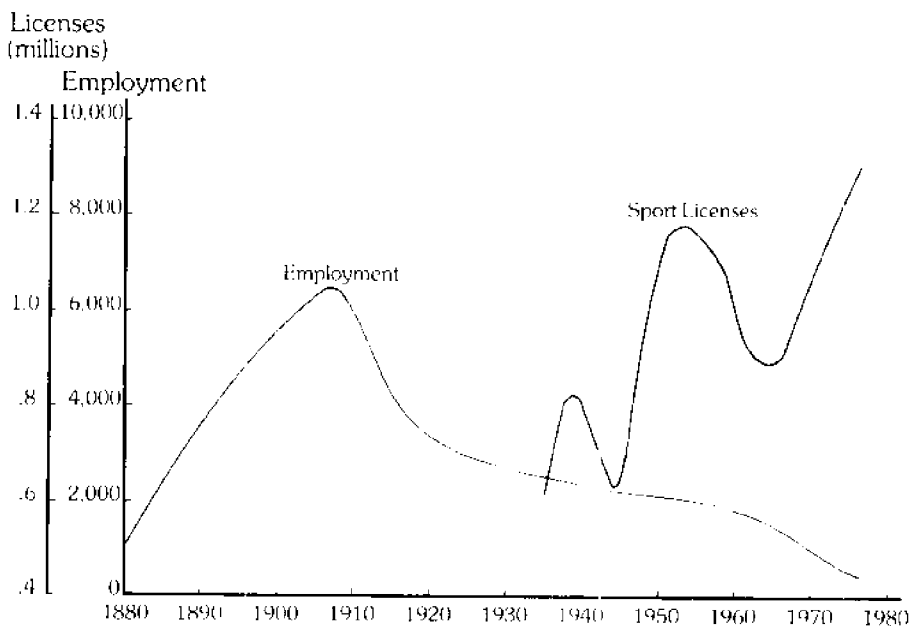


Figure 2. Commercial fishing employment and number of sport fishing license holders in Michigan, 1880-1980.

ing economic rent collectible from commercial fishermen in the form of taxes or license fees. Potential economic rent attributable to Michigan's Great Lakes sport fishery is about two hundred fifty million dollars per year, but is only one to three million dollars for the commercial fishery (Talhelm, 1977). Even if Michigan's entire Great Lakes fishery were devoted to commercial fishing, potential economic rent (including producer and consumer surplus) would not be over twenty million dollars per year (Ghanbari, 1977). These are all-or-none values, the values of having the respective fisheries as opposed to not having them. The values of marginal changes within either fishery are quite different. The probability that the values of particular resource changes are proportional to the all-or-none values is remote. In other words, sport fishing values are not always greater than commercial fishing values when the two compete for the use of the same resources. Work is planned or underway in several Great Lakes states to document the values of various tradeoffs between commercial and sport fishing in specific instances.

### **Early Restrictions**

The story of Michigan's commercial fishery can be told in terms of cycles, each beginning with technological improvement and continuing with overfishing, fish stock depletion, and effort shifted to new stocks, and finally leading to unemployment and reduction of effort. The first example of this occurred about one hundred years ago. Pound nets were introduced in the mid-1800s, and were first used with very small mesh to take both adult and juvenile whitefish. During the 1860s, it became apparent that certain whitefish populations were declining. Unsuccessful efforts were made to enforce mesh size restrictions. Shallow water production fell greatly, but the introduction of steam tugs allowed fishermen to move to deeper waters. In 1884 the fish superintendent commented (Marks, 1884):

The fishing grounds are one after the other fished out, and then new places sought where the same process is repeated. If each ground, as it becomes unprofitable for large operations was actually abandoned and allowed to rest, it would undoubtedly be slowly restored to productiveness by natural processes, because the fishing would become unprofitable before the last fish was taken, but this seldom happens.

In the 1890s the power gillnet lifter was introduced. After 1890 the catch of whitefish declined precipitously, and the catch shifted rapidly to other species (Tody, 1974). The fishermen were obviously capable of depleting fish stocks seriously by that time. Proposals to regulate the fishery were defeated by the legislature many times in the nineteenth century. Other innovations had similar effects, including the submarine trap net, the gasoline engine, nylon nets, freezers, and others. A recent example is the introduction of monofilament gillnets, which are much more effective than nylon.

Two small areas were closed to commercial fishing in 1897, and licenses were required for fishing vessels in 1907, but the first significant control over commercial fishing was permitted in the Commercial Fishing Law of 1929 (Act 84). This act permitted the DNR to define legal gear, restrict mesh size, close seasons, set size limits, and protect species. Many bays were closed or restricted

to commercial fishing and reserved for sport fishing (Borgeson, 1974). The fishery was mildly regulated under this act. The act was revised in 1955 to make it more effective. Under the 1955 act (Act 218, P.A. 1955), "... a trawl fishery was authorized under permit, the gillnet fishery was regulated more closely, and commercial fishing for lake trout in Lake Superior was stopped" (Scott, 1974, p. 82).

### **The Fishery Under Limited Entry**

In 1968 the legislature finally provided authority to limit entry (Act 336, P.A. 1968, amending Act 84). "Under this further authority, steps have been taken to provide for limited entry into the fishery, to specify the kind and amount of fish that could be harvested, to designate areas and depths to be fished, and to delimit the methods and gear that could be employed" (Scott, 1974, p. 82). These steps were taken in 1970 as part of the DNR's "zone management program." The primary objectives of this plan were to restore depleted populations of sport and commercial fish and to obtain optimum sport and commercial utilization of the resource, including "... a profitable and progressive commercial fishing industry" (Scott, 1974, p. 82). This plan was modified in 1974 to eliminate the zones in favor of individual gear and location restrictions, and to ban most gillnetting under a forced buyout plan.

Limiting entry and reducing the number of commercial fishing operations are important aspects of the plan. The number of commercial fishing licenses was limited for the first time in 1968. Starting that year, no new licenses were issued, although licenses could be transferred from one vessel to another with permission from the DNR. The number of licenses was also reduced slightly by eliminating the license for any vessel not earning one thousand dollars or more in any one of the five years from 1963 to 1967. Some licenses that were eliminated were unused or used more for "recreational" purposes.

Beginning in 1970, licenses for fishing vessels were allocated to individuals. An individual can license several vessels, but regulations are applied to his entire operation as a whole. Nominal license fees, usually around one hundred fifty dollars per year depending upon vessel size, are assessed for each vessel. Licenses are still transferable with DNR approval. Although few have been transferred since then, none has been refused transfer by the DNR. The DNR discourages transfer, however.

So far, the number of licensed operations has been reduced from 300 in 1969 to about 140 in 1978. The biggest reduction came in 1970-71, when the DNR revoked the licenses of all part-time fishermen, nearly half the total, leaving only 188 operations in 1971. Part-time fishermen were defined as license holders who reported less than a given number of fishing days, or who earned less than a given value, in at least two of the three years from 1967 to 1969. The number of days required varied with the type of fishing, from fifty for gillnets to twenty-five for pound or trap nets to ten for seining or trawling. Some of those eliminated were involved in fishing seriously even though they fished only part-time.

Fishermen were also required to have complied with reporting regulations in 1969, and to have adequate facilities to harvest, transport, and market fish. No compensation was paid.

There was little organized resistance to this action, although those who were disenfranchised were bitter. Organized resistance and individual resistance developed in the next few years, especially when major new rules were proposed. Individuals violated gear, area, and species restrictions, and reported catch and effort inaccurately. DNR enforcement personnel have even been shot at occasionally, apparently by unlicensed (illegal fishermen). Organized resistance has generally taken the form of litigation over regulations. Proposals to ban most gillnetting and to buy out those operations and permit conversion to impoundment gear have been stalled for four years and could remain stalled for another year or two.

Gillnets appear to be an economically efficient gear in the Great Lakes. Until the last year or two they have dominated catch and effort in Michigan. The reasons for banning them (Great Lakes F.A.C., 1973) are: (1) they are size-selective but not species-selective, so there is a significant incidental catch, particularly of lake trout, which are considered primarily a sport fish, and are usually killed if caught in gillnets; (2) other gear can be used effectively; (3) they prevent restoration of lake trout and other salmonid stocks; (4) they are difficult and costly to regulate; and (5) flagrant violations were found primarily in this fishery.

The one and one-half million dollar forced buyout of gillnet operations actually began in 1976. Payments are to be based upon about 80 percent of average dockside value of catch over a three-year period. Money for the program was appropriated by the legislature from general funds. Fishermen are being allowed to convert from gillnets to impoundment gear after compensation, even though there may be too many impoundment operations already. Not all fishermen are expected to convert.

While in the past few years some operators have sold out to the gillnet buyout program (rather than continue legal appeals) and a few more have been eliminated through retirement, several more were eliminated when Lake Michigan's chub fishery collapsed recently. An advisory panel has recommended that the number of operations be reduced to about 40 (Great Lakes F.A.C., 1973), less than 30 percent of the present 140. Since this number was determined simply by dividing the value of the recommended quota by the estimated cost of an average operation, it has little economic justification. Quota recommendations were based upon informed judgment about harvest levels appropriate for rebuilding depleted stocks. More sophisticated biological information was not available. For most districts, even maximum sustained yield was not estimated using population dynamics models until a few years later (Jensen, 1976). This recommendation of 40 operations has been treated as a serious but tentative estimate of a long-range goal.

Estimates of maximum economic yield are now becoming available. Ghanbari and the author conducted a bioeconomic study of the recent (1963-1976) lake whitefish fishery in upper Green Bay of Lake Michigan (Ghanbari, 1977). This district produces almost 19 percent of the U.S. whitefish catch and about 25 percent of Michigan's catch. The analyses showed that since 1970 effort has been about what one would expect under conditions of free entry: overfishing near the point where the total cost curve intersects the total sustainable revenue curve (figure 3). The estimated total value product curve may be steeper than is

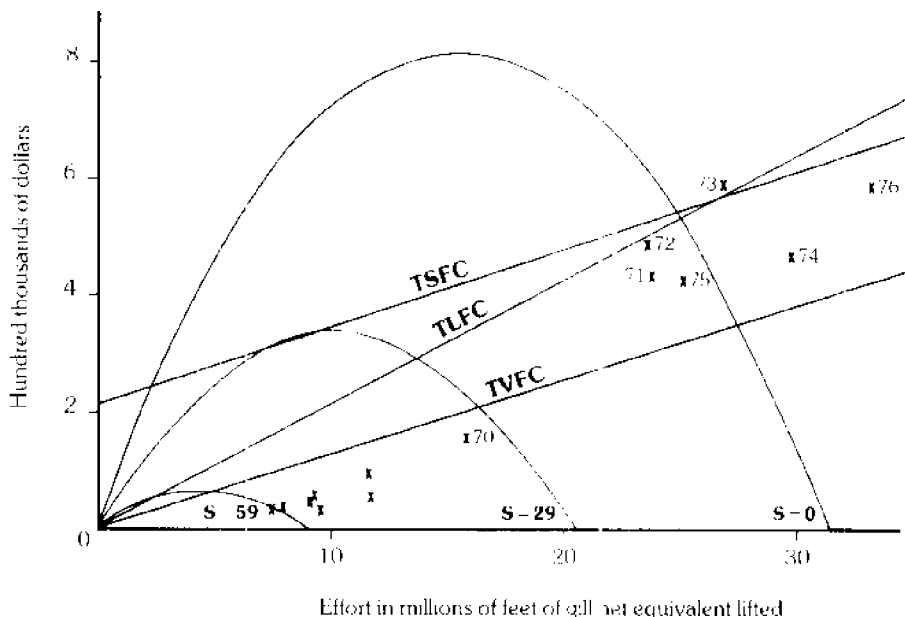


Figure 3. Commercial fishing total product value (TPV) for whitefish in district MMJ (Northern Green Bay) as a function of effort at three observed abundance levels of sea lamprey (S), and total long-run factor costs (TLFC), total short-run factor costs (TSFC) and total variable factor costs (TVFC). Costs are those observed in 1973. Product values are computed using the 1973 average dockside price of whitefish. Cost and values are deflated by the 1973 consumer price index (1976 = 100). (From Ghanbari, 1977).

represented by reality, but the 1971-1975 data show a consistent cycle around the intersection point. Static maximum economic yield would require less than half as much effort, but would result in some increase in total yield and would be very profitable per unit of effort. Population studies by Jensen (1976) showed that similar overfishing for lake whitefish continues in many other Michigan districts. Therefore, since total costs of fishing approximately equal total revenues, about three and one-half to four million dollars in recent years, the potential gain from eliminating half the effort could be as much as two million dollars per year (although it is probably less). The two million dollars worth of capital and labor could be used productively elsewhere in our economy.

The other aspects of the zone management program are restrictions on how, when, and where fishermen can operate. For example, gillnetters in the whitefish fishery in 1973 were restricted to a maximum of twenty-four thousand lineal feet of gillnets set at any one time, were not permitted to keep whitefish under seventeen inches, were restricted to certain areas, were not allowed to fish in November (during spawning season), and could set the nets only at certain depths. Before the restrictions, many fished fifty thousand lineal feet or more of gillnets. In response to the restrictions gillnetters increased the area per lineal foot of the nets by 150 percent by increasing the nets from twenty meshes deep to

fifty meshes deep (4½ inch mesh size). About the same time, they also converted from nylon to the more effective monofilament. Thus gear limits have been less effective than intended. Costs have gone up because fishermen tend their nets twice as frequently as before. The total costs of the various inefficiencies (restrictions) are unknown, but they serve to spread out the effort and perhaps prevent the severest overfishing. This may be more equitable with regard to the fishermen who would otherwise be eliminated, but it is probably not economically efficient.

A "quota-shares" system began in 1975 for the chub fishery of Lake Superior. Each year the DNR divides the quotas for the various districts into two equal parts. One-half is allocated to individual operations and the other half is open to competitive harvesting by all operations in the respective districts. The individual allocations are based upon the percentages caught by the operators prior to 1975. These percentages can be changed either by voluntary transfers between operators (with DNR approval) or, if an operator were simply to drop out, by allocating his share to the others. During any one year the first half of the quota is the "competitive" half. When this amount is caught, the operators can begin catching their reserved allocation. An operator's "competitive" catch does not count against his share of the reserved quota. Operators are restricted to designated areas approximating all waters within a fifty-mile radius of their respective ports. Quotas are also divided into blocks. For example, most of the quotas in easily accessible "inshore" areas are allocated to individuals rather than to the "competitive" portion of the quota. This is done to prevent overfishing in the most accessible and most productive areas.

This system was developed as a compromise between the DNR, which wanted the entire quota to be divided into shares, and the fishermen, who generally wanted an entirely competitive system. The fishermen objected to a quota-shares system apparently because they felt it would reduce their chances of expanding or improving their business in a competitive fashion. Fishermen in other areas of Michigan have voiced similar objections to regulations that would reduce their opportunities for expansion. Despite these objections the quota-shares system for the Lake Superior chub fishery has apparently been satisfactory both to the DNR and to the fishermen. There may be some tendency for overfishing in the more productive or more accessible areas, for example, more distant areas may be fished only after closer areas become unproductive, but this is not seen as a serious problem. Likewise, economic waste in the form of a race to catch the competitive quota is not yet apparent.

The various regulations developed since 1968 have been fairly successful at preventing conflicts between anglers and commercial fishermen, but some usually indirect conflicts still occur. The policy of the DNR is to favor sport fishing in cases where the two conflict. For example, commercial fishing for perch is permitted only on stocks deemed surplus to sportsmen's needs. Commercial fishing has long been banned in Lake St. Clair, Grand Traverse Bay, and some other areas. The Canadian Province of Ontario, which appears to favor commercial fishing over sport fishing, long permitted commercial fishing for walleye, perch, and other species on its side of Lake St. Clair, much to the consternation of Michigan anglers. In 1970 that commercial fishery was halted because Lake St.

Clair fish were contaminated with mercury. When the mercury problem decreased, commercial fishing was not resumed, apparently because of U.S. and Canadian sportsmen's demands. In another case, the DNR proposed to allow limited fishing in Grand Traverse Bay for fish stocks not used by sportsmen. Organized sport fishing groups quickly let the DNR know that they seriously objected to it. That plan was cancelled.

### **Future Regulation**

Future fisheries regulations are uncertain because two Native American groups now claim control of all fisheries in about two-thirds of Michigan's Great Lakes waters, while litigation continues in several areas without licenses. At present they are restrained primarily by their temporary lack of equipment and by threats from recreational fishermen. The DNR could lose control over most of the commercial fishery and some of the sport fishery if the Native Americans win. The remainder of this paper, however, assumes that the DNR will eventually regain control.

During our recent conversations, commercial fishermen have maintained that their primary concern is one of equity. As long as their revenue covers expenses and a normal return to labor, management, and investment, they would rather have more fishermen in the business than fewer, especially if some or all of their prospective rent were taxed away. They also prefer to have an opportunity to improve their business competitively. Similar inefficiencies have been built into other segments of our economy to maintain more employees or firms than required. For example, U.S. farm policy sustains too many farmers. Furthermore, ICC trucking regulations in the U.S. prevent certain truckers from hauling loads on the return leg of hauling runs. Yet other examples come from labor union actions. For instance, after the 1978 coal strike was settled, union leader George Meary said something like "you can't pay those men enough to work down in those mines." In such cases the overriding public concerns are equity and ownership rights (see Bromley and Bishop, 1977). Perhaps it would be more equitable to maintain a larger, less efficient fishery that returns little or no economic rent to the fishermen or general public, or even one that returns too little to pay for its own management. At this time it is unclear what the merits or benefits of increased equity would be, or even whether there would be increased equity. Public policy makers must ultimately compare the benefits of increased equity with the more measurable benefits of increased economic efficiency. However, the cost of a small increase in equity may be very great. Imagine the bureaucracy, inefficiency, and lack of incentive if our entire economy were managed on this basis. That situation A is fairer than situation B does not necessarily mean that A is the socially optimum choice.

The DNR has raised other questions about equity which regard future controls (Scott, 1972). About 75 percent of Michigan market fish are exported from the state, whereas the costs of commercial fisheries management, administration, and law enforcement exceed license revenue by about fifteen to one (2). The excess is paid by sportsmen. This cost distribution seems inequitable. One would think that the commercial fishery should pay for itself and perhaps even pay rent to the public. The fact that fish are exported to other states has almost



no significance from a national perspective and little significance from a state or local perspective. Michigan communities benefit from the income flows in either case. If the fish were sold locally, more income and employment would remain in the local area.

The Great Lakes Fishery Advisory Board (1973) recommended that the number of licenses be reduced to the optimum level of forty, recognizing that this may increase or decrease over time as biological and market conditions change (3). Other recommendations include: (1) slightly modifying the license system to be more like a franchise system; (2) basing management upon a concept of allowable harvest, allocating quotas to each licensee; (3) assessing annual franchise fees of 10 to 20 percent of the estimated dockside value of the catch quota (at the beginning of the year) to pay the cost of administration, management, and enforcement; (4) compensating displaced fishermen; (5) establishing eligibility requirements for license holders; and (6) taking positive steps to help market Great Lakes fish.

The advantages for franchises cited by the committee (G.L.F.A.C., 1973, pp. 9-10) are:

1. The life of the franchise would usually be longer than one year.
2. Each franchisee would be subject to yearly catch quotas.
3. Each franchisee would be restricted as to allowable fishing gear.
4. The initial franchise fee assessed would offset startup expenses for conversion of the commercial fishery to franchising.
5. Continuing annual fees based on catch value would more equally carry the expense of managing the fishery.
6. Only qualified responsible persons with an adequate investment in the necessary gear and supporting equipment would be granted a franchise.
7. Districts could be assigned exclusively to a franchise if deemed necessary.
8. Assistance could be provided to assure adequate accounting and reporting procedures, allowing a more uniform and exacting check on the resources.
9. Scientific help could be offered to the franchisee by the department to assist in meeting the quotas set.

Other aspects that may be considered are an improved system for auditing the catch and its distribution through the markets and an allocation board to allocate fisheries among commercial fishermen. Fishing licenses or franchises would continue to be transferable, with DNR approval. Catch fees may also be used to finance a gradual buyback program to compensate fishermen for leaving the fishery. One difficulty with the recommended system is that while fees would be assessed in proportion to allowable catch, the fee would not necessarily be related to actual catch. Within any one year the fee would amount to a fixed as-

assessment based upon estimate catch but independent of actual catch. Economic analysis would predict pressure during the year for increased catch. There would be less pressure if the fee were assessed on actual catch.

### **Sport Fishing**

Michigan's sport fishery contrasts interestingly with its commercial fishery. Sport fishing regulations have generally followed the usual pattern in the U.S.: imposed inefficiencies in the form of tackle limits, catch limits, seasons and area closures, and nominal entry fees (licenses) with unlimited entry. These regulations are designed to promote near-maximum effort by distributing the catch over a large number of anglers and by keeping entry fees low enough to provide money for a reasonably high quality management program while not significantly limiting effort. Unlike some other states, Michigan provides no designated areas where a daily site fee is charged for special high quality angling.

Equity, sportsmanship, maximum participation, and fish resource enhancement are apparently the DNR's main goals of sport fishing management, with socially optimum sustained yield only a secondary goal. For example, creel limits of five salmonids per person per day are designed to provide more anglers with a chance for a fair share of the catch. Yet angling pressure at some places and times is so heavy that angler crowding causes serious conflicts (externalities) among anglers and between anglers and property owners. Some local fish stocks are probably being harvested even beyond the point of maximum sustained yield. With increasing recreation demand, inefficiencies such as creel limits must become increasingly strict to prevent biological overfishing.

Sport fishermen respond to open-access fisheries in much the same way as commercial fishermen: that is, they respond to the average product rather than the marginal product, entering the fishery until their personal fishing values equal their marginal costs. There is little or no "intramarginal rent" (i.e., surplus of value over cost) attributable to the more productive fishing grounds—no outstanding open-access fishing areas within easy reach of many people. With free entry, fishermen flock to the most promising fishing areas, fishing them down to the point where average catch rates are fairly equal in all areas except the more distant or least accessible ones. This can be viewed as an externality, with the private marginal product exceeding the social marginal product. The private marginal product would roughly equal the social average product. In other words, each angler's catch lowers everyone's future success, but each angler's decision is based upon his own values, not aggregate values. Other externalities, such as crowding or trampling, may also be present. Greater net social value could be obtained if effort were limited in such cases.

A system of site fees for fishing privileges similar to those found in Europe would restrict entry more appropriately and could lead to more optimal use of sport fishing resources. This would include providing some truly outstanding fishing areas for the public, without a complicated system of uniform regulations. Aggregate net societal value might be increased greatly if the administrative costs of this kind of system were not too great. Surely, the potential economic rent, before subtracting administrative costs, would be greatly increased. Perhaps the greatest argument against such a system is that of reallocation of fishing activity

from low income people to middle and high income people. Theoretically, this objection could be overcome if those who gain were to compensate those who lose.

Potentially, sport fishing can return economic rent to the owners of the resource, the general public. This could be done through the present system of license fees, through site fees, or through other mechanisms. A site fee system may be the most efficient if administrative costs are too high. There is no obvious reason why the sport fishery should not pay rent if the commercial fishery does, or vice versa. At present, the sport fishery does pay a slight amount of rent in the form of a subsidy to the commercial fishery (i.e., part of the administrative costs). It also pays part of the natural resource law enforcement costs, benefitting the general public as well as anglers.

Optimum levels of effort could also be reached by limiting entry using effort quotas, either on a first-come, first-served basis, through a lottery, or by allowing fishing on fewer days or fewer hours per day. However, none of these would provide optimal potential rent (net social value). The first method would resemble industry-wide quotas in which fishermen waste time and money racing to be first. The third method would encourage crowding externalities. The lottery system seems most attractive and is often used in Michigan to allocate limited hunting privileges. However, it has another drawback. A lottery system selects both high- and low-valued use with roughly equal probability, in contrast to a pricing system, which selects only that portion of the use that has the highest value to users. A lottery system may be fair in one sense, but it is inefficient because the maximum possible net value of resource use cannot be realized even with the optimum amount of effort. The other two methods also fail to discriminate between high- and low-valued use of the resource adequately, but to a lesser degree.

Recreational and commercial fisheries differ in some other important respects. Often, market fish prices remain constant over a wide range of effort and catch for a given commercial fishery. Yield can easily be mapped into total value of the product for the purpose of analyzing revenue and cost at various levels of effort. In the recreational fishery, however, once fish are available at a fishing site, the consumer is also the producer. An angler transports himself to the site and spends time fishing. He cannot pick up a unit of fishing in a plastic wrapper at a given price at the grocery store. This has three important implications for any economic analysis of angling. First, effort production costs are not uniform but, among other things, depend upon how far one must travel. There is a wide range of production costs for angling at each site, and these vary from site to site. Second, angling "product" values differ from individual to individual, since each will participate until his marginal utility is in some proportion to his marginal cost, and costs depend upon travel distance. In addition, the value of angling at one site depends upon the availability of perfect and imperfect substitutes, which in turn depend upon where one lives in relation to those substitutes (4). Finally, angling values depend to some extent upon angling effort. Both crowding and catch rates have some effect upon the value per unit of fish harvested. Other attributes of angling experiences have similar effects. The nature of these effects is difficult to determine. In addition, the effects may not be independent of each other; different anglers respond differently to various attributes (Talhelm, 1973).

Therefore, optimum sustained recreational use of fisheries is difficult to determine and difficult to compare with commercial use. Yield curves cannot easily be mapped into recreational value curves, and effort production costs vary widely. Simulation modeling of demand and supply appears to be the best method of determining economically-optimal recreational use (Talhelm and Eklafson, 1973).

Where the two compete, sport harvest values (per unit) are usually greater than commercial values for two reasons. First, both sport and commercial fishing produce food, but angling also produces recreational experiences. Second, and probably more important, substitutes are more readily available in the food market than for recreation. Fish are much less costly to transport to another location than are fishermen. However, commercial fishing values should outweigh sport fishing values in some cases, particularly for fish stocks inaccessible to large numbers of people, for species unattractive to anglers, and for fish stocks less accessible than stocks that are good substitutes. Policies that favor sport or commercial fishing in all cases are likely to produce less than maximum public values.

### **Present and Future Success with Limited Entry**

So far Michigan's limited entry program has been only a partial success. Much of the most serious overfishing has apparently been curbed. The number of commercial fishermen has been greatly reduced, providing a start toward an effective limited entry program. However, some stocks are still significantly overfished, the program is partially out of control because of various court suits, many inefficiencies are required of fishermen, and considerable resentment exists over the program. A franchise program promises to be more effective and more efficient, but perhaps less equitable, depending upon how ownership rights are viewed and depending upon the goals of the program. The quota shares system in Lake Superior seems to be a step in this direction.

Optimal levels of commercial and sport fishing have not yet been estimated precisely, although the Michigan Sea Grant Program, the DNR, and others are working on that problem. Methods are now available to estimate recreational values. Bioeconomic analyses may be used to estimate economically-optimum effort, taking into consideration inefficiencies that may be built into the system through regulations. These inefficiencies and the costs of administration and enforcement should be explicitly considered, together with various other social costs (Talhelm, 1977).

The present regulations have been quite successful in reducing the direct competition between sport and commercial fishermen, although at some cost. Some fish stocks in areas closed to commercial fishing are now being underutilized because anglers harvest so few. Perhaps purse seines or other gear will permit commercial harvesting in such areas without hampering sport fishing. In other cases, less efficient fishing methods, such as trap nets, are being used to avoid killing sport fish. More important, however, the program recognizes the fact that, on the whole, sport fishing values far outweigh commercial fishing values. This was felt long before it was verified through economic analysis. Perhaps the most valuable lesson to be learned from Michigan's experience is that sport fishing values are usually greater than commercial fishing values near populated areas. Sport fishing values are still increasing more rapidly. This will

probably continue to be true in the future unless food prices increase greatly or recreation demand falls. In areas where sport and commercial fishermen compete for the same stocks, especially within a few hours' drive of urban areas, the greatest values will usually be realized when the sport fishery is given first priority under some sharing arrangement. Methods are now available to determine more precisely optimal sport and commercial shares of fish stocks. The sport/commercial allocation problem is becoming more and more important in marine fisheries management.

The DNR feels that the Great Lakes are still underutilized for both sport and commercial fishing. The future outlook is good for a small, viable, and fairly efficient commercial fishery as well as an outstanding sport fishery. This future could be far or near, depending upon pending and future court actions.

Table 1: Common and Scientific Fish Names

Common Name	Other Names	Scientific Name
lake trout		<i>Salvelinus namaycush</i>
rainbow trout	steelhead	<i>Salmo gairdneri</i>
coho salmon	silver salmon	<i>Oncorhynchus kisutch</i>
chinook salmon	king salmon	<i>Oncorhynchus tshawytscha</i>
lake whitefish		<i>Coregonus clupeaformis</i>
lake herring	shallow water cisco	<i>Coregonus artedii</i>
bloater	chubs, deepwater cisco	<i>Coregonus hoyi</i>
longjaw	chubs, deepwater cisco	<i>Coregonus alpenae</i>
blackfin	chubs, deepwater cisco	<i>Coregonus nigripinnis</i>
lake sturgeon		<i>Acipenser fulvescens</i>
alewife		<i>Alosa pseudoharengus</i>
smelt		<i>Osmerus mordax</i>
sea lamprey	lamprey eel	<i>Petromyzon marinus</i>
carp		<i>Cyprinus carpio</i>
sucker	mullet	<i>Catostomus and Moxostoma species</i>
yellow perch		<i>Perca flavescens</i>
walleye	yellow pickerel	<i>Stizostedion v. vitreum</i>
northern pike		<i>Esox lucius</i>
emerald shiner		<i>Notropis atherinoides</i>
smallmouth bass	black or green bass	<i>Micropterus dolomieu</i>

# WISCONSIN'S LIMITED ENTRY EXPERIENCE

Richard C. Bishop, Gary V. Johnson, and Karl Samples

Wisconsin now has nearly ten years of experience with a limited entry program in its Lake Superior commercial fisheries. The fisheries themselves are small by national standards, involving about twenty licensees who take an annual dockside catch of about half a million dollars. The experience at Lake Superior involves some rather unique aspects that are not likely duplicated elsewhere. Still, Wisconsin's experience in limiting entry on Lake Superior and recent legislation authorizing limited entry on Lake Michigan as well do offer some valuable lessons about practical aspects of limiting entry into commercial fisheries. While much has been written about limited entry on a theoretical level, practical applications are relatively new and have received less attention. This workshop is thus serving a valuable function by facilitating documentation and comparison of practical experiences from a number of jurisdictions.

The present paper has two goals: to document the evolution and current status of limited entry in Wisconsin and to draw on that experience for observations that may be helpful to other states and provinces in managing their fisheries.

The paper begins with a brief description of the Lake Superior fisheries as they stand today. The current status of the fisheries has been strongly influenced by the invasion of sea lampreys and resulting damage to the fish stocks that began in 1953. Once the lamprey populations had yielded partially to control measures, how to manage the fisheries, and particularly the lake trout fishery during rehabilitation, became the central issue. It was out of efforts to cope with this issue that the Lake Superior limited entry program was born. These historical events and the resulting configuration of management institutions is the topic of the second section of this paper.

A closer look at the fishing industry based on personal interviews with a sample of licensees and other data shows that present licensees feel that the program has had some important benefits to them, particularly in the form of incidental lake trout catches that are larger than they could have been under open access. The fishers also see certain problems with the program, including possible inadequacies in the mechanisms for the entrance of new licensees, as existing ones retire or exit for other reasons.

While entry limitation legislation was adopted for Lake Superior in 1968, open access continues in Wisconsin's larger and more productive Lake Michigan commercial fisheries. A new legal basis for managing both Lake Superior and

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Lake Michigan was signed by the governor in May 1978. After a brief look at the current situation in the Lake Michigan fisheries, the major features of the new law are discussed, with particular attention to the role of proposed commercial fishing boards for both lakes. These boards would include commercial fishers and would share management authority with the Wisconsin Department of Natural Resources in several important areas related to limited entry.

The closing section of the paper draws on Wisconsin's experience to develop some observations about the importance of clearly defining management objectives, the potential roles of license fees and individual quotas in limiting entry, the advantages of making licenses transferable, and other topics.

This paper is devoted to Wisconsin's experience with limited entry. As such, it does not consider the broader question of whether entry *ought* to be limited either in Wisconsin or elsewhere. It must suffice here to suggest that much of the writing by economists advocating limited entry rests on questionable footing theoretically and empirically because of inadequate attention to the linkages between equity and efficiency. The interested reader is referred to Bromley and Bishop (1977) and literature cited there. Let us here focus instead on Wisconsin's experience, beginning with an overview of the Lake Superior fisheries.

### **The Lake Superior Fisheries (1)**

The commercial catch in Wisconsin waters of Lake Superior was about one million pounds in 1977, valued at about half a million dollars dockside. More than 95 percent of these amounts was contributed by six species: whitefish, chubs, lake trout, siscowhet (or fat trout), lake herring, and smelt. Around 70 percent of the catch was taken by gillnets with pound nets also being important for whitefish and smelt.

The catch was taken by nineteen license holders. In 1975, the most recent year for which we have data, thirty-eight people were employed as crew members. Also for 1975, the licensees reported 1.7 million dollars invested in gear, vessels, and real estate. Over a million dollars of this total was accounted for by real estate alone.

The above figures include two Native American fishers who held commercial fishing licenses. In addition, there are about a dozen Native Americans with substantial commercial catches who do not hold commercial fishing licenses but fish under treaty rights and market through regular marketing channels. An additional thirty or forty Native Americans fish under treaty rights, but largely for home use or local sales. Only the catches of the two Native Americans who hold regular licenses are included in the above statistics.

The non-Indian commercial fishery as it stands today has been shaped by several environmental factors. The lake trout population has made some recovery after serious depletion by the sea lamprey. Lake herring were once produced at a rate over six million pounds per year, but in 1977 did not even provide a catch of one hundred thousand pounds. Decline of the lake herring may be a result of increases in smelt, a non-native species that is now plentiful. The trend in chubs has been down somewhat, possibly due to expansion of the smelt population. Rapid expansion of the siscowhet catch has occurred with recovery of the population from the lamprey disaster. Whitefish have been relatively pro-

ductive in recent years. Reasons for whitefish fluctuations are not well understood.

In addition to these environmental factors, the shape of the industry has been affected by regulations including the entry limitation program.

### **The Entry Limitation Program in Historical Perspective**

Prior to 1953, the Wisconsin waters of Lake Superior supported a relatively stable commercial fishing industry. While a number of species were commercially valuable—whitefish, chubs, lake herring, and smelt—the backbone of the industry was lake trout. The importance of lake trout was the result of its high value and the stability of lake trout yields (Lawrie and Rahrer, 1972). Regulation of the lake trout and other fisheries in Wisconsin's Lake Superior waters was the responsibility of the Conservation Department—later reorganized into the present Department of Natural Resources (hereinafter, both departments will be referred to as DNR). Regulation of the fisheries was of the traditional nature of closed seasons for several species during spawning, minimum size limits (seventeen inches on trout), and outlawing of certain types of gear.

Sea lampreys (*Petromyzon marinus*) had been infiltrating the Great Lakes system for several years and starting in 1953 became a factor in Lake Superior. By 1955, the total lake trout losses throughout the Great Lakes amounted to five million dollars annually (Dulles, 1955). A treaty between Canada and the United States established the Great Lakes Fishery Commission, which was charged with lamprey control and research coordination. The commission also provided a forum for those with regulatory powers to meet and discuss regulatory actions.

Commission-funded research led to a chemical lamprey toxin called TFM, which went into broad use with great success. In Lake Superior, sea lampreys had been reduced to 1.0 percent of their former abundance by 1962. Unfortunately, the success of the lamprey control program had little immediate effect on the lake trout population because of the effects of previous predation on the breeding stocks. As a result, at a 1962 Great Lakes Fishery Commission meeting, representatives of the states and Ontario agreed to go back to their agencies and recommend the lakewide closure of the Lake Superior lake trout fishery. On July 1, 1962, Wisconsin closed its lake trout season on Lake Superior. Along with the season closure, DNR added a provision to the regulations stipulating that a fisher was required to move his or her nets whenever 10 percent of the fish in a lift were lake trout.

The lake trout closure resulted in additional stress on a fishing industry that was already very depressed because of low catches not only of lake trout but also of whitefish and lake herring. To aid the whitefish industry, DNR decided to allow it to take up to 50 percent of its catch in "illegal" lake trout. However, to protect and, it was hoped, to enlarge breeding stocks, DNR began to control the amount of gear and the number of lifts of each whitefish licensee. This was accomplished through the issuance of whitefish permits issued for six-week periods. At the end of each six-week period, biologists would review the catch of whitefish and lake trout and adjust the amount of gear and the number of lifts for each operator up or down accordingly. In addition, a total of fifteen thousand pounds of trout could be taken through the ice. The quota was divided equally



among the applicants for winter whitefish permits. Average catches were around eighteen hundred pounds of lake trout per whitefish operator, with gillnetters being permitted larger catches and pound netters smaller catches because of lower survival of lake trout in gillnets.

Although this concession did help the industry to survive, it also created tensions that ultimately led to substantial support for limited entry in the industry itself. While each whitefish permit restricted the amount of gear and the number of lifts, the lack of limited entry meant that anyone who applied for a permit got one. As lake trout stocks began to rebound, entry, or more accurately re-entry, occurred. The entrants tended to be casual operators who had left the fishery in previous years. They held outside jobs at least part of the time and tended to fish for supplementary income and to fill periods of seasonal unemployment. Each casual operator, however, received a permit to fish just as much as a full-time operator. As DNR attempted to hold the lid on fishing pressure, the full-time operators were increasingly restricted. To augment tensions, the fifteen-thousand-pound ice fishing quota was simply divided equally among the applicants. As the casual fishers entered, this diluted the shares of established fishers. In 1967, the last year before limited licensing went into effect, thirty fishers shared the incidental ice fishing catch of lake trout. The full-time fishers viewed these seasonal fishers as having deserted the fishery when things were rough and as having come back to skim the cream as the fishery recovered.

Additional momentum toward limited entry resulted from concerns on the administrative side. In 1964, just two years after the closing of the lake trout season on Lake Superior, it became evident to the participants in the Great Lakes Fishery Commission meetings that if the lake trout did recover and the fishery could be reopened, there would be a gearing-up by commercial fishers, resulting in intense, early pressure and rapid depletion of the lake trout population. During these discussions, the idea of limiting entry surfaced. It was recommended that each of the agencies with regulatory power should investigate the feasibility of limiting entry under its current statutory power. It was determined in Wisconsin that new legislation would be required.

Out of these events came Wisconsin Assembly Bill 14, which became law on July 8, 1967. The goal of the legislation was to promote wise use and conservation of fish resources. To this end, DNR was authorized to limit the number of licenses and designate areas for fishing on the basis of the available harvestable population of fish. The DNR was also instructed to develop criteria for eligibility to hold commercial fishing licenses, taking into account residency, past record, fishing and navigation ability, and the quantity and quality of equipment possessed. While the original legislation included Lake Michigan, this was dropped in the face of heavy opposition, so that the 1967 law applied only to Lake Superior.

On March 30, 1968, DNR took the first step toward implementing the new law by freezing the number of licenses at its then-current level of sixty-eight. Licenses were to be nontransferable. If and when the number of licenses in force fell below sixty-eight, new licenses could be issued. To qualify, the potential applicant had to have been a crew member or partner in a commercial fishing operation on Lake Superior for the previous five years. Priority was to be given first

to residents of Wisconsin counties bordering Lake Superior, second to other Wisconsin residents, and third to nonresidents. In cases where the number of equally-qualified applicants exceeded the number of available permits, the earliest postmarks were to be the determining factor. Commercial fishers present at a public hearing prior to adoption of these controls voiced support for them by a margin of nineteen to fifteen.

The promulgation of these regulations meant that by 1968 commercial fishing on Wisconsin's Lake Superior was subject to these regulations: illegality of certain gear, size limits, and closed seasons, all of which had been in effect prior to 1953; permits for the type and amount of gear and the maximum number of lifts in the whitefish industry during the permit period that had been introduced into the fishery in 1962 (also the allowance of an incidental lake trout catch to whitefish fishers); the specification of areas that could be fished; and the limitation of the total number of licenses in the fishery to sixty-eight. This still left the portion of the 1967 law relating to licensing criteria unfulfilled and did not relieve tensions between full-time operators and those casual operators who were grandfathered into the fishery as part of the sixty-eight licenseholders. After some urging from members of the industry who wanted their long-term status clarified, the Wisconsin legislature instructed DNR to prepare a long-term plan for the fisheries, including criteria for annual issuance of licenses. As part of this process, the number of licenses was reduced to fifty-eight for the 1971-72 season, as a result of attrition that had occurred since 1968. After the 1971-72 licensing year, the number of licenses was to be set at the maximum number issued in the preceding two years. Furthermore, criteria for licensing based on minimum catch and days fished in the preceding year and on minimum investment in commercial fishing were developed as shown in table 1 and implemented starting in 1971-72. Both present licensees in 1971-72 and future applicants who were otherwise qualified as discussed above had to meet these requirements. After five years in the fishery (1975-76 for then-current license holders), one must maintain ten thousand dollars in total investment, catch five thousand dollars worth of fish, and fish seventy-five days each year in order to continue to be licensed. The obvious intent of these criteria was to eliminate the casual operators by giving them five years either to become more fully involved or to exit.

Table 1: Added Licensing Criteria for the Lake Superior Fisheries

Year	Total Investment in Commercial Fishing	Value of Catch in the Previous Year	Days Fished in the Previous Year
1	\$ 5,000	none	none
2	\$ 5,000	\$3,000	50 days
3	\$ 7,500	\$3,000	50 days
4	\$10,000	\$3,000	50 days
5 and after	\$10,000	\$5,000	75 days

Entrance of the Native Americans into the fishery in a major fashion in 1972 once again brought change to the fishery. The Native Americans' right to fish commercially was established in two court cases involving the DNR: one involved the fishing by Native Americans in a close area and the other concerned the sale of fish by them to a local wholesaler. The Native Americans won both cases by proving that their ancestors had fished commercially on Lake Superior prior to the 1854 treaty date (Albrecht, 1975). Once the Native Americans had established their fishing rights, the question of the incidental lake trout catch arose. At a Great Lakes Fishery Commission meeting, Wisconsin DNR, along with the U.S. Fish and Wildlife Service, worked out a total quota of lake trout for all of Wisconsin's Lake Superior fishers—sports and Native and non-Native American commercial fishers—of one hundred fifty thousand pounds per year. This quota had been arrived at from review of lake trout sampling data and the then current rate of stocking of three million lake trout of age one or older per year. This overall quota was divided into fifty thousand pounds for the sport fishery and one hundred thousand pounds for the Native and non-Native American commercial fisheries. The commercial quota was further divided, with forty thousand pounds being allocated to the Native Americans, forty thousand pounds to non-Native Americans, and twenty thousand pounds reserved by DNR for assessment of the stocks to be awarded by contract to eligible Native and non-Native commercial fishers.

While the Native American conflict precipitated the last major regulatory change in the Lake Superior fisheries to date, other changes have occurred. The licensing age was lowered to eighteen. The maximum number of licenses in the fishery was permanently set at twenty. This last change was done at the request of the fishers themselves because they feared that setting the maximum at the highest number in the previous two years, as under the previous regulations, was resulting in too few licenses in the fishery. Many of the non-Native American fishers were aging and feared that when they wanted to retire, their rigs would be worthless if licenses were not available. Restrictions on gear and lifts in the whitefish/lake trout fishery have been relaxed in favor of simpler restrictions on the amount of gear that can be licensed by each operator on an annual basis, supplemented by required permits for summer and ice fishing for specific areas.

Another change in the regulations was the official opening of a lake trout season in 1976. Since the closing of the lake trout fishery in 1962, DNR continued to look upon the catch as an incidental one even after the official lake trout quotas were established with the increased activity of the Native American commercial fishers in 1972. The opening of the lake trout season did not change DNR's treatment of lake trout as incidental catch. This is reflected by the fact that whitefish fishers using pound nets were given a quota of twelve hundred pounds of lake trout in 1977, as opposed to the twenty-two-hundred-pound quota given large mesh gillnet fishers in that same year. This differential treatment reflects the higher mortality of lake trout in gillnets.

Table 2 outlines the major changes in the Lake Superior fisheries management and regulation given in this section of the paper.

### **Effects of Entry Limitation on the Industry**

In 1968 when the number of licenses was frozen, there were sixty-eight li-

Table 2: Chronology of Wisconsin's Lake Superior Fishery Management and Regulation

Item	Date	Description
Closed seasons, size limits and illegal gear	Prior to 1953 to the present	These are the traditional means of controlling the fisheries that are still in use today
Initiation of the lake trout sampling program	1959 to the present	The purpose of this sampling was to obtain comparable year to year data on the lake trout population. Size of the sample has stayed roughly between 10,000 and 15,000 pounds throughout and has usually involved five fishers.
Increased stocking of age 1 or older lake trout	Began 1961 for Wisconsin	An effort to help the recovery of the lake trout after poisoning of the lamprey spawning streams with TFM
Closure of lake trout fishery	1962-76	Lake trout only caught incidental to white fish fishing.
Permits for quantity of gear and maximum lifts	1962 to the present	Wisconsin's means of protecting remaining lake trout and controlling the anticipated gearing-up of fishers after the lake trout recovery.
Limited licensing and the designation of areas which could be fished.	1967 to the present	Number of licenses frozen and gear permits issued on area basis.
Institution of criteria on investment, value of fish caught and days fished	1971 to the present	The addition of these criteria brought about the full implementation of the limited licensing law of 1967
Institution of an overall lake trout quota for the fishery	1972 to the present	A response to the expansion of the Native American fishery.
Setting of the maximum number of licenses at 20	1976 to the present	Done at the request of the commercial fishers
Opening of the lake trout season	1976 to the present	Lake trout catch less strictly tied to whitefish, but gill netters continue to get larger quotas.

censes in force. By the 1970-71 licensing year, just prior to the year that the relicensing requirements based on investment, catch, and days fished went into effect, only thirty-eight licensees remained. Even though the basis for licensing had changed (2), this still represented considerable attrition because of poor fishing. Lake trout remained tightly controlled and tied to whitefish under the system described above. Whitefish fishing was in a slump until 1970, when recovery began. Lake herring stocks that once had produced six million pounds in a single year had not, and indeed still have not, recovered. Chub catches were down

somewhat as well. By 1970-71, the industry consisted of two groups: the small casual fishers and the full-time people who had somehow held on through the lean years. Several of the full-time operators were nearing retirement.

As discussed above, scarcity of resources and the regulatory scheme led to tensions between casual and full-time fishers. The relicensing criteria implemented in 1971 did exactly what they were designed to do: eliminate the casual fishermen. In the process, some of the full-timers who were near retirement also fell below the minimum criteria and were eliminated. By 1977, only nineteen licensees remained, despite improved fishing for some species such as whitefish (3).

During the summer of 1977, we interviewed thirteen out of the nineteen current licensees. Available data on the remaining six licensees indicated no reason to suspect that the sample was in any way unrepresentative of the group as a whole. The average age of our sample was 57.7 years and the median was 55 years. All but one of the thirteen considered themselves full-time fishermen. About 75 percent had thirty or more years of fishing experience.

All but two of the thirteen operators had net family incomes after taxes between six thousand and fourteen thousand dollars and the median income bracket was ten to twelve thousand dollars. Few, however, were totally dependent on fishing and fishing-related businesses for their incomes. At least two and possibly three were receiving social security payments. Rental of waterfront property, and earnings from working wives and, in one case, from a small business were other sources of household income.

Almost everyone we interviewed had some favorable things to say about the limited entry program. Elimination of the casual operators tends to be viewed as a major benefit by those remaining. While the poor quality of fish produced and the poor fishing practices of the former participants were mentioned, the overriding consideration was division of the lake trout quota. Several interviewees also mentioned that entry limits protect them from migrations of Lake Michigan and other fishers.

On the other hand, our respondents pointed out some aspects of the program that they perceive as being problematic. The licenses are not directly transferable and this creates uncertainty when the current licensee wishes to sell out or turn the business over to a son or daughter. Furthermore, young potential fishers may be discouraged by doubts about whether licenses will be available once they have served as crew members for a sufficient length of time and have otherwise become qualified. Our survey indicated that there were no crew members other than those from the licensees' families who intended to become licensees. This would tend to support the position that Wisconsin's Lake Superior entry limitation program does not make adequate provision for future entry. On the other hand, the net income figures noted above suggest that perhaps incomes are still too low by present day standards to attract younger people from nonfishing families. The extent to which entrants from traditional fishing families will be attracted in sufficient numbers to replace fishers who exit for retirement or other reasons over the next decade or two remains to be seen.

Turning to the other end of the age spectrum, some present fishers also feel that the program makes inadequate provision for semi-retirement. To continue

to catch sufficient fish and operate on a sufficient number of days to maintain the license is difficult for a person who is getting up in years, yet doesn't want to retire completely. Several Lake Superior fishers feel that some special provision should be made for them when they reach the age where semiretirement would be preferable.

Some concerns also surfaced relating to the minimum entry requirements. While none of the respondents had any problems meeting the minimum investment requirement (ten thousand dollars), some worried about having to fish enough to accumulate seventy-five days fished and possibly even the five-thousand dollar catch if, say, fishing were poor or illness set in. It may be worth noting that seventy-five days fished would seem small in many ocean fisheries but represents a substantial amount of fishing for the Great Lakes because of ice. In the case of Lake Michigan where we have data, only the top 10 percent of the fishers fished more than one hundred fifty days in 1976 (Bishop, *et al.*, 1978). Lake Superior fishers wonder whether they will be forced to fish seventy-five days in years when it is not economical to do so or lose their licenses due to illness.

One question that often arises in the case of limited entry is what happens to those who are excluded. We hoped to learn more about this group by asking present licensees about them. This was not very successful, however. We could learn of only two ex-fishers and only one of these still lives in Wisconsin. To try to follow up did not seem very promising.

Perhaps more serious are management problems that are emerging as a result of expansion in the Native American fisheries. Under treaty law as interpreted by the courts, DNR cannot regulate the Native Americans fishing under treaty rights unless there is a threat of substantial depletion of the resource. Cases in other states indicate that the Native Americans must be allocated a "fair share" of fishery resources where conflicts developed. Thus, for example, the Native Americans were allocated half of the allowable commercial harvest of Lake Superior lake trout (forty thousand pounds). Not only is regulation made more difficult by these legal constraints, but DNR has not been able to acquire catch records from Native Americans to adequately assess their impacts on the resources. It does appear that they are expanding effort, thus gaining the capacity to have a major effect on the stocks. This may eventually undermine the limited entry program and even now makes it difficult to evaluate the program.

Although these problems exist, improved fishing, lake trout quotas, and protection from entry seem to have contributed to an environment of guarded optimism. The rate of decline in the number of operators, which has been such a dominant force since the beginning of the sea lamprey disaster, appears to have stabilized. The fishers we interviewed are sufficiently optimistic to be making substantial investments in equipment, such as new depth finders, radar, and ship-to-shore radios. Some new investment in gear is occurring, particularly in pound nets. Some new open boats used in servicing pound nets have been added to the fleet.

Against this background of guarded optimism are major new alterations in the institutional base for managing Wisconsin's Great Lakes commercial fisheries. At this point in the story, however, management of Lake Michigan be-

comes an important, even predominant, consideration, so that it is necessary to turn to the characteristics of the Lake Michigan fisheries and the issues that confront public decision makers there.

### **The Lake Michigan Fisheries**

Wisconsin's Lake Michigan commercial fisheries are larger than the Lake Superior segment of the industry. In 1976, a total of 38.4 million pounds of fish were produced with a dockside value of \$2.6 million. More than 98 percent of the catch in both pounds and dollars consisted of six species—whitefish, yellow perch, alewives, chubs, smelt, and carp. Wisconsin presently licenses about three hundred people to fish commercially in Lake Michigan. More than half of these consider themselves to be part-time. During 1976, only 213 actually reported a catch. The average age of Lake Michigan licensees is about fifty years, which is slightly less than that of Lake Superior. About six hundred crew members are employed by the licensees, with nearly 70 percent considered part-time. The low level of activity of a large share of the fishers is further illustrated by the distribution of the catch among operators who reported some catch. The top 10 percent of the fishers (twenty-two licensees) caught 55.5 percent of the catch and the top 40 percent caught 94.3 percent of the fish (in dollars). The fishers report \$13.6 million of investment in gear, vessels, and real estate, with nearly \$10 million of the total held in real estate alone. For more details about the Lake Michigan fisheries see Bishop, *et al.* (1978).

As was noted in the historical sketch, the legislation authorizing entry limitation on Lake Superior originally included Lake Michigan as well, but this had to be dropped because of resistance from the industry. In 1974, the secretary of the Wisconsin Department of Natural Resources appointed the Ad Hoc Lake Michigan Task Force, which included representatives of the commercial fishers, sport fishers, federal agencies, and University of Wisconsin. As part of its charge, the task force was asked to consider whether participation in the commercial fishery should be restricted and, if so, how. In its report (Wisconsin DNR, 1975, p. 27) the task force did recommend limited entry, pointing out that:

Lake Michigan has limited stocks of fish, governed by production space available and the fertility of the system. Fishing units currently operating can deplete stocks of preferred species. The number of fishing units should be proportional to the available stock of fish. Such a ratio would permit stability, efficiency, and adequate conservation of fish stocks. Limited entry is not an adequate answer in itself, because it must operate with quotas and area and gear restrictions to be effective.

The task force concluded that the Lake Superior program had been a success and recommended that implementation of limited entry be carried out by limiting the number of licenses and establishing criteria for relicensing.

With the support of the task force's report, DNR has continued to work for legislation to authorize limited entry on Lake Michigan. Its arguments are familiar to the economist. Open access puts heavy pressure on stocks of species with sufficient economic value. Individual profits fall to the margin. To try to realize a reasonable level of profit, fishers try to expand catches. To quote Ronald J. Poff of DNR, "More fish cannot be produced from a limited resource and therefore

the result is destruction of both the resource and the industry. The fishing industry on Lake Michigan is all too aware of the 'boom or bust' consequences of open fishing" (Poff, p. 6). Traditional approaches to fishery regulations such as closed seasons only make matters worse, according to Poff. "This leads to overcapitalization, marginal profits, and ultimate failure" (Poff, p. 6). Thus, limits on the number of licensees, the amounts of legal gear each can use, and the catches each can take are seen as basic tools of management. These must be combined with seasons, area closures, and other more traditional approaches if the fisheries of Lake Michigan are to be managed effectively from the standpoints of both the stocks and the industry. Stability and efficiency in the industry can best be accomplished, according to DNR's view, by fostering an industry made up of a comparatively small number of larger full-time operations that can adapt to changes in abundance of stocks and other exogenous influences such as contaminant regulations. Until recently, DNR supported legislation that would have given it legal authority to set up a Lake Superior-type program for Lake Michigan. As in previous years, however, there was much resistance from the industry.

Why is it that this approach to limiting entry could be instituted and gain a certain amount of support from the Lake Superior sector and not gain support from a substantial share of the Lake Michigan people? Part of the explanation must lie in the fact that Lake Michigan has not seen the tensions over scarce lake trout resources that developed on Lake Superior. Tentative results of a sample survey of Lake Michigan fishers indicate that the larger full-time operators do not view the casual and part-time fishers as a threat. Furthermore, our tentative results seem to imply that the Lake Michigan fishers do not share DNR's view that the "boom or bust" phenomenon is a problem. The fishers tend to emphasize natural fluctuations, exotic species, and pollution rather than overexploitation as the major causes of diminished stocks. It should also be pointed out that among the fishers there is a great deal of distrust of anything DNR proposes. This may be partially the result of a basic political conservatism with respect to government interference in the private sector. It also stems from a commonly held view that past management decisions have given inadequate attention to the fishers' economic situation, have been arbitrary and capricious, and have reflected an agency bias in favor of sport fishing. Finally, the situation among part-time operators may be different from that for Lake Superior. It will be recalled that, so far as we have been able to determine, the part-time operators on Lake Superior, prior to institution of the minimum requirement to renew licenses, were predominantly quite small, rather casual fishers. By contrast, Lake Michigan has many part timers who have substantial operations. In 1976 perhaps forty licensees reported catches of between one thousand and five thousand dollars gross value. Nearly sixty licensees fished more than twenty-five but less than seventy-six days. Clearly, there is a substantial group on Lake Michigan that would have problems meeting the Lake Superior criteria, yet may have a significant economic interest in fishing and feel threatened by limited entry.

The result was that the proposal to authorize DNR to limit entry on Lake Michigan ran into heavy opposition. In addition, events in the courts put further constraints on DNR's management activities. In particular, a case involving a re-



striction on where gillnets could be used resulted in a lower court decision that the DNR did not have the legal authority to prohibit fishing for whitefish on an area basis. Questions began to arise about other regulations as well. The desire to clarify management authority was thus added to the push to limit entry. The result was a new commercial fishing law, which makes potentially significant changes in the institutional structure for managing the Lake Superior and Lake Michigan fisheries.

#### **Wisconsin's 1978 Fishing Law (4)**

An important statement of intent is presented in the law:

The intent of the legislature in revising commercial fishing laws is to provide for multiuse management of the Great Lakes fishery, including an economically viable and stable commercial fishery and an active recreational fishery. To reach this management objective, the legislature recognizes that it may be necessary to limit participation in the commercial fishery and to limit the harvest of commercially fished species through proven scientific management techniques (Wisconsin Laws of 1977, Chapter 418, Sec. 923(37)(d), Nonstatutory provisions, p. 214)

Thus, Wisconsin is committed to the coexistence of sport and commercial fishing on the Great Lakes. This is in contrast to states like Michigan, which have policies of permitting commercial fishing only where it does not interfere with sport fishing. Furthermore, the legislature goes on record here as agreeing that limited entry may be required to achieve a viable, stable commercial fishery.

The institutional structure for decision-making to achieve this goal differs from the Lake Superior entry limitation program and is rather innovative. Authority is divided between the DNR and two commercial fishing boards, one for Lake Superior and one for Lake Michigan. The Lake Superior Commercial Fishing Board consists of five members, including three commercial fishers, one wholesale fish dealer, and one citizen. The Lake Michigan board would consist of five commercial fishers, one fish wholesaler, and one citizen. Board members are to be appointed by the governor and serve at his/her pleasure.

Under the new law, DNR and the boards share authority in three important areas. First, DNR is authorized to issue annual licenses and to determine the total number of licenses to be issued. However, issuance of licenses must be based on criteria established by the boards, including criteria for identifying inactive licensees. Following the 1967 entry limitation law, the new bill explicitly mentions residency, past record, fishing and navigational ability, and quantity and quality of gear possessed as considerations important to the development of these criteria. All present operators receiving "a majority of their income" from fishing are to be grandfathered for five years to provide for orderly transition. Secondly, and also relating to licensing, the boards are charged to approve or reject applications to transfer licenses based on criteria developed by DNR. The licenses are transferable to qualified persons, including members of the licensee's immediate family, provided that the rules of transfer developed by DNR assure "the wise use and conservation of the fish resources being harvested under the license." The DNR is also authorized to determine species harvest limits. These limits are

to be divided into quotas for individual licensees on the basis of criteria provided by the boards.

Several other aspects of management will be handled by DNR alone. The bill explicitly authorizes the department to designate the kind, size, and amount of gear to be used, and areas where commercial fishing operations will be restricted. Also, the department can establish catch fees for those species of fish whose populations are sustained or supplemented through stocking.

Additional aspects of the law are of interest here. The license fees are raised substantially. License fees in Wisconsin depend on the size of boats used in fishing and currently total substantially less than one hundred dollars for most operators. The new fee schedule involves a resident fee of sixty dollars for boats under twenty-five feet (or fishing under the ice without a boat) and two hundred dollars for boats twenty-five feet or over with an additional fee of five dollars per foot of overall length in excess of forty feet, with a maximum of three hundred dollars per boat. A licensee may have more than one boat per license in Wisconsin. Higher license fees are supported by DNR and some fishers as a way to cover management costs and reduce the number of casual and inactive licensees. Another important aspect relates to rough fish contracts. Removal of rough fish such as carp, suckers, and alewives is considered desirable and there was concern that the higher fees would significantly reduce incentives to catch these fish. Thus, those who harvest only rough fish are exempt from licensing requirements. Instead contracts will be signed with DNR for a set fee of twenty-five dollars.

Finally, we should mention that one source of controversy as the bill proceeded through the legislature was the mechanisms for legislative review of rule changes. Normal procedure in Wisconsin is for all sorts of administrative rules and regulations to go before rules committees of both houses of the legislature and then to the governor with whatever recommendations the committees care to make. Rules approved by the governor then go into the Administrative Code. Because of what they felt have been poor decisions in the past, the commercial fishing groups wanted more careful scrutiny of DNR decisions by the legislature. The 1978 law provides a framework for legislative review of proposed changes in commercial fishing regulations except in emergency situations.

How well fishery management under this new basis will work in the Lake Superior fisheries will depend on the results of interactions between the board and DNR, but we suspect that there will not be major problems. With the current setup, provisions for transfer of licenses should be welcomed by the fishers as a solution to one problem. We suspect that under the new organization for management, the limit on licenses, limits on gear to be fished under each license, and minimum requirements for renewal of licenses will continue in force. If and when there is evidence of overexploitation, individual quotas may be added for species other than lake trout, creating some difficult choices, but the changes from the 1978 law are likely to be mild compared to those that may come about if the Native American fishery continues to expand.

The outlook for Lake Michigan is much more uncertain. Higher license fees will probably drive out several dozen casual operators. The new law does clearly authorize restrictions on fishing in areas designated by DNR. The agency has

stated that such controls are important, and area restrictions as well as other traditional forms of regulation can be expected to continue. Whether the board and DNR can develop a system of limited entry, as DNR hopes, remains to be seen. The bill contains the ingredients for major confrontations. Suppose, for example, that DNR under the authority of the law sets the number of licenses at, say, 125, but the board refuses to come up with licensing criteria to attain this goal? Perhaps all of this can be ironed out. It will be interesting to see. Our results do indicate that many fishers remain adamant that DNR already has too much power over them, and fail to see what, if anything, limited entry will accomplish that will be helpful to anyone in the industry. Most endorse the commercial fishing board as a method of giving them some control over the process of rule making, but many are skeptical about how much the boards can actually accomplish on their behalf, citing what they view as disadvantageous decisions in the past, despite the long existence of the Great Lakes Fisheries Advisory Council (5). An interesting tentative result of our research is that the increase in license fees is one of the least controversial parts of the bill, a point to which we will return in the concluding section.

### **Some Concluding Thoughts on Limiting Entry**

More and more states and provinces are experimenting with entry limitation, and the extension of fisheries jurisdiction may add further impetus to this trend. This concluding section pulls together some thoughts from fisheries economics and Wisconsin's experience that may be useful in managing other fisheries.

First, we as economists must continually remind ourselves and those around us that limited entry is a set of tools for management and not a goal in itself. Whether one or more of the tools for limiting entry is appropriate depends on the goal or goals of management. These goals should be clearly articulated in practical terms. Many of Wisconsin's Lake Michigan fishers have been dead-set against limited entry legislation over the last ten years because they do not have a clear idea of what it is designed to accomplish. Abstract ideas about common property and economic efficiency are not likely to clarify the issues. On the other hand, when a clearly defined, practical goal like protecting Lake Superior's depleted lake trout stocks was articulated, the way was easier. At least, the debate can focus on concrete issues if goals are clearly stated in practical terms.

If limited entry is desirable, the next problem is to choose which approach to take. In the Lake Superior case, Wisconsin has opted for fixing the number of licenses, setting the amount of gear to be fished by each licensee, and setting criteria for continued licensing that demonstrates commitment to fishing as an occupation. In the case of lake trout, individual quotas have been instituted. Under the 1978 law, additional limits on entry would be created through higher license fees and authorization for wider use of individual quotas. Programs for fisheries in other areas will no doubt want to use combinations of some or all of these tools designed to achieve their objectives.

The relatively high acceptability of increased license fees is one of our tentative results that we find rather surprising. Clearly, fees and taxes have limitations for the purpose of controlling entry, particularly in established fisheries. It is polit-

ically infeasible to tell a fishing industry that it is going to be taxed so heavily that, say, half its members will be driven out of business. On the other hand, though, fees and taxes may have a role to play when combined with other tools. Just as economic theory would suggest, fees and taxes involve minimal direct interference in the internal decision-making of operating firms. This is a desirable property when dealing with independent, conservative people like many commercial fishers. Suppose, for example, that the policy is to reduce the number of casual operators, and this can be done either by higher license fees or setting a minimum number of days fished in the preceding year to renew licenses. Most fishers are likely to prefer the fee, except, of course, for the casual operators who are likely to oppose both measures.

The waters become muddied when one tries to apply this approach to other forms of regulation, however. When entry is limited by limiting the number of licenses, for example, the question arises whether this should be coupled with restriction on the amount of gear that each licensee can operate or quotas on how much each licensee can catch (6). Based on what was said in the preceding paragraph, one might argue that individual quotas should be preferred since they involve minimal interference in the internal decisions as to where, how, and when to fish. On the other hand, many Lake Michigan fishers are telling us that while they would rather have neither quotas nor gear restriction, they would prefer gear restriction. The person who wants to work harder can catch more fish, and there is always a chance for an especially lucky year if only gear is restricted, whereas quotas limit these opportunities. Where choices between gear restrictions and individual quotas must be made, adaptations to local conditions, relative enforcement costs, and fisher preferences will all probably have to come into play.

It may not always be desirable to make licenses transferable, but Wisconsin's experience illustrates the advantages of doing so. Nontransferability as it is currently in effect for Lake Superior has a number of problems. The transition from parents to children in fishing families becomes difficult. If the parent discontinues fishing, will the son or daughter be issued the license? Transferability will facilitate such transitions. Similarly, the fisher who wants to sell out to an unrelated person may be adversely affected. Without transferability, the market for his/her vessel and gear will depend on whether potential buyers can also get a license. Transferability should promote package deals, thus facilitating smooth transitions. Likewise, where a young person must undergo an apprenticeship program, transferability may make the possibility of getting a license at the end more certain. And, transferability may facilitate institution of limited entry programs by giving the licensee an asset that, it is hoped, will become valuable.

The minimum requirements that the government should place on the new potential licensee are an interesting issue. The Lake Superior program of a five-year apprenticeship as a crew member is certainly one approach. Perhaps this is necessary to assure competence. However, it may also foster long years at very low pay for the potential fisher. Particularly in such a small fishery, apprenticeships may give existing members of the industry power to determine who the future participants will be. It is also not clear that a crew member will actually be taught what he/she needs to know simply by being present on a boat as a crew

member. Furthermore, would an experienced person from, say, Lake Michigan require five years as a crew member on Lake Superior to become accustomed to the new location? We are not sure.

In setting up entry limitation programs, the question of what to do about those who would like to become semi retired may also arise. Society may choose to follow the approach of most public and private employers and not provide for part-time continuation on the job as people approach retirement. The alternative, and one that has the support of many Wisconsin fishers, is to provide some sort of mechanism that allows semi retirement.

The commercial fishing boards established by Wisconsin's new law will constitute a very important and promising experiment. If we look at fisheries management as welfare economists, it is abundantly clear that one of the groups that has the most to gain or lose from management decisions is the fishers themselves. If we maintain the value judgment that the individual's assessment of his/her wellbeing is the appropriate measure of economic welfare from the social point of view, one obvious way to facilitate the expression of the fisher's assessments in the decision-making process is to include the fishers themselves, or at least their representatives, in decision making.

There is, we fear, a tendency to assume that if fishers are given greater responsibility in management, the result would be a profit-hungry rush, resulting in economic chaos and resource depletion. Actually, theory points in the opposite direction. The open-access problem results, theoretically, from the fact that if, say, operators A through K band together to optimize jointly, the rents will be dissipated through entry of new operators L through Z. If L through Z are excluded by limitation of entry and the state is present to enforce the arrangements worked out by A through K, theory indicates that A through K would have strong incentives to maximize the present value of rents. In fact, one might argue, theoretically, that overly-conservative monopolistic behavior would be more likely to arise than economic and biological ruin. To these theoretical observations, we would add that our work with fishers has involved many solid, intelligent, practical people who appear capable of playing a larger role in determining their fate than they have been permitted to play in the past. Subject, of course, to mechanisms to safeguard the resource base for future generations and represent the interests of other groups within society such as fish consumers and recreationists, experiments with new forms of fishery regulation should include not only limited entry but also mechanisms for greater participation by the fishers themselves in management decisions.

# THE WASHINGTON EXPERIENCE WITH LIMITED ENTRY

Gary Benson and Robert Longman

## Introduction

Washington State initiated its second attempt at a limited entry program for the commercial salmon fishing industry on May 6, 1974. The first attempt in 1934 by the initiative process was found to be unconstitutional by the Washington State Supreme Court (see section on constitutional issues, p. 342). During the 1960s and early 1970s, several attempts were made to have the Washington legislature pass some form of limited entry program. The legislation that was being sought would have initially placed a moratorium on the issuance of new commercial salmon fishing licenses. Such a moratorium was supported by the Department of Fisheries and various fishermen's organizations because of the feeling that too much gear was competing for a limited number of salmon. They felt that some limitation was essential. The argument used against the legislation was that, since the fishing industry was subsidized by taxpayers through hatcheries, entry to it should not be limited.

This report reviews the 1974 commercial fishing vessel license moratorium and subsequent amendments and extensions. It should be pointed out that this initial Washington moratorium is just that—a moratorium on the issuance of new commercial salmon fishing licenses. The intention was to put a cap on the growth in the number of vessels fishing for salmon and to prevent a bad situation from getting worse, not to reduce the number of vessels or solve all the management problems of the fishery. Any limited entry program should be a slow evolutionary process that takes one step at a time so as not to put the industry into complete disorder and chaos. This is the process that Washington has chosen.

The following sections review the 1974 legislation, an advisory committee's findings, the 1977 and 1979 amendments, the impact of the moratorium, future considerations, and constitutional issues.

## 1974 License Moratorium

With passage of the 1974 license moratorium legislation, the legislature made the following statement of findings and intent:

the legislature finds that the protection, welfare, and economic good of the commercial salmon fishing industry is of paramount importance to the people of this state. Scientific advancement has increased the efficiency of salmon fishing gear. There presently exists an overabundance of commercial salmon fishing gear in our state waters, which causes great pressure on the salmon fishery resource. This situation results in great economic waste to the state and prohibits conservation programs from achieving their goals. The public welfare requires that the number of commercial salmon fishing licenses and vessel delivery permits issued by the state be limited to insure that sound conservation

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programs can be scientifically carried out. It is the intention of the legislature to preserve this valuable natural resource so that our food supplies from such resource can continue to meet the ever increasing demands placed on it by the people of the state (1).

This initial program required that:

1. Commercial licenses and delivery permits to fish for salmon could be issued for the period January 1, 1975, through December 31, 1977, only to those vessels that:
  - a. held such a license or permits in any year between January 1, 1970, and May 6, 1974, and
  - b. could prove that salmon were caught and landed by that vessel during such period
2. All licenses or vessel delivery permits were transferable
3. Single delivery vessel delivery permits were available for commercial salmon fishing vessels that were intended to land salmon outside the territorial waters of the state and that were not qualified for an annual license or delivery permit
4. Commercial fishing vessels under construction or purchased in good faith between April 16, 1973, and May 6, 1974, were eligible for licenses
5. Charter fishing vessels could be licensed for commercial trolling if the director of the Department of Fisheries found that the charter industry was suffering economic hardship because of a national or state fuel crisis
6. Three-man advisory boards of review were created to hear cases of any person aggrieved by a decision of the Department of Fisheries pursuant to the moratorium
7. The Department of Fisheries, in cooperation with the industry, was directed to continually evaluate the program and make recommendations to the legislature on a phase II approach by January 1, 1977
8. The commercial salmon license moratorium was to expire on December 31, 1977, before which time the legislature would need to act if it wanted to continue any form of a limited entry system

### **Ad Hoc Limited Entry Committee**

In an effort to evaluate the initial commercial salmon license moratorium and to develop a phase II approach by January 1, 1977, the Department of Fisheries assembled an ad hoc limited entry committee comprising representatives from the various commercial organizations. This committee met a number of times during 1975 and 1976 to discuss the direction that a limited entry program should take. In a report prepared by the Department of Fisheries, several areas of agreement among the user groups were brought out (2).

First, the committee uniformly agreed that the fishing effort in Washington's salmon fishing industry required regulation and that, in an effort to improve the economic health of the industry and the management of the fishery, this regulation should be accomplished by control of the number of vessels and boats licensed to fish in each of the state's salmon fisheries. There was disagreement, however, on how much control was needed and how fast it should proceed. The options were either to maintain the lid on the number of vessels and licenses or to enter into a program to reduce the number of vessels and licenses. All members felt that the number of commercial licenses should be controlled. In addition, all felt that a moratorium of some type relating to the charter fishing industry should be implemented.

Second, the committee uniformly agreed that licensing control should be approached cautiously in stages, with an opportunity for a full evaluation after each stage. This evaluation process should allow for the identification and correction of mistakes and for the development of new approaches as needed.

Third, the committee members uniformly agreed that fishermen, processors, and other individuals and groups involved in the salmon fishing industry in Washington should have an active role to play with the Department of Fisheries in studying and administering license control programs.

Fourth, the committee felt that if reductions in the sizes of the various commercial fisheries were to occur, the vessels to be excluded should be those that were consistently and historically among the least productive in the respective fleets, with due regard in calculating productivity for the multistate and multispecies nature of the Northwest's commercial fishery. The committee was of the opinion that emphasizing productivity would tend to result in a commercial fishery composed of productive "professional" fishermen.

In addition, the committee believed that the use of productivity as a tool for distinguishing qualified from nonqualified fishing vessels should be employed on a trial basis first, if further reductions in fleet sizes were appropriate.

### **1977 Amendments**

The license moratorium enacted in 1974 was designed to expire automatically on December 31, 1977. It was necessary for the legislature to act if the moratorium were to continue or be expanded upon. The legislature acted by (1) adding a new landing restriction, (2) extending the moratorium to December 31, 1980, and (3) expanding the moratorium to include charter boats (3). The complete texts of the commercial salmon fishing license and charter boat license moratorium programs as they read as state law after 1977 are included as appendices I and II.

#### **1. Landing Restriction**

The new landing restriction requires that no commercial salmon fishing license or vessel delivery permit be issued to a vessel in 1979 and 1980 unless that vessel:

- a. was issued or had transferred to it a valid license or delivery permit during the previous year; and
- b. could prove that food fish were caught and landed by such vessel in Washington or another state during the previous year.



The original 1974 moratorium had a one-time qualification restriction that fish had to be landed during the base period (January 1, 1970, through May 6, 1974). The new restriction requires that landings be made every year to qualify for the next year.

This restriction does not require a vessel to have been active in the Washington salmon fisheries the previous year, but only for it to have been active in some fisheries, somewhere. Still intact is the restriction that the vessel must have been qualified during the period between January 1, 1970, and May 6, 1974.

## 2. **Extension of the Moratorium**

At the same time, the commercial salmon license moratorium was extended to December 31, 1980. Before this time the legislature will have to act if it desires to continue any form of a limited entry system for commercial salmon fishing vessels.

## 3. **Charter Boat Moratorium**

The structure of the salmon charter-boat license moratorium is very similar to that of the original commercial salmon fishing license moratorium:

- a. Charter boat licenses are to be issued only to those boats that were licensed between January 1, 1974, and January 1, 1977.
- b. No charter boat is entitled to more than one charter boat license.
- c. Qualified charter boats are entitled to renew their licenses through December 31, 1980; however, if the license is not renewed in any given year it automatically expires and cannot be renewed further.
- d. All charter boat licenses are transferable.
- e. Licenses are to be issued to charter boats that were under construction or purchased in good faith between April 16, 1976, and May 28, 1977.
- f. Prior to January 1, 1980, the Department of Fisheries in cooperation with representatives of the charter boat industry will recommend to the legislature a phase II approach to regulate gear entry into Washington's charter boat fishery.
- g. Three-man advisory boards of review were created to hear cases of any person aggrieved by a decision of the Department of Fisheries pursuant to the moratorium.
- h. The charter boat license moratorium expires on December 31, 1980, before which time the legislature will have to act if it desires to continue any form of a limited entry system on charter boats.

## **1979 Amendments**

During the 1979 legislative session, two bills were passed that affect the commercial salmon license moratorium and the charter boat license morato-

rium. (Note: As of March 23, 1979, only the charter-boat-license moratorium and limited effort bill have been signed by the governor.)

The 1979 amendments to the commercial-salmon-license moratorium removed the December 31, 1980, expiration date, thus making the moratorium permanent, and allowed new vessels purchased after the close of the fishing season (normally November and December) and unable to make any landings to be eligible for a license the following year if an otherwise valid license was transferred to it. The complete text of the new language is included as appendix III.

The charter-boat-license moratorium enacted in 1977 was amended to extend it for another year, to December 31, 1981. In addition, an entirely new concept in the licensing of charter boats was created. An effort limitation was placed on charter boats that put a lid on the total carrying capacity of the charter boat fleet. Along with the license, a charter boat is to be issued an "angler permit," specifying the maximum number of persons, or "anglers," that may fish from the charter boat at any one time. The initial number of anglers that the Department of Fisheries may authorize for a salmon charter boat is to be determined from a schedule given in the act. The schedule is based on the documented length of the charter boat. The total number of permitted anglers authorized by the Department is fixed and may not exceed the total number initially authorized for eligible boats. The angler permits are fully transferable and a charter boat may transfer all or a portion of the permit to another charter boat. In this regard, a charter boat may expand its angler carrying capacity only if another charter boat reduced its angler carrying capacity. The holder of an expanded permit may use, and renew, the permit, even though the use of the permit would allow the charter boat to exceed the initial number of anglers specified in the schedule. The complete text of the new permit system is contained in appendix IV.

### **Impact**

Table 1 lists historical data on Washington commercial fishing vessel licenses by fleet and Washington salmon landings in numbers of fish. As can be noted, most fleets are several times larger in the 1970s than they were in the 1930s to 1940s or even the 1960s. However, salmon landings have not shown such dramatic increases. The 1974 license moratorium has put an upper limit on the number of licenses and has stopped the growth in licenses.

Between 1935 and 1955 the total number of commercial salmon licenses ranged from fifteen hundred to around three thousand, with salmon harvests ranging from two million fish in 1944 to over twelve million fish in 1947. From the mid-sixties to the early seventies the total number of licenses ranged from 3,540 in 1966 to 8,229 in 1971, and harvests ranged from three million to over eight million salmon. Today, salmon licenses have stabilized near the six thousand level. The new landing restriction passed in 1977 should begin reducing the number of licenses by 1979. The increase in 1978 over 1977 is a result of the 1977 amendments; all eligible licenses not renewed in 1978 cannot be renewed in 1979.

It is apparent that there are still more licenses being issued than are necessary to catch the available number of salmon. However, as stated earlier, it was not the intent of the license moratorium to reduce the number of licenses but,

Table 1: Licensed Fleets by Gear Type  
and Salmon Landings, 1935-1977

Year	Purse Seine	Puget Sound Gillnet	Willapa Bay Gillnet	Grays Harbor Gillnet	Columbia River Gillnet*	Troll**	Reef Net	Total Licenses	Commercial Salmon Landings (Number of Fish in Thousands)
1935	215	325	100	105	484	726	20	1,975	9,851.1
1940	158	381	93	129	441	356	76	1,634	3,416.6
1945	121	339	151	132	392	904	47	2,086	8,820.9
1950	317	472	137	117	447	648	126	2,264	4,344.4
1955	375	830	100	92	338	986	110	2,831	8,395.1
1960	338	812	151	140	184	2,434	30	4,139	2,101.8
1965	400	906	86	103	237	1,822	76	3,630	3,801.3
1966	317	835	79	108	218	1,931	52	3,540	3,906.4
1967	340	970	89	110	228	2,372	53	4,172	8,099.2
1968	301	909	100	104	208	3,400	54	5,076	3,144.3
1969	384	1,007	124	149	186	3,500	53	5,413	4,241.2
1970	319	1,039	171	153	235	3,300	54	5,271	4,065.3
1971	298	1,419	210	225	367	5,641	69	8,229	8,377.6
1972	275	1,194	297	238	*	3,753	51	5,818	3,864.6
1973	320	1,303	301	259	*	2,880	74	5,137	8,091.9
1974	437	1,989	478	338	*	3,487	35	6,814	5,705.1
1975	385	1,659	407	295	*	3,344	31	6,171	5,833.9
1976	382	1,577	408	284	*	3,208	73	5,932	5,102.8
1977	398	1,507	422	288	*	3,232	78	5,925	7,266.1p
1978	402p	1,532p	431p	288p	*	3,391p	74p	6,118p	4,497.0p

\* Separate Columbia River Gillnet license issued 1935-1971 thereafter all gillnet vessels licensed for either Willapa Bay or Grays Harbor also entitled to operate in Columbia River.

\*\* Licensed troll vessels estimates only, 1935-1971.

p Preliminary

Source: Washington Department of Fisheries  
GB 3/20/79

rather, only to stop the increase. For example, Puget Sound gillnet licenses fluctuated from 263 to 641 during the period 1935 to 1954, jumped to 830 in 1955, reached 953 in 1958, numbered 1,007 in 1969, and increased to 1,419 by 1971. The number of Puget Sound gillnet licenses stood at 1,659 in 1975 and has decreased to 1,532 since then.

The bulge in licenses for 1974 is a result of the moratorium law. Individuals could buy a 1974 license from January 1 to April 15, 1974, when the moratorium legislation was being discussed. However, to qualify for a license in 1975, landings had to be made on the license any time from January 1, 1970, to May 6, 1974. If in 1974 an individual purchased a new license that had no history of landings, that individual did not have the opportunity to qualify the license (since most fishing seasons do not open until after May 6). These people were weeded out in 1975.

### Possibilities for the Future

This past legislative session, the House Natural Resources Committee reviewed the license moratorium program, the proposals being suggested by the

Presidential Task Force on Washington Fisheries Problems, the suggestions of the Pacific Fisheries Management Council, and the ideas being put forth by the industry. The moratoriums were set to expire on December 31, 1980. There is no assurance of a session in 1980, but the Washington constitution did require a legislative session in 1979. Thus, if the moratoriums were not to lapse, action needed to be taken in 1979. The action that was taken is outlined in the section entitled "1979 Amendments." One particularly detailed proposal that may be considered in a later legislative session is outlined later in this section.

A very emotional issue that overwhelms any discussion of the future of the salmon fisheries in Washington State is the Boldt decision and the effect it may have on the salmon fishery. In February, 1974, U. S. District Court Judge George Boldt rendered his decision in *U. S. v. Washington*. This suit was brought against Washington State by the U. S. government on behalf of treaty Indians to determine the nature and extent of treaty Indian fishing rights pursuant to several treaties written during the 1850s (4). Boldt's decision granted treaty Indians the opportunity to harvest over 50 percent of the harvestable salmon, up from the recent historical average of around 5 percent (5). This allocation of the salmon has caused a great deal of disruption in the Washington fisheries during the 1970s.

The Regional Team of the Federal Task Force on Washington State Fisheries (6) was given the responsibility of finding a solution to the fisheries problem. They spent a great deal of time studying the issue of moratoriums, limited entry, fishing vessel buyback programs, etc. Controlling the fleet size and fishing effort, both actual and potential, is an integral part of their settlement plan. The reporting of the regional team's conclusions and the description of their plan here do not represent an endorsement of the plan by the Washington State legislature, the House of Representatives, the House Natural Resources Committee, or anyone connected therewith. The regional team's plan is only one of several that will eventually be considered by the legislature. One alternative is suggested by the commercial-recreational fisheries delegation (7).

### **Commercial salmon license reduction**

After over a year of studying, reviewing, and discussing licensing programs, the regional team came to four conclusions. These were:

1. The number of licenses in each of the state's commercial salmon fleets (excluding the reef net fleet) had grown substantially since 1965; however, the impact of the 1974 commercial license moratorium was to stabilize the level of licensing.
2. In each commercial fleet a large portion of the licenses are issued to license holders whose boats account for a very small portion of each fleet's production. These licenses represent a large potential for growth in each fleet's fishing effort.
3. In each commercial fleet the major portion of the total catch is produced by individuals who are dependent to a significant degree upon the fishery and who have demonstrated an involvement as professional commercial fishermen.

4. In each commercial fishing fleet the available effort has reached a level which if unrestricted, would lead to overharvesting; hence significant reductions in authorized fishing opportunity are required.

The regional team attempted to design a program to return fleet size to levels that are expected to permit continued operation by professional fishermen and allow for sufficient salmon fishing seasons as a part of an overall program leading to economically healthy fishermen. Their limited entry program is as follows:

1. **Rank licenses.** Each current holder of a commercial salmon license at the time the program goes into effect would be ranked according to the average annual Washington salmon landings made by that licensee's vessel or vessels in the respective fisheries during the base period from 1973 to 1977 (or the portion of the period during which each licensee was licensed). After the ordering in each fleet was accomplished, an "inactive" fisherman category would be identified, commencing with license holders showing no average annual landings whatsoever and progressing upward through the list toward "active" fishermen.
2. **Inactive licenses.** The category of inactive fishermen as a whole would be composed of the group of individuals whose cumulative average catch (starting with the lowest catches and progressing to larger catches) accounted for a combined total of 5 percent (3 percent in the commercial-recreational alternative plan (7)) of each fleet's average annual production. These individuals would not be eligible for renewal of their commercial salmon fishing licenses. Table 2 lists the number of inactive licenses for each fishery. Overall, 45.7 percent of the licenses accounted for 5 percent of the catch during the base period years. These licenses would be phased out immediately.

Table 2: "Inactive" Licenses

Fishery	1977 Fleet Size	Inactive Licenses		Poundage Break Between Active and Inactive Fishermen
		Number	Percent	
Troll	3,232	1,699	52.6%	986
Puget Sound Gillnet	1,507	542	36.0%	3,342
Coastal Bays/Columbia River Gillnet	710	336	47.3%	1,870
Purse Seine	398	130	32.7%	21,038
Reef Net	78			
Totals	5,925	2,707	45.7%	

3. **Active licenses.** All license holders falling above the 5 percent dividing line in each fishery would be entitled to renew their licenses. Each such license would be fully transferable even upon death or retirement of the license holder. No additional landing standards would be required in the future. The only continuing obligations for retention of salmon licenses would be those currently found in state law, i.e., annual purchase of each license and at least one food fish landing each year.
4. **Special features.**
  - a. Individuals who are sixty-five years of age or older on the date on which the license reduction program goes into effect would be exempt from the requirements of the program. However, their licenses would not be transferable unless they qualified as "active" licenses.
  - b. Some method of allowing future growth of fleet size, if appropriate, would be developed.
  - c. Each license would need to qualify separately, even if several were owned by a single individual.
  - d. Each fishery would have to be qualified for separately, even if a single vessel was currently licensed to fish in more than one fishery.
  - e. An appeals process and an appeals board would be created to handle a series of special circumstances.
  - f. Troll licenses present a special problem in that, with the license freely transferable from vessel to vessel, owners of smaller, less mobile vessels could become owners of larger, more efficient vessels, thus increasing fishing effort. Troll licenses would then be issued on the basis of troll vessel length, and transferring licenses to larger vessels would not be allowed. Proposed state legislation along these lines is included as appendix V. No action was taken by the legislature on this proposal.
  - g. A full fishing vessel and license buyback program would be available for active fishermen.
  - h. The current license moratorium would be extended for another ten years. (Note: the 1979 legislature chose to extend the license moratorium indefinitely.)

#### **Salmon charter-boat-license reduction**

The regional team's conclusions regarding charter boats were:

1. The number of charter boat licenses grew rapidly between 1971 and the present time, with the 1977 license moratorium stabilizing the fleet size at a level approximately twice the licensing level of 1971.

2. The fishing effort of the salmon charter fleet has a large potential for growth (via transferring licenses to larger boats).
3. Another potential for growth in effort exists since charter boats under construction before May 28, 1977, are entitled to charter licenses upon completion.

The regional team has attempted to design a charter license reduction program that would stabilize charter fishing effort for salmon and control potential future growth. Some aspects of this program are as follows:

1. **Angler carrying capacity.** Each charter boat license would specify the number of anglers that the charter boat is authorized to carry consistent with federal law. Angler capacity would be closely related to the length of the boat; however, all charter licenses would be fully transferable and any charter boat owner wishing to upgrade a vessel or to carry more anglers would be entitled to do so provided that he or she purchased licenses sufficient to authorize the expanded capacity. This proposal was enacted by the 1979 legislature and is included in appendix IV.
2. **Other.**
  - a. Further regulations would be developed to determine and restrict the exact numbers of vessels currently under construction that will qualify for a charter boat license.
  - b. An appeals board would be maintained.
  - c. A buyback program would be available for owners of charter boats.
  - d. Other provisions to reduce the charter boat fleet may be necessary if the tightening of the under-construction provision and the buyback program are not successful.
  - e. The current moratorium would be extended for another ten years. The 1979 legislature chose to extend the current moratorium only until December 31, 1981.

Again, the above are only suggestions for the direction in which the Washington license moratorium and limited entry programs should move. What happened in 1979 was not a full implementation of either the regional team's proposal or the commercial-recreational delegation's proposal. However, their ideas are still alive and will probably be considered by future legislatures.

### **Constitutional Issues**

Any limited entry program raises constitutional questions of an equal protection nature, since a class of persons privileged to obtain licenses is created and other persons are excluded from that class. The Washington Supreme Court has said that for legislation to withstand equal protection challenge, "persons in the same class must be treated alike and . . . reasonable grounds (must) exist for

making a distinction between those within and those without the class" (8). In the limited entry context, the most likely source of trouble is the distinction between the class of persons who may obtain a license and those persons who are not permitted to enter the field.

An example of a limited entry program that was held unconstitutional can be found in the 1936 Washington case of *State ex rel. Bacich v. Huse* (9). That case involved a law enacted by the initiative process (Initiative 77) (10) that imposed a limited entry program that limited gillnet licenses after December, 1934, to persons who held gillnet licenses in either 1932 or 1933, and made gillnet licenses nontransferable.

The court described the initiative's license limitation plan as "wholly arbitrary and capricious" (11) and held that it violated the equal protection clause of the constitution for the following reasons:

1. The state, according to the court, is the owner of the fish in the state's waters and must dispose of its property in a fair and impartial manner (12). The initiative, however, was "founded upon mere fortuitous circumstances and (made) a gratuitous selection of individuals who shall enjoy the use of common property to the exclusion of all others" (13). Thus, the court decided that mere possession of a license in 1932 or 1933 was not constitutionally sufficient to entitle a person to be in the privileged class of persons allowed to obtain a license for 1935 and subsequent years.
2. The initiative did not accomplish its claimed purpose of protecting persons who already had an investment in gillnet equipment. Persons who held licenses in 1932 or 1933 could obtain a license in 1935 and years following (whether or not they landed a fish in 1932 or 1933), while persons who held a license in 1934, but not in 1932 or 1933, could not obtain a license in 1935 (although they may have had a substantial investment in gear) (14).
3. Only a chosen few could ever obtain a license, since the licenses were nontransferable (15).

While the *State ex rel. Bacich* decision presents a significant obstacle to any limited entry program in Washington, the moratorium currently in effect probably overcomes this obstacle for the following reasons:

1. The opportunity to obtain licenses is restricted to those vessels that were licensed in any year between January 1, 1970, and May 6, 1974, and that actually landed salmon during that period (16). Therefore, the moratorium provides more reasonable requirements for obtaining a license than did the initiative, which required only prior possession of a license.
2. The moratorium does a better job of protecting investments in fishing gear than did the initiative. As noted above, the initiative created a "gap" year, 1934, when a person could have held a license but would not have qualified for a license for 1935 and subsequent



years. There is no comparable gap under the moratorium. The right of appeal to a review board by a person denied a license under moratorium further insures fair treatment of persons with an investment in fishing gear (17).

3. Unlike the initiative, the moratorium provides that licenses are transferable (18). Thus, there is a possibility of access to the industry by persons who did not hold licenses during the qualifying years.

Thus it would appear that Washington has enacted a moratorium that avoids the equal protection problems identified in the *State ex rel. Bacich* case. However, this report is not intended to be an exhaustive analysis of every possible constitutional argument that might be made during a court review of the moratorium.

## APPENDIX I: COMMERCIAL SALMON FISHING VESSEL LICENSE MORATORIUM

**RCW 75.28.450 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—INTENTION.** The legislature finds that the protection, welfare, and economic good of the commercial salmon fishing industry is of paramount importance to the people of this state. Scientific advancement has increased the efficiency of salmon fishing gear. There presently exists an overabundance of commercial salmon fishing gear in our state waters which causes great pressure on the salmon fishery resource. This situation results in great economic waste to the state and prohibits conservation programs from achieving their goals. The public welfare requires that the number of commercial salmon fishing licenses and vessel delivery permits issued by the state be limited to insure that sound conservation programs can be scientifically carried out. It is the intention of the legislature to preserve this valuable natural resource so that our food supplies from such resource can continue to meet the ever increasing demands placed on it by the people of this state. [1974 ex.s. c 184 § 1.]

### NOTES:

**Expiration date—RCW 75.28.450-75.28.480:** "The provisions of RCW 75.28.450, 75.28.455 as now or hereafter amended, RCW 75.28.460, 75.28.465, 75.28.470, 75.28.475, and 75.28.480 shall automatically expire on December 31, 1980, unless such expiration date be removed or extended by subsequent action of the legislature." [1977 1st ex.s. c 106 § 8; 1974 ex.s. c 184 § 12.]

**Severability—1977 1st ex.s. c 106:** See note following RCW 75.30.010.

**Severability—1974 ex.s. c 184:** "If any provision of this act, or its application to any person or circumstance is held invalid, the remainder of the act, or the application of the provision to other persons or circumstances is not affected." [1974 ex.s. c 184 § 11.]

**RCW 75.28.455 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—PROGRAM TO LIMIT COMMERCIAL SALMON VESSELS—QUALIFICATIONS FOR LICENSING.** On and after May 6, 1974, the department of fisheries of the state of Washington shall initiate a program to limit the number of commercial salmon vessels for each type of fishing gear and area by issuing licenses and vessel delivery permits to fish for salmon only to those vessels holding such licenses or permits in any year between January 1, 1970 and May 6, 1974: PROVIDED,

That only those vessels which held commercial gear fishing licenses or vessel delivery permits valid for salmon during such period and can prove by means of a valid fish receiving document that salmon were caught and landed during such period shall be entitled to a valid commercial fishing license or vessel delivery permit to fish for or possess salmon for the same type of gear and area for each year of a period extending from January 1, 1975 through December 31, 1980: PROVIDED FURTHER, That except for vessels coming under the provisions of RCW 75.28.460, no commercial salmon fishing license or vessel delivery permit shall be issued to a vessel for calendar years 1979 and 1980 unless that vessel (1) was issued or had transferred to it a valid Washington state commercial salmon fishing license or vessel delivery permit during the previous calendar year, or during the last calendar year in which the vessel was legally eligible for licenses if the vessel's licenses were suspended or revoked during the calendar year or years previous to the year for which the licenses are being sought; and (2) can prove by means of a valid fish receiving document that food fish were caught and landed by such vessel in this state or in another state during the previous calendar year, or during the last calendar year in which the vessel was legally eligible for licenses if the vessel's licenses were suspended or revoked during the calendar year or years previous to the year for which the licenses are being sought: PROVIDED, HOWEVER, That nothing herein shall be construed to be contrary to the provisions of Title 75 RCW or any regulation promulgated thereunder. All such licenses or vessel delivery permits shall be transferable. [1977 1st ex.s. c 230 § 1; 1977 1st ex.s. c 106 § 7; 1974 ex.s. c 184 § 2.]

NOTES:

**Severability—1977 1st ex.s. c 106:** See note following RCW 75.30.010.

**Expiration date:** See note following RCW 75.28.450.

**Severability—Expiration date—1974 ex.s. c 184:** See notes following RCW 75.28.450.

**RCW 75.28.460 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—SALMON CAUGHT OUTSIDE STATE WATERS—SINGLE DELIVERY PERMIT—FEE.** Any commercial salmon fishing vessel not qualified for a commercial salmon fishing license or vessel delivery permit under RCW 75.28.455 and wishing to land salmon caught outside the territorial waters of the state of Washington shall be able to obtain a single delivery vessel delivery permit. The fee for such permit shall be one hundred dollars. [1977 1st ex.s. c 327 § 4; 1974 ex.s. c 184 § 3.]

NOTES:

**Expiration date:** See note following RCW 75.28.450.

**Severability—Effective date—1977 1st ex.s. c 327:** See notes following RCW 75.18.100.

**Severability—1974 ex.s. c 184:** See note following RCW 75.28.450.

**RCW 75.28.465 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—VESSELS UNDER CONSTRUCTION.** In addition to the commercial salmon fishing licenses and vessel delivery permits issued pursuant to RCW 75.28.455 the department shall issue the required license to any commercial fishing vessel which is under construction or purchased in good faith between April 16, 1973, and May 6, 1974. [1974 ex.s. c 184 § 4.]

NOTES:

**Expiration date:** See note following RCW 75.28.450.

**Severability—Expiration date—1974 ex.s. c 184:** See notes following RCW 75.28.450.

**RCW 75.28.470 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—LICENSING OF CHARTER FISHING VESSELS.** Charter fishing vessels may be licensed for commercial trolling during the salmon trolling season if the director finds that the charter industry in this state is suffering economic hardship due to a national or state fuel crisis. [1974 ex.s. c 184 § 6.]

NOTES:

**Expiration date:** See note following RCW 75.28.450.

**Severability—Expiration date—1974 ex.s. c 184:** See notes following RCW 75.28.450.

**RCW 75.28.475 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—ADVISORY BOARDS OF REVIEW—TRAVEL EXPENSES.** The director shall appoint three man advisory boards of review to hear cases as provided for in RCW 75.28.480. The members of such a review board shall be from the commercial salmon fishing industry, shall serve without pay, and shall serve at the discretion of the director of the department of fisheries. The members of such a review board shall be reimbursed for travel expenses pursuant to RCW 43.03.050 and 43.03.060 as now existing or hereafter amended for each day or major portion thereof spent in the performance of their duty. The director shall promulgate regulations concerning the operation of such review boards in accordance with chapter 34.04 RCW. [1975-'76 2nd ex.s. c 34 § 171; 1974 ex.s. c 184 § 7.]

NOTES:

**Expiration date:** See note following RCW 75.28.450.

**Effective date—Severability—1975-'76 2nd ex.s. c 34:** See notes following RCW 2.08.115.

**Severability—Expiration date—1974 ex.s. c 184:** See notes following RCW 75.28.450.

**RCW 75.28.480 LIMITATION UPON SALMON LICENSES AND DELIVERY PERMITS—APPEAL TO BOARD OF REVIEW—HEARING—PROCEDURE.** Any person aggrieved by a decision of the department pursuant to RCW 75.28.455 through 75.28.475 may voluntarily request that a board of review be impaneled to hear his case. Such a hearing before a board shall be informal and the rules of evidence shall not be applicable to the proceedings and a record shall be kept thereof as provided by chapter 34.04 RCW. After the presentation of a case such a review board shall inform in writing both the director and the initiating party of whether or not the board agrees or disagrees with the department's decision and the reasons for such agreement or disagreement. Upon receipt of the board's findings the director, at his discretion, may either uphold or reverse the department's action.

Nothing in this section shall be construed: (1) to impair an aggrieved person's right to proceed under chapter 34.04 RCW; or (2) to impose any liability on members of a review board for their actions pursuant to this section. [1974 ex.s. c 184 § 9.]

NOTES:

**Expiration date:** See note following RCW 75.28.450.

**Severability—Expiration date—1974 ex.s. c 184:** See notes following RCW 75.28.450.

## APPENDIX II: SALMON CHARTER BOAT LICENSE MORATORIUM

Chapter 75.30 RCW

### SECTIONS

75.30.010	Legislative findings.
75.30.020	Moratorium on issuance of licenses—Renewals—Transfers.
75.30.030	Charter boats under construction or purchased between April 16, 1976 and May 28, 1977.
75.30.040	Duty of department to evaluate and recommend phase II approach.
75.30.050	Advisory board of review.
75.30.060	Hearings.

**RCW 75.30.010 LEGISLATIVE FINDINGS.** The legislature finds that the wise management and economic health of the state's salmon fishery are of continued importance to the people of the state and to the economy of the state as a whole. The legislature finds that charter boats licensed by the state for use by the state's charter boat fishing industry have increased in quantity. The legislature finds that limitations on the number of licensed charter boats will tend to improve the management of the charter boat fishery and the economic health of the charter boat industry. The state therefore must use its authority to regulate the number of licensed boats in use by the state's charter boat industry in a manner provided in this chapter so that management and economic health of the salmon fishery may be improved. [1977 1st ex.s. c 106 § 1.]

### NOTES:

**Severability—1977 1st ex.s. c 106:** "If any provision of this 1977 amendatory act, or its application to any person or circumstance is held invalid, the remainder of the act, or the application of the provision to other persons or circumstances is not affected." [1977 1st ex.s. c 106 § 10.]

**Expiration date—1977 1st ex.s. c 106 §§ 1-6:** "The provisions of sections 1 through 6 of this 1977 amendatory act shall expire on December 31, 1980, and shall be null and void and without any further force and effect on such date without any further action by the legislature." [1977 1st ex.s. c 106 § 11.]

**RCW 75.30.020 MORATORIUM ON ISSUANCE OF LICENSES—RENEWALS—TRANSFERS.** For the purposes of this chapter, the term "charter boat" shall refer only to those charter boats from which salmon are taken. On and after May 28, 1977, the department shall initiate a moratorium on the issuance of charter boat licenses by issuing such licenses only to those boats whose owners can prove by means of good and sufficient documentary evidence that the boat was licensed pursuant to RCW 75.28.095 between January 1, 1974, and January 1, 1977. No charter boat shall be entitled to more than one charter boat license.

Such boats shall be entitled to receive and renew the charter boat license for each year during the period from May 28, 1977 through December 31, 1980. A charter boat license for which no application is made to the department or which is not renewed in any year automatically expires and shall not be renewed further.

Nothing herein shall be construed to be contrary to the provisions of Title 75 RCW or any rule promulgated thereunder. All such charter boat licenses shall be transferable. [1977 1st ex.s. c 106 § 2.]

**RCW 75.30.030 CHARTER BOATS UNDER CONSTRUCTION OR PURCHASED BETWEEN APRIL 16, 1976 AND MAY 28, 1977.** In addition to the charter boat licenses issued pursuant to RCW 75.30.020, the department shall issue a charter boat license to any charter boat which was under construction or purchased in good faith between April 16, 1976, and May 28, 1977. [1977 1st ex.s. c 106 § 3.]

**RCW 75.30.040 DUTY OF DEPARTMENT TO EVALUATE AND RECOMMEND PHASE II APPROACH.** On and after May 28, 1977, the department, in cooperation with representatives of the charter boat industry, shall continually evaluate the provisions of RCW 75.30.010, 75.30.020, and 75.30.030 and recommend to the legislature prior to January 1, 1980, a phase II approach to regulate gear entry into this state's charter boat fishery. [1977 1st ex.s. c 106 § 4.]

**RCW 75.30.050 ADVISORY BOARD OF REVIEW.** The director shall appoint a three member advisory board of review to hear cases as provided in RCW 75.30.-060. The members of such review board shall be nominated by the charter boat fishing industry, shall serve without pay, and shall serve at the discretion of the director of the department of fisheries. The members of such review board shall be reimbursed for travel expenses as provided in RCW 43.03.050 and 43.03.060 as now existing or hereafter amended. The director may promulgate rules concerning the operation of such review boards in accordance with chapter 34.04 RCW. [1977 1st ex.s. c 106 § 5.]

**RCW 75.30.060 HEARINGS.** Any person aggrieved by a decision of the department made pursuant to the terms of this chapter may voluntarily request that a board of review be impaneled to hear such person's case.

The board of review may make such other recommendations and determinations as are consistent with the terms of this chapter.

Hearings before review boards shall be informal, the rules of evidence shall not be applicable to the proceedings, and the records shall be kept thereof as provided by chapter 34.04 RCW. After the presentation of a case each review board shall inform the director and the initiating party in writing concerning whether or not the review board recommends that the charter boat license be issued and the reasons for such recommendation. Upon receipt of the review board's findings the director may order such relief as the director deems appropriate under the circumstances.

Nothing in this section shall be construed: (1) To impair an aggrieved person's right to proceed under chapter 34.04 RCW; or (2) to impose any liability on members of a review board for their action pursuant to this section. [1977 1st ex.s. c 106 § 6.]

### **APPENDIX III: 1979 AMENDMENTS TO COMMERCIAL SALMON FISHING VESSEL LICENSE MORATORIUM**

AN ACT Relating to salmon resources; amending section 2, chapter 184, Laws of 1974 ex. sess. as last amended by section 1, chapter 230, Laws of 1977 ex. sess. and RCW 75.28.455; and repealing section 12, chapter 184, Laws of 1974 ex. sess. and section 8, chapter 106, Laws of 1977 ex. sess. (uncodified).

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

Section 1. Section 2, chapter 184, Laws of 1974 ex. sess. as last amended by section 1, chapter 230, Laws of 1977 ex. sess. and RCW 75.28.455 are each amended to read as follows:

On and after May 6, 1974, the department of fisheries of the state of Washington

shall initiate a program to limit the number of commercial salmon vessels for each type of fishing gear and area ((by issuing licenses and vessel delivery permits to fish for salmon only to those vessels holding such licenses or permits in any year between January 1, 1970 and may 6, 1974; PROVIDED, That only those vessels which held commercial gear fishing licenses or vessel delivery permits valid for salmon during such period and can prove by means of a valid fish receiving document that salmon were caught and landed during such period shall be entitled to a valid commercial fishing license or vessel delivery permit to fish for or possess salmon for the same type of gear and area for each year of a period extending from January 1, 1975 through December 31, 1980; PROVIDED FURTHER, That)).

(1) Except for vessels coming under the provisions of RCW 75.28.460, no commercial salmon fishing license or vessel delivery permit shall be issued to a vessel ((for calendar years 1979 and 1980)) unless that vessel ((1)) (a) was issued or had transferred to it a valid Washington state commercial salmon fishing license or vessel delivery permit during the previous calendar year, or during the last calendar year in which the vessel was legally eligible for licenses if the vessel's licenses were suspended or revoked during the calendar year or years previous to the year for which the licenses are being sought; ((and (2)) (b) has not subsequently transferred the license or permit to another vessel; and (c) can prove by means of a valid fish receiving document that food fish were caught and landed by such vessel in this state or in another state during the previous calendar year, or during the last calendar year in which the vessel was legally eligible for licenses if the vessel's licenses were suspended or revoked during the calendar year or years previous to the year for which the licenses are being sought ((PROVIDED, HOWEVER, That)).

(2) The director may waive the landing requirement of subsection (1) (c) of this section if (a) the vessel to which an otherwise valid license is transferred has not had the opportunity to have caught and landed salmon and (b) the intent of the commercial salmon vessel limitation program established under this section is not violated.

Nothing ((herein)) in this section shall be construed to be contrary to the provisions of Title 75 RCW or any regulation promulgated thereunder.

All such licenses or vessel delivery permits shall be transferable.

**NEW SECTION.** Sec. 2 Section 12, chapter 184, Laws of 1974 ex. sess. and section 8, chapter 106, Laws of 1977 ex. sess. (uncodified) are each repealed.

## APPENDIX IV: 1979 AMENDMENTS TO SALMON CHARTER BOAT LICENSING LIMITATIONS

AN ACT Relating to salmon fishing, amending section 2, chapter 106, Laws of 1977 ex. sess. and RCW 75.30.020; adding new sections to chapter 106, Laws of 1977 ex. sess. and to chapter 75.30 RCW; creating a new section; repealing section 11, chapter 106, Laws of 1977 ex. sess. (uncodified); prescribing penalties; providing an effective date, and providing an expiration date.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

**NEW SECTION.** Section 1. The legislature finds that wise management of the state's salmon fishery is essential to the well-being of the state. The legislature recognizes that further restrictions on salmon fishing in the charter salmon industry are necessary and that a limitation on the number of persons fishing is preferable to reductions in the fishing season or daily bag limits, or increases in size limits.

**NEW SECTION.** Sec. 2. In addition to the salmon charter boat license required under chapter 75.28 RCW, every owner of a salmon charter boat operating in salt water and eligible for licensing under RCW 75.30.020 or 75.30.030 shall obtain from the de-

partment, without charge, a yearly angler permit specifying the maximum number of persons, or "anglers," that may fish from the charter boat at any one time.

Failure to comply with this section constitutes a gross misdemeanor.

**NEW SECTION.** Sec. 3. The initial number of anglers that the department may authorize under section 2 of this act for a salmon charter boat shall be determined under the schedule established in this section.

As used in this schedule, "length of boat" means the length, in feet, of the salmon charter boat as shown on the United States Coast Guard certificate of inspection, not exceeding the size specified in the schedule. "Number of anglers" means the initial number of anglers that may be authorized by the department for a boat of the size specified.

Length of boat	Number of anglers:	Length of boat:	Number of anglers:
31.5	8	51.5	20
32.5	9	52.5	21
34.5	10	54.5	22
36.5	11	56.5	23
37.5	12	58.5	24
39.5	13	59.5	25
41.5	14	60.5	27
42.5	15	61.5	29
44.5	16	62.5	30
46.5	17	63.5	31
47.5	18	64.5	33
49.5	19	over 64.5	34

Vessels exceeding a length specified in the schedule may be authorized the number of anglers provided for the next higher category.

Vessels not inspected by the United States Coast Guard will be issued a permit by the department to carry up to six anglers.

Those salmon charter boats licensed prior to January 1, 1978, whose hulls, such as fifty-four foot Thermodyne brand hulls, are substantially wider than conventional hull designs, are exempt from the schedule established in this section and will be issued a permit by the department to carry up to twenty-five anglers.

**NEW SECTION.** Sec. 4. A salmon charter boat may not carry anglers, other than members of the crew, exceeding the number of anglers specified in the angler permit issued to the boat under section 2 of this act. Members of the crew may fish from the boat only to the extent that the number of anglers specified in the angler permit exceeds the number of noncrew passengers on the boat at that time.

Failure to comply with this section constitutes a gross misdemeanor.

**NEW SECTION.** Sec. 5. (1) The total aggregate number of anglers authorized by the department shall be fixed and may not exceed the total number initially authorized for eligible boats under section 2 of this act.

(2) Angler permits issued under section 2 of this act are fully transferable. A charter boat possessing an angler permit may transfer all or a portion of the permit to another charter boat. The holder of such a permit, after complying with subsection (3) of this section, may use, and renew, the permit, even though the use of the permit will allow the charter boat to exceed the initial number of anglers established in section 3 of this act.

(3) When an angler permit is transferred, the department shall be notified, and the department shall issue a new angler permit certificate. If the original permit holder retains a portion of the permit, the department shall issue a new angler permit certificate reflecting the decrease in authorized angler capacity. The department shall collect a fee of ten dollars for each certificate issued under this subsection.

**NEW SECTION.** Sec. 6. This chapter, and any subsequent amendments, shall expire on December 31, 1981.

Sec. 7. Section 2, chapter 106, Laws of 1977 ex. sess. and RCW 75.30.020 are each amended to read as follows:

For the purposes of this chapter, the term "charter boat" shall refer only to those charter boats from which salmon are taken. On and after May 28, 1977, the department shall initiate a moratorium on the issuance of charter boat licenses by issuing such licenses only to those boats whose owners can prove by means of good and sufficient documentary evidence that the boat was licensed pursuant to RCW 75.28.095 between January 1, 1974, and January 1, 1977. No charter boat shall be entitled to more than one charter boat license.

Such boats shall be entitled to receive and renew the charter boat license for each year during the period from May 28 1977 through December 31, ((1980)) **1981**. A charter boat license for which no application is made to the department or which is not renewed in any year automatically expires and shall not be renewed further.

Nothing herein shall be construed to be contrary to the provisions of Title 75 RCW or any rule promulgated thereunder. All such charter boat licenses shall be transferable.

**NEW SECTION.** Sec. 8. Sections 2 through 6 of this act are added to chapter 106, Laws of 1977 ex. sess. and to chapter 75.30 RCW.

**NEW SECTION.** Sec. 9. Section 11, chapter 106, Laws of 1977 ex. sess. (uncodified) is repealed.

**NEW SECTION.** Sec. 10. This act shall take effect on January 1, 1980.

Passed the House February 22, 1979.

Democratic Speaker of the House.

Republican Speaker of the House.

Passed the Senate March 2, 1979.

President of the Senate.

## APPENDIX V: PROPOSED LEGISLATION TO LIMIT EFFORT OF TROLLERS (NOT ENACTED)

AN ACT Relating to salmon fishing; adding new sections to chapter 75.28; creating a new section; and providing an effective date.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

**NEW SECTION.** Section 1. The legislature finds that conservation and management of the state's salmon fishery is essential to the well-being of the state. The legislature recognizes that further restrictions on salmon fishing are necessary and that a limitation on the potential fishing capability of the salmon troll fleet is preferable to reductions in the fishing season or increases in size limits. The legislature finds it necessary to limit the growth and fishing capability of the salmon troll fleet to ensure that the troll fishery continues to take a stable share of the available harvestable surplus salmon in coastal waters of the state.

**NEW SECTION.** Sec. 2. A vessel applying under RCW 75.28.130 for a troll license for the taking of salmon or under RCW 75.18.080 for a vessel delivery permit for the delivery of salmon shall be issued an "A" license or permit if the vessel is thirty feet or more in length or a "B" license or permit if the vessel is less than thirty feet in length.

The length of the vessel, for the purposes of this section, shall be determined from the 1979 troll license or delivery permit application. For vessels not submitting a troll license or delivery permit application in 1979, length shall be determined by measuring from the fore part of the outer planking on the side of the stem to the after part of the planking of the stern, measured as a straight line between the two points.

A vessel may not simultaneously have more than one troll license and may not



simultaneously have more than one delivery permit, but the vessel may be licensed for other fishing gear in addition to the troll license and delivery permit.

**NEW SECTION:** Sec. 3. An "A" license or permit issued under section 2 of this act may be transferred to a vessel of any length, but a "B" license or permit may only be transferred to a vessel under thirty feet in length.

A person who has obtained four "F" licenses or four "B" permits may, upon application to the department, convert the four licenses or four permits into one "A" license or permit. "B" licenses or permits acquired for this purpose shall be placed in a reserve status and shall not be assigned to any particular vessel. "B" licenses or permits in reserve status are fully transferable but may be removed from reserve status only by conversion to an "A" license or permit.

"B" licenses or permits in reserve status shall be renewed each year, but the licensee shall pay a renewal fee of ten dollars in lieu of the annual license or permit fee. "B" licenses or permits in reserve status are exempt from the landing requirement established in RCW 75.28.455.

"A" licenses or permits may not be converted into "B" licenses or permits.

**NEW SECTION:** Sec. 4. (1) In addition to the limitations on salmon licenses established in RCW 75.28.455, to qualify for a salmon troller license or salmon vessel delivery permit in 1980 a vessel must prove by means of valid fish receiving documents that one thousand pounds of salmon were caught and landed by the use of troll lines in any one of the years between January 1, 1974, and December 31, 1978, in this state or another state. Vessels that were new to the troll fishery in 1979 and had not made any troll landings prior to 1979 may qualify in 1979 by catching and landing one thousand pounds of salmon by the use of troll lines.

(2) After 1979, a vessel may maintain its salmon troll license or salmon vessel delivery permit by meeting the requirements of RCW 75.28.455.

(3) Any person aggrieved by a decision of the department under sections 2 or 3 of this act or this section may request that a board of review be impaneled to hear the case under RCW 75.28.475 and 75.28.480.

**NEW SECTION:** Sec. 5. Sections 2 through 4 of this act are added to chapter 75.28 RCW.

**NEW SECTION:** Sec. 6. This act shall take effect January 1, 1980.

**NEW SECTION:** Sec. 7. If any provision of this act or its application to any person or circumstance is held invalid, the remainder of the act or the application of the provision to other persons or circumstances is not affected.

# GEAR REDUCTION/BUYBACK PROGRAMS IN BRITISH COLUMBIA AND WASHINGTON STATE

Douglas M. Bell

## Introduction

Gear reduction through buyback is a relatively new phenomenon in the fishing industry. It is the purpose of this paper to explore the two programs that I have managed, to point out some of the basic and not so basic differences between them, and to look at the methodology for achieving the stated objectives of each program. For the sake of clarity, I will refer to the B.C. experience as the "buyback" program and to the Washington State experience as the "gear reduction program."

Policymakers view a buyback program as one technique for reducing the excess human and capital resources within an identifiable fishery. However, policy is very much akin to the artist's sketch. The resource manager must operationalize the plan and provide the necessary detail for the finished product. This is particularly the case in new, untried ventures when the impact of decisions can be very wide-ranging. The performance of the program and its impact upon both human and capital resources does depend to a very great extent upon the abilities of the manager. Often, the manager is the only link between the individual fisherman and the bureaucracy, and his interaction with that fisherman can have long-lasting results that in turn can be good or bad from a public relations point of view. The manager is necessarily limited by stated policy and statutory authority; the direction of this paper will be to plead for greater clarity of purpose and more management autonomy to achieve policy objectives.

## Discussion

Support for both the British Columbia buyback program and the Washington State gear reduction program stems from a common concern: there appear to be too many fishermen chasing too few fish. In both programs a prerequisite was a moratorium on new salmon fishing licenses. It is obvious that the capping of the fleet at then-existing levels of fishing effort was an important first step before any sort of buyback/gear reduction program could be implemented successfully.

The British Columbia buyback program was a new and untested venture. There were no precedents or guidelines for either the structure or operating methodology of such an effort. Therefore, the then minister of fisheries, Jack Davis, announced that a working fishing industry should be formed and be responsible for the development, subject to the approval of the minister, of the details and procedures for implementing the program. The committee consisted of representatives of the United Fishermen and Allied Workers, an organization primarily representing gillnetters, crew members on seine vessels, and cannery workers; the Pacific Trollers Association, representing the owners of troll vessels; the Native Brotherhood of British Columbia, representing the native Indian ves-

Mr. Bell was manager of the gear reduction program for the Washington State Department of Fisheries when this paper was written.

sel owners and crew members; the Prince Rupert Fishermen's Cooperative Association, representing its member vessel owners; the Fishing Vessel Owners Association, representing primarily the owners of seine vessels; and the Fisheries Association of British Columbia, representing the processors. The chairman was a Federal Fisheries Service assistant director. As a result, I found myself placating six supervisors ranging from the United Fishermen and Allied Workers' Union representative to the representative of the processors' Fisheries Association of British Columbia, and, of course, the federal government and its numerous representatives. The methodology was developed slowly. The buyback committee found early in its deliberations that it was impossible to lay down hard and fast rules to cover all eventualities. Some of the guidelines gave the manager broad discretionary powers in the administration of the buyback procedures. Briefly, the guidelines set down by the working committee and approved by the Minister of Fisheries were as follows:

- A. Any "A" licensed vessel could be bought with no limitation on size or value.
- B. All gear types qualified, i.e., seiners, gillnetters, trollers.
- C. All vessel owners were mailed circulars that gave full details of the program.
- D. There were no production criteria. The committee was really assessing the capabilities of the vessel in the hands of an "average" fisherman.
- E. Vessels were purchased with liens, mortgages, etc. attached. These were cleared under prescribed legal procedures.
- F. None of the purchased vessels could re-enter the commercial fishing industry in the west coast of Canada.
- G. Prices were not negotiable and the price offered was based on two appraisals.
- H. Appraisals were scheduled by the manager at designated locations.
- I. After an agreement was reached between the owner and the manager, vessels had to be delivered to either Vancouver or Prince Rupert for storage. The price then paid to the seller included only fixed gear, not nets, lures, lines, etc.
- J. Storage was obtained by tender, and vessels were stored until sold outside the fishery.
- K. Under exceptional circumstances, the "buyback" committee reserved the right to make exceptions to any of the foregoing rules.

At the time these guidelines were most important because they allowed the program manager to deal with a variety of circumstances that were to arise during the appraising and valuing of vessels and licenses for purchase and resale. While the final responsibility for de-

cisions had to rest with the federal government, this operation was an example of a broadly-based cooperative industry effort. The committee had been given and had accepted major responsibility for advising and carrying out a very controversial program.

It is important to note that the buyback program in British Columbia was only one phase of a very comprehensive program dealing with the reduction in fishing effort of the entire salmon fishery.

The gear reduction program in Washington State was founded upon an entirely different objective. That objective was the economic assistance of Washington State fishermen who had been adversely affected by federal court decisions. While all British Columbia salmon fishermen were afforded the opportunity to take advantage of the buyback program, only those net fishermen in Washington State affected by the Boldt decision of 1974 were allowed to participate in the gear reduction program. In 1974, Judge George Boldt ruled that the treaty language "in common with" meant that Indians were entitled to 50 percent of the salmon harvest. His ruling also forced the State Fisheries Department into managing the resource in a manner that allowed Indians the opportunity to harvest 50 percent of the salmon. This ruling forced further restrictions on an already hard-pressed industry in the non-Indian sector and was ultimately the reason for implementation of a gear reduction program. However, Boldt's 1974 decision did not encompass all the waters of Washington State. This meant that Columbia River gillnetters and Willapa Bay and Grays Harbor gillnetters and salmon trollers were not included in the program.

A study and development task force was successful in 1974 in obtaining the Economic Development Administration grant (federal), which then required state legislation to administer. That state legislation does not allow any alterations or expansion in the management of the gear reduction program. Further court decisions since 1974 have had an impact on fishermen outside the original case area, so we now have some fishermen who can participate and others equally affected who cannot. This diversity of program objectives also affected program funding. The funding source for the buyback program of British Columbia was an increase in license fees for all salmon fishing units. This meant that all the funds collected from the fishermen as license fees for the duration of the buyback program was founded upon a 2.4 million dollar grant by the Economic Development Administration branch of the federal government. Its purpose was to buy out on a voluntary basis a number of the economically-deprived, state-licensed, and mostly non-Indian fishermen adversely affected by the Boldt decision and to set up short-term vocational programs for existing fishermen in need of retraining. The funds are state-administered under state regulation but their administration must adhere to the stipulated constraints of the EDA grant. The original EDA grant also contained an interest repayment loan program designed to assist fishermen repaying the interest on existing loans. This portion of the grant reverted to the gear reduction program after it became apparent that no fishermen wanted to borrow more money just to cover an existing loan.

Operating methodologies for the two programs tend to be comparable. The participation of individual license owners or vessel owners was solicited by circu-

lating details of the program along with application forms. Completed applications are dealt with on a first-come first-served basis. Offers are made to purchase vessels that are qualified by program guidelines. The price offered is based upon current market value derived from the average of two appraisals. In B.C., one appraiser was a Department of Fisheries vessel insurance appraiser, the other an independent contractor. In Washington State, both surveyors were independent contractors. The Washington State program added some sophistication to the procedure by allowing the vessel owner to obtain an independent survey of his own and to purchase certain gear in addition to that gear fixed to the vessel. In British Columbia, a bonus or addition to the average of the surveyed value was allowed in the enabling legislation and the industry committee was the determining body in deciding what the offered price should be in terms of market conditions. The B.C. program began with a 5 percent bonus added to the average of two appraisals. The 5 percent factor gradually escalated during the three-year life of the program to a maximum of one thousand dollars per net ton of vessel. Program suspension in 1973 was necessitated by the record salmon harvest and price per pound paid to the fishermen. This caused a dramatic spiraling value for salmon licenses and a dramatic decline in the number of vessels offered for sale to the program. At the same time, no increase in funds was made available to the program. The Washington State program differs somewhat. While the average of two surveys is the basis for the price offered, the enabling legislation leaves no room for changing market conditions. The price offered *must* be the average of the two surveys and the "bonus." Thus, in reality the price offered for the license cannot exceed the face value or purchase price from the state, i.e., two hundred dollars currently. After careful and often emotional negotiations have taken place with the sellers, if they decide that the price offered is acceptable, the appropriate documents are signed and the vessel is delivered to a storage yard for eventual sale by public auction or other means deemed by the manager as the most beneficial to the interest of the agency and program. A condition of sale is that the vessel not be used again in the regional, that is, Washington State, salmon fishery.

### **Problems and Recommendations**

For want of a better classification scheme, I shall group problems into two separate categories, planning and operation. Experience has shown that planning should be comprehensive, that it should take a long-term perspective, and that it should be depoliticized. The buyback program in British Columbia was part of a very comprehensive program dealing with the reduction effort for the entire salmon fishery. The objective in Washington State was much narrower. Under Washington State conditions, any attempts at methods of license limitation or limited entry such as the A and B license scheme in British Columbia were and perhaps still are politically impossible. Also, native Indians in British Columbia were considered to be a separate and confined user group, yet still were more or less assimilated into the overall management plan. The Washington State situation, however, is probably best described by a bumper sticker displayed by many non-Indian gillnetters: "Two Nations Under Boldt." In Washington State the program is federally funded while it is strictly state-implemented

and managed. The continuing conflict between the two concerned agencies creates an uneasy management situation. Fuel is further added to this fire by the presence of a presidential task force intent on making some sort of out-of-court settlement between Indians and non-Indians. A final example of the need for comprehensive and long-term planning is the evidence that substantial numbers of vessels involved in the British Columbia buyback and in the Washington State gear reduction programs are simply moving into the salmon fisheries of adjacent political entities. As a matter of fact, I have had the pleasure of buying and selling a number of vessels more than once and look forward to seeing them again as limited entry programs expand.

If our objective is to reduce the human and capital resources in a given fishery, in this case salmon, it would seem worthwhile to develop a plan free of repetitive and wasteful duplication.

The British Columbia program sold almost half its vessels into Washington and Alaska fisheries, while the Washington program is selling a good number of the better quality vessels into the fisheries of California and Alaska.

Problems in the category of operations are primarily related to the need both for greater autonomy in the decision-making process and for adequate socioeconomic information. Each buyback event is unique. The individual participant may or may not be leaving the fishery for a variety of reasons. The negotiator and decision maker must be better informed and must have the authority to cope with a diverse set of circumstances. Experience with buyback and limited entry programs provides strong support for Dr. Orbach's position that more socioeconomic information about the participants in the fisheries is needed if we are to make fair and effective management decisions.

In both programs, there were and are no restrictions on the individual seller of a vessel. That person may or may not continue fishing as he wishes. In many cases, boats were sold that were rundown or no longer viable and the seller used the funds he received to upgrade his position in the fleet, usually with a new, highly sophisticated unit. Neither program has been concerned with this development even though the purpose of both is to reduce the amount of gear on the water. In reality, the fishing pressure has not decreased. Those licenses that previously were considered to be marginal or nonproducing are now becoming producing in the hands of good fishermen with good gear. We are not approaching maximum utilization of all salmon licenses in Washington, although we probably have reached that point in British Columbia. We have, however, succeeded in removing all the nonproducing licenses from both fleets, but with little effect on the amount of gear actually fishing. In the Washington program, did we really help those fishermen who were affected most by court decisions, as outlined in the legislation, or have we become purely a "gear reduction effort?"

It should be noted that the Washington State Department of Fisheries is presently developing a data base of socioeconomic information for the salmon fishery in the state of Washington.

# LICENSE LIMITATION IN THE BRITISH COLUMBIA SALMON FISHERY

G. Alex Fraser

License limitation in the British Columbia salmon fishery is not entirely new. Two earlier unsuccessful licensing schemes were implemented in the province: the first on the Fraser River between 1889 and 1892 and the second in the northern areas of the province between 1907 and 1917. Without doubt this early attraction was because of the peculiar nature of the resource; because of their spawning patterns and migratory behavior, salmon are extremely susceptible to depletion and indeed absolute extinction. Conservation was clearly the major *raison d'être* for the early licensing schemes and proved an insufficient basis on which to rationalize the continuation of the programs.

As time proceeded, a tentative recognition of other factors began to emerge, a recognition that social and economic considerations were also important elements in fisheries management policy. However, this new attitude was slow to gain wide acceptance. Undoubtedly, a major problem was the lack of theoretical base from which to carry the argument; only in the 1950s with the formulation of the modern economic theory of fisheries did the possibilities of license limitation begin to be seriously re-examined. A further twenty years were required before this re-examination bore fruit in a new licensing program.

In 1969 an exciting new era of experimentation began. The licensing program introduced that year was one of the most far reaching ever attempted. In its formulation, the goal of resource conservation, while important, was secondary to the goal of socioeconomic rationalization. There has been an attempt by means of license limitation to promote a strong and economically viable fishery, an attempt not only to protect the resource, but also to ensure that its exploiters and its ultimate owners (the people of Canada) obtain maximum benefit from it.

As one of the most advanced of its kind, the British Columbia program has generated considerable international and academic interest. In its positive aspect it has created a large number of precedents, while in its negative aspect it has amply illustrated the many pitfalls to be avoided. It is hoped that this study offers a useful summary of what is to be learned. In the later sections, the actual structure and implementation of the program are described and an attempt is made to gauge its efficacy in obtaining its stated goals. However, prior to this, the historical events leading up to 1969 are outlined in some detail. It is important to identify the main social, political, and economic considerations which operated to form the eventual program. It is also important to learn what we can from the failure of prior licensing schemes and identify the questions this raises for the present program.

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## BACKGROUND

### The First Attempt

The danger of overfishing in British Columbia, particularly on the Fraser River, received increasing attention in the late 1880s. The demise of salmon production on the Sacramento and Columbia Rivers, ostensibly the result of overexploitation, was a current and highly relevant example of what could happen on the Fraser. As a consequence, in 1887, Department of Fisheries staff drew attention to the possibilities in their annual reports. Guardian Charles F. Green observed that as many as two hundred fifty boats fished in Canoe Pass (on the Lower Fraser) and suggested "as a partial remedy . . . that only a limited number of licenses be issued and that no cannery be allowed more than forty boats, contract or otherwise" (1). Similarly, Guardian John Bute wrote:

. . . in my opinion it is about time that some limit . . . be placed on the number of nets allowed on this river and I think the Fisheries Department cannot too soon take this matter into serious consideration (2).

In 1888, the dominion government responded to these observations by reserving the right to determine the "number of boats, seines or nets . . . used on each stream" (3) in British Columbia. In 1889, a specific limit of five hundred boats was placed on the Fraser River; three hundred fifty of these licenses were issued to the canneries for their own company vessels, and the remaining one hundred fifty were issued to independent "outside" fishermen.

The major flaw in this first attempt at limited licensing was the failure to recognize the full implications of the policy. A resource rent or excess profit accrued to those companies and individuals who obtained the right of exploitation. In one form, this encouraged a lineup of potential independent fishermen demanding the right to fish the river. Also, and perhaps more damning, was the form that cannery licensing took. Originally, fishing licenses were issued on the basis of canning capacity, then later on a straight pro-rata basis. At the same time, there was no restriction on the growth of canning capacity. This inevitably led to severe distortions in industry investment. Established operators constructed new facilities with the object, not of canning, but of securing an enlarged share of total cannery licenses, and new entrepreneurs were encouraged into the industry. Not surprisingly, the number of canneries on the Fraser River increased from twelve to eighteen between 1888 and 1891. With their opening, the government was in a poor position to deny them a share of the resource, while concurrently it was difficult to reduce the number already allotted to the established operators (4).

These various pressures brought about an early demise of this first experiment in license limitation. In 1892, the licensing restrictions were removed, and by 1893 the number of vessels involved in the fishery had more than doubled (5).

### The Second Attempt

As the first attempt at limited entry was restricted to the Fraser River, the second was limited to the northern areas of the province. In this region, indepen-



dent fishermen were much less evident since the vast majority of the fleet were cannery operators. For this reason, the limitation was placed on canneries rather than directly on the number of boats or operators.

The 1907 report of the commissioner of fisheries for British Columbia noted that "there has been in the last two or three years a considerably large increase in the number of boats engaged in the fisheries." The report continued:

... there is danger, from the constantly increasing efforts to catch the fish, that a condition similar to that which now exists upon the Fraser River may be created. Both the canners and inspector of fisheries for the northern district appreciate this, and very wisely in my judgment, are advocating that the government should not permit the industry be further prosecuted under present conditions; and also, in consequence of the increase in the number of canneries and boats engaged in the fishery, that no additional canneries should be permitted to be constructed in the North, and that a limit be placed upon the number of boats which the existing canneries should be permitted to operate.

In response, the government passed the "Dominion Fishery Regulations" of 1908 which required a license to conduct cannery operations. At the same time, it was announced that no new salmon cannery licenses would be issued for northern British Columbia.

Of course, these actions by themselves could not reach the root of the problem. Under a competitive system the individual processors still had the incentive to expand their own fishing capacity. However, this new limitation on entry also created the possibility for rent realization by the established canners, thus paving the way for the establishment of a boat allotment committee by these operators. This committee of three allocated boats to each cannery on the basis of former pack productions, floor area, and equipment in the plant. Under this allotment a total of eight hundred fifty boats were allowed to fish in the Skeena River and seven hundred fifty boats in Rivers Inlet while other major fisheries of the north coast were given similar quotas.

Private allotment eventually broke down in 1909 because of dissension among the participants. Rather than allow its demise, the provincial government took over responsibility in 1910. Without doubt, boat allotment was extremely successful with respect to its primary objective of resource conservation. The 1911 annual report of the Provincial Fisheries Department noted:

... accepted and enforced by both (provincial & federal) authorities (boat allotment) proved eminently workable and has resulted in the solution of a problem which has wrecked many of the salmon fisheries of the Pacific Coast and has constantly threatened all (6).

However, as with the Fraser River experiment, a significant defect of the program was a failure to recognize the full implications of the policy. The unforeseen result was the creation of a resource rent. Because of the structure of the program, this return inevitably accrued to the established cannery operators in the form of excess profits. This resulted in a natural demand from other entrepreneurs to enter the "closed shop." Until 1914, this demand was generally ignored, but during the First World War, with the price of canned salmon escalating rapidly, the pressure to allow new entry increased radically. As a result, several new licenses were issued for the northern area, effectively ending the

second experiment with license limitation. In January, 1917, this became official when the dominion government announced that all restrictions on the number of cannery licenses in British Columbia would be removed.

### **Sanford Evans Commission**

This announcement inevitably resulted in dissatisfaction among the established processing companies and immediate representations were made to Ottawa. A royal commission (under the chairmanship of W. Sanford Evans) was formed to investigate the problems of the British Columbia salmon industry. The analysis and recommendations of this commission are immensely interesting in their considerable prescience. For the first time a public policy for fisheries was outlined in the following terms:

It is clear public duty not merely to conserve the supply of salmon in its present proportion, but to increase it until each year it reaches the *economic maximum* and it seems to us equally clear that all conditions surrounding the industry should as far as possible be stabilized and *the excessive use of capital and labor obviated or prevented* . . . The solution of this problem would not seem to be found in encouraging or permitting the employment of more capital or more labor than can efficiently perform the work. The public interest can be served in other ways . . . *If the cost of production becomes too great all hope of advantage to the public as consumers will disappear* (7). (Emphasis added.)

In recommending further limitation in the cannery industry, the commission stated that it did so "upon the condition that excess profits, if any, shall go to the public and that exploitation in fact as well as motive shall be eliminated from the industry."

Here in 1917 is a clear recognition of several points accepted today: first, recognition of the economic waste associated with free entry in terms of unnecessarily high costs of production; second, acceptance that it is public duty to prevent this from happening; and, finally, recognition of the consequences of limited entry for those who are allowed to participate, and its solution in the taxation of "excess profits."

Unfortunately, the findings of this commission and its recommendations were generally ignored. The dominion government proceeded with its plans to open access to the industry in 1918. Undoubtedly, a major consideration in these actions was the cessation of World War I hostilities and the problem of employment opportunities for returning soldiers. Also, the commission was simply too far ahead of its time. While its recognition of the various forces operating in the fishery was unquestionable, the theoretical base for its findings did not exist. As a result, it was a cry in the wilderness, a cry not heard for over forty years.

### **The Theoretical Base**

In the following years the conservation goals of license limitation were achieved by means of increasingly stringent gear, area, and time restrictions on the fishery. The question of license limitation appeared completely and finally banished to the realm of history. In 1953 and 1954 this situation began to change dramatically. In these years the theoretical work of a Canadian economist, H. Scott Gordon, radically revised thinking on fisheries management.

One major effect of Gordon's work was the final destruction of the pure conservation argument for fisheries management. Quoting Burkenroad, he said, "the management of fisheries is intended for the benefit of man not fish; therefore, the effect of management upon fish stocks cannot be regarded as beneficial *per se*" (8). He continued: "focusing attention on the maximization of the catch neglects entirely inputs of other factors of production which are used up in fishing and must be accounted for as costs" (9). By bringing in this concept of costs, Scott Gordon argued convincingly for a concentration on "net economic yield" as opposed to "biological yield" in fisheries management. From a theoretical viewpoint, he showed that the optimum utilization of a resource is achieved where the social value of production less its social cost of production is maximized. Of course, in this he said little more than Sanford Evans, but the great strength of this analysis was the description of this goal's frustration in a free entry fishery.

With optimum utilization of the resource, on certain fishing grounds a resource rent would be generated. A wedge would exist between the costs of resource exploitation and the value of output. However, since the resource is not private property, this rent cannot be appropriated by an individual. "The result is a pattern of competition among fishermen which culminates in the dissipation of the rent" (10). The optimal allocation of fishing effort is not an equilibrium (that is, a stable allocation) in a free entry fishery. Under free entry, exploitation continues until the rent is dissipated in its entirety.

Scott Gordon effectively showed that the perverse tendency towards overexploitation of fisheries resources was economic rather than biological in origin. It was the promise of excess profits that drove participants in the industry forward. The end result was the elimination of these profits by overexploitation of the resource base. Also, he drew renewed attention to the fundamental economic waste associated with free entry fisheries. The promise of excess profits resulted in a misallocation of far greater quantities of capital and labor to the industry than that actually necessary to harvest the resource.

### **The Aftermath**

Scott Gordon's work began a wide-ranging discussion among academics, industry groups, and government administrators on the means of obtaining maximum economic yield in fisheries. While it was generally agreed that free entry was the problem, the best means for limitation was the subject of considerable debate. In 1958, the federal government commissioned an extensive study with respect to the British Columbia salmon and halibut fisheries by the economist, Sol Sinclair. This study, published in 1960, was an exhaustive examination of the various means available for limiting entry.

In his analysis, Sinclair concentrated on two main methods. The first was a system of taxes on catch and/or fishermen that would dissuade the excessive application of capital and labor in the industry. Of this he said, "in theory and ease of application and imposition, a tax is the simplest and least disturbing method of limitation of entry." However, from the viewpoint of political acceptability Sinclair identified a number of immense difficulties (11).

The use of a tax to reduce entry is based on the assumption that it will discourage fishermen from fishing. . . . Undoubtedly there will be some that will re-

spond in this fashion. However, we cannot ignore the persistence of excess capacity in the fisheries despite the fact that earnings for many have been quite low. It is therefore doubtful if the imposition of a tax in itself will eliminate sufficient of the sub-marginal enterprises rapidly enough to bring about the desired optimum in the fisheries, unless the tax is set at a very high level.

*In the present situation with overcapacity and generally depressed earnings, it is hardly appropriate or politically acceptable to attempt to correct a situation by adding a high tax to already burdensome costs of operation in fishing (12).*

The second alternative Sinclair presented was the simple restriction of entry with only token license fees. While in terms of general administration he felt that this method was as simple as a tax, in terms of specifics he identified a number of other problems. In theory, an optimal allotment of licenses requires perfect knowledge of the cost and production functions of each individual boat. Also, problems of law and politics are involved in terms of a "fair" allotment of the restricted licenses. In consequence, "these conditions preclude the development of a workable licensing system that could be instituted immediately or even in a short period of time" (13).

In light of the qualifications with both methods, Sinclair suggested that a gradual policy be implemented—one that would avoid rapid changes in the fisheries, and one that "can be modified as experience and knowledge about these new techniques are gained" (14). Also, he suggested that any program instituted should use those features of both methods most likely to produce the desirable results. Specifically, Sinclair recommended a gradual licensing program to begin. By making these licenses nontransferable, attrition would create an economic surplus that would raise the level of fishermen's remuneration. This would then allow procedure towards a more taxation-oriented form of limited entry. Sinclair felt that after a five year moratorium on new licenses they could be issued on a permanent transferable basis under competitive bid.

## **PROGRAM STRUCTURE**

While some of Sinclair's specific recommendations have been adopted, many have been modified and others completely forgotten. However, the general philosophy of this report has been the basis of license limitation in the British Columbia salmon fishery.

In July, 1968, the minister of fisheries instructed that a basic licensing plan be prepared. In September of that year, licensing proposals were announced and the industry advised that they would be effective for the 1969 fishing season. In keeping with the theoretical justification, the primary objective of the program was the reduction of overcapitalization and excess labor usage within the fishery. This was intended to reduce the cost of production and create an economic surplus that would, first, raise the level of fishermen's remuneration and, second, provide a certain return to government to compensate for the use of this public resource and the ever-increasing costs of resource management. Finally, it was to achieve these ends with minimal dislocation of capital and labor then employed.

The plan devised encompassed four distinct stages: first, freezing the fleet at a stable level; second, effecting gradual reduction in fleet size; third, improve-

ment of the vessels; and, fourth, introduction of economically optimal gear and area regulations. The next sections review the timing, form, and rationale for the specific regulations introduced.

### **Phase I**

With a few changes, the first phase followed the recommendations of the Sinclair report. Although both occurred, neither reduction in fleet size nor increase in license fees were significant features. The main point was to stabilize fleet size and prevent future expansion.

The fleet was frozen by creating a specific salmon license in lieu of the general fishing license previously available. While the general license had been freely available to any individual, only those with commercial salmon landings in 1967 or 1968 qualified for the new license. In addition, retention of the license required annual renewal and participation in the fishery at least every other year. Increased administrative costs were paid by doubling license fees but they still remained nominal.

Licenses were issued on vessels rather than to individual fishermen. The rationale for this lay mainly in the administrative and policing necessities of the program. Under a personal licensing system, as the licensed individual moved from vessel to vessel, it would prove difficult to determine which vessels were fishing legally and which were not. Also, by making the individual the limited factor, a personal licensing system would inadvertently encourage the substitution of capital for labor in the fishery. At the same time, there would be no means to prevent the influx of more capital-intensive vessels to the fleet. The end result of a personal licensing system could be a large fleet of expensive, highly automated vessels, each operated by a single fisherman. While vessel licensing can be equally labor-oriented, most western fisheries technology is labor saving rather than labor using. Given this, the substitution of labor for capital was much less likely.

Undoubtedly, vessel licensing posed equity problems for those fishermen who operated rental vessels or acted as crewmen, but at least the vessel was a concrete, clearly specified entity. For field management, it was relatively simple to determine a vessel's status; for administration, relatively easy to control its replacement. The decision to license vessels made a clear and logical tradeoff between the advantages and disadvantages of the two systems.

The vessels qualifying for the salmon license were subdivided into two categories on the basis of their performance history. Vessels that landed in excess of ten thousand pounds of pink or chum salmon (or an equivalent amount of other salmon species) qualified for class "A" licenses, while those with smaller production records qualified for class "B" licenses. In monetary terms, the production cutoff between the two categories was approximately twelve hundred fifty dollars. While both were entitled to full participation in the fishery, class "A" vessels could be replaced if retired, but no such provisions were made for class "B" vessels. This license categorization generally distinguished serious fishermen, who derived a reasonable income from the resource, from part-time and recreational fishermen, who made the majority of their income from other sources.

One major divergence between phase I as implemented and Sinclair's recommendations lay in the provision for license transferability upon vessel sale.

Sinclair proposed entirely nontransferable licenses for the first five years of the program. In effect, he relied on the attrition rate over this period to reduce fleet size significantly. This approach was deemed infeasible for several reasons. If, upon sale, the salmon license could not be retained, clearly the sale value of vessels would be adversely affected. For a retiring fisherman, this would prove an immense hardship. If effect, it would force individuals to continue participating against their will. In all likelihood, the attrition rate would be low and the hardship caused immeasurable.

Not surprisingly, the new regulations did not meet with uniform approval from industry groups. In particular, the U.F.A.W.U. (United Fishermen and Allied Workers Union, the major fishermen's union in the province) strongly objected to vessel-based licensing. The main point in the union's opposition was that the "program increased the power of the big companies that now dominate the industry" (15). They voiced the fear that the processing companies involved might extend their control over the now limited fleet. By buying up class "A" salmon licenses, they would exclude independent fishermen and effectively undermine the bargaining position of all fishermen. In answer to this criticism a freeze was implemented on company ownership of class "A" vessels, effective April 3, 1969. Company ownership of fishing vessels was fixed on that date at its then current number.

Other criticism was leveled by the Fishing Vessel Owner's Association (16) against the provisions excluding nonsalmon vessels from obtaining salmon licenses. They argued that the majority of these vessels traditionally fished for salmon during peak production years. Consequently, their exclusion from the salmon fishery would detrimentally affect their long-run income and vessel values. In response to this criticism, the regulations regarding salmon licensing were relaxed. Eligibility for a license changed from requiring participation in the salmon fishery, specifically, to only participation in "fishing."

In retrospect, this modification caused serious problems for the licensing program. While the actual number of vessels added to the fleet was quite small (one hundred sixty at maximum), many of these were relatively large groundfish trawlers and halibut longliners. In effect, a large pool of unused capacity was created that could be drawn into the salmon fishery as it became more lucrative. Over time, these nonsalmon vessels were retired from the salmon fishery and were replaced by actual salmon vessels. The original vessels then continued as before to fish nonsalmon species. This process has seriously undermined the progress of rationalization.

The final step taken in the first phase of the program was the creation of an appeal committee. It was not intended at this point to exclude any operator from the fleet who was a bonafide salmon fisherman. On this basis, the appeal committee was to consider licensing vessels that did not meet the qualifications because of "special circumstances." An industry advisory committee was formed (17) and charged with the task of defining this term; it unanimously recommended the following:

1. A salmon fishing vessel constructed, under construction, or for which a contract had been signed prior to September 6, 1968 (and that valid proof can be provided for)

2. A vessel to be acquired by a fisherman who had lost his vessel prior to September 6, 1968, provided that the fisherman had not already acquired a vessel that was eligible to fish in 1969
3. A vessel owned by a fisherman that had a historic record of salmon fishing prior to 1967, but which had not fished in 1967 or 1968 because the fisherman was unable to operate for a compassionate reason such as illness

Satisfaction of any of these criteria would qualify the appellant for a license. Given these guidelines, the appeal committee handled the impressive number of twelve hundred appeals within the first year of its existence. The majority of these were denied, but if the fishermen wished to proceed further, the option of a direct appeal to the minister was open. However, after receiving an interpretation of the regulations, this option was rarely exercised.

## **Phase II**

As noted, under phase I the licensing program was designed to limit fleet size, but did not address the problem of reducing that fleet from its already excessive level. This was the central focus of phase II. The main features were:

1. A substantial increase in license fees
2. The phase-out of the "B" licensed fleet
3. The funding of a buyback program

In addition, adjustments were made in the original regulations in response to various problems that became apparent.

Effective for the 1970 salmon season, license fees were increased from their nominal level of ten to one hundred dollars for category "A" vessels less than fifteen net tons in capacity. Vessels larger than this were faced with two hundred dollar fees in a rough attempt to make fees proportional to fishing capacity. Effective for the 1971 season, these fees were doubled to two hundred and four hundred dollars respectively (18).

Category "B" license fees remained at a ten dollar level, but were to be phased out in ten years. In the meantime they were to retain full fishing privileges. It was hoped that these provisions would encourage operators to voluntarily opt for "B" status and eventual retirement from the fishery.

The decision to eventually eliminate the "B" fleet was politically and economically motivated. In the short run, the catch of these vessels was minimal and their elimination would add little to the income of the remaining fishermen. However, part-time and casual fishing had been a contentious issue for a number of years. The more serious fishermen naturally objected to the nuisance hazard of amateurs crowding the fishery and taking a share of the limited catch. At the same time, with the now limited fleet size, there could be no guarantee that these vessels would remain casual participants in the fishery. The possibility that the casual participants would sell out in favor of more serious participants was a definite threat. The long-run result might be an effective increase in effort from these vessels that would circumvent the program's intent. The phase-out period was designed to address both of these problems.

The final major feature of phase II was the creation of a buyback program. To speed up the rate of attrition, the proceeds of the higher license fees were channeled into a fund. Beginning in the 1971 season, this fund was used to enter the "A" licensed vessel market to purchase and retire a proportion of the fleet.

All "A" license holders were circularized with the details of the program. In effect, an offer was made to purchase any vessel subject to the following guidelines. The price offered was based on market value derived from two appraisals—the first carried out by a field representative of the Department of Fisheries and the second by an independent surveyor. The two appraisals, when in general agreement, were averaged and a 5 percent bonus added to arrive at the final price offer. A fisherman was free to accept or reject this offer and, since the decision was purely voluntary, the program effectively minimized coercion to leave the fishery.

Vessels purchased through buyback were resold at public auction subject to the order that they could never be used in any British Columbia commercial fishery. The proceeds of these sales were rechanneled into the buyback fund for additional purchases. On the whole, the program was a reasonable success. By the time of its suspension in 1973, it had succeeded in retiring three hundred fifty vessels, about 7 percent of the "A" licensed fleet. The program's suspension was necessitated by a record salmon harvest in 1973 and the consequent spiraling value of class "A" licenses. There was no simultaneous increase in funds available from license fees, it became difficult to meet vessel owners' asking prices, and the number of vessels offered to the program declined drastically.

Other provisions of phase II refined the original regulations in the light of experience. In 1969 and 1970, retired class "A" vessels were replaced on a boat-for-boat basis. In retrospect, the result was quite predictable. In the two years, 76 vessels with a total carrying capacity of 186 tons were removed and replaced by vessels with a total capacity of 596 tons. This subversion of the program's intent required additional restrictions. Effective July, 1970, a "ton-for-ton" replacement rule was brought into effect, stipulating that the replacement vessel could be no larger in capacity than the vessel removed. If an operator wished to bring in a larger vessel, he could only do so by retiring vessels equal to the tonnage he required.

Various administrative problems were encountered with this regulation. All vessels greater than fifteen net tons by law must be registered and surveyed by the Ministry of Transport. However, vessels smaller than this, including the vast majority of the salmon fleet, are not so constrained. The Department of Fisheries statistics on the net tonnage of this group were nothing more than fishermen's estimates. With replacement based on tonnage, the fisherman was clearly encouraged to overreport this factor. To counter this tendency, and in the interests of equity, a table converting length to net tonnage was added to the regulations. When a vessel was registered, the actual net tonnage shown on the registration certificate was used as the relevant proxy but when unregistered, the vessel was measured and replacement allowed on the basis of the length-tonnage conversion table.

Even this was found insufficient to completely stop the trend towards larger replacement vessels. An extreme example of this was evident when a small thirty



foot river gillnet vessel registered at five net tons was replaced by a forty-two foot open ocean troller at the same registered net tonnage. In August, 1972, further restriction was effected, limiting the length of the replacement vessel to that of the vessel removed.

Also, under phase II, the problem of growing company control of the fishing fleet recurred. With a nonshrinking fleet, if processors were allowed to retain their 1969 number of vessels, clearly their proportional share of the fleet would increase. To avoid this, companies were advised that as fleet size declined, they would be expected to make parallel decreases in their own fleet. It should be noted that this provision was never actually written into the regulations, but was a personal statement of intent by the minister to all companies involved.

The final problem under phase II was the hardship caused to native Indian fishermen by the increased license fees and more stringent license requirements. Many Indian vessels had been classified as "B" vessels and as such they were faced with phase-out in ten years. Others, although categorized as "A" vessels, were small producers who were severely hurt by the substantial increases in license fees.

The Indian problem derives from the position of the fishery vis-a-vis native culture. Although many Indians are casual or part-time participants compared to most whites, fishing in this manner is an integral part of their traditional way of life. Given this and a general lack of employment alternatives in many isolated native communities, the dependence on this source of income in both economic and social terms is substantial. On this basis, special provisions were implemented by the 1971 season with the creation of an A-I license. Natives who qualified were eligible for a ten dollar license fee subject to the rider they would be ineligible for the buyback program because they did not contribute to this pool of funds. The native was free under the provisions to sell his vessel to either native or white, but if sold to a white, the vessel would revert to "B" status unless all exempted license fees were paid in full.

### **Phase III**

The third phase of the salmon rationalization program is really something of a misnomer. The main emphasis of this step was never viewed in terms of reducing fleet size. The actual goal was to improve vessel standards for purposes of improving the quality of product delivered and the safety of the participants. This goal had been under consideration for a number of years prior to 1969. In 1967, a working group formed to make recommendations in this regard noted that "the use of safety standards solely would not provide an effective method of controlling entry to the salmon fishery." They rationalized that the number of vessels would be minimal and that the actual vessels removed would tend to be the smallest and least productive units.

When finally implemented for the 1973 season, vessel standards provisions applied to all fishing vessels and not merely to salmon vessels. Four general requirements were involved:

1. Holds must be at least thirty cubic feet and able to protect fish from weather and contamination

2. Insulation is required to protect fish holds from the heat of the engine
3. Where the vessel is to hold fish for longer than eighteen hours, it must have means of refrigeration and at least a sixty cubic foot hold
4. A clean smooth nontoxic surface is required in fish holds

These standards are enforced by biannual inspection of each vessel and failure to pass implies revocation of all fishing privileges.

As predicted, vessel standards had little effect on the number of vessels participating. Although many vessels failed on their first attempt, most owners chose to upgrade rather than retire from the fishery. Out of an entire fleet in excess of five thousand vessels, only ninety-five "A" and sixty three "B" category vessels were excluded in 1973 and seventy-nine "A" and nineteen "B" category vessels in 1974. Also, these vessels could be resubmitted for inspection and re-enter the fishery at a later date.

#### **Phase IV**

At this time, the first three phases are the full extent of the salmon rationalization program. The as yet unimplemented final phase was to address the question of changing gear and area restrictions on the fishery. As explained previously, these various restrictions were developed over the years primarily for conservation purposes with little attention paid to economic efficiency. As a consequence, they have a direct and detrimental effect on operating costs and thus relative returns to fishing vessels and fishermen. The intent of phase IV was to bring economic factors into line with conservation requirements. It was believed that the more obviously detrimental regulations could be removed or adjusted as the fleet shrank in size.

In 1972, the West Coast Salmon Fleet Development Committee (including industry, academic, and government representatives) was organized to advance recommendations on this part of the program. This committee was unable to attain unanimity in its deliberations and, in 1973, they submitted majority and minority reports to the minister. The minority report, the work of the U.F.A.W.U., did little more than reiterate the union's opposition to the licensing program as it was implemented. The majority report, while offering useful suggestions on various facets of the program as already implemented, did little to advance beyond these confines. Too little was known of the relative potential economic efficiency of the various gear types operating in the fishery. Additional work was needed in this area before more definite suggestions could be offered.

## **EFFECTIVENESS**

The 1976 season was the eighth full year of the latest salmon license experiment. The fisheries department has given high priority to monitoring the progress of the program during this period. Much of the information presented in this chapter is drawn from a number of primarily unpublished reports prepared by department economists in performing this task. Where necessary and possible, the information has been extended and updated.

It appears on a superficial level that the program is a reasonable success. The number of licensed salmon vessels and the number of vessels actively engaged in the salmon fishery have shown substantial declines. Unfortunately, this trend is extremely deceptive and more rigorous examination raises a good number of questions. The primary goal of license control was the reduction of capital and labor input to the fishery. In this sense, vessel numbers are no more than a proxy for the amount of capital and labor employed. It is difficult to attain adequate measures of the trends in these more basic factors, but the available information does leave room for considerable doubt concerning program effectiveness.

### Vessel Numbers

In 1967 and in 1968 approximately 6,600 vessels engaged in the salmon fishery. On this basis 6,932 vessels qualified for salmon licenses in 1969. This number gradually declined such that, by 1976, only 5,339 licensed salmon vessels, or 77 percent of the base fleet remains (table 1). Of this number, 623 are "B" licensed vessels slated for removal in 1980.

The trend in active fleet size is equally impressive. Poor salmon runs in 1969 created a large inactive residual, that is, vessels that did not participate although qualified to do so. Fully 828 vessels out of the original licensed fleet chose not to participate in 1969. Although the trend in this inactive residual is generally downward because of the alternate year fishing rule and higher license fees, in 1975 there were still 390 vessels that did not use their salmon fishing privilege. Between 1966 to 1969, approximately 6,500 vessels participated each year, while in 1975 only 5,028 were actively engaged in salmon fishing.

Table 1: Trends in Salmon Fleet Size by License Category  
1966-1976 (Numbers of Vessels)

YEAR	"A"	"B"	TOTAL LICENSED	NO. ACTUALLY ENGAGED	INACTIVE RESIDUAL
1966				6,575	
1967				6,639	
1968				6,603	
1969	5,870	1,062	6,932	6,104	828
1970	5,668	973	6,641	6,201	440
1971	5,344	984	6,328	5,806	522
1972	5,046	897	5,943	5,533	410
1973	4,996	734	5,730	5,254	476
1974	4,823	704	5,527	5,210	317
1975	4,775	643	5,418	5,028	390
1976	4,716	623	5,339		

Sources: (a) Annual Licensing Statements—Fisheries and Marine Service, Vancouver, — (unpublished)

(b) Income by Gross Return Group—Unpublished Summary Computer Run—Fisheries and Marine Service, Vancouver.

The decrease in active salmon vessels can be examined more closely by classifying the number according to the type of gear used (table 2). It is apparent that the decline did not affect all sectors of the fleet. Over the first few years of license limitation, the seine sector remained relatively stable at approximately four hundred vessels, then increased dramatically to over five hundred vessels

**Table 2: Trends in Active Salmon Fleet by Gear Category**  
(Numbers of Vessels)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Seiners	248	233	278	286	271	253	249	226	201	217
Seine Combination	155	181	120	83	135	152	148	231	325	266
Subtotal	403	414	398	369	426	405	397	457	526	483
Gillnet	2,515	2,388	2,501	2,472	2,315	2,151	2,098	1,785	1,655	1,595
Gillnet Combination	1,176	1,479	1,327	949	1,189	1,064	948	1,315	1,465	1,335
Subtotal	3,691	3,867	3,828	3,421	3,504	3,215	3,046	3,100	3,120	2,930
Troll	2,375	2,231	2,244	2,208	2,141	2,045	1,959	1,520	1,497	1,429
Troll Combination	106	127	133	106	130	141	131	177	167	123
Subtotal	2,481	2,358	2,377	2,314	2,271	2,186	2,090	1,697	1,664	1,552
Total	6,575	6,639	6,603	6,104	6,201	5,806	5,533	5,254	5,210	5,028

Source: (a) Income by Gross Return Group—Unpublished Summary Computer Run 1971 to 1975.

(b) Returns from Fishing Vessels in British Columbia—Published 1966–1970.

during the most recent period. The decline in fleet size is entirely concentrated in the gillnet and troll sectors of the fleet. Of the three basic gear types used in the salmon fishery, purse seine constitutes the largest and most capital- and labor-intensive units, using crews of five or more and vessels in excess of fifty feet in length. In contrast, gillnet and troll units tend to be smaller one- or two-man operations, with vessels in the thirty to forty-five foot range. These figures give a dramatic indication of the pattern taken by fleet reduction. While there was a substantial decrease in overall fleet size, it was the smaller rather than the larger vessels that were eliminated. The number of larger vessels involved actually increased by a variety of means. First, many of the nonsalmon vessels originally licensed were modified into salmon vessels or were retired and replaced by new salmon seiners. Second, as many smaller vessels were retired, their licenses were consolidated and they were thus "pyramided" into larger seine vessels.

Another point made in tables 2 and 3 is the trend in the various combination categories in the fleet. Traditionally, a number of vessels have used two or more salmon gears during the year, and many salmon vessels have fished for other species. Clearly, vessels which can use a number of gears rather than a single operation are more capital intensive. The various modifications required and the expense of the additional gear add to vessel value and operating costs.

Table 3: Active Fleet Single and Combination Categories  
(Numbers of Vessels)

	1966-1968 Average	Percent of Total Fleet	1973-1975 Average	Percent of Total Fleet
Seine Single	253		215	
Gillnet Single	2,468		1,678	
Troll Single	2,283		1,449	
TOTAL SINGLE	5,004	76	3,342	65
Seine Combination	152		274	
Gillnet Combination	1,327		1,372	
Troll Combination	122		156	
TOTAL COMBINATION	1,601	24	1,802	35
TOTAL FLEET	6,605	100	5,144	100

In the seine sector of the fleet, the number of single operations actually declined over the period of license limitation. The overall increase in this fleet sector was entirely the result of an increase in the number of combination units. In the gillnet and troll sectors of the fleet, the entire decline in vessel numbers was centered in the single gear categories while the respective combination categories remained relatively constant or witnessed some growth.

For the decline in vessel numbers to represent absolute proof of a decline in fishing costs, a necessary condition is that the vessels themselves represent a standard unit over the years. The evidence simply does not support such an assumption; on the contrary, it implies that the average fishing vessel has become larger and more capital intensive. As a consequence, on the basis of vessel numbers alone, the overall trend in fishing costs is quite indeterminate. Analysis on a more detailed level is required to reach conclusions on this issue.

### Labor Input

One means of measuring labor input to the fishery is by the number of individuals employed. A requirement for employment in the industry is a *personal* fishing license, which is freely available to any Canadian citizen. Prior to salmon licensing, approximately twelve thousand of these licenses were issued each year in British Columbia (table 4). Two trends are apparent since salmon licensing began. Between 1968 and 1972, the number of licensed individuals declined to less than ten thousand, then from 1972 onward there was a consistent upward trend until by 1976 almost fourteen thousand licenses were issued. However, it is unlikely that these figures are an accurate representation of trends in salmon employment. Some of the individuals who took out personal licenses did not fish (the license fee is nominal) and some of those who fished did not fish for salmon (the license is not species specific). The latter consideration is particu-

larly relevant since 1972, with an expansion of markets for other B. C. fisheries products.

Another estimate of employment in the salmon fishery is based on the number of vessels engaged and the average employment on these vessels. In 1970, a Fisheries and Marine Service survey estimated average employment on seine vessels as 5.5 men, and on gillnet and troll vessels as 1.2 men. Assuming that this has remained constant over the years, it appears that labor input to the salmon fishery was stable at approximately 9,600 individuals prior to 1969 (table 4). Between 1969 and 1975 there was a relatively consistent downward

Table 4: Trends in Labor Input to the Salmon Fishery

	Number of Personal Fishing Licenses Issued	Estimated Number of Individuals in Salmon Fishery Employment	Estimated Man Days Salmon Fishing
1966	11,977	9,623	394,560
1967	12,117	9,747	400,050
1968	12,133	9,634	432,167
1969	10,492	8,912	333,645
1970	11,647	9,273	429,919
1971	11,015	8,709	375,705
1972	9,902	8,347	380,343
1973	11,717	8,270	380,937
1974	11,906	8,514	327,675
1975	12,578	8,111	275,115
1976	13,899	Not Available	329,266

- Sources: (a) Annual Licensing Statement—Fisheries Service, Vancouver (unpublished)  
 (b) Income by Gross Return Group—Unpublished Summary Computer Run—1971–1975  
 (c) Returns from Fishing Vessels in British Columbia—Published Statistical Reviews—1966–1970  
 (d) British Columbia Catch Statistics—Fisheries Service, Vancouver.—Published Statistical Review, 1966–1976.

trend until only 8,111 individuals were employed in 1975. It should be emphasized, however, that even these estimates may be subject to some inaccuracy as they cannot reflect the intensity with which the labor supply is used. To draw this into the calculations, the number of days spent fishing by gear type was used to estimate man days invested in the salmon fishery (table 4).

All three indicators show that labor input to the salmon fishery was relatively stable prior to 1969. On the basis of the two most relevant indicators, labor input has declined significantly since that time. The decline in estimated individuals employed is in the range of 15 percent. The decline in estimated man days spent

fishing is even greater, in the range of 20 percent. With respect to labor input there is little doubt that the salmon license control program is working.

### **Capital Input**

Each year since 1966, the advent of vessel licensing, individual fishermen have been asked to estimate the market value of their vessels. These figures are aggregated to give the only direct estimate of total fleet capital value. Of course, there are certain problems inherent in such methodology. Many of the vessels are old and the owners have difficulty valuing them. Also, there is some tendency among fishermen to be suspicious of the question's intent. However, from year to year these figures should give a reasonably accurate representation of the trends in the market value of the fleet as a whole.

Unfortunately, in recent years these trends do not necessarily represent those of fleet capital input. Since the license is attached to the vessel and can only be transferred with the vessel, there is a tendency for the value of the license to be capitalized into the value of the vessel. Consequently, market value no longer reflects simply the value of capital employed, but also the value of the license; its value is determined by the level of rent accruing in the fishery and expectations regarding future rents. As such, it has no connection to the level of individual investment. This factor was particularly significant in 1973 and 1974. A substantial jump in the value of salmon production in these years resulted in high expectations and income levels. Consequently, market value is a significant overestimate of actual capital employed.

The market value assessments must be adjusted to obtain a more accurate assessment of the trends in capital input. In effect, the value of the licenses must be netted out. This task is complicated by a number of difficulties. First, since the license cannot be sold independently of the vessel, there is no specific market for licenses that would facilitate tracking their values. Second, the value of licenses is not standard; with the ton-for-ton replacement rule, value can be assumed to accrue in proportion to the size of the vessel licensed. This trend, is not general, however. It appears that licenses of one or two tons are in relatively high demand for consolidation into larger units.

The methodology used here estimates the average capitalized value of licenses on the basis of a fleet sample. The sample was composed of new vessels first entering the fleet in 1969. Since these vessels were first built in that year, the owners should have had an accurate idea of their true cost at that time. Also, because of the poor salmon runs, low license fees, and no actual fleet reduction at that time, license values can be assumed to have been negligible or at least extremely low. Consequently, the stated market value for new vessels in 1969 can be considered a reasonable measure of the capital input they represented during that year.

The next step tracks the estimated market values stated by the owners of these vessels in following years. As can be seen in table 5, these values increase substantially over time. Several basic reasons for this change can be differentiated in addition to the capitalization of license values. First, boat building costs, like other costs in the economy over the last few years, have been subject to high rate of inflation. Second, new equipment may have been added to the vessels.

Finally, these two sources of increment to market value must be offset by the depreciating value of the vessel as it becomes older.

Table 5: Values of 137 Vessels Newly Constructed in 1969  
(As reported by vessel owners)

Year	Total Value	Average Value
1969	\$3,488,020	\$25,460
1973	4,448,938	32,474
1974	7,027,004	51,292
1975	6,490,917	46,941

Source: "Competitiveness and Efficiency of the British Columbia Salmon Industry"—Volume II—Unpublished.—Underwood, McLellan and Associates and Erwin Reid and Associates.

The primary assumption made in this analysis is that the depreciation of the vessels exactly offsets any increased value resulting from additional equipment (19). This assumption implies that the increase in vessel values is entirely the result of the effects of inflation and license rental. The inflation factor can be eliminated using the Statistics Canada "Boat Building and Repair Index" (20). If one takes 1969 as 100, this index implies that the average capital input of \$25,460 in 1969 is equivalent to \$29,763 in 1973. In contrast, the average stated value of the vessels in 1973 is \$32,474. The difference between the two 1973 figures is assumed to represent the value of the salmon license in 1973. Table 6 summarizes this calculation and extends it to 1974 and 1975.

Table 6: Estimated Average License Values 1973-1975

Year	(1) Boat Building and Repair Index	(2) Inflated Average Vessel Values	(3) Average Vessel Value (Fisherman's Estimate)	(4) Estimated License Value
1969	100.0	\$25,460	\$25,460	0
1973	116.9	29,763	32,474	\$ 2,711
1974	134.2	34,167	51,292	17,125
1975	146.9	37,401	46,941	9,540

Column (4) = Column (3) - Column (2)

Sources: (a) "Competitiveness and Efficiency in the B.C. Salmon Industry," Volume II—Unpublished, Underwood, McLellan and Associates and Edwin Reid & Associates.

(b) Statistics Canada—"Price and Price Indexes"—Publication #62-002.



The estimates derived by this procedure appear realistic. The vessel market value is requested at the beginning of the season in conjunction with the purchase of the salmon license. At the beginning of 1973, industry sources estimated value at four hundred to five hundred dollars per licensed net ton. In late 1973 and early 1974, license values escalated dramatically, following a record salmon harvest and exceptional prices. In 1975, with lowering expectations, license values slumped. These trends are reflected in the estimates of table 6.

Based on this evidence the estimated average license values were used to calculate an adjustment for the entire fleet. In 1973, 4,587 class "A" vessels were engaged in the salmon fishery, implying a total adjustment figure of \$12,435 million. The estimated total market value for the entire fleet in 1973 was \$117,705 million. Adjusting this figure, we arrive at an estimated capital value for the fleet of \$105,270 million. These and comparable figures for 1974 and 1975 are presented in table 7 in nominal and real terms (i.e. adjusted for the inflation rate in boat building and repair).

Table 7: Estimated Nominal and Real Capital Employed  
(1966-69 and 1973-1975)

	1966	1967	1968	1969	1973	1974	1975
Estimated Fleet Market Value	60,622	68,131	72,860	80,052	117,705	219,258	204,235
Estimated License Adjustment	0	0	0	0	12,435	79,032	43,331
Nominal Capital Employed	60,622	68,131	72,860	80,052	105,270	140,226	160,904
Real Capital Employed *	62,821	70,529	74,120	80,052	90,051	104,490	109,533

\*Adjusted by Statistics Canada Boat Building and Repair Index: 1969 = 100

Sources: Income by Gross Return Group—Unpublished Summary Computer Summary.

It is clear that the license limitation program has not been a resounding success in the area of capital investment. Between 1969 and 1973, real capital input increased by 12 percent or an average of 3 percent per annum. Following the 1973 record salmon harvest, capital input in 1974 jumped 16 percent and in the following year by another 5 percent. Overall capital input has increased by fully 50 percent since 1968. It is clear that the program in its present form does not effectively control capital costs in the fishery.

### Summary

In summary, the trends in fleet size alone are an inadequate representation of the trends in salmon fishing costs. The decline in vessel numbers has centered on the smaller vessels and on the less capital-intensive units within the fleet. This

has been offset by an increase in the absolute number of larger vessels and in more capital-intensive units. New vessels entering the fleet tend to be larger than those entering before license limitation and many older vessels are being upgraded for combination operations.

Gaining a more adequate representation of the trend in fishing costs requires a more direct examination of the two most basic components of cost, namely, capital and labor. With respect to labor, it appears that the limitation program has been a relative success. Two estimates of employment in the fishery show a significant decline over the years since the program began. In contrast, the program has fallen far short of its goal with respect to capital costs. In spite of license limitation, the capital value of the fleet has increased substantially in both real and nominal terms. Overall, it is unlikely that the program is effective. Even accounting for the increase in the value of the salmon resource leaves a good deal of question regarding program viability. The response of investment to shifts in resource value appears even more excessive than under free entry. Certainly, in absolute terms, fishing costs are not declining as a result of the program; indeed, it appears that they have increased over time.

## CONCLUSIONS

The previous section was framed entirely in a long-term perspective. It is advisable to adjust to a shorter time horizon, for it is from this viewpoint that the major problems with the current program can be ascertained. In the long run, the licensing program appears largely ineffective. Decreases in labor input are being offset by dramatic increases in capital investment. In the short run this has not been the case. Because of dramatic price increases and large salmon runs in 1973, the landed value of the resource almost doubled. Invariably, under free entry, this would have signaled an immediate increase in the number of vessels involved in the fishery. With license limitation this was no longer possible. Hence, licensing had an undoubted positive effect on returns in this year.

In the long run these returns are being dissipated, perhaps more rapidly than under free entry. The major problem appears to be that the majority of these returns were left in the hand of the fishermen themselves. While this was undoubtedly to their short-run advantage, in the long run it has simply created an uneconomic distortion of investment in the industry and will potentially leave fishermen little better off than before.

### Current License Fee

The central problem with the program lies with the current license fee structure. License revenues collected from the salmon fishery in 1969 were less than seventy thousand dollars, just sufficient to cover the administrative costs of the new program. In 1970 and 1971, with a substantial increase in fees, revenues rose to approximately one million dollars and have since gradually declined with the decline in fleet size. Since 1971, license fees have generally declined as a proportion of total resource value as a result of the dramatic increases in the value of the salmon resource. Overall license revenues are quite marginal, averaging less than 1.5 percent of total landed value (table 8).

Table 8: Salmon License Revenues as a Percentage of Total Resource Landed Value

Year	Total Landed Value (\$000)	License Revenues (\$000)	Percentage of Total Landed Value
1969	27,810	69.1	0.2
1970	45,076	626.8	1.4
1971	44,476	1,051.9	2.4
1972	40,341	953.0	1.9
1973	99,998	952.0	1.0
1974	73,998	942.6	1.3
1975	46,913	944.1	2.0
1976	91,942	940.0 test	1.0

License fees can be seen as a means for government to appropriate rental from a fishery. To this end, the failings of the present fee structure are abundantly clear. Short-run rent accrues in proportion to the value of the salmon resource. However, current license fees are flat rate. Irrespective of how good or poor the year, the rental appropriated from the resource is constant. This implies that in years such as 1973 the entire short-run rental is left in the fishery. It is this rent that has provided the fuel for the dramatic increase in capital investment.

### The Distortion of Investment

It is understandable that a primary political goal of the program was to leave a proportion of any benefits to the fishermen. This was undoubtedly the price for, if not support, at least acceptance of any licensing program. However, the current structure of the program has taken this to an extreme. At the same time, the provisions of the program intended to prevent the dissipation of these returns have proven inadequate.

Certainly, the additional returns accruing to the fishermen could not be dissipated in the entry of additional vessels. However, many other loopholes existed. The program did not prevent, but simply distorted the investment process. The nonsalmon vessels originally licensed to fish salmon were retired and replaced by new salmon seiners, smaller vessels were consolidated into larger ones, and, finally, additional gear was added to allow combination operations. Increased returns were reflected not in fleet size but in the increasing capital intensity of the individual boat.

It can be argued that this process is dissipating the returns even more effectively than free entry would have done. License limitation has to a great extent created an expectation among fishermen of good returns in the future. This may be encouraging a higher rate of reinvestment than was previously the case. While the expectation of additional entry may have had a moderating effect on investment decisions, no such influence now applies. Some evidence points to a tragic overbuilding program that could not be sustained. Thus, with the return to relative normality in 1974 and a poor salmon harvest in 1975, many operators

were severely hurt. The seine fleet was hurt most, representing as it does the fleet sector that witnessed the most rapid growth.

### **Proposed Solutions**

The central problem with the current licensing plan has been recognized for some time. Numerous suggestions have been put forward to correct it, but they take two general directions. First, it has been proposed to increase license fees and change the structure of the license fee system. The main intent here is to siphon off some of the excess returns that are fueling investment in the fishery. Second, numerous additions to the regulations have been suggested to increase difficulty in reinvesting.

Even among the original phase II proposals, there were proposals to change the basis and structure of the license fees. A two-tier license fee was suggested, consisting of: (a) a minimum fee of twenty-five dollars to cover administrative costs; (b) a percentage fee based on landed value of catch. It was proposed for 1970 that the latter be set at 1 percent but with the additional proviso that it be increased in each of the following four years until a maximum of 5 percent was reached.

These original proposals ran into strong opposition from fishermen's groups, who claimed this amounted to double taxation. Also, some constitutional complexities were encountered. A landings tax could be interpreted as a sales tax, and the right to such levies under the Canadian constitution lies in provincial rather than federal jurisdiction. As a consequence of these two factors, the original proposals were dropped.

Their implementation would have had a significant positive effect for the licensing program. In 1973, a proportion of the excess returns would have been siphoned off with a consequent direct cooling effect on investment. Also, and perhaps more important, a significant change in expectations might have occurred. With an increasing proportion of returns accruing to government, investment may have been further moderated.

Since 1973, proposals for similar changes in the license fee structure were put forward. In general these more recent proposals circumvent the constitutional difficulties while they retain most advantages. The formula suggested combines features of percentage and flat-rate license fee systems. It would be based on the landed value of the catch in previous years not the current year. The relevant percentage would be divided by the number of vessels involved, with the result being charged as a flat fee. The knowledge of increasing license fees would discourage overcapitalization resulting from unusually good production years. Also, the option would remain open to increase the percentage taken following such years.

Other proposals attempt to make it more difficult to increase investment in the fishery. The two major factors in increasing fleet capitalization are: (1) the conversion of small vessels into larger seiners, and (2) the change from single to multiple gear operations. These proposals attack these two factors.

First, it is proposed to extend limited licensing from the salmon fishery to all fisheries of the province. Second, it is proposed to change licensing from its present species basis to a "gear-species" basis. That is, rather than requiring an "A"

or "B" license, specific licenses would be required for participation in the gillnet, seine, and troll fisheries. The first constraint would tend to obviate the trend towards multiple species operations by the requirement to qualify for additional licenses. Transition would still be possible but would incur the additional expense of license purchase and the payment of additional license fees each year. Similarly, the second constraint would tend to obviate the pyramiding of vessels into seiners and the transition towards multiple gear operations within the fishery. Again the transition would be possible, but it would entail additional costs.

These various licensing proposals are currently under consideration. However, advancement in these directions is slow. As always, the administration of fisheries is an extremely sensitive political issue. This is particularly noticeable with regard to changes in the current license fee structure. While the other fisheries of the province are gradually being licensed, no change in the license fee system for salmon fishing appears forthcoming. This is an error, for while the proposed fee changes attack the root of the problem, the other proposals only attack its symptoms. The basic problem is that of the excess returns left in the fishermen's hands. Unless some of these returns are appropriated by government, the current failure of the licensing program will not be corrected. While plugging loopholes with investment constraints will have a beneficial short run effect, in the long run new loopholes will arise. This in turn will simply require everincreasing restrictions and further complication of the regulations. Approaching the problem from this angle can only be self-defeating.

## **Conclusion**

The two earlier limited licensing plans applied to British Columbia were viewed primarily as a means for resource conservation. As such, the full implications of the policy were not accounted for in the programs implemented. Limitation created an economic rent from the resource; this rent, unencumbered by government, inevitably accrued as excess profits to those canneries and individuals who obtained the right of resource exploitation. In both prior cases this created a general demand from those excluded to enter the industry. In the Fraser River case, because of the program format, it also created within the industry an uneconomic distortion of investment. These pressures inevitably led to the eventual demise of both early licensing programs.

With the development of the modern economic theory of fisheries, the forces that operate within the industry came to be well understood. As a consequence, the objectives of the most recent licensing experiment are considerably broader. In spite of this, however, it appears that little has been learned. The major problems with the most recent program seem to bear an uncanny resemblance to those encountered in the past. Because of the program structure, the majority of short-run benefits are being allowed to accrue to the fishermen. This has encouraged excessive capital investment within the now limited fleet, and has created an uneconomic distortion of investment in particular vessel types. The trend is towards the participation of fewer individuals and vessels, but far larger and more capital-intensive vessels. There is no evidence that any long-run break has been initiated between the costs of fishing and the value of the resource. Clearly, unless something is done, license limitation is doomed to failure once more.

Unlike the past, it is improbable that these pressures will result in program cancellation. If nothing more, present attitudes are more committed to license limitation than they were in the past. However, large scale government intervention in the fishery has undoubtedly resulted in social costs. Small operators such as those in the "B" licensed fleet are being eliminated by government fiat, and entry to the industry for the younger generation is far more difficult than ever before. Although the program was designed to minimize dislocation, some dislocation inevitably occurred. Under the present program format, these inherent social costs will go unrewarded by any benefit; the entire exercise will be to no purpose.

# EXPERIENCE WITH LIMITED ENTRY IN BRITISH COLUMBIA FISHERIES

C.H.B. Newton

## Foreword

This paper is intended to provoke discussion on issues related to limited entry. An associated paper concerning limited entry in British Columbia by G.A. Fraser relates the progress of the B.C. program and analyzes some of the effects in this volume, pages 358 to 381. Fraser's conclusions point out that the "downfall" of limitation programs in B.C. has historically been the inability of government to capture the economic rent effectively. The present limitation program is suffering from the same problem, which is causing uneconomic distortions of capital investment in the fleet. Fraser concludes that, unless something is done, license limitation is doomed to failure. Because of this conclusion and other criticisms, the author has attempted to open the dialogue on these issues, particularly with respect to the role of economic rent in license limitation.

## Background

The tenth anniversary of the British Columbia limited entry program occurred in September, 1978. Any comparison between 1968 and now requires some constancy of external factors in order to correctly assess the impact and performance of the program. Some constancy was provided for the first four years, up to 1972, but from 1973 onward the fishing industry in B.C. has changed.

In August 1973, certain salmon products experienced price increases as high as 100 percent. In 1974, the herring roe fishery commenced, and prices to fishermen are today 265 percent higher. Halibut prices to fishermen over the same period increased by 81 percent. Aside from significant price increases, the past five years have witnessed a change in the B.C. fishing industry from a traditional (in terms of historic practices) to a modern, dynamic food industry, characterized by foreign nationals who act as brokers and bid on fish products as they do for many other commodities. The commencement of the change appears to have coincided with the presence of the Japanese in late 1973 and 1974, in the case of herring roe, and this process of change was heightened in late 1976 on the eve of Canada's declaration of extended fisheries jurisdiction to 200 miles. To document and analyze each of these external forces is not the intent of this paper, but it is important to note that continuity of the progress of the limited entry program in B.C. is not compatible between the periods 1968 to 1972, and 1973 to the present.

What is significant to limited entry about the above is that fish prices are now responsive to variations in supply. The implication is that fishermen, in their

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investment decision are faced with a degree of constancy in expected gross revenues, a factor absent prior to 1972.

British Columbia's fishing fleet has been characterized since 1887 by the expression "too many fishermen chasing too few fish" (1). The cause of the problem, the economists' theoretical arguments aside, was that of the investment response by fishermen to wrong signals. If, in any one year, the catch was particularly significant and returned attractive profits to the participating fisherman, other fishermen entered the fishery the following year. Those who were unable to enter then had their vessels completed for the year to follow. Because of the cyclical nature of the supply of salmon and the lack of response in fish prices, a "good" year was most often followed by a "poor" year. Even if the performance of a "good" year was repeated, the new participants eroded any surplus profits from the industry.

With the exception of World War II, the period from 1918 to 1968 could be characterized by a fishery with too many vessels and fishermen relative to the available catch. Because of the absence of any suitable institutional arrangements to restrict entry, the B.C. fisherman could be viewed as a kind of marine peasant, his fortunes inextricably tied to the fish processor who secured the fisherman's catch through interim financing measures.

The 1968 limited entry program had three basic objectives:

1. To increase incomes of fishermen to the average regional wage
2. To reduce the level of overcapacity by reducing the size of the fleet
3. To reduce the number of vessels to improve the management of the resource

The concept was simple: identify the salmon fleet through "grandfathering" and then apply tools to reduce the fleet. The identification of almost seven thousand salmon vessels revealed that many vessels would be required to leave the industry before there could be any significant increase in the income or catch of the remaining fishermen.

The classification of 1,000 "B" (2) fishermen was still considered inadequate for the remaining fishermen to realize any immediate gains. The institution of the buyback program in 1970 was considered a necessary tool to accelerate the decrease in numbers of vessels, but after only 346 vessels had been removed the program was terminated. The significant decrease in numbers of vessels was directly related to fishermen's incomes through an institutionalized scale of vessel replacement.

Incomes from the 1973 salmon fishery created a strong demand for new vessels. To enter a larger replacement vessel into the salmon fishery, licenses from other fishermen had to be retired. A new salmon seine vessel would require the retirement of between three and six gillnet or troll licenses. In effect, the efficient fishermen were compensating the inefficient for leaving the industry. Through this mechanism and the buyback program, dislocation of fishermen from the industry was painless.

From an initial 5,870 "A" licensed vessels identified in 1969, decreases have occurred every year at a diminishing rate, to a present level of approxi-



mately 4,700. Unless further changes are implemented to accelerate vessel replacement requirements or other programs are initiated, it is unlikely that the number of "A" licenses will significantly decrease.

The "B" licensed vessels, still a voluntary option available to "A" licensed fishermen, begin to retire after this season. Of the original 1,000 vessels classified in this category only 104 vessels (10 percent) belong to the original owner. The remaining owners have sold their licensed vessels or have permitted their licenses to lapse. By 1983, the last of the remaining 597 "B" licenses will terminate (political considerations notwithstanding).

At this time, criticism of the B.C. limited entry program can be directed to the following four major issues, which are discussed below:

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

### **Limited Entry Has Not Prevented Overcapitalization**

There exists an empirical difficulty in identifying overcapitalization (3). Since an acceptable method has not yet been developed, the approaches require some discussion. In the first instance, when B.C. began limited entry, only the theoretical economists hypothesized that economic rent existed. The size of the economic rent or the fact that it even existed had not yet been identified. Faced with an inadequate income level in the fishery, B.C. was more concerned with improving incomes than with identifying a hypothetical rent.

Furthermore, because of inadequate incomes and overregulation, the B.C. salmon fleet was obsolete. There also was, without doubt, overcapacity. Theoretically, the key to determining overcapacity is to decide on the minimum numbers of vessels required to harvest the resource and consider the excess as overcapacity. Agreement will never be reached on either the minimum numbers of vessels or whether fish traps across river mouths should be the starting point. The argument is a good academic exercise but does not provide assistance to limited entry administrators.

B.C. figures show that capital input has increased by 36 percent since the implementation of limited entry (4). How much of this capital cost should be credited toward new investment in changing from an obsolete fleet having, for the first time, a security in tenure and therefore a future? Second, some attempt has been made to show that, while capital input has increased, labor input has decreased. How much of the growth in capital input should be credited to the substitution of capital for labor?

Third, since some new investment and some substitution of labor with capital were needed, and since overcapacity already existed, to assess a program's effectiveness at any time and criticize it for contributing to further overcapitalization is misleading. The point to note is that the allocations between capital and labor are finally working and the process is now highly dynamic. This dynamic process has not yet ended and should, in time, stabilize to a level of real overcapitalization well below the 1968 level (5).

Finally, no real attempt has been made to capture economic rent. Political realities presently prevent any attempts at cooling the effect fishermen's incomes have on vessel replacement. Because of this, it is claimed that incomes will continue to increase and that the result will be an elite club of wealthy fishermen.

### **Ownership of Resource Transferred to an Elite**

If an elite is defined as an exclusive group of wealthy fishermen, then, since many other sectors of the labor force are exclusive, the complaint must focus on the wealth aspect. Certainly the wealth aspect will be the key to the future of the limited entry program in B.C. The original program was terminated in 1917 because excess profits accrued to the licensed operators, causing other entrepreneurs to demand to enter the "closed shop." Granting new licenses established a precedent and the government had to announce that all restrictions on the number of licenses were removed.

The issue again rests with the concept of economic rent. The original theoretical treatises on limited effort illustrated that curtailment of the units of effort would prevent the dissipation of surplus profits to the point where total revenues equalled total costs. The reduction in the units of effort would yield a surplus called "economic rent," originally identified by Ricardo. No mention was made in the theoretical treatment of the approach that the "economic rent" should accrue to the fishermen or be collected by the owners of the resource.

In economics, Ricardo's concept of economic rent is left in the hands of the owners and provides an acceptable format for allocation of the use of a property right. In fisheries, if the full economic rent were to accrue to the owners of the resource (still deemed to be the state or the nation), then fishermen's incomes would remain unchanged from those that prevailed prior to the reduction of effort. In theory, until the state or nation is prepared to transfer the ownership rights to individuals, the owner has the obligation to collect economic rent. If the owner intends to transfer the ownership rights at some time in the future, then the rents can accrue to the individuals so that the function of economic rents can be institutionalized for the allocation of the use of the resource, as in the case of land.

Political reality requires that fishermen's incomes rise above pre-effort reduction levels since acceptance of the program is facilitated if participants enjoy increased incomes. In light of the inadequate incomes enjoyed by the participants prior to limited entry, increased incomes have to be goals for the initiation of any program.

Once incomes have increased, methods to prevent income acceleration beyond some acceptable limit seem futile. Attempts to siphon off economic rents appear politically impossible, principally because the rents accrue to the state or nation, which is already firmly entrenched in the taxation business.

Arguments arise that income tax or poundage taxes are already in effect and that, if increased incomes are earned, existing tax laws make the necessary adjustments. If that is the case, then how can overcapitalization in the B.C. fishing fleet be explained? In point of fact, income tax laws encourage the construction of new vessels through depreciation rates and contribute to overcapitalization in vessel replacement. If economic rents are to be collected, then a kind of fisheries tax will have to be applied on the fishermen that cannot be shifted to

other groups, i.e., the buyer, processor, consumer, etc. To adopt a landings tax based on the equity principle of the catch in relation to payment (i.e., a neutral tax) will permit the incidence to be shifted to the degree determined by the elasticity of demand. Lump-sum taxation prevents the incidence of the tax from shifting and, for that reason, is unpalatable to the recipients.

In order to use the lump-sum taxation methods, normally identified as higher license fees, adequate knowledge of market trends would be required in order to raise license fees sufficiently high to prevent excess profits from occurring. Alternatively, license fees could be based on the capital value of the vessels. This latter approach might resolve the overcapitalization problem but would not be effective in preventing the establishment of a wealthy elite.

Whatever else, economic principles must be applied to this problem if fishermen's incomes are to remain constant at prelimited entry conditions. In fact, effective methods must be built into any limited entry program before its implementation.

Alternatively, consideration must be given to the possibility that the state or nation intends to transfer ownership of the resource to the private sector and is deliberately not extracting the economic rents. In Canada, the federal jurisdiction over the management of fish has, as its source, the British North America Act. As long as fishing is practiced in the form of hunting a wild species, any consideration of the transfer of ownership is doubtful. Only when the oceans are used for the production of "domesticated" fish can a transfer of ownership be contemplated.

Agriculture has shown that the Enclosures Act of the eighteenth century in Europe, or fencing of common pastures, initiated the beginning of the so-called "Agrarian Revolution." The establishment of private property rights over common land, coupled with the strong demand for food products originating with the Industrial Revolution, caused hybrid livestock and improved cultivation to develop. The necessary parameters appear to have been a strong demand and a short supply of wild stock.

I would like to hypothesize that these parameters may now be facing the fishing industry. The 200-mile extended fisheries jurisdiction has placed the ownership of the most productive part of the fisheries resource into the coastal states' jurisdiction. Displaced nations will now be in short supply, thereby creating a strong demand. If wild fish stocks cannot meet the demand, prices alone will make mariculture economically feasible in the shallow bays along the coasts. Until such time as major changes in the establishment of individual property rights in the ocean occur, it is doubtful that ownership of the resource can be transferred. The state's or nation's responsibility for collecting economic rents must, therefore, commence in earnest.

### **The Status Quo Between Gear Types Has Been Irrevocably Changed**

This is the most significant issue facing fisheries management in B.C. today. Management has, after conservation of the resource, been responsible for the allocation of salmon between users. As an historic pattern emerges, fishermen begin to expect the management agency to continue the pattern on the basis of

equity. Washington State has had its traditional allocations challenged more than have B.C. and Alaska, notably in the sport-commercial and Indian fishing conflicts.

The threat to the change in historical allocation in B.C. is derived from the unrestricted transferability of licenses between gear types. Since at this time the B.C. limited entry program indicates a reduction in gillnet and small troll licenses for an increase in the number of seines, fishermen anticipate a change in the allocation of catch in favor of seines. Resource managers must answer the question, should the status quo of allocation by catch or by gear type be maintained or should the freely competitive nature of the process be permitted to continue? Would an entirely seine fleet be easier to manage than a seine-gillnet fleet? In the long run it is conceivable that the B.C. salmon fleet could consist of seines entirely, the number of vessels being less than five hundred. These vessels would be semistationary in nature and would behave as substitutes for fish traps. In the process, capital and labor inputs would be rationalized and the optimal vessel and operation would emerge.

To succeed to this point, economic rent would have to be extracted in order to prevent the formation of an elite group of fishermen. Economists' concerns with the allocation of the resource for commercial use and with the minimum of capital and labor inputs would be satisfied.

Though the objective is clear, the means of meeting it are difficult. The current concern with the change in gear types indicates that the rate of change is too rapid. Methods will have to be implemented to reduce the rate at which seine vessels displace gillnet vessels. Alternatively, fishermen will exert pressure for a gear license, as they have in Washington State and Alaska, and demand that licenses become nontransferable among gear types. Should this occur, equity among gear types for management purposes would approximate 1,000 trollers, 2,500 gillnets, and 350 seines, for a total fleet size of 3,850 to 4,000.

With an existing fleet size of forty-seven hundred "A" licensed vessels, further fleet adjustments will only require fine tuning, not overall fleet reductions. Within gear types, however, the number of vessels will reduce as the efficient operator retires the inefficient one. Seines will be reduced in number faster than the other gear types for the same reason that seines increased faster than the others. The key to the success of this approach will be that management's allocation of catch among gear types remains constant.

### **Management of the Resource Has Not Been Facilitated**

Increased incomes have had a great effect on fleet modernization. A gradual change in vessel efficiency would not have caused concern to management. The impact of largescale modernization has complicated management's task because: (a) the fleet is now totally mobile throughout the coast, and (b) the efficiency of seine vessels in setting and retrieving nets has increased more than four times, from a rate of 7/hr to 31/hr. Therefore, in any given fishing area the number of vessels is as large as formerly existed and the efficiency of nets is greater. Management adjusts by varying the openings accordingly. The concept of reducing regulations as the result of limited entry has been delayed indefinitely.

If the measure of a limited entry program's effectiveness in facilitating management is related to reducing the regulations respecting fishing time, then as fleet efficiency increases, vessel replacement requirements must change commensurate to the degree of efficiency and in lieu of effectively reducing fishermen's incomes.

In summary, management of the resource has not been facilitated by limited entry, though, indeed, it is no more difficult than it was before limited entry. The fault lies with the limited entry administrators' ineffectiveness in adapting the program to changing conditions. There should be no doubt, however, that limited entry can facilitate resource management.

The effects of the four most cited criticisms of B.C. limited entry might be counteracted by two important ingredients in a limited entry program.

The major requirement is a mechanism to cool the effect that fishermen's increased incomes have on their investment decisions. This requires a conscious determination of the role that economic rent should play.

Secondly, a requirement for permitting administrators the flexibility to adjust the economic motives of fishermen to the intended result is mandatory. Once a limited entry program is initiated, the system becomes dynamic and changes are required.

Three externalities are seen in the B.C. limited entry experience. First, a mistake was made at the initiation of the program by limiting the salmon fishery only—even though 90 percent of the fishing industry centered around salmon. After 1973, distortions occurred between the salmon fleet and other fishing fleets. Halibut and groundfish vessels could not compete with the salmon fleet for crew, returns to capital, bait, or other inputs. In 1974, so much was the halibut fleet affected by this problem that fewer than twenty-five vessels sailed to Alaska.

The commencement of the herring roe fishery in 1974 was coupled with a herring limited entry program, although the license was placed on the fisherman instead of on the vessel. In 1975, the groundfish fleet was restricted, and by 1976 the shrimp fleet was restricted, both by vessel license programs. In 1977, abalone and roe-on-kelp licenses were restricted. Today, only the halibut and crab or longline and trap gear licenses are not restricted. Limited entry applied to the entire fleet and would have restored the balance of competition for inputs among the various fleets.

The implementation of the trawl fleet license for groundfish permitted the price increases of 1976 and 1977 to move the groundfish vessels from their depressed sector in 1975 to among the top gross revenue vessels on the coast. In fact, surplus groundfish stocks formerly available to foreign nations will, by the end of this year, be almost entirely fished by Canadians.

Limited entry helped prevent the dissipation of increased prices for groundfish species to additional vessels reacting to the expectations caused by the 200-mile zone. When all groundfish stock surpluses are transferred to Canadian use, the increased fishermen's incomes will be used to upgrade the fleet through technology improvements to achieve even higher prices—exactly what occurred in the salmon program.

A second externality of the B.C. program is that the anticipated unemployment associated with limited entry never occurred. Certainly fewer fishermen are

employed and fewer boats are involved. As mentioned previously, dislocation was minimized by compensating fishermen leaving the industry with capital gains from license sales—a good function of leaving the economic rent in the fishery. Not predicted was the multiplier effect that increased fishermen's incomes had on creating a viable support industry, namely that of shipbuilding, net supplies, and electronics. This multiplier effect has more than offset the loss in employment from displaced fishermen. By concentrating the wealth on the fishermen, the support industry is stimulated.

A third externality of the limited entry program was that the "marine peasant" was placed on the endangered list. Controversy still continues about the processing companies' control over fishing licenses and vessel financing. Processing companies are restricted in total to owning no more than 12 percent of the licensed fleet, a figure to which they have adhered during the ten-year period. A review of indebtedness of the fleet between the beginning of 1973 and 1977 indicates that fish processing companies have reduced their financial control over fishing vessels by 50 percent of the 1973 level, while banks have increased their involvement by a measure of 100 percent. Furthermore, twice as many vessels are more debt-free than they were in 1973.

A conclusion could be made that limited entry provided a security of tenure, a limit on overcapacity, and an improved financial position, all of which encouraged lending institutions to participate. This move improved the fisherman's bargaining position with the fish processing companies, since independence could not be achieved, and fish prices began to be more responsive to variations in supply as companies competed in price with each other for supply.

Associated with these changes in financial arrangements, a new pattern is emerging in the B.C. fishing fleet. Ten years ago, a vessel was considered to be efficient if it participated in a number of fisheries. This combination vessel fished halibut with longline gear, salmon by seine gear, groundfish with trawl gear, and herring by seine, changing gear according to fishing season.

Today, vessels are specialized by gear type. Seiners fish only salmon and herring for a five-month season, of which twenty eight days were recorded for salmon fishing and sixteen days for herring in 1977. Trawlers fish two hundred days, exclusively for groundfish. The level of income for a seiner fishing forty-four days has justified investments of three-quarters of a million dollars per vessel and this is considered to be efficient. This pattern of specialization in the fishing fleet is similar to what occurs in agriculture, where one-quarter of a million dollar investments are made for combine harvesters that are used for as little as two weeks a year. Economists no longer argue about the optimal number of threshing machines moving as a front northward from Oklahoma to Saskatchewan.

## **Conclusion**

Limited entry programs can meet criteria for improving incomes to fishermen, facilitate resource management, and generate revenue to the state or nation, given flexibility in program administration. It is important not to think of proving the adequacy of limited entry programs in a short time period. Because of the historic nature of North American fisheries and the political constraints involved, it is important to keep the rate of change in the early years of imple-

mentation as slow as possible, until a new generation of fishermen has replaced the present and old customs are displaced by modern business methods, in keeping with other private sector practices.

Given the 200-mile limit and the new opportunities in fisheries management, it is vital to adopt new concepts in management. With no foreign fleets to blame for overfishing, domestic fisheries management must perform. Where economic principles have previously been ignored in determining fishermen's motives, new approaches must be developed. Without them the 200-mile limit will generate significant fish price increases that will attract fishermen to invest and participate, straining the management regime until eventual stock declines occur. History will repeat itself.

A beginning solution would be to limit entry to all fisheries before the impact of 200 miles has fully occurred and to prevent license transfers until price increases and stock sizes have stabilized. These two measures alone may cause income/leisure substitutions to take effect, such that fishermen will cease fishing when a certain income level is reached, a level that might be far short of biological stock yields, maximum or otherwise.

# RESTRICTED ENTRY IN AUSTRALIAN FISHERIES

T. F. Meany

Restricted entry has been in force in some Australian fisheries for over fifteen years. Entry to the majority of the nation's important fisheries is now restricted. In general, these restrictions have been well accepted by fishermen.

Before discussing the effects of restricted entry in two selected fisheries, this paper briefly outlines the position of the fishing industry in the Australian economy and the nation's administrative framework for the industry.

## Economic Importance of Fishing

In economic terms the Australian fishing industry is relatively insignificant, the primary sector employing only about eighteen thousand people. The gross value of production in 1976/77 was \$199 million\* or about 0.25 percent of gross domestic product.

As an earner of export income the industry was relatively more important, with exports in 1976/77 valued at \$136 million or about 1.2 percent of the value of total exports. At the same time however, \$109 million worth of fish and fish products was imported.

The reason for the relatively high levels of exports and imports becomes evident only when the details of the trade figures are examined. All but six million dollars worth of the exports was made up of three items, rock lobster, prawns, and abalone, while a great proportion of imports was made up of species such as salmon not found in Australian waters and of speciality items not manufactured here. A recent estimate (1) concluded that about one-third of these imports could possibly be replaced by local production in the medium term.

## The Resource Base

The reasons for the concentration of the Australian industry on crustaceans and molluscs rather than on scale fish are related first to the nature of the resources available. The waters around Australia are relatively barren, since the continent has for the most part a narrow continental shelf and the surrounding oceans are without either the upwelling or the convergence of currents that produce more prolific fishing grounds elsewhere in the world.

A second reason is that Australians are not great seafood eaters. The annual per capita consumption is only 14.8 lbs. The ready availability of other relatively cheap animal protein is the main reason for this, together with the fact that, prior

\* All dollar figures are in Australian dollars. In 1975, one Australian dollar was worth 1.3 US dollars.

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to the introduction of refrigerated transport, fish of known quality was generally not available except around the coastal fringe. In fact, it was left to imported processed fish to pioneer the market for frozen fish. Even now there is little processing of Australian-caught scale fish. About half the scale fish eaten is imported.

By contrast, the high world prices for luxury seafoods such as rock lobster, prawns, abalone, and scallops and their relatively greater abundance in Australian waters have led to the development of quite extensive fisheries for these species.

### **Administration of Fisheries**

Australia is a federation of six states. These states have legal jurisdiction over the three-mile territorial sea while, under the constitution, the Australian government has jurisdiction over waters beyond that limit. However, many of our fisheries extend not only across the territorial sea boundary but also into waters adjacent to two or more states. Efficient management requires a great deal of cooperation and leads, as one might expect, to the occasional conflict.

Where a fishery is wholly in the waters off one state, unless the Australian government has strong objections to what is proposed, it is the usual practice for the Australian government to introduce management regulations that are identical to those of the state. This has in fact occurred in the case of the western Australian rock lobster fishery. The prawn fisheries in Shark Bay and Exmouth Gulf are, on the other hand, wholly within state waters (closing lines) and are therefore under the jurisdiction of the western Australian government.

## **THE WESTERN AUSTRALIAN ROCK LOBSTER FISHERY**

### **History of Development**

Rock lobster (*Panulirus longipes cygnus*) have been fished in western Australian waters since the early days of settlement. It was not, however, until the 1950s when the United States market for frozen rock lobster tails was developed that the fishery became heavily exploited.

As fishing pressure increased, a series of management measures were introduced to safeguard the resource. The price paid at the time for rock lobster was increasing rapidly, there was a continuous influx of fishermen into the fishery, and each measure offered only a temporary respite from the growth in fishing effort.

By the early 1960s industry exerted considerable pressure on government to restrict further entry to the fishery since, although the number of rock lobster pots in use increased by 66 percent between 1958-59 and 1961-62, the increase in catch had only been 8 percent (2).

Part of the problem confronting administrators was related to fishermen's use of an excessive number of rock lobster pots. With these, fishermen would saturate an area in an attempt to keep others off the more productive grounds. This led to conflict between fishermen and a real fear of serious violence.

Further restrictions were introduced into the fishery in 1963. These "froze" the number of licenses at the existing level (about 830) and limited the number of pots a fisherman could use to three for each foot of boat length, with a maximum of 200 per boat.

One unforeseen result of this last restriction was that many fishermen sought to increase their pot entitlement by either lengthening existing boats or by replacing them with longer ones. This necessitated additional restrictions, which virtually prohibited the replacement of boats under eight years of age and restricted replacement to boats of the same length as the ones being replaced. An exception was made for boats under twenty-five feet in length where, for safety reasons, replacement with twenty-five footers was allowed. In addition, these boats were permitted an additional one and one half pots for each foot of additional length.

In an attempt to spread fishing effort more or less evenly within the fishery, boats were restricted to zones as illustrated on the accompanying map.

### **Objectives of Management**

The stated objectives in the management of the fishery are briefly summarized as follows (3):

1. Optimum utilization of the resource
2. Reasonable economic returns to fishermen
3. Orderly fishing

From this it can be seen that the objectives include biological, economic, and social components. From the purely economic viewpoint, the social objectives in particular make the assessment of the success of restricted entry more complicated.

### **Policing of Regulations**

Of all the regulations in force in the fishery, two in particular have presented the greatest policing problems: the minimum size regulation and the restrictions placed on the number of pots used.

The selling of undersized rock lobster was a real problem in the mid 1960s. Controlling the problem required a concerted effort of heavy penalties for both fishermen and others caught with undersized rock lobster and an active enforcement program and a publicity campaign to inform fishermen of the need to protect the undersized fish. The sale of undersized rock lobster by professional fishermen would appear to be of minor significance today.

The problem of overpotting has proved somewhat more difficult to resolve although its magnitude has certainly decreased. To get a conviction for such an offense it is necessary to prove that a fisherman actually has more than his allotted number of pots in the water. As pots may be spread over several miles of ocean, this presents a formidable problem. The process of conviction has been successful and the extent of the problem has declined. There are apparently few fishermen who now use more than their allotted number of pots.

Success in gaining compliance with the regulations has not been easy. It has required a constant and continuing enforcement effort. Fisheries authorities have been alerted of suspected illegal activities by other fishermen. This has greatly assisted the enforcement effort. It has also been suggested that new fishermen entering the industry have shown a greater acceptance of the regulations

than did many of the earlier fishermen already in the industry when the restrictions were introduced.

### Economics of Operation

The fishery has been the subject of a series of economic studies: in 1956 (4), in 1963 (5), in 1969 (6), and in 1975 (7).

In figure 1, the annual catch from the fishery has been plotted against the approximate number of boats. Unfortunately, until the introduction of restricted entry the number of boats in the fishery was not accurately known.

Figure 1 shows that the annual catch from the fishery rose rapidly until about 1958-59, since which time the catch has fluctuated between about sixteen and twenty million pounds per annum.

### Boat Numbers

Boat numbers also increased rapidly until restricted entry was introduced in 1963. A feature worthy of note was the increase in numbers from 695 in late 1962 when the population lists for the 1963 economic survey were compiled, to a total of 830 that were actually licensed when restricted entry became effective in March, 1963. Several factors probably contributed to this increase. First, since there were no boats specifically licensed as rock lobster boats prior to the introduction of restricted entry, the population list was probably not complete. Second, there were undoubtedly a number of fishermen not seriously involved in rock lobster fishing who could nonetheless demonstrate some reliance on that fishery and who, largely for political reasons, could not be excluded. Third, the decision to introduce restricted entry was announced about four months before the date it became effective on March 1, 1963. Undoubtedly a number of fishermen had already committed themselves to the fishery and were awaiting delivery of boats. It is also probably true that others who may not otherwise have entered the fishery took advantage of the forewarning to acquire boats.

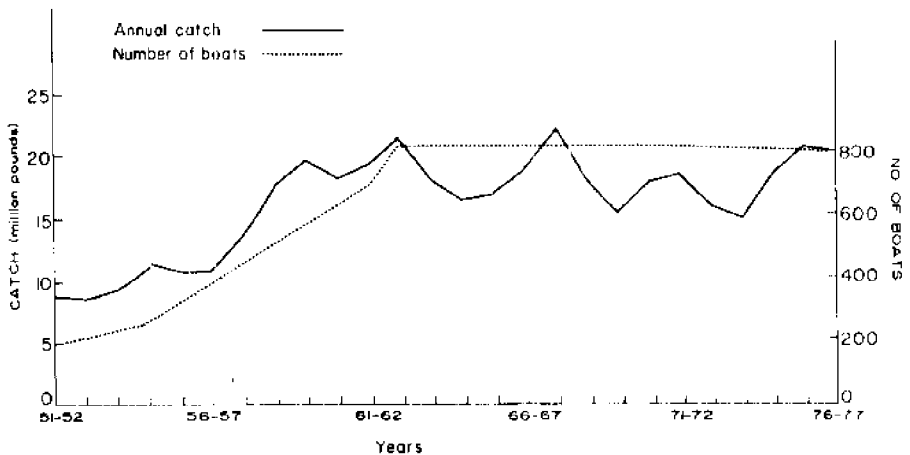


Figure 1. Western Australian rock lobster fishery. Annual catch and approximate fleet size, 1951-52 to 1976-77.

This phenomenon of an increase in boat numbers on the introduction of restricted entry has also been noted in other Australian restricted entry fisheries. It represents a real problem. For reasons of equity (and political expediency) it is difficult to exclude a fisherman who can demonstrate some past commitment to the fishery, although this may only have been minimal. Even if the commitment of this original fisherman remains relatively minor, where free sale of licenses is permitted he is usually among the first to sell and most often is replaced by a fisherman heavily committed to the fishery. As one of the objectives of restricted entry is to curtail fishing effort, the difficulty this causes is obvious.

### **The Processing Sector**

The rock lobster fishery extends more or less continuously over several hundred miles of coast, with boats operating out of ports scattered along its length. Many of these are not ports in any real sense of the word but merely anchorages that provide safe shelter in most conditions. Small boats can be beached with little difficulty if bad weather threatens.

These conditions, together with the relatively small capital outlay required for rock lobster processing and the requirement that the rock lobster must be alive at the commencement of processing, led to the establishment of a number of processing companies and plants. Although some larger companies have acquired some of the smaller plants, there are still a significant number of companies involved in rock lobster processing. The greater part of the catch, however, is handled by seven or eight main companies.

Included in these main companies are two large cooperatives and one smaller one that have a significant impact on the fishery as a whole. As profits from their processing operations are returned to the fishermen, these cooperatives tend to be the price setters for the industry. In order to compete with the cooperatives, other processors must be extremely efficient and also provide facilities such as loan funds, insurance schemes, etc. This competition works very much to the advantage of the fishermen as it compels all processors continually to strive for greater efficiency in operations and assures the fishermen maximum prices.

The "freezer" boats mentioned later in this report previously were a significant factor in the processing sector but, with declining numbers, their importance is decreasing. These boats process their own catch but cannot process the catch of other boats.

### **Price Trends**

The price paid for rock lobster is determined by the United States market for rock lobster tails, with over 90 percent of the catch being exported to that market.

Since the United States market was developed after the Second World War, the price paid to fishermen has shown a generally upward trend as illustrated in figure 2.

This upward trend has not, however, been uniform. The tendency has been for the price to rise rapidly for a year or two and then be followed by a period of steady prices or even a slight fall. The periods of rapid price rise have been peri-

ods of high profits for the industry while, in the intervening periods, costs have tended to outstrip prices, resulting in reduced profitability.

On figure 2 the price paid to fishermen is also shown as an index compared with the consumer price index, with 1966-67 equal to 100.

It can be seen from this that between 1969-70 and 1971-72 the index for rock lobster prices rose by 100 index points compared with a rise in the consumer price index of only 16 points. Between 1971-72 and 1974-75, on the other hand, the rock lobster price index rose 8 points compared with a consumer price index rise of 50 points. This illustrates the fluctuating fortunes of those in this fishery.

### Profitability

Although boat numbers increased initially and have remained stable since then and although catch has not increased, the fishery has remained profitable.

In table 1 the average catch, gross income total costs, and return to owner/skipper are shown for each zone for a series of years.

Average catches and profitability have shown different trends in each zone with the most marked difference between zones A and C. In zone A, average catches have remained quite stable and the increase in the price of rock lobster has offset increased costs. In zone C, however, average catch has declined, resulting in a marked decrease in profitability.

A comparison of table 1 with figure 2 shows that the years 1966-67 to

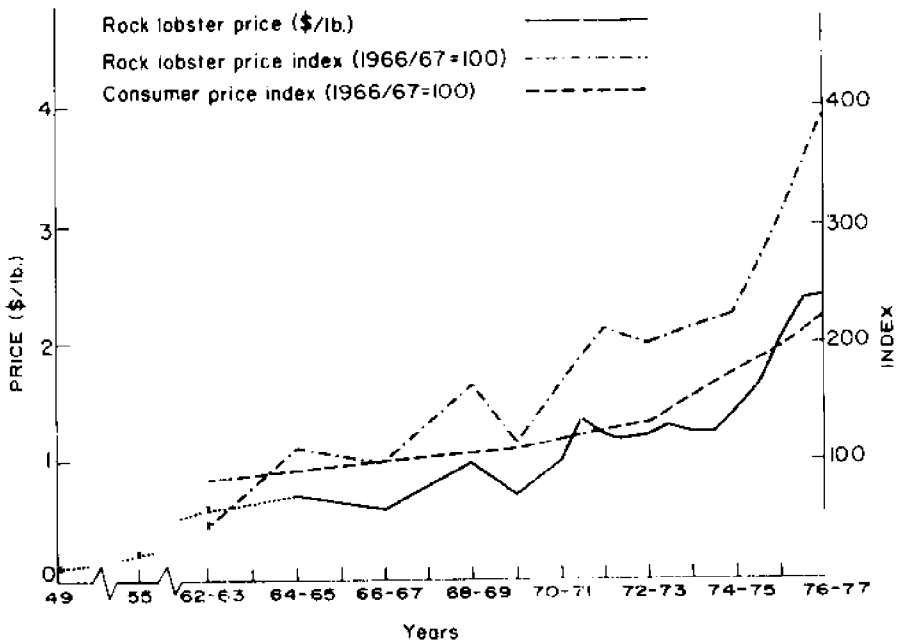


Figure 2. Average rock lobster price, Consumer price index and price index, 1962-63 to 1976-77.

Table 1: Average catch and profitability, by zone 1962/63, 1966/67, 1967/68, 1968/69, 1972/73 and 1973/74 and average annual earnings in western Australia for those years.

<b>ZONE A</b>							
	1952/63*	1966/67	1967/68	1968/69	1972/73	1973/74	
Average catch (lb)	23,197*	23,662	24,239	23,142	25,988	22,985	
Gross income \$	11,737	15,864	20,423	23,096	27,459	27,407	
Total costs \$	7,246	9,136	8,976	9,924	16,426	17,107	
return to owner/skipper \$	4,491	6,728	11,447	13,172	11,033	10,300	
<b>ZONE B</b>							
Average catch (lb)	*	19,246	21,599	18,332	15,791	16,175	
Gross income \$		14,310	19,210	22,365	19,466	19,860	
Total costs \$		8,472	8,880	10,513	12,228	11,836	
return to owner/skipper \$		5,838	10,330	11,752	7,238	8,024	
<b>ZONE C</b>							
Average catch (lb)	31,097	29,435	31,442	22,841	20,249	17,460	
Gross income \$	12,176	18,792	25,916	23,650	24,890	22,253	
Total costs \$	9,963	11,798	13,165	12,614	16,633	16,647	
return to owner/skipper \$	2,213	6,994	12,751	11,036	8,257	5,606	
Average annual earnings per employed male in W.A.	2,306	3,088	3,344	3,600	5,165	6,026	

\* Zones A and B were combined in this study

1968-69 corresponded with a period of rapidly rising prices resulting in increasing profitability. By contrast the years 1972-73 and 1973-74 were years when prices were at best constant and declined in real terms.

### Indebtedness

Costs shown in table 1 are exclusive of interest paid on borrowed money. With the rapid increases in sophistication and capital investment in boats as discussed later, there has been an increase in the need to borrow money to finance fishing operations. In addition, the capitalization of expected future earnings in the purchase price of rock lobster fishing concessions has meant an additional cost that must be met by those entering the fishery.

There is also evidence to suggest that lending institutions view restricted entry fisheries more favorably than open entry fisheries and are therefore willing to advance a greater proportion of the cost of investment in the fishery than would normally be expected.

All this suggests that many in the fishery may be heavily committed to the repayment of principal and interest on sizable loans (this aspect is currently under investigation). Most of these loans would have been contracted in times of increasing profitability (e.g., 1970-71 to 1971-72) and were no doubt negotiated with the expectation that those levels of profitability would continue. With the downturn in profitability in the years 1972-73 to 1974-75, these commitments must have placed a heavy financial burden on many fishermen.

A further related problem concerns borrowings for housing and other consumer durables. A casual observation of the standard of housing characteristic of many in the fishery again suggests that commitment to the repayment of principal and interest on borrowed money for consumer durables must be substantial.

In summary, therefore, the high profits attainable when prices increase rapidly may result in levels of financial indebtedness, the servicing of which could lead to considerable financial hardship in less profitable years, even though the levels of income appear reasonable.

### **“Freezer” Boats**

The so-called “freezer” boats played an important role in the developing stages of the fishery. While other boats land their catch live, these boats actually process on board. Since the market is for tails, it is not possible to check fish processed at sea to see that they conform to the legal minimum carapace size. For this reason, a legal minimum tail weight was also introduced. As rock lobster with legal-size carapace can still produce an undersized tail and vice versa, this double standard created considerable animosity within the rest of the industry toward the “freezer” boat operators who were accused of various illegal activities.

Also within the fishery are a number of fishermen who, for one reason or another, have boats of a size that would, on the three-pots-per-foot of boat length rule, qualify them for a greater number of pots than they are currently entitled to use. Such fishermen have been permitted and indeed encouraged to group together to buy the rock lobster fishing concession off the “freezer” boats. The pot entitlement of the “freezer” boat is then redistributed among the fishermen involved.

In this manner the number of “freezer” boats has been reduced from forty-four in 1969 to about six today.

While this procedure has been effective in solving one of the greatest administrative headaches in the fishery, it has also had the effect of reinforcing the feeling evident among fishermen that they have proprietary rights to the fishery and that it should be managed for their exclusive benefit.

### **Boat Ownership**

It is often claimed that one side effect of restricted entry can be the development of company-owned fishing fleets, since companies can in general outbid individuals for any boats that may be for sale.

Throughout the history of the rock lobster fishery over 90 percent of the fleet has been owned either by individuals or by partnerships of from two to four people. Public companies own only a small percentage of the fleet. There is nothing to suggest that this situation is changing.

This does not necessarily disprove the hypothesis that license limitations can lead to the decline of individual ownership. As has been mentioned, the fishery is characterized by the existence of a number of competing processors and it was found by companies that many employed skippers were not averse to selling a large proportion of the catch to someone other than the owner of the boat (usually a processing company). Likewise, employed skippers were often not as dedicated as owner-skippers and did not maintain boats in the same condition. Indeed, an executive of one processing company that has owned a fairly substantial fleet explained to me that the company had been forced to change its policy and was taking the skippers into partnership in the ownership of the boat "because it was better to make a profit on a 50 percent ownership than a loss on a 100 percent ownership."

### **Sale of Rock Lobster Fishing Concessions**

Perhaps one of the most controversial aspects of restricted entry in the fishery is what amounts to the virtually unrestricted sale of rock lobster concessions.

Quite naturally, before restricted entry was introduced in 1963, the license to fish had no transfer value. By 1969 the average value of a license was about seventeen thousand dollars while at the same time the average boat, without the license, was valued at only about ten thousand dollars. Between 1969 and 1975 the average value of a license had increased to about twenty-two thousand dollars while average value of the boat without the license had risen to about fourteen thousand dollars.

(These figures have been calculated from estimates provided by fishermen. I have some doubt about the validity of the 1965 estimate of license value for the following reason. As the figures in table 1 indicate, there was somewhat of a downturn in profitability in real terms between 1969 and 1975 and there appears in the latter year to have been fewer boats sold on which fishermen could base assessments. Many fishermen valued their license on the current value of pots from retiring "freezer" boats. I would expect that an established fisherman wishing to buy a few extra pots would pay a higher unit price than would a person buying a boat and its complete pot entitlement. For this reason I believe the value of the license in 1975 stated above to be an overestimate).

Incidentally, it has been noted in this and other restricted entry fisheries that the value of concessions is anything but stable and can fluctuate quite widely with downturns and upturns in profitability.

### **Change in the Fishery Fleet**

As already mentioned not only are there restrictions on the number of boats licensed to operate in the fishery but there are also regulations governing the size and age of boats that can be replaced. These restrictions have not prevented a considerable change in the fishing fleet, which change must have added to the technical (although probably not the economic) efficiency of fishing.

Table 2 demonstrates quite clearly a considerable increase in the sophistication of the fishing fleet, despite all the restrictions on boat replacement. Undoubtedly the profitability of the fishery has contributed substantially to this rapid technological change. Two factors appear to be at work here. There are no



Table 2: Changes in selected boat characteristics 1963, 1969 and 1975.

Characteristic		1963	1969	1975
B.H.P. of engine	(b.h.p.)	70	100	172
Planing hulls	(%)	29	50	62
Fiberglass hulls	(%)	1	1	16
Plywood hulls	(%)	27	56	45
Planked timber hulls	(%)	66	38	34
Echo Sounders	(%)	68	88	99
Radio transceivers	(%)	18	88	98
Automatic Pilots	(%)	NIL	8	33

doubt many fishermen, often among the most successful, who take pride in having the latest in equipment. By increasing their technological efficiency these fishermen can increase their total catch and hence their gross income. It is difficult to determine to what extent these fishermen are concerned with increasing their net income. Many fishermen in this group of innovators are already well established financially and appear to be motivated as much by the desire to demonstrate their ability as fishermen as by the desire to increase their profits still further. If this is so, they will be prepared deliberately to overcapitalize to achieve their objective.

Since the fishery is already fully exploited, any increase in catch by one group of fishermen means that there is less rock lobster available to the remaining group. As the cost of taking this smaller catch remains unaltered, this amounts to a reduction in net income. These fishermen must therefore match the technology of the innovators if they are to remain competitive.

There is little doubt that these two factors are the prime cause of the trends illustrated in table 2. Of particular prevalence in this table is the change from displacement hulls to planing hulls.

The type of operation involved lends itself to small boats, and few boats in the fishery are larger than forty-five feet in length, with the vast majority between twenty-five and forty-five feet. In zone A, much of the area fished consists of shallow reefs. High speed planing hulled boats locally called "scooter" boats evolved in this area. Because of their greater speed and ability to work more remote grounds in shorter times, boats of this type have become increasingly large and almost all replacement boats now entering the fishery, regardless of size, are of this type. The greater power required to propel a planing hull largely explains the increase in average horsepower.

### Average Age of Hulls

There has been a slight increase in the average age of boats. In 1962-63 it was eight years, by 1969 it had increased to ten years, and by 1975 to eleven years. In 1963 about half the fleet was under five years old (representing the rapid increase in the fleet immediately prior to the introduction of restricted en-

try). By 1969 this percentage had dropped to 25 percent. However, by 1975 it had increased slightly to 27 percent, despite the fact that only 8 percent of the fleet was under four years old. This decrease in building activity after about 1972 reflects the reduction in profitability that occurred at that time as a result of the downturn in prices illustrated in diagram B. In 1975 48 percent of boats were in fact between four and nine years old.

The effect of profitability on the decision as to when to replace a boat is illustrated by comparing the situation in zones A and C. In 1969, both of these zones were returning very good profits. At this time, 26 percent of the boats in zone A and 24 percent in zone C were under five years old. In 1975, zone A was still producing quite reasonable profits while those in zone C were the cause of some concern. By that year the percentage of boats in zone A under five years of age had risen to 34 while in zone C it had declined to 21 percent.

The higher percentages in zone A in both years are partly the result of differences between the two zones. Boats in zone A have traditionally been smaller. With plywood hulls more popular on these boats, they have a shorter life than the larger planked timber hulls more frequent in zone C.

The divergence of the two sets of figures does, however, illustrate the effect of the change in levels of profitability on investment. Although there was reduced investment in all areas of the fishery between about 1972 and 1975, the increase in profitability resulting from the higher prices received since then has resulted in a renewed round of boat replacement.

### **Sociological Characteristics**

Data on this aspect of the fishery is limited, although each consecutive economic survey has collected an increasing range of data. The following discussion briefly summarizes some of the main aspects.

The great majority of fishermen in the rock lobster fishery have no family history in fishing; indeed, the greater proportion of them came to the fishery from other occupations, many being skilled or semi skilled tradesmen. In general ethnic background, they appear to represent a reasonable cross section of the Australian community, with a majority Australian by birth but with a reasonable number of migrants, mainly from the United Kingdom and Northern Europe.

An exception to this general situation is found in the port of Fremantle (in zone C) where a large percentage of fishermen are Italian. This group tends to differ from others in the fishery in several ways: first, they tend to operate their boats as family units, with most members of the crew related, and, second, they tend to use what I have seen referred to in U.S. publications as the "Italian lay" system of payment, with each crewman taking an equal share after a certain percentage has been set aside for the cost of running the boat. Elsewhere in the fishery, crewmen mainly are paid a fixed rate per 100 pound bag of rock lobster landed. Probably because they were family units, these Italian boats tended to carry larger crews than those on similar sized boats elsewhere in the fishery. With the drop of profitability in zone C, it was noted in 1975 that this differential in crew size had disappeared.

One interesting feature of the fishery relates to the average age of skippers. In 1963 it was forty-one years. With the introduction of restricted entry it is rea-

sonable to expect that this average age would tend to increase. This has not occurred. In both 1969 and 1975 the average age was forty-two years. Without doubt, this results from the high prices being offered for the rock lobster concessions, enticing many out of the fishery into other avenues of employment before they reach normal retiring age.

### **License Fees and Resource Rental**

License fees in the fishery are minimal, with boat licenses and fishermen's licenses costing only a few dollars each. The most significant fee is an annual license fee of \$3.50 to \$4.00 per pot (the fee differs between zones). This fee could be as high as \$800 per annum for a boat with the maximum entitlement of 200 pots. (These are 1978 charges and must be looked at in the light of 1978 prices.) However, in view of the level of profit, this hardly represents an attempt to appropriate a substantial part of the resource rent available from this fishery.

This in turn has led to what can probably be termed excess profits, by fishermen, which has contributed to gross overcapitalization and excessive fishing effort.

Some very rough calculations I made following the 1969 study showed that if boat numbers were reduced to approximately the 1959 level (when the annual catch from the fishery reached eighteen million pounds), and assuming some relaxation of the three pots per foot rule, after allowing for a reasonable payment for the skippers' labor and a 25 percent return on original investment, a resource rental of seven million dollars per annum could have been taken from the fishery. This amount represents considerably more than the total expenditure by all Australian governments on all types of fisheries research in Australia at that time.

### **Growth in Fishing Effort**

Prior to the introduction of restricted entry in 1963, there had been a very rapid increase in fishing effort with a rapid rise in the number of boats and rock lobster pots used.

A closed season has operated in zones B and C from August 15 to November 14 for many years, while the fishery in zone A is closed from August 15 to March 14. Most boats from zone A fish in zone B from November 15 to March 14. The closed season corresponds with the season of reduced availability of rock lobster.

Fishing is, however, concentrated in a much shorter season. For example, in 1969 it was noted that 94 percent of the catch in zone C was taken in the five and one-half months from November 15 to April 30. Likewise, boats in zone A took 87 percent of their total catch in two periods totaling only four months (from November 15 to December 31 while operating in zone B and from March 15 to May 31 in zone A). There were indications at the time that boats, particularly the smaller ones, were extending their fishing season and that even at the lower catch rates being taken in the remainder of the season most boats could still fish quite profitably.

This trend has apparently continued and it has recently been announced that the rock lobster season in 1978 will be closed six weeks earlier than in previous years, on June 30 instead of August 15.

The reasons given (8) for the new restrictions were these: "In recent years there has been a gradual increase in fishing pressure due to the introduction of faster boats and more efficient catching gear and methods. As a result the number of days worked each season by lobster fishermen has increased correspondingly."

"Fishing effort was producing an annual exploitation rate of about 70 percent of all legal-size rock lobsters. This meant that the fishery is heavily dependent on annual recruitment to legal size."

Research had indicated "that effective fishing effort had risen to levels similar to those prior to 1963 when pot restrictions were introduced."

The length of the existing closed season has already created a recruitment problem in some sectors of the industry. The additional six weeks must add to this. It may also mean that many more owner-skippers will have to seek work ashore during the closed season.

The decision to extend the closed season highlights the deficiencies in the system of "freezing" numbers. Such a step slows down but does not stop the growth in fishing effort. Without some mechanism for reducing boat numbers, the necessity for additional measures of "regulated inefficiency" would appear to be inevitable in the long term.

## Summary

There can be no doubt that without the introduction of restricted entry the number of boats in the rock lobster fishery would have increased well beyond the 830 level. This would have placed severe pressure on the resource and resulted in very great problems in restricting fishing effort using other methods. It would also have created even greater problems in policing these restrictions.

The introduction of restricted entry has also given the fishermen involved a period of high and relatively stable incomes that could not have been attained under open entry.

Restricted entry has not, however, prevented effective fishing effort in the fishery from increasing. Indeed, it would appear that the reinvestment in the fishery of the high profits available under restricted entry has probably been the major cause of the growth in effective fishing effort.

The success of limited entry in this case has also been influenced by the fact that prices paid for rock lobster have increased faster than costs and that high profits were in fact maintained despite a substantial increase in costs.

Had prices risen at the same or at a slower rate than costs, the situation in the fishery would be very different. The fishing would certainly be less profitable, but, as part of the increasing level of costs was associated with overcapitalization encouraged by high earnings, this does not necessarily mean that it would have been an unprofitable fishery. It does mean that the fleet structure would be different.

Of concern also is the high value attached to fishing concessions. For my own part I have no great objections to the concept of sale of concessions; indeed, I consider it to be less objectionable than to have some committee reallocate surrendered concessions. What does worry me in this instance is the lack of any acknowledgement as to the communities' rights with respect to the resource

and the growing conviction evident among many fishermen that they have acquired some form of property rights to the resource and that its management should be for their exclusive benefits.

## **THE WESTERN AUSTRALIAN PRAWN (SHRIMP) FISHERIES**

The existence of commercial quantities of prawns in Shark Bay was first established in 1952. Development of the fishery was slow because of the remoteness of the area, the lack of suitable processing plants, and the shortage of suitable boats.

To reduce the risks associated with investment in this remote area, the western Australian government offered two processing companies exclusive rights to shorebased processing in the fishery in 1963. In addition, it restricted to twenty-five the number of concessions issued to fish the area, fifteen of which were given to the two processing companies. One processing company later purchased the assets of the other to give it exclusive shorebased processing rights.

Following the discovery of commercial quantities of prawns in Exmouth Gulf, the number of concessions in that fishery was restricted in 1965, with seventeen being issued, thirteen of which were to the two processing companies given exclusive rights for shorebased plants.

This same philosophy was followed in 1971 when restricted entry was extended to Nickol Bay. Here thirteen concessions were issued, all to two processing companies (one of which was a cooperative).

In the early days of the fishery, many of the concessions held by the processing companies were utilized by privately owned boats under contract to the processor. Gradually, however, all processing companies have built up their own fleets. In Shark Bay and Exmouth Gulf all processing company concessions are now utilized by company-owned boats.

In all areas the number of concessions are reviewed every three years and additional concessions issued if biological and economic data suggest that such a course is prudent. When additional concessions are issued, they are provisional for the first three years. When evidence gathered in this period confirms that the additional concessions have not had adverse effects, the provisional concessions acquire full status.

### **Management Objectives**

The stated objectives for the management of these fisheries are as follows (9):

1. Economic viability of fishing units
2. Economic viability of processing establishments
3. Prevention of overexploitation of the prawn resource

A comparison of this with management objectives in the rock lobster fishery indicates more concern with economic and less with social considerations in the prawn fishery.

The difference in emphasis is undoubtedly related to the different histories of the two fisheries. The management objectives in the prawn fisheries are

greatly influenced by the initial decisions taken to assist the development of the fishery.

### Trends in Profitability

Annual production from Shark Bay, Exmouth Gulf, and Nickol Bay is shown in figure 3. This shows that the annual catch from Shark Bay has shown a steady upward trend. While also showing an upward trend, the Exmouth Gulf catch has shown much greater variability, while Nickol Bay has shown great year-to-year variability.

Along with general world prices for prawns and shrimp, the price paid for prawns has a strong upward trend throughout this period. Table 3 shows the gross income, costs, net income, and percentage return on capital for Shark Bay and Exmouth Gulf over a series of years. The value of capital used in calculating percentage return on capital is the market value exclusive of any value attaching to the license.

Table 3: Prawn catch, Gross income, Expenses, and Returns  
Shark Bay and Exmouth Gulf, in selected years.

#### Shark Bay

		1966-67 (10)	1967-68 (10)	1971-72 (11)	1972-73 (11)
Prawn catch	(lb)	87,300	83,300	120,810	135,532
Gross income	\$	50,212*	55,051*	84,784	104,366
Expenses	\$	39,258	45,189	62,120	77,710
Net income	\$	10,954	9,862	22,658	26,656
Return on capital	%	29.2	25.8	21.6	25.4
		1973-74 (11)	1974-75 (12)	1975-76 (12)	1976-77 (12)
Prawn catch	(lb)	139,322	n.a.	n.a.	n.a.
Gross income	\$	104,733	111,001	176,145	172,019
Expenses	\$	79,083	92,942	99,847	113,082
Net income	\$	25,650	18,059	76,298	59,528
Return on capital	%	24.4	11.8	50.0	39.0

\* over 30% of gross income in 1966-67 and 1967-68 was from rock lobster

#### Exmouth Gulf

		1966-67 (10)	1967-68 (10)	1971-72 (11)	1972-73 (11)
Prawn catch	(lb)	92,300	84,200	114,588	140,603
Gross income	\$	40,122*	45,760*	54,551	81,127
Expenses	\$	29,632	34,079	54,756	59,756
Net income	\$	10,490	11,681	loss 205	21,903
Return on capital	%	37.2	32.7		30.0
		1973-74 (11)	1974-75 (12)	1975-76 (12)	1976-77 (12)
Prawn catch	(lb)	106,568	n.a.	n.a.	n.a.
Gross income	\$	67,240			
Expenses	\$	55,981			
Net income	\$	11,259			
Return on capital	%	15.4			

\* In 1966/67 26% and in 1967-68 37% of gross income came from rock lobster.

This table shows that very high returns were earned in both fisheries in most years, although Exmouth Gulf showed much greater variability than did Shark Bay.

### Changes in the Fishing Fleet

As already mentioned, the number of boats in each fishery is reviewed every three years, with the result that the original twenty five Shark Bay and seventeen Exmouth Gulf boats have now been increased to thirty-five and twenty two respectively. The practice adopted in issuing additional licenses is to call for applications and then to assess the contribution made by the applicants to the further development of the fishing industry, usually by way of exploratory fishing in more remote areas to the north. Employed skippers on company-owned boats are eligible to apply for these additional licenses. In recent years it has not been the practice to issue additional licenses to processing companies.

The fisheries were developed in the first place mainly by converted rock lobster boats. Even in 1968, when the first economic survey was carried out, many of these had been replaced by purpose-built prawn trawlers.

In Table 4, the trends in the fishing fleet are illustrated. It might be kept in mind that there are no artificial restraints on boat replacement in this fishery. Each owner determines when he will replace a boat, the size of that boat, and the equipment it will carry. In 1968, no boats were recorded as carrying radar. By 1974, about two-thirds of the fleet carried this equipment and by 1977 all boats carried it. In 1968, the boats were about equally divided between planked timber and steel hulls; by 1977, there were only three planked timber boats remaining in the two fisheries. In 1968, about half the boats in Shark Bay and all the boats studied in Exmouth Gulf were single rigged. In 1977, all boats were double rigged.

These figures indicate quite clearly that there has been a continuing development in technical efficiency in the operation of the fleet.

It will, however, be noted that, although there are no restraints on boat replacement, there has been no tendency in recent years for the size of boats in the fishery to increase. In Exmouth Gulf for example, all boats are between fifty-eight and sixty-six feet in length, while in Shark Bay only the older boats are outside these limits. This suggests a tendency toward a most efficient size for the fishery. The dominance of company ownership and fleet standardization must be a contributing factor, but individually-owned boats appear to follow the same pattern.

Table 4: Trends in the fishing fleet, Shark Bay and Exmouth Gulf

Year	Shark Bay			Exmouth Gulf		
	1968	1974	1977	1968	1974	1977
Length of hull	55.0	64.0	64.0	48	61	62
Age of hull	8.3	7.5	10.0	6	6	6
Engine power (bhp)	148.0	272.0	283.0	162	263	321

The increase in average age of boats in Shark Bay is greatly influenced by company operations. Seventy-five percent of boats operated by the one shore-based processing company in this fishery are between nine and ten years of age. As the company estimates an economic life of ten years for steel hulls in this fishery, a major rebuilding program can be anticipated in the next few years.

There has also been an extension of the prawning season. In 1966-67 and 1967-68, between 70 and 80 percent of the annual prawn catch from Shark Bay was taken in the three months from April to June. By 1971-72 to 1973-74, the percentage had dropped to less than 50 percent, with most boats actively fishing in all months of the year except December. A similar trend was evident in Exmouth Gulf.

Part of this extension of the season results from the fact that in the early years of the fishery most boats were also involved in the rock lobster fishery. Once the prawn fishery was firmly established, fishermen were compelled to choose one or the other of the restricted fisheries and surrender their other concession.

### **Sale of Concession**

Because many concessions are held by processing companies that have not been interested in selling and, as there have been few recorded sales in the relatively small privately owned fleet, it is difficult to get a realistic figure for the market value of licenses. In 1973 (13) it was suggested that the value might be as high as one hundred thousand dollars. In 1977, fishermen valued the licenses at between one hundred fifty thousand and two hundred thousand dollars.

### **The Processing Sector**

There have been no attempts to evaluate the economic performance of the processing sector of these fisheries. The processing companies run their boats and processing plants as integrated operations. In arriving at the figures on boat profitability in table 3, the income of company boats had to be adjusted by using the unit price received by independent operators. For their own accounting purposes the companies paid their own boats only a nominal price.

The processing companies must pay a market-determined price to individually-owned boats since most of these, particularly in Shark Bay, have full freezing facilities and can process prawns to export standards on board, thus, if necessary, bypassing the shorebased processor. In Exmouth Gulf, the competition between the two processing plants is sufficient to ensure reasonable prices.

### **Ownership of Boats**

Although there is no legal bar to their doing so, processing companies have not apparently attempted to establish complete monopolies by buying out individually-owned boats, though this has occurred to some extent in Exmouth Gulf. While the reasons for this are not quite clear, it is probably that such an attempt would result in counter moves by government. The knowledge of this and the desire to retain good relations with the government probably determine the companies' present attitude.

There has, however, been evidence of other companies buying up individ-



ually-owned boats to establish fleet operations. Table 5 shows the number of boats in Shark Bay and Exmouth Gulf that are owned by processing companies, other companies (owning more than two boats), and those in single ownership in 1977.

Table 5: Ownership of boats Shark Bay and Exmouth Gulf 1977, percentage of total

	Processing companies	Non-processing companies	Individually owned
Shark Bay (%)	55	24	21
Exmouth Gulf (%)	75	15	10

All licenses not held by processing companies were originally issued to individual fishermen. There is, therefore, clear evidence of a trend towards company ownership. This would tend to support the suggestion that restricted entry can lead to the development of monopolistic tendencies in the ownership of fishing fleets.

### Nickol Bay: A Special Case?

Apart from the initial mention that license limitation operated in Nickol Bay, little has been mentioned about that fishery in this paper.

From figure 3 it can be seen that the annual catch from this fishery has fluctuated widely from year to year. Although thirteen licenses were initially issued in Nickol Bay, there has been no year since then during which all these boats have operated.

One basic problem with this fishery is obviously the very large 1967 catch and the progressive increase in catch from 1968 to 1971, when restricted entry was introduced. This must have given the impression of a much more substantial fishery than subsequent events have indicated.

The main species caught in this fishery is the banana prawn *Penaeus merguensis*, which is subject to much greater fluctuations in abundance than are the western king prawn *P. latisulcatus* and the tiger prawn *P. esculantus*, which are the main species in the Shark Bay and Exmouth Gulf fisheries.

At the time of the 1974 economic surveys of the Shark Bay and Exmouth Gulf fisheries, an attempt was made to include the Nickol Bay fleet. This attempt, however, was abandoned because of the difficulty in contacting fishermen and the poor records left by those who could be contacted. The clear impression was gained, nonetheless, that this was a fishery returning a very low level of profitability.

I would argue that, when a fishery fluctuates as much as does that of Nickol Bay, restricted entry is not an appropriate management measure. Unless the number of boats that are permitted entry is at a level that is based on catches in poor years, restricted entry cannot hope to give economic stability. However, if this is done, then much of the catch in peak years must be wasted. Fluctuating

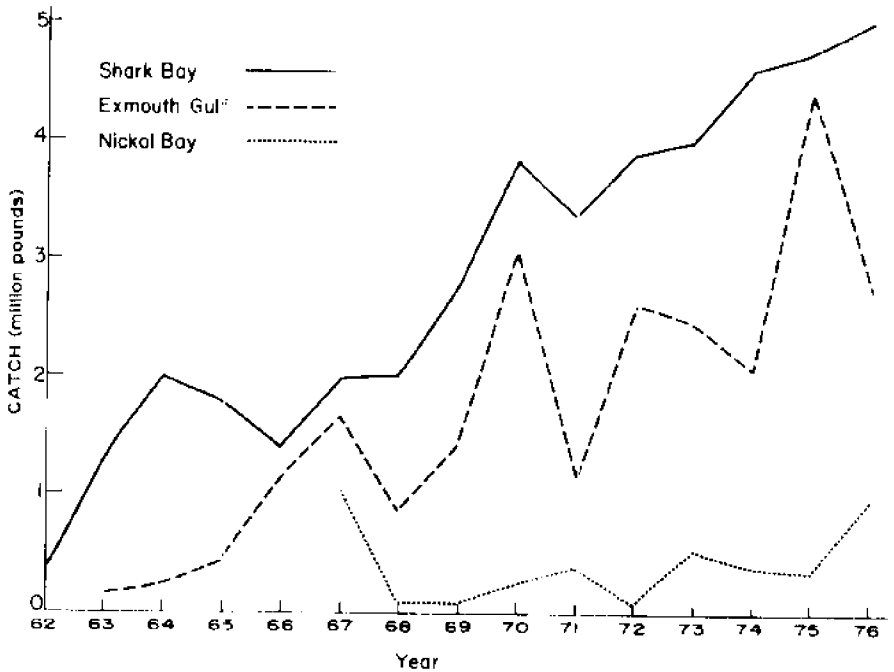


Figure 3. Annual prawn catch, Shark Bay, Exmouth Gulf and Nickol Bay, 1962-1976.

fisheries are not generally subject to the same demand for entry as are more stable ones. It would seem that such fisheries would be better fished on an opportunistic basis and that fishing pressures should, if necessary, be regulated by measures other than restricted entry.

### Resource Rental

As with the rock lobster fishery, there has been no real attempt to appropriate part of the resource rental. Licenses for this fishery cost fifteen hundred dollars per annum for Shark Bay, twelve hundred fifty dollars for Exmouth Gulf, and two hundred dollars for Nickol Bay. In view of the levels of profitability in these fisheries, this must be regarded as a nominal amount. It certainly does not represent what might be considered a significant part of the resource rental available.

Although the number of processing plants is also restricted, license fees charged for them are also nominal, only a few hundred dollars per annum.

### Summary

In the light of the management objectives set out for this fishery, the strategy adopted must be acknowledged to be very successful, at least with respect to Shark Bay and Exmouth Gulf. Development of the fisheries has been at a controlled rate and without the overcapitalization characteristic of many open entry fisheries.

The privileged position given to the processing companies, both with regard to exclusive shorebased processing rights and a substantial proportion of the fishing concessions, contributed strongly to the initial development of the fishery. By reducing the number of different interests making investment decisions about the fishery, it has also kept capital investment at a level appropriate to the size of the resource.

Management of these fisheries has in fact approached the suggested economic ideal of private ownership (14), and the rationalization of inputs which, it had been suggested, this approach could achieve has in fact occurred.

The major objection that can be raised about the present management structure is that it has not attempted to appropriate a greater part of the resource rental for the Australian people, who are, after all, still the nominal owners of the resource.

## **COMPARISON OF THE ROCK LOBSTER AND PRAWN FISHERIES**

Management of the two fisheries represents two different approaches to limited entry. In the rock lobster fishery, restricted entry was introduced in a fully exploited fishery, while the prawn fisheries have been developed under a limited entry regime.

The fisheries share the characteristic of using only one method during a relatively long catching season. With the exception of Nickol Bay, these fisheries are also relatively stable, with annual catches fluctuating within what are in fishery terms rather small limits.

In the main the fisheries are very profitable, with limited entry and rising prices placing the fishermen in a very favorable position that could not have been attained under open entry.

The rock lobster fishery has, however, shown a strong tendency towards overcapitalization. This has not occurred in the prawn fishery. It would appear that this is a result of the predominance of individual ownership in the rock lobster fishery compared with the dominance of company owned fleets in the prawn fisheries. The fact that limited entry has been in force in the prawn fisheries throughout their development may be a contributing factor, but it would appear to be less significant than is the nature of ownership of boats.

The rock lobster fishing fleet has remained one characterized by individual ownership, whereas the prawn fisheries have shown a trend towards company operations. Several factors appear to be at work in these trends.

The greater remoteness of the prawn fisheries must make the operation of individually-owned boats more difficult, in that the provision of servicing facilities is a more practical proposition with fleet operations. The capital investment in the two fisheries must also influence the type of ownership; the smaller rock lobster boats represent an investment more within the capability of an individual than do the larger boats in the prawn fishery. The more diverse marketing opportunities in the rock lobster fishery combined with the strength of processing cooperatives must also mitigate against the development of fleet operations in that fishery.

## LIMITED ENTRY IN OTHER AUSTRALIAN FISHERIES

The success of limited entry in the western Australian rock lobster and prawn fisheries has played no small part in encouraging its introduction into many other Australian fisheries. In some fisheries it has been quite successful while in others, it could be argued, it has been an inappropriate management device.

### Abalone

The abalone fishery is concentrated around the southeastern section of the continent, with significant fisheries off the states of Tasmania, Victoria, South Australia, and New South Wales. In all states except New South Wales, restricted entry is in force.

The abalone is taken by divers, who prize the abalone off rocks on the sea bed. It is a hazardous occupation, resulting both from the physical dangers encountered in the water and the long-term health problems that can occur.

Up until about 1974, all states with restricted entry would not permit sale of licenses. A steady increase in the average age of divers was noted. Tasmania now permits the sale of licenses and although there are no statistics available it might be expected that the average age of divers in that state would have declined relative to that in Victoria and South Australia.

The resource is considered to be fully exploited and, because of the nature of fishing, it is one that is easy to overfish. Apart from restricted entry and size limits that already apply, it is difficult to envisage other effective measures that would not impose extremely difficult policing problems. With rapidly rising prices, divers have in the past few years been making very high profits. This has presented administrators with the difficult decision of whether to permit the entry of additional divers.

The high level of profits has in some areas led to a marked decrease in the average number of days a diver works each year (approximately eighty). This has resulted in some underutilization of the resource. The dilemma is that the licensing of more divers to increase fishing effort so as to fully utilize the resource and reduce the high level of profits will almost certainly result in an increase in effort by existing divers. In effect, this combined increase could result in resource depletion.

In New South Wales, where there is as yet no restricted entry, it is generally accepted that the resource is overfished.

### Southern Rock Lobster

This fishery is situated in the waters off Victoria, Tasmania, and South Australia, with a combined fleet of about nine hundred boats. Unlike the western Australian fishery, where few boats engage in other types of fishing, boats in this fishery have tended to be multipurpose. Shark fishing, scallop fishing, and several other types of fishing have been important additional sources of income. An economic survey on the Victorian sector of the fishery conducted in 1965 indicated that on the average over 40 percent of gross income came from species other than rock lobster (15).

As has been traditional with the introduction of restricted entry in Australian

fisheries, all boats with a history of involvement in the rock lobster fishery, even though this may have been of a minor nature, were given rock lobster fishing endorsements (restricted entry applied only to rock lobster fishing, not to the fishery as a whole)

This created a dilemma for the administrators (which has not been resolved more than a decade later). To insist that a boat must fish in the rock lobster fishery for some minimum period each year to retain its license endorsement would have resulted in an increase in effort in a fishery already considered to be at or near full exploitation.

To let the boats retain license endorsement without any minimum commitment to the rock lobster fishery meant that there was a substantial amount of potential fishing effort that could at any time be brought to bear on the rock lobster stocks.

This latter has in fact occurred. A combination of higher prices for rock lobster, increasing restriction on shark fishing (due to levels of mercury in larger sharks), and a decline in the scallop resource had resulted in 1972-73 in rock lobster sales comprising nearly 70 percent of average gross income (16).

Restricted entry in this fishery has not, however, resulted in any substantial profits to fishermen involved. As an indication of this the average value of a license in the fishery in 1973 was only fifty-five hundred dollars (17), which is only about one-quarter of the value in the Western Australian fishery.

In the Victorian sector of the fishery there is also limited entry in the scallop fishery. Some boats have license endorsement for both the rock lobster and scallop fisheries, while others have endorsements for more than one rock lobster zone. As license fees take little or no account of the economic benefits conferred, the equity of this system gives some cause for concern.

## **Tuna**

The Australian tuna fishery, based mainly on juvenile southern bluefin, has traditionally used the pole and live bait method in the waters off New South Wales and South Australia. This fishery is very seasonal, part of the same stock being exploited in both areas during part of its annual migration. The behavior of this fish is very sensitive to oceanographic conditions. This results in large annual fluctuations in the catch in both fishing areas. Biological evidence suggests that, although there is heavy exploitation of available fish in any particular year, this represents only a small part of the total stock and no threat to the resource.

In the early 1970s, several purse seiners started fishing in competition with the pole and live bait boats. Their initial catches were quite good. This led the pole and live bait fishermen to exert political pressure for restraint on the purse seiners. As a result, restricted entry was introduced to the purse seine fishery, with licenses issued only to the six existing boats.

As it has turned out, the catches of the purse seiners have been disappointing, and only two of them, with indifferent success at that, are still operating in the fishery.

What is of some concern is the use of limited entry as a mechanism for protecting one group of fishermen from competition by others. The tuna fishery is not the only instance where this has occurred. For example, it has recently been

decided to issue only a limited number of licenses to boats between one hundred and one hundred fifty feet in length to fish in the southeastern trawl fishery. This situation is not identical to that in the tuna fishery, since, at the time this latter decision was announced, there were no boats of this size operating in the fishery. The demand for these larger boats arose from the development of trawl grounds on the continental slope. It can be argued that the restrictions were imposed to restrain effort until the extent of this resource was fully known. There is, however, no doubt that the impetus for the restriction came from the owners of smaller boats who were developing this fishing, or working established grounds on the continental shelf, and who saw their livelihood threatened by these larger boats.

### Summary

As a management tool, limited entry is most effective in a fishery with a relatively stable catch, using but a single fishing method and with a fishing season lasting for the greater part of the year.

The western Australian rock lobster and the prawn fisheries in Shark Bay and Exmouth Gulf all satisfy these conditions and, within the objectives stated as the aims of management in these fisheries, limited entry must be acknowledged to be very successful.

However, the more a fishery diverges from this ideal the less it is suited to management by restricted entry. This is not to say that restricted entry may not have a part to play in these other fisheries, but rather that they require a more sophisticated form of management whereby restricted entry of some form comprises part of a package of management measures.

It has, however, been demonstrated that restricted entry, even where supported by other measures, is not sufficient to prevent effective fishing effort from increasing. Indeed, by permitting profits in excess of those that could be taken under open entry and by encouraging reinvestment of accumulated capital, restricted entry can actually encourage the growth in effective fishing effort.

Even in the case of the Shark Bay and Exmouth Gulf fisheries it must be recognized that the time will come when the resources will be fully exploited. Even if the number of boats is not increased further, there will continue to be a growth in fishing effort as boats increase their efficiency.

Throughout the history of these fisheries the prices paid for their catch has risen faster than costs. It is unrealistic to believe that this will continue indefinitely.

While it is easy enough to let additional boats into an expanding profitable fishery, to be really effective, management must also cope with the situation where increasing fishing effort threatens the resource or where profit margins are shrinking because of rising costs or falling prices. If sociological objectives are to form part of the management structure, mechanisms must be developed to cope with these problems. There is surely more social necessity to intervene in a situation of declining profitability than when profits are high.

It is suggested therefore that a buyback scheme or some other mechanism for reducing boat numbers should be part of any restricted entry fishery and that this should be used to manipulate boat numbers with the object of attaining

whatever objectives the management of a particular fishery is designed to achieve. A fishery is, after all, a dynamic system. Unless there is the capability of both increasing and decreasing boat numbers, restricted entry represents an attempt to impose a static solution on this dynamic system. In the long term this is an impossibility.

There have, I know, been many unforeseen problems with the Canadian buyback system. This does not invalidate the concept. The Canadian experience has drawn attention to some of the problems. Undoubtedly other problems will occur in other fisheries. We should learn from these rather than reject what must be an inevitable component of any restricted entry system.

The Australian fisherman has on the whole accepted restricted entry with enthusiasm, except of course where he is among those who miss out.

In almost all open entry fisheries, there is now pressure by fishermen for restricted entry. Unfortunately this is a very easy pressure for politicians and fisheries administrators to succumb to, with the result that restricted entry has been introduced into many fisheries in which it would appear to be inappropriate or at least to have been formulated inappropriately.

That this has been permitted to occur, probably reflects the relatively small contribution the Australian fishing industry makes to the national economy. This has resulted in little public or political concern for or debate on this topic. Man-

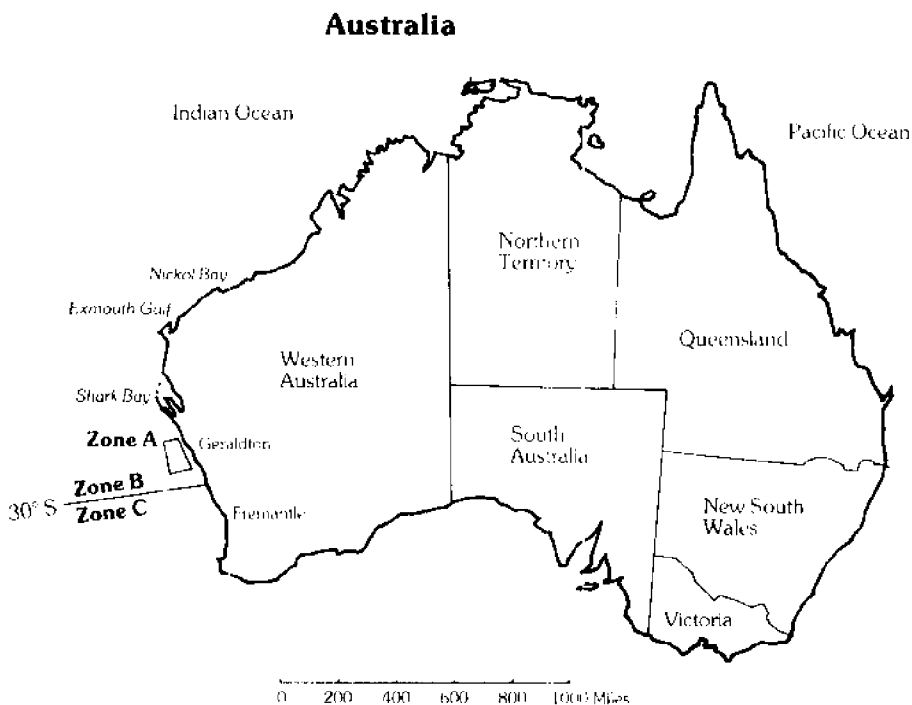


Figure 4.

agement of fisheries has largely been left to the fishermen and the administrators, which has led to relatively greater weight given to the demands of fishermen and administrative convenience and less to what might be termed the wider public interest.

Many of the problems associated with restricted entry fisheries in Australia are related to the failure of those responsible to link the concept of restricted entry to that of resource rental, of letting fishermen retain all the resource rental themselves.

If properly managed, by reducing excess profits a royalty system could reduce the sale value of fishing concessions and the rate of overcapitalization. By varying the rate of royalty it could also be used to dampen fluctuations in income and possibly even to subsidize fisheries in particularly bad years. There would appear to be available from the Australian fishing industry a potential resource rental of a size sufficient to pay for all fisheries research and development and to make a significant contribution to the public purse.

The imposition of a royalty would also be likely to dampen the fishermen's enthusiasm for this particular type of management measure, hence the tendency to want it introduced in fisheries where it may not be appropriate.

I believe that restricted entry is with us to stay. As efficiency increases, more and more fisheries are threatened with overexploitation. There is also an increasing awareness that the fishery itself is not the only resource involved and that management of other resources—labor, capital, fuel, etc.—are also important. If used in an enlightened way, restricted entry can achieve all this. On the other hand, it can be just as wasteful as more traditional management measures in conferring few benefits on anyone except possibly a few privileged fishermen.



# CASE STUDIES ON ECONOMIC EFFECTS OF LIMITING ENTRY TO THE FISHERIES

Leah J. Smith

## Introduction

Fisheries management has grown more complex as man has evolved increasingly sophisticated methods for harvesting, preserving, and distributing fish. Management techniques intended to conserve stocks of fish have included quotas and limitations on equipment. However, as overfishing has grown more common in spite of conservation attempts, an alternative management method, limiting entry to the fisheries, has been proposed. In helping to restrict overall catch levels, limited entry denies access to the resources to specific individuals or groups so as to improve the economic efficiency of those vessels that remain in the fishery. The economic effects of limited entry programs for commercial fisheries, in particular the effect of various forms of this management technique on industry structure, are detailed in this paper.

The discussion of the implications of limited entry for industry structure includes the following topics: 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 that have accompanied the introduction of limited entry programs in several places are described here 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 practical problems of applying such techniques to U.S. fishery management.

## INDUSTRIAL STRUCTURE AND LIMITED ENTRY

All fishery management programs have some effects on the economic situation of the industry: for example, closed seasons or moratoriums can mean inefficient use of capital and idle labor for extended periods, and gear restrictions can stifle the introduction of new technology. The specific management technique of limiting entry *directly* restricts participation in the industry; other management programs *indirectly* control entry into the industry by requiring a high capital outlay or specialized skills, or by restricting the size of the vessel or the number of days of fishing.

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Economists have discussed at some length the advantages of using limited entry as a fisheries management tool (1). One specific aspect of the economic effects of limited entry is the change that it will make in the structure of the industry. Industry structure and operation under this management system are determined by the conditions of entry, exit, competition, and pricing in the specific form of limited entry. It is also important to understand how this particular management technique in its various forms is likely to affect allocation among the users of the resource. Limited entry in a heavily overfished industry must exclude some users or potential users, for whom the allocation is zero (2). In addition to changes in allocation of the fish among fishermen, limited entry is likely to change the relationship of the individual fishermen to the buyers of their product.

Some general studies of the effects of changing industry concentration on profitability and efficiency may indicate something about the effects of increased concentration within the fishing industry. Increased concentration means that fewer producers account for a larger share of total production in an industry (3). Various studies have found an almost universal association between higher concentration and higher profitability. A recent study (4) of a large group of industries over the period 1947-1967 established that long run changes in market structure toward increased concentration are accompanied by increased efficiency (5). The gain in efficiency was most pronounced when concentration was high and rising and when demand was growing.

Demand for fish—both fresh and processed—has certainly risen over the past few years (6). Fishing industries generally are more competitive than many manufacturing industries. However, because a limited entry program can change ownership patterns in the industry, concentration may be increased. For example, if there is no special provision to discourage ownership of boats by processing companies, the processors' superior access to capital may enable them to buy up multiple licenses and thus concentrate ownership of fishing boats in fewer hands. Even if concentration of ownership is discouraged by regulations controlling transfer of licenses, the conditions of entry and exit will be altered in a way that changes income distribution in the industry. The requirements that determine the allocation of licenses generally take into account income derived from fishing as well as participation in the fishery. Fishermen with low incomes or low catches are more likely to be excluded, so the fishermen allowed entry will average higher incomes and catch. If fees are charged on the catch, or if fish prices are manipulated, the successful, efficient fishermen are most likely to be able to pay such fees and remain in the fishery. With either a limited licensing scheme or a fee scheme, the incomes of the fishermen or boats remaining in the industry under conditions of limited entry are likely to be higher on the average than under free entry. Limited entry programs have also been accompanied by increased capitalization and higher total industry income when fish prices rise.

Although the experiences of other industries in which concentration has changed over time do not necessarily predict what will happen in the fishing industry, they do indicate some changes which may accompany limited entry if ownership becomes more concentrated. As appropriate data becomes available from more limited entry programs, we can see what modifications in industry

structure do take place. Since some of the potential effects of limited entry relate to major concerns of fishermen and fishery managers, it is useful to assess such effects, especially for temporary programs such as moratoriums or freezes, as indicators of the future effects of a longer term limited entry program.

The explicit barriers to entry inherent in limited entry programs are not the only influences on competitive structure. A simple freeze or moratorium on licenses may make no explicit provision for buying back licenses from fishermen who wish to leave the fishery; the moratorium affects industry structure and competition by abridging the fisherman's freedom to leave as well as to enter the fishery. If the fisherman wishes to stop fishing but cannot sell his license with his gear, he may not be able to recoup his investment. This sort of limitation is another constraint on flexibility in the operation of the fishery and may create opposition from fishermen (7).

However, vesting property rights in a limited number of fishermen is generally recognized as one way to encourage more rational, efficient use of boats and gear. The individual fisherman can allocate his effort without the constraints of bycatch limitations and perhaps forced discards of what he considers target species, gear restrictions, and frequent changes in quotas. Although fishermen would certainly continue to catch some nontarget species, they would not have to discard valuable fish if the overall effort allowed for each fishery were to properly take account of bycatch ratios. Present regulations sometimes force fishermen to discard valuable species caught as bycatch, because quotas for those species have been exceeded. Limited entry would probably not eliminate quotas altogether, but it should reduce effort enough so that the quotas are less restrictive to individual fishermen.

Income levels and returns on investment would be expected to rise, reflecting the capture of economic rents by the remaining fishermen. With a higher income and more stable expectations about his share of the fishery, the fisherman should be more willing to invest in gear and vessels and more able to adopt technical advances in gear and to develop innovative fishing techniques. Were investment and innovation to lag after establishing a limited entry program (contrary to recent experience in British Columbia and elsewhere), extension services, investment tax credits, and other incentives could be added.

It is difficult to predict the effect of limited entry on the price of fish. Under some present management arrangements, such as closed seasons or moratoriums on catch at the end of quarters (for example, when groundfish quotas in New England have been filled), prices fluctuate widely. With limited entry these prices might become more stable. Windfall profits to wholesalers or retailers who can take advantage of the dock price-retail price differential when prices at the dock seesaw might be reduced. The present marketing arrangements generally deny the consumer proportionately low prices for fish when the dock price is extremely low. There is no guarantee that consumers would benefit from this possible change in price fluctuations at the dock; marketing relationships among fisherman, buyer, and retailer probably must change substantially before there is a more direct relationship between dock price and retail price. Of course, if stocks and annual catch of the popular species remain low, prices will be high. Expansion into underutilized species may be encouraged in a limited entry pro-

gram which subsidizes their price; market promotion and quality control may also be necessary to ensure that such species are sold in the U.S. and as exports.

In addition, limited entry may affect the relationships between fishermen and processors. Many fishing boats are already owned by vertically integrated firms which process fish. A limited entry program could either encourage or discourage this practice, depending on its administration and the requirements for licenses; alternatively, the present balance between processor-owned and independently-owned boats could be continued. If limited entry results in a smaller number of independent fishermen but proportionately no more processor-owned boats, the fishermen might gain some degree of market power in the various ports, because cooperative agreements are more likely within a smaller group. Fishermen have long been sensitive to the imbalance in economic power between themselves and the processors to whom they sell fish. The result of a more oligopolistic selling and buying arrangement is difficult to predict; it seems likely that strong competitive forces would continue to dominate. In this case, average prices at the dock should not change substantially. In time a more even distribution of the catch should, however, reduce the occurrence of temporary gluts in a particular market, with the attendant rock-bottom prices for fishermen. If these extreme fluctuations abate, fishermen's feelings of frustration with "the system" should diminish while their incomes improve.

A limited entry program might also affect the relative proportion of full-time and part-time fishermen in any given fishery. In a multispecies fishery, fishermen traditionally fish for several different species during the course of a year, changing gear and/or target species, depending on a variety of biological, economic, and seasonal factors. They may use their gear quite efficiently in pursuit of any one species, although only a small portion of their total income is derived from that fishery.

If a limited entry program is applied to just one or to only a few of these species, a program to promote efficient harvest should include both those fishermen who fish most of the year for the controlled species and the fishermen who, though they spend much of their time fishing for other species, consider the limited effort species an important part of their annual catch. The flexibility to seek different species at different times should be preserved. Even though this represents "part-time" participation in the fishery for any one species, the fisherman is often a full-time fisherman. A limited entry program for a single species or groups of species is also likely to increase effort to harvest other species for which access is not limited. A limited entry program in a multispecies fishery might be most effective and equitable by establishing individual vessel quotas rather than a simple license limitation scheme. The implications for part-time participation and for effort in other fisheries should be examined with particular care in a multispecies fishery.

## **SOME CASE STUDIES**

### **Atlantic Canada**

Limited entry programs in the eastern provinces of Canada cover the fish-

eries for Bay of Fundy scallops, offshore scallops, Atlantic groundfish (trawls and some other gear), tuna (angling), Snowcrab, herring, and lobster (coastal maritime and outside f.fy miles). Recent catch statistics for each of these fisheries are shown in table 1. The dates of initiation and coverage of each of these programs are as follows (8):

1. **Herring (*Clupea harengus*)**. Entry has been limited (except for gillnets) since 1970. Nevertheless, effort continues to be so excessive that annual quotas are often taken in a few weeks.
2. **Scallops—Bay of Fundy**. Limitation of entry began in 1973, and was based on 1972 participation in the fishery. At the same time, a size restriction was placed on scallops caught: sixty meats per pound. The big 1976 increase in scallop catch led to a renewal of interest in entry. In order to keep the number of vessels near the level of the early seventies, an additional requirement was added (March 1, 1977) that licenses must be renewed annually or be forfeited.

Table 1: Quantity and Value of Catch in Atlantic Canada Limited Entry Fisheries, 1970-1977<sup>1</sup>

	1970	1971	1972	1973	1974	1975	1976	1977 <sup>2</sup>
<b>Groundfish</b>								
inshore-metric tons	195,824	185,996	159,717	46,088	119,182	121,884	149,138	
value	16,943	19,726	20,285	25,683	24,542	25,139	33,660	494,706
offshore-metric tons	383,242	388,735	360,458	396,010	298,553	298,950	320,538	115,813
value	37,598	39,842	40,959	55,040	49,319	50,610	50,937	
<b>Scallops</b>								
Bay of Fundy-metric tons	9,598	6,760	7,540	4,782	2,520	3,291	4,096	
value	2,829	2,051	3,423	1,796	900	1,365	1,884	135,052
offshore-metric tons	37,500	33,781	36,168	35,660	50,349	63,355	89,335	38,901
value	11,272	10,908	16,085	14,034	17,674	24,345	36,997	
<b>Herring</b>								
inshore-metric tons	68,262	69,917	84,024	74,068	60,568	70,736	69,535	
value	2,767	3,150	5,148	5,577	4,700	5,247	5,350	219,028
offshore-metric tons	410,693	349,379	220,028	151,453	165,000	171,170	155,947	23,648
value	10,483	10,010	7,509	7,076	8,745	8,555	10,483	
<b>Lobster</b>								
inshore-metric tons	16,567	17,193	14,709	15,658	13,829	16,949	15,338	
value	29,661	33,033	36,181	39,305	36,888	46,843	43,693	15,993
offshore-metric tons	—	103	343	489	413	540	739	46,397
value	—	181	817	1,263	1,075	1,536	2,353	
<b>Snowcrab</b>								
inshore-metric tons	1,229	1,284	1,353	2,037	2,211	1,743	2,032	
value	224	228	283	692	890	526	874	14,087
offshore-metric tons	6,438	5,500	5,664	7,016	8,250	5,298	8,705	7,305
value	1,361	980	1,775	3,335	3,155	1,919	3,881	

Source: Fisheries and Marine Service, Department of the Environment, Ottawa, Canada.

<sup>1</sup>Values are given in thousands of dollars.

<sup>2</sup>Preliminary figures; only combined inshore-offshore statistics were available.

3. **Offshore scallops.** To maintain existing levels of effort (seventy-two vessels), limited entry was introduced in 1973. Size limits and significant increases in catch in 1975-1976 indicate that the desired biological stock growth probably has been occurring. Approximately seventy-six vessels are licensed for 1978, and the license limitation has continued.
4. **Offshore lobster fishery (outside fifty miles).** Entry was limited in 1973, but no significant reduction in effort has taken place since then. This program was set up primarily to help assess interactions between inshore and offshore stocks and to provide additional protection to the inshore stocks if necessary.
5. **Lobster: Maritime Provinces.** A license limitation scheme has been applied to lobster boats since 1967 (9). Vessels are either issued permanent licenses or licenses to be phased out. The maritimes have few employment opportunities for fishermen who are removed from the fishery, so the "excluded" group is likely to resist strongly the reduction in total number of licenses. A qualitative study of the regulations in this fishery concluded that the program would not substantially change total fishing effort but would lead to increases in the value of boats and number of traps. A more equal distribution of income among the lobster fishermen was also expected to emerge.
6. **Groundfish.** Limited entry, begun in 1973, applies to otter trawls, Danish seine, Scottish seine, and midwater trawl. Other gear types have fewer restrictions: there is no restriction for new entry of longliners; licenses for gillnetters have been frozen only since 1976 (August 11), but with allowance made for fishermen transferring from Prince Edward Island and eastern New Brunswick to Newfoundland; additional licenses are allowed on a conditional basis for fixed gear vessels only if it is demonstrated that catches of herring, salmon, and tuna will be minimal. The complexity of the stocks and the difficulty of measuring international effort preclude assessment of the effectiveness of this limited entry program.
7. **Snowcrab.** Effort was restricted in 1974 to counter declining stocks. No trends are apparent yet.
8. **Tuna.** Entry into angling for tuna was intended to be limited beginning in 1976 but effort has actually increased since then. Effort early in 1976 was estimated to be 235 units.

All of these programs share general policies designed to control inter-personal transfer of licenses. A directive dated April 20, 1977, allows the sale of vessels with permit only if the vessel has been owned by the seller two or more years before the sale date and if the vessel has been used in the fishery in the previous twelve months. This directive also strengthens the common basis of all the programs: licenses or entry permits are the property of the Crown and can-

not be transferred freely among individuals. Permits are issued to the owner, not to a skipper or agent. Despite reliance on *vessel* licenses for each fishery to restrict effort, a personal license is also required for each skipper and crew member. These individual licenses, however, are not used by themselves to restrict entry into the various fisheries.

With reference to industry structure, Fisheries Minister Romeo LeBlanc has explicitly stated that "the policy of my department is to encourage the ownership of fishing boats by individuals or fishing enterprises rather than by processing companies . . . any attempt by a company to increase the size of its existing fleet would certainly be restricted" (10). Furthermore, Mr. LeBlanc has proposed future "efforts . . . to separate the fishing fleet from the processing companies in Atlantic Canada," which shall "improve efficiency of vessel operations, make it easier to match overall catching and processing capacity, raise fish prices and fishermen's incomes, increase the fishermen's bargaining power, create a healthier balance of forces in the industry, and invigorate fleet development by the fishermen." This statement includes many economic goals of limited entry programs as well as other goals which reflect social judgments on the distribution of income among various groups. It is not necessarily true that separation of boat ownership from processing will improve vessel efficiency or make it easier to match catching and processing capacity. In fact, one might more easily argue that a processor-owned fleet could be directly coordinated to match the capacity of the processor and that a processor could more efficiently direct a fleet of boats to catch the needed fish. Separation of ownership is, however, likely to encourage investment by fishermen because they might perceive a more profitable potential for participation in the fishery.

From the point of view of industry structure, the intended increase in the power of fishermen to bargain for better dockside prices for their fish is particularly interesting; processing industries have almost always been more concentrated (i.e., embodied oligopolistic or monopolistic power, particularly within a single port or even in a region) than fishermen. By limiting the number of fishermen, a limited entry program lessens the degree of competition among fishermen, and thus increases the likelihood that they will act in coalition to promote their own interests. The goals of improved efficiency of vessel operation and raised fishermen's incomes which may be associated with this increase in power are, of course, attendant upon the development of property rights in the fishery.

The subsidy program in Canada's fisheries also affects industry structure. Subsidies are credited for part of the overcapitalization problem which, along with heavy foreign fishing, led to declines in popular stocks. More recently policy has excluded subsidies from vessels constructed for use in fisheries where excessive capacity exists (lobster, scallops, herring, salmon, and snowcrab) (11). Subsidies will be granted for modernization throughout the fleet for new vessels designed to fish unexploited stocks, for conversion of existing vessels to increase productivity, and for replacement of existing vessels. These subsidies complicate administration of the limited entry programs: they may be counterproductive because they encourage additions to fishing capacity, but they are also designed to improve efficiency and to encourage adoption of new technology and expansion to underutilized stocks of fish.

The simultaneous encouragement of technological improvement through the subsidy program and the provision to fishermen of some degree of protection of their fishing rights (via the limited entry program) are likely to lead to increased engineering efficiency of operation in a way that more traditional management techniques do not (12).

### **South Africa**

In contrast to the stated aims of the Atlantic Canada entry restriction program, the South African limited entry program institutionalizes the relationship between fisherman and processor (13). The fisheries for pilchard (*Sardinops ocellata pappe*), maasbanker (*Trachurus trachurus*), and mackerel (*Scomber japonicus*) have been restricted in the numbers of licenses granted by the national government since 1953. Dual licensing of fishing vessels and processors (reduction plants since 1949 and canneries since 1964) has encouraged vertical integration. Shorebased companies have purchased their own vessels, built stickwater plants to extract nutrients from waste water produced by fish meal processing, and devised processes to utilize tonnage of raw fish more fully. The net result has been a reduction in the number of boats, an increase in the size of boats and processing plants, a shift in fishing boat ownership away from individually owned boats toward factory owned boats, and larger capitalization cost required to enter the fishery (14). Such a combination of limits on entry into the fishery is clearly a restriction of competition, necessarily limits innovative activities to a small group, and discourages change by a complex set of circumstances. Limited entry programs need not operate in this way, and clearly such a rigid set of arrangements is foreign to the ideals of U.S. enterprise. It is worth including the South Africa example because it reflects a style of limited entry which most people would agree is not to be emulated in the United States fisheries.

### **East Coast U.S. Lobster**

Two New England states, Maine and Massachusetts, have attempted to limit entry into their inshore lobster fisheries. The Maine program, introduced with great publicity, has never been implemented as a permanent law. The political problems of passing such a complex and controversial law aimed at reducing the number of commercial lobster fishermen were simply too great to overcome (15). (See also the comment by Patrick Jackson on page 129.)

In 1975, Maine put a freeze on lobster licenses and legislation was introduced to set up a permanent system for restricting licenses. The proposed legislation proposed several different classes of licenses and was widely debated in public hearings all along the coast. Although some fishermen supported the legislation, other fishermen and legislators were vehemently opposed. At the same time of the general public debate over the issue, a coincidental challenge to the residency definition in the law was filed in federal court (*Massey v. Appollonio*). The court decided that the three-year residency requirement used to determine whether the applicant was a valid commercial lobsterman was unconstitutional. Rephrasing of the law could have established a constitutional basis for selection of lobstermen for the limited number of licenses, but the issue of limited entry



was so complex and controversial that the proposed program was never passed by the legislature (16).

One interesting sidelight about the temporary freeze on lobster licenses was the change in the number of licenses issued around the period of the freeze. The number of commercial licenses rose steadily in the early 1970s, with a jump just before the freeze was implemented in 1974-1975. After the moratorium was lifted, the number of licenses dropped again (17). The temporary rise in the number of licenses was clearly an attempt by potential fishermen to establish some vested right in the fishery in case it were to be closed to new entry. After the threat of license limitation was removed, the level of participation fell to a more normal open-access level. Overcapacity still existed, but the problem was not further exacerbated by the rush to establish a property right.

The Massachusetts attempt to restrict entry in the lobster fishery quietly crept in by the back door. Instead of a widely proclaimed public campaign to limit entry, legislation was passed to declare a moratorium on new commercial lobstering licenses in 1975 (18). The moratorium has become an issue of political interest and controversy only in the past year. In the few years since the moratorium took effect, the number of reporting license holders has been reduced only slightly.

However, the moratorium has not yet succeeded in reducing effort in the lobster fishery. Table 2 shows the relationships between the number of license

Table 2: Fishing Effort in Massachusetts Coastal Commercial Lobster Industry, 1972-1977

Year	1972	1973	1974	1975	1976	1977
License issued (Commercial \$100)	1,090	1,163	1,367	1,397	1,369	1,371
Licenses Reporting	934	882	876	1,201	1,211	1,181
No. Pots	159,688	148,580	143,483	194,308	220,778	216,459
Pounds Caught	3,943,373	3,393,733	3,655,316	4,897,826	4,752,823	5,535,095
Value of Sales	4,863,218	5,043,035	5,488,045	8,809,547	8,238,813	10,337,004
Averages						
Pots per license reporting	170.97	168.45	163.79	161.78	182.31	182.20
Pounds per license reporting	4,222.02	3,847.76	4,172.73	4,078.12	3,924.70	4,659.17
Sales per license reporting	5,206.87	5,717.72	6,264.89	7,335.17	6,803.31	8,701.18

Source: Massachusetts Division of Marine Fisheries

holders, amount of gear, and pounds of value of lobsters caught over the past few years, before and after the moratorium. The average pounds and value of lobsters caught per commercial lobsterman dropped slightly in 1976, but in 1977 average pounds and value both rose. Total catch averaged 3.66 million pounds for 1972-1974 (before the moratorium) and 5.06 million pounds for 1975-1977; total value rose even more, from \$5.13 million in 1972-1974 to \$9.13 million in 1975-1977. Although the total number of licenses issued and the number of actively reporting license holders have remained about the same since 1975, the number of pots fished rose by over 10 percent between 1975 and 1977 (50 percent between 1974 and 1977). The license holders who are inactive or who do not report catch are barred from renewal the following year. On the contrary, those who seek the limited number of replacement (new) licenses are actively interested in lobstering (19).

One measure of change in industry structure is the distribution of catch. Table 3 shows the percentage of total value of sales by the highest four, eight, twenty, and fifty license holders from 1974 to 1977. The concentration ratios have not demonstrated any significant change in industry structure over the period just before and just after the license moratorium. The coastal commercial lobster industry is competitive by any standards, and the slight shift in the twenty-firm concentration ratio (for dollar value of lobsters sold) from .14 in 1974 to .13 in 1975, .12 in 1976, and .13 in 1977 shows almost no alteration in the industry structure. In fact, the fifty-firm concentration ratio decreased slightly after 1974. Results were similar when pounds of lobsters were used as a production measure. The time series is too short to display trends, but it will be interesting to see what happens as the moratorium continues. The division is already considering some method of allocating new licenses other than the present first-come, first-served system.

Table 3: Concentration Ratios for Massachusetts  
Coastal Commercial Lobster Industry

No. firms in concentration ratio <sup>1</sup>	1974	1975	1976	1977
4-firm	.037	.040	.031	.035
8-firm	.066	.068	.056	.064
20-firm	.141	.131	.119	.126
50-firm	.293	.244	.236	.243

Source: Data from Massachusetts Division of Marine Fisheries

<sup>1</sup>A firm is taken to be a license holder. Each concentration ratio is calculated by dividing value of sales for the largest 4 (8, 20) or 50) firms by total sales of all license holders

## POSSIBILITIES OF LIMITED ENTRY IN NEW ENGLAND

Fishery managers in New England—council members and state officials—

have been introduced to several potential limited entry programs. One is a moratorium on entry, with some unspecified longer-run licensing system to control effort in the fishery. A second is a vessel allocation quota based on past catch. A third is a change in incentives to fish for various species by manipulating fish prices through a system of taxes and subsidies. There is a great deal of uncertainty on the part of many council members about precisely what a limited entry program would imply for fishermen who remain in the business, as well as for potential new entrants. They are particularly concerned about the limitation of freedom to switch among fisheries. They feel that anything short of "limited entry" (undefined) would be preferable. They fear that if entry is limited for the fishery in one species, it will soon be limited for other species. Where will they be then?

Introducing limited entry into a multispecies fishery is difficult for several reasons. If entry is limited for one fishery at a time, pressure on other fisheries may hasten their decline and make more stringent management necessary for the new fisheries as well. If entry is limited for commercial fishermen only, recreational pressure may still bring overfishing. If entry is limited for many species at once, multiple licenses will sometimes be necessary to allow the efficient use of boats and gear which may be used on a seasonal basis for different fisheries. At least 20 percent of fishing vessels in New England use more than one gear type now; virtually all vessels catch substantial amounts of several species groups.

One factor which may favor limited entry over the existing combination of quotas, mesh size, and other techniques is that of enforcement. Coast Guard officials have recently said that enforcement of the present complex system of trip quotas for groundfish in New England is virtually impossible (20). A license system would certainly make checking compliance easier; even if quotas were still necessary, presumably they would not have to be adjusted as frequently as now.

Fishermen feel a strong need to retain their independence and freedom to take advantage of opportunities as they may arise. Despite the likelihood of increased incomes for those remaining in the fishery under limited entry, many fishermen feel that the restriction of possibilities inherent in limiting entry might be more costly in the long run. In fact, they are already facing many restrictions—quotas, mesh size limitations, etc.—which limit their freedom. But these are usually accepted as equitable, although vessel size classes for bycatch invariably draw arguments of unfairness from one group or another. The recent end-of-quarter groundfish moratoriums have infuriated the fishermen.

Perhaps the most promising way to initiate a limited entry program is to begin with regulations that are both acceptable to fishermen and management councils and that might pave the way for future changes in the system. Thus, a temporary moratorium on entry into one fishery could be coupled with a licensing system for all fisheries. Under the licensing system, data could be collected to assess the effects of future effort limitation on different segments of the fleet. The moratorium should have an automatic ending date and must include some provision, even over a three-year period, for exit and replacement of vessels. In addition, improvements in efficiency should be considered explicitly. The advantage of limited entry embodied in improved efficiency and higher income levels

should not be undercut by forbidding changes in gear, etc., required of those who remain in the industry. Furthermore, a limited entry scheme in such a fishery *must* explicitly allow for part-time participation; otherwise, many full-time fishermen who adjust target species depending on availability, weather, and time of the year would be excluded unjustly.

To minimize the likelihood of increased concentration in ownership, licenses should be issued to fishermen (captains) rather than to vessels. Increases in effort should be avoided by stipulating that new boats replace old boats only on a ton-by-ton basis: if a captain wants a bigger boat, he must buy up additional licenses to permit him to do so.

These provisions could also apply to a vessel-allocation quota system. In this case, entry would be limited by allowing only an average amount of the restricted species to new entrants: to acquire rights to a higher level of catch, the new entrant would have to purchase quotas from other fishermen. The barrier here would be the increased cost of catching additional pounds of fish through the purchasing of additional quota allocations.

These plans contain a serious philosophical question: what degree of freedom and independence among fishermen is consistent with formal management of a common property resource? This paper has not addressed this question directly, but much of the discussion has considered specific problems to be addressed if any sort of limited entry program is to be introduced.

Limited entry programs may not be appropriate for some fisheries. However, when such programs would improve fisheries management, the range of possible schemes is wide. Limited entry can have a variety of economic effects on the industry and its structure, depending on how the program is designed. Either a licensing plan or a price/tax subsidy plan can be administered in such a way that flexibility, efficient response to market forces, and the independence of fishermen are encouraged. It is essential to obtain industry input and support so that the limited entry program is appropriate to conditions in the fishery and is enforceable. A moratorium or a freeze on the number of licenses may be most acceptable to some members of the fishing industry, but even these measures should be buttressed with provisions to consider replacement, exit, and other considerations.

## **Summary**

This paper discusses the economic effects of limited entry programs on industry structure, describes applications of limited entry in several fisheries (Atlantic Canada, South Africa, Maine, and Massachusetts), and examines some practical problems of applying limited entry to the fisheries of New England.

Limited entry directly restricts participation in the fishery and has some predictable effects on the structure of the fishing industry. Barriers to entry are created by licensing restrictions or by differential taxes/subsidies to discourage/encourage catch of various species of fish. Average income levels for fishermen remaining in the industry would be expected to rise, as would investment in boats and gear. If no provision for buying back licenses or for allowing fishermen to transfer licenses were made, the fisherman's freedom to leave the industry would also be abridged. This might prevent full recovery of investment in boats and gear and would certainly reduce flexibility in operating the fishery.

Limited entry would affect not only the distribution and level of income among fishermen but also the relationships between fishermen and processors. If a limited entry program is designed in such a way that processor ownership of fishing boats becomes more common, ownership of the fleet is likely to become concentrated in fewer hands. If, however, a limited entry program actively encourages individual ownership of boats, the smaller number of independent fishermen (compared to the free entry situation) must gain some degree of market power vis-a-vis buyers in various ports.

Limited entry programs in the eastern provinces of Canada cover fisheries for scallops (Bay of Fundy and offshore), Atlantic groundfish (trawls and other gear), lobster (coastal maritime provinces and outside fifty miles), herring, snowcrab, and tuna (angling). Most of these programs were begun in 1973 and their economic effects are not yet obvious. All of these programs share economic goals and general policies designed to control interpersonal transfer of licenses. The programs encourage individual ownership of fishing boats, promote efficiency of vessel operations, intend to improve fishermen's incomes and bargaining power, and are designed to better match overall catching and processing capacity. Subsidy programs also affect capitalization and the administration of the limited entry programs.

In contrast to the stated aims of the Atlantic Canada entry restriction program, the South African limited entry program has institutionalized the relationship between fisherman and processor. The number of boats has decreased, the size of individual boats and processing plants has increased, and ownership of fishing boats has shifted away from individuals to factories.

Maine and Massachusetts have attempted to limit entry into their inshore lobster fisheries. In both states, initial proposals for license moratoriums were strongly supported by the local lobstermen. The Maine program, introduced with great publicity in 1975, has never become a permanent law. The political problems of passing such a complex and increasingly controversial law aimed at reducing the number of commercial lobster fishermen were simply too great to overcome. The Massachusetts program was set up in 1975 by legislation declaring a moratorium on new lobster licenses. There has been no significant reduction in the number of actively-reporting commercial lobster fishermen, but the number of traps fished has risen dramatically since the year before the moratorium was established. Average income levels and total catch rose in 1977, but no change in industry structure has yet become apparent.

Fishery managers in New England have been introduced to several potential applications of limited entry programs: a moratorium on entry, a vessel allocation quota based on past catch, and manipulation of fish prices through a system of taxes and subsidies. Application of any of these three types of limited entry in New England must be planned carefully to allow some form of exit and new entry (transferability of licenses). Recognition should also be given to traditional part-time participation in any single fishery by fishermen who in fact fish full time but adjust target species based on availability, relative prices, weather, and time of year. Limited entry programs are not appropriate for all fisheries. Where they are, industry input and support are essential to develop an enforceable program.



**Notes and References**

**Additional  
Suggested Reading**

**List of Participants**



# NOTES AND REFERENCES

## LIMITED ENTRY AS A CONSERVATION MEASURE

J. L. McHugh

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## **AN EVALUATION OF LIMITED ENTRY AND ALTERNATIVE FISHERY MANAGEMENT SCHEMES**

Kenneth E. McConnell and Virgil J. Norton

## NOTES

1. The large and continually increasing amount spent for fisheries research, administration, and enforcement by all levels of government indicates that this is an important and too often neglected aspect of fisheries management.
2. Such waste is a loss to society for several reasons. Costs are incurred in harvesting the fish. Mortality of discarded fish is high, causing inaccurate biological inferences from catch per unit effort data. Downward pressures on consumer prices are lost because the fish are not marketed. Perhaps the highest cost incurred by society is the illwill among fishermen who are required by law to throw back profitable items.
3. In calculating the returns to fishing, our viewpoint is regrettably nationalistic in that we count as valuable only those returns which accrue to people in the U.S.
4. Although we are dealing with a static objective function, we realize the importance of dynamics and the influence of time, particularly in year to year management decisions. Some of the most important and most difficult management decisions now deal with dynamic issues in the time frame of one to three years. Nonetheless, for simplicity of presentation here, we suppress the dynamic framework.
5. It is of some value to express equations (1) and (2) mathematically to gain some insight into the interactions of different sectors. Notation:

$x$  = harvest per vessel

$V$  = number of vessels

$R$  = recreational catch

$F$  = foreign catch

$a$  = proportion to foreign fish caught in domestic waters and imported to U.S.

$Vx + aF$  = domestic consumption

$S$  = index of abundance

$CS(Vx + aF)$  = consumers' surplus from domestic consumption

$PS(V, x, S)$  = producers' surplus from domestic landings

$RB(R, S)$  = benefits from recreational catch

$FT(F)$  = tax receipts from foreign harvest in U.S. economic zone

$I$  = information costs

$A$  = administration costs

$E$  = enforcement costs

$S = f(S)$  = biological growth function

Then equation (1) in the text is

$$(1) NB = CS(Vx + aF) + PS(V, x, S) - RB(R, S) + FT(F) - I - A - E.$$

Equilibrium of the biomass requires

$$(2) f(S) = Vx + R + F$$

The optimal policy would maximize the present discounted value of (1) subject to (2).

6. Because gear restrictions are often proposed as alternatives to limited entry, it is interesting to note that some types of gear restriction result in fewer vessels. To show this result, suppose that we have a fishery with constant market price  $p$ ,  $C(x, S, \alpha)$  = individual vessel cost function, where  $x$  = harvest,  $S$  = stock abundance,  $\alpha$  = mesh size,  $\frac{\partial C}{\partial \alpha} > 0$ ;  $f(S, \alpha)$  = biological growth,  $\frac{\partial f}{\partial \alpha} > 0$ ;  $V$  = number of vessels. For an industry regulated by mesh size, long-run equilibrium conditions are: total revenue equals total cost ( $px = C(x, S, \alpha)$ ), price equals marginal costs ( $p = \partial C / \partial x$ ), and commercial harvest equals biomass growth ( $Vx = f(S, \alpha)$ ). Suppose that mesh size is increased and the fishery returns to long-run equilibrium. By differentiating the first order conditions, it can be shown that stock size increases unambiguously. However, the signs of  $\partial x / \partial \alpha$ ,  $\partial V / \partial \alpha$  and  $\partial xV / \partial \alpha$  are all ambiguous. Hence, under certain conditions, we might expect that increasing mesh size would reduce harvest and the number of vessels, suggesting again direct limitation of vessels, and therefore, effort in the fishery.
7. Quotas by vessel class, as now exist in the New England groundfish fishery, tend to promote socially unproductive scale changes. The vessel classes are 0-60 gross registered tons (GRT), 61-120 GRT, and 121 or more GRT. Since these quotas are oper-

ated by closure, they will reward larger, faster vessels. Hence, we would expect to see new vessels in the 0-60 class very close to 60 GRT and the same for 61-120 GRT class. Socially productive scale changes will not be pursued.

8. Tax adjustment systems like the ones we propose have been suggested in many different forms by economists. For example, see Olson.

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## THE COSTS OF UNCONTROLLED ACCESS IN FISHERIES

Francis T. Christy, Jr.

### NOTES AND REFERENCES

1. Control over access is any system that directly limits the quantity of vessels, fishermen, or gear in a fishery or that deters entry by extracting revenues from fishermen through taxes, user fees, or other means. There are four different kinds of systems: (a) "license limit"—a limit on the number of vessels, fishermen, or gear; (b) "fisherman quota"—a limit on the total catch divided into shares (expressed as pounds or percents of allowable catch) for individual fishermen or their vessels; (c) "franchise"—an exclusive right to use a stock(s) or an area granted to a group of fishermen; and (d) "tax or fee"—a license fee or a tax on catch that deters some fishermen from entering the fishery.
2. Overcapitalization results from too many fishermen pursuing a limited number of fish. It occurs when the costs that are added by a new fisherman entering a fishery are greater than the revenues that are added to the total by his efforts. Overcapacity occurs when the new fisherman entering a fishery adds nothing to the total catch.
3. Depletion occurs when a stock is fished beyond the point of its maximum sustainable yield. In a very few cases, where harvesting takes place on a single year class after reproduction has occurred, depletion may not occur.
4. Gordon, H. Scott. 1954. The economic theory of common-property resource: The fishery. *The Journal of Political Economy*. 62(2): 124-142.
5. See, for example, Clark, Colin W. 1977. Control theory in fisheries economics: Frill or fundamental? In *Economic Impacts of Extended Fisheries Jurisdiction*, Lee G. Anderson, Ed. (Ann Arbor Science Publishers, Inc., Ann Arbor), pp. 317-330.
6. See, for example, Bromley, Daniel W. and Richard C. Bishop. 1977. From economic theory to fisheries policy: Conceptual problems and management prescriptions. *op. cit.* *Economic Impact* (note 5), pp. 281-302.
7. Jacob J. Dykstra quoted by Ryan, Bill. 1978. U.S. fishermen: Red tape is our real enemy. *Parade*. (in *The Washington Post* Sunday edition) July 9, p. 7.
8. Taylor, Harden F. 1951. *Survey of Marine Fisheries of North Carolina* (University of North Carolina Press, Chapel Hill), p. 290.
9. Crutchfield, James A. and Arnold Zellner. 1962. Economic aspects of the Pacific halibut fishery. *Fishery Industrial Research* 1(1): 1-173.
10. This approach was suggested by Harden Taylor (*op. cit.* note 8). Taylor, however, said that "it appears to be impossible to exterminate a species or a fishery for profit.

since the profit disappears before the fish is exterminated." He assumed, therefore, that almost no controls would be necessary. But "the truism that a stock can never be extinguished because it costs too much to catch the remaining individuals, is of doubtful validity" (Christy, Francis T., Jr. and Anthony Scott. 1965. *The Common Wealth in Ocean Fisheries*, Johns Hopkins Press for Resources for the Future, Baltimore, p. 84). It is safe to assume that society will be willing to bear fairly high costs to prevent the extinction of fish with commercial or recreational value.

11. Talhelm, Daniel R. 1978. Limited entry in Michigan fisheries. In this volume pp. 300-316.
12. This approach is discussed in greater detail by J. L. McHugh, who describes it as the laissez-faire approach. (Cf. McHugh, J. L. 1978. Limited entry as a conservation measure, in this volume pp. 175-187.) McHugh feels that the adoption of this approach is unlikely: "Fishery research and management problems of the fisheries are hot public issues which receive generous legislative attention. Neither the constituency nor its elected representatives are likely to remain silent or refrain from tinkering" (p. 184). This is not unlike the comment by Harden Taylor in 1951 (op. cit. note 8, p. 306) that "The fisheries, however, being public, are . . . the subject of rivalries, fears and jealousies which give rise to the belief, deeply and historically implanted in the public mind and not minimized by political interest and the demands of sportsmen, that the fisheries are to be regarded less as a source of wealth to be promoted than a limited natural resource in danger of being exhausted or 'depleted'."
13. For a discussion of three of the different forms of access controls and their relationship to various objectives, see Christy, Francis T., Jr. 1975. Alternative entry controls for fisheries. In *Limited Entry into the Commercial Fisheries*, J. Carl Mundt, Ed. (Institute for Marine Studies, University of Washington, Seattle, pp. 85-100). For a detailed analysis of the alternatives applied to a specific fishery, see Collinworth, Don W., G. Wesley Silverthorne, and Nelson E. Stewart. 1976. Effort management in the Dungeness crab fishery. *Phase II Completion Report: Proposal for Development of a State/Federal Fisheries Management Plan for the the California, Oregon and Washington Dungeness Crab Fishery*, (State/Federal Dungeness Crab Management Program, Sacramento). See also Christy, Francis T., Jr., 1973. *Fishermen Quotas: A Tentative Suggestion for Domestic Management*, Occasional Paper No. 19, The Law of the Sea Institute, University of Rhode Island, Kingston.
14. It is assumed here that access rights will be transferable.
15. National Marine Fisheries Service. 1978. Emergency amendments to groundfish regulations, Press Release dated July 19.
16. See Newton, C.H.B. 1978. Experience with limited entry in British Columbia fisheries in this volume pp. 382-390.
17. *Ibid.*, p. 387.
18. *Ibid.*

## **SOCIAL AND CULTURAL ASPECTS OF LIMITED ENTRY**

Michael K. Orbach

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## **EVALUATION CRITERIA FOR MAKING LIMITED ENTRY DECISIONS: AN OVERVIEW**

Biliana Cicin-Sain

### **NOTES AND REFERENCES**

1. See Christy, Francis T., Jr. 1972. Fisheries: Common property, open access, and the

- common heritage. In *Pacem in Maribus*, E. Mann Borgese, Ed. (Dodd, Mead and Co., New York) pp. 183-206; Christy, Francis T., Jr. 1973. *Alternative Arrangements for Marine Fisheries: An Overview*. Program of International Studies of Fishery Arrangements. Paper No. 1. Resources for the Future, Inc., Washington; Christy, Francis T., Jr. and Anthony Scott. 1965. *The Common Wealth in Ocean Fisheries: Some Problems of Growth and Economic Allocation* (The Johns Hopkins Press, Baltimore); Crutchfield, James A. 1961. An economic evaluation of alternative methods of fishery regulation. *J. Law and Economics* 4(3): 131-143; Crutchfield, James A. 1972. Economic and political objectives in fishery management. In *World Fisheries Policy. Multidisciplinary Views*. Brian J. Rothschild, Ed. (University of Washington Press, Seattle), pp. 74-89; Crutchfield, James A. and Giulio Pontecorvo. 1969. *The Pacific Salmon Fisheries: A Study of Irrational Conservation* (The Johns Hopkins Press, Baltimore).
2. Cicin-Sain, B., Moore, J. and Wyner, A. 1978. Limiting entry to commercial fisheries: Some worldwide comparisons. *Ocean Management* 4:21-49.
  3. This includes a future time perspective, i.e., conservation and management "... are designed to assure that ... irreversible or long-term adverse effects on fishery resources and the marine environment are avoided. ..." (FCMA, Sec. 3 (2) (B) (ii)).
  4. Another major reason for passage of the FCMA was the desire to protect American fishermen from foreign fishing competition.
  5. For example, in the California abalone fishery, a continuing source of controversy between the abalone divers and the state Department of Fish and Game (DFG) concerns the ecological relationship between sea otters and abalones. The conflict revolves around the question of whether the sea otter consumes the abalone resource in large numbers (as the divers maintain), or whether the otter indirectly enhances the abalone resource by eating its competitors (sea urchins) and improving the quality of its food (kelp beds). In a related controversy, divers contend that the DFG has been reluctant to study the biological implications of reopening the North Coast (which has been closed to commercial diving since 1945) because of political pressure from sports divers and environmental groups (Cicin-Sain, B., Moore, J. and Wyner, A. 1977. *Management Approaches for Marine Fisheries: The Case of California Abalone*. Sea Grant Publication 54 (Institute of Marine Resources, University of California, LaJolla), chapter 4.
  6. The social equity criterion can also be interpreted as including a future time dimension, i.e., conservation and management measures "... are designed to assure that ... there will be a multiplicity of options available with respect to future uses of these (fishery) resources ..." (FCMA, Sec. 3 (2) (B) (iii)).
  7. I am indebted to Suzanne Holt, University of California, Santa Cruz, for making this point.
  8. Orbach, Michael K. 1978. Social and cultural aspects of limited entry. In this volume, pp.211-229.
  9. Rivlin, A. M. 1971. *Systematic Thinking for Social Action* (Brookings Institution, Washington).
  10. I am indebted to our research fellow, Peter Lufkin, for making this point. Christy makes a related point when he states that hearings are only mandatory at the regional level, thus limiting the expression of overall national interests (Christy, F. T., Jr. 1977. *The Fishery Conservation and Management Act of 1976: Management objectives and the distribution of benefits and costs*. *Washington Law Review* 52 (3): 657-680).
  11. Cicin-Sain, B., Moore, J. and Wyner, A. (in preparation). *Policy Implementation in a Federal System: Establishing a Regional Framework for Fisheries Management*.
  12. On problems associated with representation on the councils, some preliminary data are presented by Pontecorvo, G. 1977. Fishery management and the general welfare: Implications of the new structure. *Washington Law Review* 52 (3): 641-656. On problems of representation on advisory panels, see Kelly, J. E. 1978. The Fishery Conservation and Management Act of 1976: Organizational structure and conceptual framework, *Marine Policy* 2 (1): 30-36.

I discuss problems associated with participation in public hearings in "The federal role in fostering citizen participation: From the great society to the new federalism and beyond" (paper presented at the annual meeting of the Western Political Association, Phoenix, Arizona, March 1977).

The need to include more consumer representation in the fishery management decision-making process is discussed extensively in Jurgensen, K. M. and A. P. Covington, Eds. 1978. *Extended Fishery Jurisdiction: Problems and Progress, 1977 Proceedings of the North Carolina Governor's Conference on Fishery Management Under Extended Jurisdiction* (North Carolina Office of Marine Affairs, Raleigh).

13. A further complication in the fishery management decision-making system concerns international inputs (Table I). Treatment of these issues, however, falls outside the scope of this paper.
  14. Pontecorvo, op. cit., note 12, p. 645
  15. Ibid., p. 641.
  16. Orbach, op. cit., note 8.
  17. Surveys of occupational satisfaction have consistently shown that university teaching ranks highest in scales of work satisfaction (this is an enterprise noted more for its attributes of independence than for its financial rewards). To my knowledge, no systematic opinion surveys of work satisfaction among fishermen are currently available; nevertheless, impressionistic assessments generally tend to indicate that the independence and risk characteristics of fishing are among the most important reasons for occupational recruitment and satisfaction. Our survey of California abalone divers supports this popular notion. When asked why they became abalone divers, most gave answers that combined aspects of potential benefits, enjoyment of the environmental aspects of the job, freedom and independence (see Cicin-Sain, et al., op. cit., note 5, p. 50)
- For some current efforts to operationalize this variable see Holt, S. (in preparation). An economic study of the U.S. albacore jig boat fishery. Department of Economics, University of California, Santa Cruz; Smith, Leah J. 1978. Case studies on economic effects of limiting entry to the fisheries. In this volume pp. 416-428.
18. One need only to see the quagmire created by the Boldt decision to underscore this point.
  19. In addition to these pragmatic reasons, certain requirements of the FCMA bear directly on the political feasibility criterion, i.e. provisions calling for responsiveness "... to the needs of interested and affected states and citizens ..." (sec. 2 (c) (3)), and provisions calling for public hearings and the formation of advisory panels (sec. 302 (g) (2); 302 (h) (3)).
  20. As one example, Secretarial reversal of New England council decisions regarding the groundfish fishery has created a great deal of turmoil in that region and significantly undermined fishermen's confidence in the novel processes established by the FCMA.
  21. Cicin-Sain et al., op. cit., note 11.
  22. Cicin-Sain, op. cit., note 12.
  23. Grader testimony before U.S. Congress, Senate Committee on Commerce, Science and Transportation, *Oversight of the Fishery Conservation and Management Act and S. 3050*, 95th Cong. 2d sess., 26 and 27 April 1978, p. 2.
  24. The FCMA explicitly calls for the consideration of administrative factors, e.g., "Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication" (sec. 301 (a) (7)). "... be based upon the best scientific information available" (sec. 301 (a) (2)).
  25. Peters, R. A. 1978. Low groundfish quotas start talk of limited entry: A beginning discussion of the pros and cons. *Marine Commercial Fisheries*, February 5 (7): 17.
  26. Ibid.
  27. McHugh, J. L. 1978. Limited entry as a conservation measure. In this volume pp. 175-187.
  28. Orbach, op. cit., note 8.
  29. Fraser, G. Alex, 1978. License limitation in the British Columbia salmon fishery. In this volume, pp. 358-381; Cicin-Sain et al., op. cit., note 2, p. 10.
  30. Cicin-Sain et al., op. cit., note 5, chapter 3.

31. Szabo, P. 1976. Alaska's limited entry regulations continue to generate sharp division among fishermen. *National Fisherman*, December p. 27A; Van Hying, J. M. 1976. Salmon hatcheries: Panacea or panic? *Alaska Conservation Review* 17: 10-12.
32. Van Hying, J. M. 1976. Limited entry. *Alaska Conservation Review* 17: 8-9
33. Orbach, op. cit., note 8.
34. Ibid.
35. Personal communication with Tim Sullivan, Atlantic Coast editor, *National Fisherman*.
36. Personal communication with W. F. "Zeke" Grader, General Manager, Pacific Coast Federation of Fishermen's Associations.
37. Cicin-Sain et al., op. cit., note 2.
38. Setting a minimum number of landings as a qualification for continued participation in the fishery can prove problematic. In the case of the California abalone fishery, for example, permit holders were required to land at least ten thousand pounds of abalone or make twenty landings in order to be eligible for a permit in succeeding years. It is reported that many divers are qualifying by making twenty landings of only one abalone per landing, thus creating a "bookkeeper's nightmare" (telephone communication, Mike Wagner, abalone processor, Santa Barbara, California, May, 1978).
39. Cicin-Sain et al. op. cit., note 2.
40. Ibid. p. 27.
41. Ibid.
42. This appears to have been the case in Alaska prior to the establishment of limited entry in 1973. A study of fishermen's incomes showed that the income of the average operator in fifteen out of eighteen salmon fisheries sampled fell below the federally defined poverty level (Owers, J. E. 1975. An empirical study of limited entry in Alaska's salmon fisheries. *Marine Fisheries Review* 37: 22-25.)
43. Intervention would be justified here in terms of government responsiveness to constituent preferences (which may be problematic)
44. *National Fisherman*, June 1976, p. 6.
45. Christy, op. cit., note 10.
46. To date, very few empirical data have been gathered on limited entry experiences. The available literature consists mostly of descriptive accounts of the programs established and summaries of relevant legislation. The few evaluations of limited entry that have been performed rely for the most part upon impressions of administrators and key industry spokesmen. Very little in the way of careful systematic data collection has occurred. The lack of evaluative empirical studies is due, in part, to the recent enactment of most existing limited entry programs. Yet, it is also my impression that no systematic evaluative component has been built into most of these programs and that very limited baseline data—on the basis of which future changes may be judged—have been established.
47. Many would argue, though, that price fluctuations are related to market considerations, and not to limited entry.
48. Cicin-Sain et al., op. cit. note 2.
49. Ibid.
50. Koch, Christopher L. 1978. A constitutional analysis of limited entry. In this volume, pp. 251-268.
51. Mundt, J. C. Unpublished manuscript on legal aspects of limited entry, College of Fisheries, University of Washington.
52. Dykstra testimony, op. cit., note 23, p. 110.
53. For example, current estimates of the costs of administering the Alaskan limited entry system (through the Alaska Commercial Fisheries Entry Commission) is 1.2 million dollars per year.
54. A great deal of waste may be involved in existing buyback programs in the Pacific Northwest. It is reported that a substantial number of vessels involved in the British Columbia BuyBack and in the Washington State Gear Reduction Program are merely moving into the salmon fisheries of adjacent political entities. A number of

vessels, in fact, have been bought and sold by the government several times (see Bell, D. M. 1978. Gear Reduction/BuyBack Programs in British Columbia and Washington State, in this volume, pp. 353-357.

55. Cicin-Saint et al., op. cit., note 2.

## A CONSTITUTIONAL ANALYSIS OF LIMITED ENTRY

Christopher L. Koch

### NOTES AND REFERENCES

1. For a legal analysis of whether the Fishery Conservation and Management Act permits the recapture of economic rent under a limited entry system, see Burke, *Recapture of Economic Rent Under the FCMA: Sections 303-304 on Permits and Fees*, 52 Wash. Law Rev. 681 (1977).
2. *United States v. Chicago, Milwaukee, St. Paul & Pacific R. R. Co.*, 282 U.S. 311, 324 (1931).
3. *Schechter Poultry Corp. v. United States*, 295 U.S. 495 (1935); *Panama Refining Co. v. Ryan*, 293 U.S. 388 (1935).
4. The Supreme Court has at times placed emphasis on this criminal-civil penalty distinction. In *Fahey v. Mallonee* 332 U.S. 245 (1947), the Court sustained a broad delegation of authority to the Federal Home Loan Bank and Board and stated: "(The *Schechter* and *Panama Refining* cases) dealt with delegation of a power to make federal crimes of acts that never had been such before . . . the provisions of the statute under attack are not penal provisions . . . (they) are regulatory . . . A discretion to make regulations . . . may be constitutionally permissible while it might not be allowable to authorize creation of new crimes in uncharted fields." *Id.* at 249-50. Over time, however, the Court's attitude on delegations has become more permissive, and at least in *United States v. Sharpnack*, 355 U.S. 286 (1958), this distinction was not determinative.
5. See, e.g., *American Trucking Assn. v. United States*, 344 U.S. 298 (1953); *FCC v. RCA Communications*, 346 U.S. 86 (1953); *Lichter v. United States*, 344 U.S. 742 (1948); *Yakus v. United States*, 321 U.S. 414 (1944); *Bowles v. Willingham*, 321 U.S. 503 (1944); *United States v. Rock Royal Co-operative, Inc.*, 307 U.S. 533 (1939); *Currin v. Wallace*, 306 U.S. 1 (1939).
6. *J. W. Hampton, Jr. & Co. v. United States*, 276 U.S. 394, 409 (1928).
7. *Tagg Bros. & Moorhead v. United States*, 280 U.S. 420 (1930).
8. *New York Central Securities Corp. v. United States*, 287 U.S. 12 (1932).
9. *Federal Radio Comm. v. Nelson Bros. Bond & Mortgage Co.*, 289 U.S. 266 (1933). A case which illustrates how the delegation doctrine is used by the Court is *National Broadcasting Co. v. United States*, 319 U.S. 190 (1943). There the Court found that the discretion conferred on the FCC to license broadcasting stations to promote the "public interest, convenience, or necessity" conveyed a standard "as complete as the complicated factors for judgment in such a field of delegated authority permit." *Id.* at 216. The Court then upheld regulations affecting the contractual relations between networks and stations that were designed to reduce the effect of monopoly in the industry—a policy on which the statute was silent. (See also *Red Lion Broadcasting Co. v. FCC*, 295 U.S. 367 (1967) (Court sustained FCC rules creating a "fairness doctrine: and a "right to reply."), and *Banzhaf v. FCC*, 405 Fed. 1082 (D.C. Cir. 1968) cert. denied sub nom., *Tobacco Institute v. FCC*, 396 U.S. 842 (1969) (sustained FCC rule requiring the carrying of antismoking advertisements).
10. *FTC v. Gratz*, 253 U.S. 421 (1920).
11. *Opp Cotton Mills v. Administrator of Wage and Hour Division*, 312 U.S. 126 (1941).
12. 373 U.S. 546 (1963).
13. *Id.* at 594.
14. *Id.* at 625.
15. The Supreme Court has upheld regulations when the agency concerned initially denied it had the authority, sought unsuccessfully to acquire such authority from Con-



gress, and then finally acted without congressional guidance. See *Permian Basic Area Rate Cases*, 390 U.S. 747 (1968) (Federal Power Commission developed a system of area price fixing for natural gas), and *American Trucking Associations v. Atchison, Topeka & Santa Fe Ry.*, 387 U.S. 397 (1967) (Interstate Commerce Commission formulated "piggyback" rules requiring railroads to carry trailers or containers of motor carriers.)

16. *Yakus v. United States*, 321 U.S. 414, 425 (1944).
17. S. Rep. No. 94-416, 94th Cong., 1st Sess. 35-36 (1975).
18. *National Broadcasting Co. v. United States*, 319 U.S. 190, 216 (1943).
19. The due process clause of the Fourteenth Amendment, applicable to the states, is worded identically to that of the Fifth Amendment, and analysis of governmental actions proceeds similarly under each.
20. *Allgeyer v. Louisiana*, 165 U.S. 578, 589 (1897). The era of using substantive due process to strike down economic regulations is perhaps most commonly associated with *Lochner v. New York*, 198 U.S. 45 (1905) (5-4 decision), where the Supreme Court invalidated a state law which prohibited employees from working more than ten hours a day or sixty hours a week. The majority stated that such statutes "are mere meddlesome interferences with the rights of the individual."
21. Several commentators have pointed out that the modern view of the Court on substantive due process is probably not as demanding as the "rationally related" test would lead one to believe. "Although retaining the rhetoric of the rational basis standard, the Court has applied it so tolerantly in the area of economic regulation that no law is likely to violate it." Note, *Due Process Limitations on Occupational Licensing*, 59 Va. L. Rev. 1113 (1973). See also C. Pritchett, *The American Constitution* 680 (2d ed. 1968).
22. 341 U.S. 622, 632-33 (1951) (a person convicted of violating a municipal ordinance prohibiting door-to-door solicitation without invitation brought a due process challenge to the ordinance on the grounds that it imposed an unreasonable restraint on "the right to engage in one of the common occupations of life.").
23. 348 U.S. 483, 487-88 (1955). This case involved a state law which had the effect of prohibiting opticians from fitting old lenses into new frames without a prescription. The lower court had struck down the law as "neither reasonably necessary nor reasonably related to the end sought to be achieved," thereby violating the due process clause by arbitrarily interfering with the optician's right to do business.
24. 372 U.S. 726, 729-30 (1963).
25. 426 U.S. 88 (1976).
26. *Id.* at 102. Interestingly, the Court at this point cited a pre-"modern era" decision, *Truax v. Raich*, 239 U.S. 33 (1915).
27. Tribe, *American Constitutional Law* 952 (1978).
28. 149 F. Supp. 771 (D. Md.), *aff'd*, 355 U.S. 34 (1957).
29. See page 7 *supra*.
30. *Id.*
31. See, e.g., *Mullane v. Central Hanover Bank & Trust Co.*, 339 U.S. 306, 313 (1950). The interest at stake in the implementation of a limited access system is likely to be the "liberty" interest protected by the due process clause. "Although the Court has not assumed to define 'liberty' with any great precision, that term is not confined to mere freedom from bodily restraint." *Bolling v. Sharpe*, 347 U.S. 497, 499 (1954). Because the Court has found that "liberty" encompasses one's justifiable expectation of continued entitlement of employment, *Schwartz v. Board of Bar Examiners*, 353 U.S. 232, 238 (1957); *Stochower v. Board of Education*, 350 U.S. 551 (1956), it is likely that fishermen, facing exclusion from participating in a particular fishery, would be deemed to have an affected liberty interest. Also compare *Perry v. Sindermann*, 408 U.S. 593 (1972), with *Board of Regents v. Roth*, 408 U.S. 564 (1972).
32. Tribe, *American Constitutional Law* 511 (1978).
33. For an examination of this issue, see Comment, *Judicial Review of Fishery Management Regulations Under the Fishery Conservation and Management Act of 1976*, 52 Wash. L. Rev. 599 (1977).

34. *Goldberg v. Kelly*, 397 U.S. 254, 262-63 (1970).
35. *Id.* See also *Dixon v. Love*, 97 S. Ct. 1723 (1977); *Mathews v. Eldridge*, 424 U.S. 319, 343 (1976).
36. *Goldberg v. Kelly*, 397 U.S. at 269.
37. *Fuentes v. Shevin*, 407 U.S. 67, 81-82 (1972).
38. *Boddie v. Connecticut*, 401 U.S. 371, 379 (1971).
39. *Id.* at 377.
40. See *North American Cold Storage Co. v. Chicago*, 211 U.S. 306 (1908); *Central Union Trust Co. v. Garvan*, 254 U.S. 554, 556 (1921); *Phillips v. Commissioner*, 283 U.S. 389, 497 (1931); *Ewing v. Mytinger & Casselberry*, 339 U.S. 594 (1950).
41. Elsewhere in the FCMA, Congress adopted a policy that strongly favored expeditious implementation of fishery management measures over potential judicial delays. 16 U.S.C. 305(d). See Comment, *Judicial Review of Fishery Management Regulations Under the Fishery Conservation and Management Act*, 52 Wash. L. Rev. 599 (1977).
42. See, e.g., *Perry v. Sindermann*, 408 U.S. 593 (1972) (firing from employment at state university); *Morrissey v. Brewer*, 408 U.S. 471, 475-76 (1972) (termination of parole); *Fuentes v. Shevin*, 407 U.S. 67, 75-77 (1972) (replevin of consumer goods held under conditional sales contract); *Stanley v. Illinois*, 405 U.S. 645, 647-49 (1972) (removing unwed father's custody over his children); *Goldberg v. Kelly*, 397 U.S. 254 (1970) (withholding welfare benefits); *Snidach v. Family Finance Corp.*, 395 U.S. 337, 335 (1969) (prejudgment wage garnishment).
43. 402 U.S. 535 (1971).
44. *Id.* at 542. Recently, in *Dixon v. Love*, 97 S. Ct. 1723 (1977), the Supreme Court held that a hearing was not required prior to revoking a driver's license, but this case involved an instance where revocation was statutorily mandatory—there was no finding of fact in dispute or at issue.
45. Some commentators have noted "a reduced concern about the intrinsic and instrumental benefits of a prior, as opposed to subsequent, hearing. In upholding governmental procedures denying hearings prior to important deprivations, the Court has given less weight than in the past to the possibility that personal interest cannot be adequately indicated after deprivation, and has demanded less urgency of the governmental interest involved, so long as the alternative procedures offered by the government are shown to produce substantially accurate results." Tribe, *American Constitutional Law* 543-49 (1978). While such a trend may be developing in some cases, (i.e., school spanking cases) it would seem sufficiently removed from the present analysis that it should not significantly affect the due process rights of fishermen excluded from a fishery in which they have participated previously.
46. See *Buckley v. Va. ex. rel. C. A. Murray*, 424 U.S. 1, 93 (1976).
47. Note, *Legal Dimensions of Entry Fishery Management*, 17 Wm. & Mary L. Rev. 757, 763 (1976).
48. Suspect classifications include: alienage (*Graham v. Richardson*, 403 U.S. 365 (1971)) race (*Loving v. Virginia*, 388 U.S. 1 (1967)); and national origin (*Oyama v. California*, 332 U.S. 633 (1948)).
49. Language in some decisions affirmatively suggests that occupational choice is not a fundamental right. See, e.g., *Schwartz v. Board of Bar Examiners*, 353 U.S. 232, 239 (1957), where the Court stated that qualifications for admittance to the practice of law need have only a "rational connection" with the applicant's fitness to practice.
50. *Lindsley v. Natural Carbonic Gas Co.*, 220 U.S. 61 (1911). See also *Dandridge v. Williams*, 397 U.S. 471 (1970).
51. See, e.g., *Lindsley v. Natural Carbonic Gas Co.*, 220 U.S. 61 (1911); *Metropolitan Casualty Insurance Co. v. Brownell*, 294 U.S. 580 (1935); *McGowan v. Maryland*, 366 U.S. 420, 425 (1961).
52. 397 U.S. 471, 484-85 (1970).
53. 427 U.S. 297 (1976).
54. In the *City of New Orleans* case, 427 U.S. at 303-04, the Court stated: "... the judiciary may not sit as a superlegislature to judge the wisdom or desirability of legislative policy determinations made in areas that neither affect fundamental rights nor

- proceed along suspect lines; in the local economic sphere, it is only the invidious discrimination, the wholly arbitrary act, which cannot stand consistently with the Fourteenth Amendment."
55. See Gunther, "Foreward: In Search of Evolving Doctrine on a Changing Court: A Model for a Newer Equal Protection," 86 *Harvard Law Review* 1 (1972). See also pages 14-15 *supra* for a discussion of permissible governmental objectives.
  56. Congressional Research Service, *Constitution of the United States of America: Analysis and Interpretation*, Sections 156-57 (1976 Supp.)
  57. *Eisenstadt v. Baird*, 405 U. S. 438 (1972).
  58. *Trimble v. Gordon*, 430 U. S. 762 (1977).
  59. *Craig v. Boren*, 429 U.S. 190 (1976).
  60. *Department of Agriculture v. Moreno*, 413 U.S. 528 (1973).
  61. 187 Wash. 75 (1936).
  62. *Id.* at 84.
  63. 387 F. Supp. 373 (D. Me. 1974).
  64. 297 F. Supp. 300 (D. Alas. 1969), *reversed* on abstention grounds, 397 U.S. 82 (1970).
  65. It should be noted that the Supreme Court has on several occasions upheld local licensing schemes that involved control of occupational access by practitioners of that occupation. See *Williamson v. Lee Optical Co.*, 348 U.S. 483 (1955), and *Kotch v. Board of River Port Pilot Commissioners*, 330 U. S. 552 (1947).
  66. 550 P.2d 359 (Alas. 1976).
  67. Docket No. 77-5710 (decided Dec. 4, 1978)(Sup. Ct. Alaska).
  68. The Alaskan Supreme Court's justification for the stricter scrutiny in *Isakson* was founded upon what it perceived to be the willingness of the U.S. Supreme Court to use the equal protection clause "more rigorously to invalidate legislation." 550 P.2d at 362. However, the state court's perception was erroneous as the *City of New Orleans* illustrates, and it failed to recognize that the Supreme Court had used an "intermediate" standard only in protecting certain interests, see page 22 *supra*, and never in challenges to economic legislation. The Alaskan Court soon after *Isakson* acknowledged this and that its equal protection test differed substantially from the test set forth by the U.S. Supreme Court: "Under the Federal Constitution, the test is much more deferential: The law is to be upheld if the legislature could have had any conceivable basis to believe that it furthered a permissible state interest. E.g., *City of New Orleans v. Dukes*, 427 U.S. 297 (1976)." *Hicklin v. Orbeck*, 565 P. 2d 159, 167 (Alas. 1977). The Alaska Court added, however, that it no longer uses the deferential federal standard in testing state laws against the Alaska Constitution. *Id.* at 167 n. 12.
  69. See Note, *Legal Dimension of Entry Fishery Management*, 17 *William and Mary L. Rev.* 757, 766 n. 59 (1976) for a list of general sources on this issue. Although the meaning of "property" as used in the Fifth Amendment taking clause has been held a federal question, it normally is resolved by reference to state law. *United States ex rel. TVA v. Powelson*, 319 U.S. 266 (1943). See generally, Annot., 1 A.L.R.Fed. 479 (1969).
  70. It is unlikely that taking claim would arise in a moratorium-type access limitation because such a system merely precludes new participation in the fishery.
  71. See, e.g., *Acton v. United States*, 701 F.2d 896 (9th Cir. 1968), *cert. denied*, 393 U.S. 1121, 395 U.S. 945 (1969) (uranium prospecting permits). See generally, Sackman, *Nichols on Eminent Domain*, sec. 5.751 (rev. 3d ed. 1974).
  72. A property right has been found to exist in the "right to fish" when a statute explicitly created such a right, and even then the nature of the right has been uncertain and limited. (See *Havik v. Alaska Packers' Assn.*, 263 U.S. 510 (1924); *Anderson v. Smith*, 71 F.2d 493 (9th Cir. 1934) or when a treaty created such a right. (*U.S. v. Washington* 384 F.Supp. 312) W. v. Wash. 1974
  73. See, e.g., *Mitchell v. United States*, 267 U.S. 341 (1925); *R. J. Widen Co. v. United States*, 357 F.2d 988 (Ct. Claims 1966).
  74. Several existing state fishery management schemes incorporate nontransferability as an element in their permitting system. For example, California's statute for the man-

agement of herring provides as follows: Herring may be taken for commercial purposes only under a revocable, nontransferable permit. . . . The commission may, whenever necessary to prevent overutilization or to insure efficient and economic operation of the fishery . . . limit the total number of permits which are granted and the amount which may be taken under such permits. Cal. Fish & Game Code section 8550 (West Supp. 1977).

75. Knight & Lambert, "Legal Aspects of Limited Entry for Commercial Marine Fisheries" 117 (1975), as quoted in Christy, "The Fishery Conservation and Management Act of 1976: Management Objectives and the Distribution of Benefits and Costs," 52 Wash. L. Rev. 657, 670 n. 44 (1977).
76. Indeed, the Supreme Court noted that the lower court decision had focused on the "exclusionary character" of the ordinance and its concomitant "creation of a protected monopoly for the favored class member" 427 U.S. at 300.
77. 330 U.S. 552 (1947).

## THE ALASKAN EXPERIENCE WITH LIMITED ENTRY

Allan Adasiak

### NOTES AND REFERENCES

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2. Governor's Study Group on Limited Entry. 1973. *A Limited Entry Program for Alaska's Fisheries*. State of Alaska, Juneau.
3. An initiative was placed on the ballot in 1976 to repeal the limited entry legislation, but was defeated by a vote of 75,125 to 44,304.
4. Governor's Study Group, op. cit., note 2.
5. Cooley, Richard A. 1963. *Politics and Conservation. The Decline of the Alaska Salmon*. Harper and Row, New York.
6. Commercial Fisheries Entry Commission. 1978. A summary of price, revenue, and cost information for the Prince William Sound management area drift gillnet salmon fishery. Unpublished report, Juneau.
7. Crutchfield, James A. 1972. Economic aspects of fishery management. In *Alaska Fisheries Policy* (Institute of Social, Economic and Government Research, University of Alaska, Fairbanks), pp. 15-39.
8. Quota shares and taxation schemes are discussed by Christy, op. cit. note 1.

## LIMITED ENTRY IN MICHIGAN FISHERIES

Daniel R. Talhelm

### NOTES

1. Licensed anglers harvested around 23 million pounds of Great Lakes salmonids in 1976 (Jester, 1978). Unlicensed anglers including spouses, children under 17 and illegal fishermen harvest an unknown amount, but some surveys have suggested they are responsible for up to half of the total angling in the state.
2. Based on the 1971 licensed revenue of 26,000 dollars and assuming a 15-to-1 ratio, the costs would have been about 400,000 dollars.
3. The Great Lakes Fishery Advisory Committee is a nine-member body appointed by the Michigan governor to advise the state regarding commercial fishery policy. It was created by Act 84 of 1929.
4. See Talhelm (1973) or Talhelm and Ellefsom (1973) for a more complete discussion of these points and some of the others in this section.

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## WISCONSIN'S LIMITED ENTRY EXPERIENCE

Richard C. Bishop, Gary V. Johnson, and Karl Samples

### NOTES

1. Data in this section are from Wisconsin Department of Natural Resources, 1976; King and Swanson, 1976; and unpublished data from the files of Wisconsin Department of Natural Resources.
2. In 1968, Wisconsin issued separate licenses to each boat. However, by 1970, this had

been changed so that a licensee (individual fisher) could have more than one boat per license.

3. There are now (1977-78) actually twenty-one licensees. One person was refused a license for failing to meet the requirements. This was overturned in court after the twentieth license had been reissued.
4. As finally passed, it was part of a budget bill, 1977 Assembly Bill 1220, which became Chapter 418, Laws of Wisconsin. With some modifications, it was earlier designated as substitute amendment 1 to Senate Bill 409.
5. This council has been in existence for many years and is considered by DNR to be one of its major contacts with the industry. In contrast with the boards, it serves purely in an advisory capacity.
6. Economists would argue that one or the other would be necessary to have a true limited entry program as they use the term.

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## THE WASHINGTON EXPERIENCE WITH LIMITED ENTRY

Gary Benson and Robert Longman

### NOTES AND REFERENCES

1. Section 1, Chapter 184, Washington Laws of 1974 Ex. Sess.
2. *Report to the Washington State Legislature by the Ad Hoc Limited Entry Committee*, December 29, 1976, prepared by the Washington Department of Fisheries.
3. Chapter 106, and Section 1, Chapter 230, Washington Laws of 1977 Ex. Sess.
4. During the 1850s, a number of treaties were negotiated between the U.S. government and several Indian tribes in Washington State. Each of the various treaties applicable to Western Washington's tribes contain a clause having to do with the Indian's rights to fish. The basic language is:  
 "...The right of taking fish, at all usual and accustomed grounds and stations, is further secured to said Indians in common with all citizens of the Territory. ..." (Treaty of Medicine Creek, 1854).

The suit was brought by the federal government to determine what was meant by the phrase "in common with."

- 5 Judge George Boldt determined an allocation formula for the sharing of salmon between treaty Indians and non-Indians as follows:

**Treaty Indians:**

- a. The exclusive right to fish on the reservations without any state regulation;
- b. The right to take fish from all usual and accustomed off-reservation sites necessary for personal subsistence and ceremonial purposes, subject only to state regulation deemed necessary for conservation;
- c. The right to 50 percent of the rest of the fish from all usual and accustomed reservation sites; and
- d. The right to an equitable adjustment in number of fish allowed to be taken at usual and accustomed off reservation sites because of disproportionate amount which is taken by non-Indian fishermen at adjacent areas which prevents fish from entering off-reservation sites of the treaty Indians.

**Non-Treaty Fishermen:**

- a. No right on Indian reservations;
  - b. The "right" to 50 percent of the harvestable fish from all usual and accustomed off-reservation sites. As with Indians, this is subject to state regulation for purposes of conservation, but equal sharing with the treaty Indians must be maintained. Further, non-Indian access cannot be considered a right since it does not flow from a treaty or agreement with the government; it is a privilege accorded fishermen by the state;
  - c. The access to all other fishing sites, subject to regulation by state and equitable adjustment spoken in d above. ("Indian Fishing--What Judge Boldt Ruled," Richard C. Ehke, Library of Congress).
- 6 On April 7, 1977, President Carter announced the establishment of a Federal Task Force and assigned to it the task of developing solutions to the highly complex and increasingly emotional problems occurring in the salmon and steelhead fishery in Washington State. A settlement plan (*Settlement Plan for Washington State Salmon and Steelhead Fisheries*, June, 1978) was prepared by the Regional Team of the Federal Task Force to recommend to the national administration and Congress, as well as all interested parties, actions and policies which, if implemented, would provide a set of solutions to the problems.
- 7 Commercial-Recreational Fisheries Delegation (Purse Seine Vessel Owners Association, Washington State Sportsmen's Council, Washington State Commerical Passenger Fishing Vessel Association, Grays Harbor Gilnetters Association, Northwest Steelhead and Salmon Council, Washington State Blackmouth Association, Pacific Seafood Processors Association, Washington Trollers Association, Washington Reefnet Owners Association, and Washington Kelpers Association). *Settlement Plan for Washington State Salmon and Steelhead Fisheries* (August 1978), and other working document (untitled) provided by the Delegation.
8. *Moran v. State*, 83 Wn. 2d 867, 874, 568P. 2d 758 (1977).
9. 187 Wash. 75, 59 P. 2d 1101 (1936).
10. Chapter 1, Washington Laws of 1935.
11. 187 Wash. at 81.
12. See also, *Wash. Kelpers Assoc. v. State*, 81 Wn. 2d 410, 502 P. 2d 1170 (1972). Recent opinions of the United States Supreme Court have cast doubt upon the validity of the doctrine of state ownership of uncaught fish. Compare *Baldwin v. Fish and Game Commission of Montana*, 46 U.S. L.W. 4501 (May 23, 1978) with *Douglas v. Seacoast Products, Inc.*, 431 U.S. 265 (1977). However, since property law is generally a matter of state law, one can probably rely on the Washington court's adoption of the traditional rule as correct for the purposes of this discussion.
13. 187 Wash. at 82.
14. 187 Wash. at 82-83.
15. 187 Wash. at 84.
16. RCW 75.28.455.
17. RCW 75.28.480.
18. RCW 75.28.455.

## LICENSE LIMITATION IN THE BRITISH COLUMBIA SALMON FISHERY

G. Alex Fraser

### NOTES AND REFERENCES

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2. *Ibid.* p. 257.
3. Anonymous. 1888. *Op. cit.*, note 1, p. xiv.
4. Reid, David J. unpublished. Foreign monopoly, capital in the Fraser River salmon canning industry. pp. 29-31
5. Anonymous. 1893. *Op. cit.*, note 1, p. 283.
6. Anonymous. 1912. *Report of the Commissioner of Fisheries for British Columbia*. p. 7.
7. Anonymous. 1917. *Op. cit.*, note 6, p. 17.
8. Gordon, H. Scott. 1954. The economic theory of a common property resource: The fishery. *Journal of Political Economy* 42:124-142
9. *Ibid.* p. 128.
10. *Ibid.* p. 131.
11. Sinclair, Sol. 1960. *License Limitation in British Columbia*. Department of Fisheries of Canada, Ottawa. pp. 103-104
12. *Ibid.* p. 106.
13. *Ibid.* p. 197.
14. *Ibid.* p. 110.
15. Press release dated September 6, 1968 from the United Fishermen and Allied Workers Union (U.F.A.W.U.).
16. This industry group draws its constituency from the owners of the larger vessels in the fishing fleet.
17. This group consisted of representatives from the U.F.A.W.U., Native Brotherhood of B.C., Fisheries Association (a group representing the processing companies), Fishing Vessel Owners Association, and the Prince Rupert Fisherman's Co-Operative.
18. Vessels under thirty feet in length were exempted from these increases and retained one hundred dollar license fees.
19. Revenue Canada capital cost allowance schedules permit a 5 percent depreciation per annum on commercial fishing vessels. It is unlikely that these vessels would be extensively refitted so soon after building, hence this does not seem an unreasonable assumption.
20. Statistics Canada. undated. *Price and Indexes*. Catalog No. 62-002.

**Data sources.** A variety of published and unpublished Fisheries & Marine Service statistical reports were used in this study. Among these were:

1. Annual summary of British Columbia Catch Statistics (1966-1976)
2. Fisheries Statistics of British Columbia (1966-1973)
3. Fishing Returns in British Columbia. Periodic Reports. (1963-1974)
4. Various computer runs based on information gathered from submitted sales slips and license application forms including (a) Summary Income Study by Gross Return Group, (b) Summary Fishermen's Performance Tables, and (c) Detailed Income Study by Commercial Fishing Vessel number.

## EXPERIENCE WITH LIMITED ENTRY IN BRITISH COLUMBIA FISHERIES

C. H. B. Newton

### NOTES AND REFERENCES

1. In fact, a limited entry program was implemented in 1908, only to be cancelled in 1917 because of First World War conditions. Fraser, G. Alex. 1977. *License Limita-*



- tions in the British Columbia Salmon Fishery. Economics and Special Industry Services Directorate, Pacific Region. Tech. Rep. Series No. PAC T-77-13, pp. 3-5.
2. Salmon vessels were assigned to the "B" category for failure to record landings valued at more than twelve hundred fifty dollars during the qualifying years of the limited entry program. "B" licensed vessels were to be removed from the fishery after a period of ten years. "A" licensed vessels had to have landed in excess of ten thousand pounds of salmon which was approximately twelve hundred fifty dollars during the qualifying years.
  3. Although overcapitization is the popular term used, the intent is overcapacity.
  4. Fraser, G. Alex, op. cit., note 1, p. 52.
  5. The new trend is to retire two trollers and replace them with one larger vessel. Its two owners rotate the operation of the new troller every ten to fourteen days. Seine vessels have already replaced a crew of eight with a crew as small as three.

## RESTRICTED ENTRY IN AUSTRALIAN FISHERIES

T. F. Meany

### NOTES AND REFERENCES

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7. Australia, Department of Primary Industry, Fisheries Division. 1976. *Preliminary Report on the Economics of the Western Australian Rock Lobster Fishery, 1972/73 to 1974/75*. Australian Government Publishing Service, Canberra.
8. Anonymous. 1978. W. A. rock lobster season shortened. *Australian Fisheries*, February.
9. Bowen, B. K., op. cit., note 2.
10. Australia, Department of Primary Industry, Fisheries Branch. 1970. *An Economic Survey of the Shark Bay and Exmouth Gulf Prawn Fisheries, 1966/67 and 1967/68*, Fisheries Report No. 6. Australian Government Publishing Service, Canberra.
11. Australia, Department of Agriculture, Fisheries Division. 1975. *Western Australian Prawn Fisheries: An Economic Survey*, Fisheries Report No. 13. Australian Government Publishing Service, Canberra.
12. Unpublished data from an economic survey conducted in 1977.
13. Bowen, B. K., op. cit., note 2.
14. Scott, Anthony D. 1955. The fishery: The objectives of sole ownership. *Journal of Political Economy* 63: 116-124.
15. Australia, Department of Primary Industry, Fisheries Branch. 1970. *An Economic Survey of the Victorian Rock Lobster fishery 1962/63 to 1965/66*, Fisheries Report No. 5. Australian Government Publishing Service, Canberra.
16. Unpublished data from an economic survey conducted in 1974.
17. Ibid.

## CASE STUDIES ON ECONOMIC EFFECTS OF LIMITING ENTRY TO THE FISHERIES

Leah J. Smith

### NOTES AND REFERENCES

1. For example, see, Christy, Francis T. Jr. 1973. *Alternative Arrangements for Marine Fisheries: An Overview*. Program of International Studies of Fishery Arrangements, Paper No. 1, Resources for the Future, Inc., Washington; Christy, Francis T. Jr. 1977. Limited Access systems under the Fishery Conservation and Management Act of 1976. In *Economic Impacts of Extended Jurisdiction*, Lee G. Anderson, Ed. (Ann Arbor Science Publishers, Ann Arbor), pp.141-156; Anderson, Robert C. and James A. Wilson. 1977. Economic dimensions of fees and access control under the Fishery conservation and Management Act of 1976. *Washington Law Review* 52(3): 701-721.
2. In terms of economic effect on the society as a whole, of course, these excluded users cannot be ignored altogether. Economic costs to society of restraining programs, welfare, and less productive use of labor may also be created by a limited entry program.
3. Thus, a perfectly competitive industry has low concentration, while a monopoly represents the highest concentration possible. Fewer fishermen participate in the fishing industry under a limited entry program.
4. Peltzman, Sam. 1977. The gains and losses from industrial concentration. *Journal of Law and Economics*, Vol. 20.
5. Efficiency is defined as the most productive use of the resources basic to the industry. The major resources of the fishing industry are fish, fishermen, boats, and gear. As a renewable resource, fish are subject to special problems.
6. Direct consumption of fish and shellfish rose from 5,579 million pounds in 1968 to 7,389 million pounds in 1976 (domestic production plus imports), while prices for most fresh fish and shellfish rose substantially (NOAA-NMFS, 1977. *Fisheries of the United States, 1976*. U.S. Department of Commerce, Washington, D.C., p. 44).
7. A comment by an industry member on limited entry programs in Australia is apt: "... a management policy which does not provide any avenue for fishermen to get out of a fishery except by going broke, with loss of boats, experience and capital to the industry, is no management at all; it takes no account of people as human beings but only as numbers in some kind of management chess game. ..." (Stanistreet, H. K. 1975. The fisherman's role. *Australian Fisheries*, 34: 15-18.)
8. These summaries are based on information in the following documents: Letter dated January 7, 1976 from H. H. Scarth (Manager, Maritimes Licensing Unit); News release dated November 14, 1973, from Environment Canada (W. J. Lever, Chief, Information Branch, Fisheries & Marine Service); News release dated May 11, 1970, from Department of Fisheries and Forestry of Canada. News release dated August 13, 1973, from Environment Canada (W. J. Lever, Chief, Information Branch, Fisheries & Marine Service); Policy for Entry Control in the Offshore Scallop Fishery, March 1, 1976, Environment Canada, Fisheries & Marine; Atlantic Coast Herring Regulations, November 30, 1977, Fisheries and Environment Canada; Fishermen's Program, Licensing Program for 1978 Revised, Fisheries and Environment Canada; and Policy for Canada's Commercial Fisheries, May, 1976, Environment Canada.
9. DeWolf, A. Gordon. 1974. *The Lobster Fishery of the Maritime Provinces: Economic Effect of Regulations*. Bulletin 187 of the Fisheries Research Board of Canada.
10. Press release dated February 10, 1978 (E. H. Hearnkton, Information Branch, Fisheries & Marine Service, Fisheries and Environment Canada).
11. News release dated November 14, 1973, from Environment Canada (W. J. Lever, Chief, Information Branch, Fisheries & Marine Service).
12. Unfortunately, data are not now available to evaluate the precise effect of limited entry on fishermen's incomes, distribution of investment, and other economic aspects of the fishery.
13. Gertenbach, L.P.D. 1973. License Limitation Regulations: The South African Sys-

- tem. Paper presented at the FAO Technical Conference on Fishery Management and Development, Vancouver, British Columbia, February 13–23.
14. In 1955, the total fleet numbered 219 boats (aggregate tonnage of 7700 tons); factories owned 79 boats (2884 tons), nonfactory owners, 138 (482 tons). By 1960, there were 106 factory-owned boats (6911 tons) and 46 boats (2564 tons) with other owners. The trend to larger size and factory ownership has continued (ibid., p. 11).
  15. Many informal but very effective local arrangements continue to limit access to certain lobster fisheries in Maine. Although these may keep down the number of participants in the fishery, they are not formal "limited effort" programs in any administrative sense (Bowles, F. 1978. Territorial boundaries of fishing communities. Unpublished manuscript) Also, Acheson, J. M. 1971. Territories of the Lobstermen. *Natural History* 81: 60–69, and Acheson, J. M. 1975. The lobster feits: Economics and the ecological effects of territoriality. *Human Ecology* 3(3): 183–207.
  16. Another potential influence on entry into the Maine lobster fishery in 1974 was the declaration by NMFS that the Gulf of Maine become a "conditional fishery." This allowed denial of financial assistance programs (obligation guarantees and direct federal funding) if they "would not be consistent with the wise use and with the development, management, conservation, and protection of fisheries resources." Of course, these financial assistance funds had been frozen anyway, so the impact was limited to paper. The "conditional fishery" classification has continued to the present, and some federal assistance programs are being funded again. *Federal Register*, 1974.
  17. The numbers of Maine commercial lobster licenses from 1970–1977 were: 1970–6316; 1971–6702; 1972–7045; 1973–7894; 1974–523; 1975–10,455; 1976–9041; 1977–8827. Maine Department of Fisheries.
  18. Limitation on the number of licenses was proposed and pushed by the commercial lobstermen themselves.
  19. There were many more than one hundred fifty applicants for the one hundred fifty new licenses allowed in January 1978. Data are not available yet to show how the new entrants' catches compared with those of the other license holders. In 1976 and 1977 all new applicants were able to obtain licenses at the first of the year.
  20. Statement by Commander Nunes in New England Regional Fishery Management Council Meeting, 19–20 April, 1978. Peabody, Mass.

## **ADDITIONAL SUGGESTED READING: A LIMITED ENTRY BIBLIOGRAPHY**

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