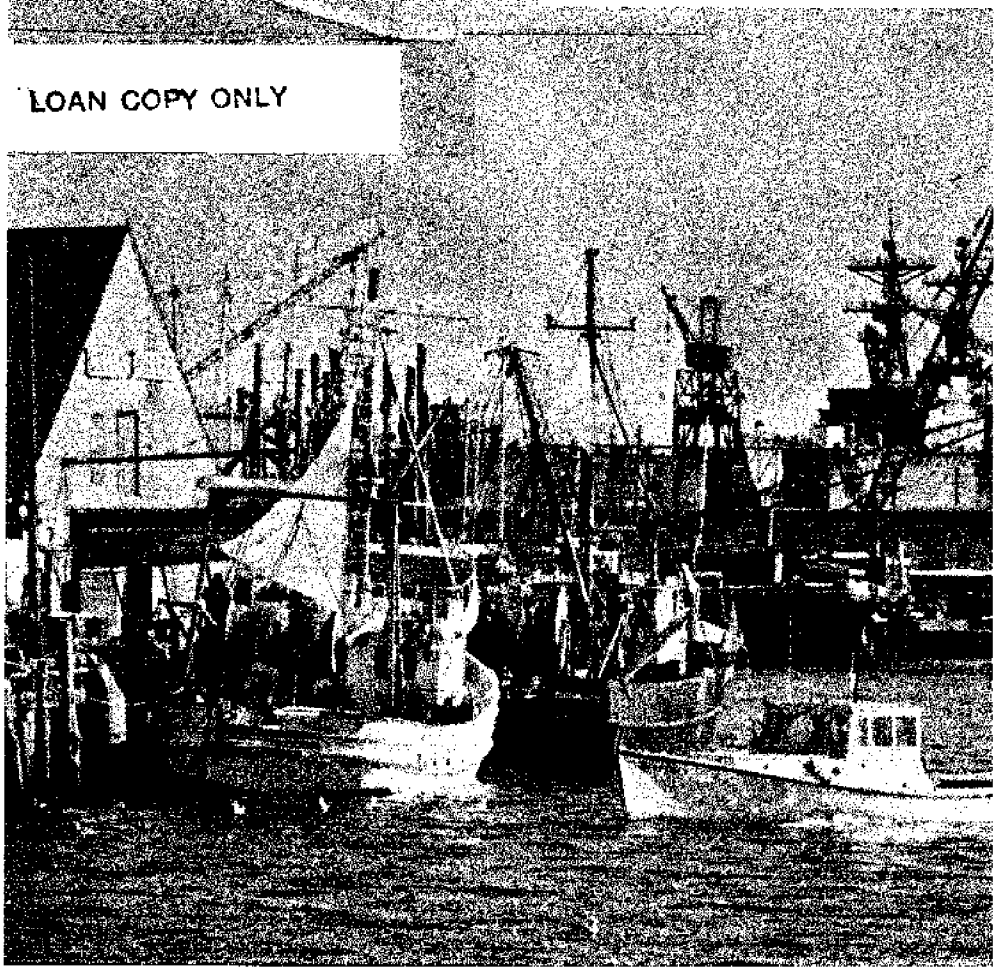

East Coast Fisheries Law and Policy

Marine Law Institute

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Proceedings from the June 17-20, 1986 Conference on East Coast Fisheries Law and Policy

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Editors

Marine Law Institute
University of Maine School of Law
Portland, Maine 1987

ISBN: 0-9618224-0-6

Printed and bound in the United States of America

Preface and Acknowledgements

The papers published in this volume were presented at a conference on East Coast Fisheries Law and Policy in Portland, Maine, June, 1986. The purpose of the conference was to bring together professionals from a wide spectrum of disciplines to examine the status and prospects for the East Coast fishing industry. Recent events have made it necessary to bring scientists, managers, and lawyers together in a multidisciplinary effort to understand the issues involved. The crisis in marine insurance, the degradation of fisheries habitats, the encroachment of waterfront development on water dependent industries, tax law changes, the increasing number of joint venture proposals with foreign fishing companies, and recent policy developments affecting state and federal management of shared resources contribute to the complexity of maintaining a viable and healthy fishing industry.

The major theme of the conference was the U.S.-Canada East Coast fisheries relationship. Part One, therefore, is devoted specifically to different facets of this relationship. The remainder of the conference addressed management, enforcement, and development, and the U.S.-Canadian relationship emerged throughout as participants from the two countries gave a comparative view of their approaches to these issues.

We would like to thank all of the speakers and moderators whose research and thoughtful contributions made the conference valuable for everyone involved. We would also like to thank the Maine/New Hampshire Sea Grant College Program for contributing support to both the conference and to the background research that made the conference possible. Beverly Bayley-Smith, the administrative manager of the Marine Law Institute, receives our deepest thanks for her invaluable assistance in managing the conference and in the production of these proceedings. And special thanks to Anne Bernard of the Center for Research and Advanced Study, University of Southern Maine, for her technical expertise in producing this book.

This book is dedicated to the memory of
Frederic M. Fairfield.

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Part Three: Fisheries Development

Introduction and Overview

An overview of each of the three major conference areas gives a brief indication of the interrelationships and common themes that arose on each panel. As expected, participants often approached a topic with different assumptions, based on their varied experiences and relationships to the fishing industry. These assumptions often clashed and brought new issues t light. At other times, surprisingly common threads emerged from participants representing different ends of the political spectrum. At minimum, th conference brought people together to listen to each other's points of view and encouraged dialogue. It is the hope of the conference organizers that opening the door to dialogue will encourage further discussion and creative solutions to the complex problems of East Coast fisheries development and management.

U.S.-Canadian Fisheries Developments

Ties between Atlantic Canada and the U.S. East Coast fishing industry reach back through several generations. Participants described the interdependence of the two countries' fishing industries and ways in which that dependence has become more complex over time. In the Gulf of Maine, th two nations share valuable stocks of fish such as haddock, cod, and scallop The U.S. and Canada are the leading world exporters of fish and therefore share common goals in the international marketplace. Despite these simila interests, recent developments have caused a deterioration in the cooperativ relationship once experienced between the two countries. Once allied agai the perceived excesses of foreign fleets exploiting the fishery resources alo the entire eastern seaboard, the extension of national fisheries jurisdiction i the late 1970s has changed the U.S. and Canadian attitudes toward each other. A proprietary and nationalistic view of the 200 mile fishing zone an the relative scarcity of certain highly valued stocks have led each country t adopt a more protective and defensive stance with respect to fishery resources.

With the extension of fisheries jurisdictions, very different management regimes, based on different governmental structures and economic realities have emerged in the two countries. Canadian participants described the tremendous importance of the fishing industry to the socio-economic well-being of the Atlantic provinces. The federal government's central role in management reflects the historical importance of government in peoples'

lives as compared to a more decentralized management context in the United States. Whereas public participation and a democratic process have resulted in greater flexibility for the New England fishing industry, Canada's management regime is highly centralized to ensure a given level of production for an emerging industrial fishery. Even the scientific approaches reflect different assumptions about the purposes of management.

The trade relationship has also become more complex. A review of the trade flows between the Atlantic provinces and the U.S. shows a seasonal pattern that significantly affects the harvesting and processing sectors of both countries. The most significant recent event under U.S. trade laws was the filing of a countervailing duty suit by a segment of the New England fishing industry. The resulting duty of 5.82 percent on whole, fresh groundfish provoked different responses by U.S. and Canadian observers. Some felt it would not change the trade relationship or prices in either country. Others believed the duty would be passed on to consumers and thereby damage the overall market for fish. Still others thought the U.S. processors would be most affected because of the impetus on behalf of Canadian exporters to reduce the supply of fresh, whole fish flowing to the U.S.

Perhaps the most important single event to change the U.S.-Canadian fishing relationship was the delimitation of a maritime boundary by a special chamber of the International Court of Justice in October, 1984. Previous attempts to establish a mechanism for cooperatively managing shared stocks in the Gulf of Maine had failed, and reference to the international tribunal was necessary to resolve the overlapping 200-mile limit claims. The resulting single maritime boundary leaves the two countries no mechanism for managing stocks that migrate across this border. The effect of the boundary decision has been to increase tensions, as fishing vessels violate the international border and differences in management become increasingly apparent. The management and trade relationships have suffered and U.S.-Canadian cooperation in resource management is at an all time low.

Despite the deteriorated relationship, both countries recognize the wisdom of regaining the spirit of cooperation that prevailed in the 1970s. There was a consensus among the conference participants that cooperation in trade, management, and the exchange of information is in the best interest of both countries. As other nations such as Japan and the European countries assume a larger place in the world fish market, the U.S. and Canada cannot afford to be at odds with each other if their fishing industries are to survive and prosper. One constructive suggestion was for the two nations to begin to explore ways in which cooperation can take place. The establishment of a bilateral consultative mechanism to deal with issues, starting with exchanges

of scientific data, would be a first step. Better communication at all levels of industry and government is a prerequisite to any progress.

Management

The U.S. national fisheries program under the Magnuson Fishery Management and Conservation Act has been in operation for ten years. Participants discussed the effects of the 200-mile law on state and federal management of East Coast fisheries. Proposals for improvement on the current structure elicited lively debate.

Prior to the Magnuson Act, management efforts were limited to the states. Federal management is a recent phenomenon that has been superimposed on longstanding state regulatory frameworks. State agencies vary considerably in their scope of authority and responsibility to manage coastal fisheries. As these authorities have evolved to meet the demands of managing a complex resource, certain public policies have clashed. One example is the tension between state conflict of interest laws and membership requirements of marine fisheries commissions, which dictate more industry involvement in management decisions. If a commission member participates in a decision in which he or she has a financial interest, a conflict of interest may be found. Participants discussed this increasing problem and various state efforts to address it.

The overlay of federal administration and the regional fishery management council system on state management has caused a variety of jurisdictional problems. The migratory nature of many fish stocks often brings different management entities into the fray. These management bodies often have different conservation objectives as well as different political constituencies. Several suggestions were put forth to simplify the overlap, some in the policy realm, others more sweeping in their reconstruction of the legislative framework created by the Magnuson Act. Within the federal realm, a proposal to separate the conservation and allocation functions of the councils between the federal agencies and the regional councils prompted a lively discussion.

Finally, management can only accomplish so much without effective enforcement. Without the ability to ensure compliance with regulations, efforts at conservation and resource allocation will only produce "paper management." Problems with the current system include lack of adequate funding and overlapping jurisdictions. Some possible solutions involve better coordination between enforcement officials and management authorities, including the regional councils. Participants examined permit sanctions

as well as monetary penalties, and regulations that are more conducive to effective enforcement.

Development

Perhaps some of the most innovative proposals to increase the fishing industry's productivity and profits have come in the areas of fishermen's cooperatives and marketing techniques. The display auction on the Portland, Maine waterfront is one of the most striking examples. Participants analyzed existing tax and maritime laws and their ability to help or hinder innovative ideas such as seafood marketing councils, joint ventures, and the trend toward full utilization of U.S. fisheries.

Other factors that are limiting progress in development are the crisis in marine insurance and pollution of ocean and estuarine waters by industrial activities. Competition for space on the waterfront between the fishing industry and other commercial and recreational interests is forcing fishermen to become involved in land use control issues and to work together for the survival of fishing as an economically viable venture. Groups of fishermen are cooperating with one another by forming associations that have economic and political influence. The days of the self-reliant, independent fisherman may be numbered as it becomes increasingly evident that fishermen must work together to ensure the health of the resource upon which they depend.

Jill L. Bubier
Alison Rieser

Part One:

United States - Canadian Fisheries Developments

Chapter 1
Management

Managing the Realities of the Canadian Atlantic Fisheries

Paul Sutherland
Former Regional Director, Department of Fisheries and Oceans,
Atlantic Region, Halifax, Nova Scotia

Introduction

It is indeed a pleasure for me to be here today to share with you some of the realities of the fisheries in Atlantic Canada. It is, of course, an added pleasure to share the podium this morning with my good friend and colleague, Dick Schaefer. As some of you may know, Dick and I meet together with our key staff members on a regular basis to discuss the many issues of common concern to the fishermen, fish plant owners and workers of both nations. The many problems of managing a common property resource are extremely complex, but certainly not unique to Canada, so I have always appreciated, and found most helpful, the frank and co-operative exchange of views with Dick and his staff. These continuing exchanges as well as gatherings such as this one today offer those from both nations an opportunity to "look in your neighbor's window" and obtain a better understanding of what makes "the other fellow tick."

I will briefly sketch out for you a realistic picture of the Canadian east coast fishery. Since time is limited, I will focus my comments primarily on the groundfish fishery; our most economically important fishery. In leaving with you some of the facts or "realities" of our fishery, I am confident that you will better understand why our management plans differ from those of New England where the facts or "realities" are indeed different from our own.

Realities

A. History

Two years ago, I was privileged to be present at an address given by a former U.S. ambassador to Canada in which he related a particular difficulty with new foreign service officers posted to the embassy in Ottawa. The difficulty was convincing these new officers that Canada was indeed a foreign country with its own history, form of government and socio-economic needs. He told the story of an officer who reported a particular action by our parliament as being "un-American." It took some time, apparently, to convince this officer that the action was a normal one for any sovereign country to take and should not be viewed as "un-American" but rather as "uniquely Canadian."

A student of history could, I am sure, point out major differences in our pasts which may explain some of the reasons why we conduct our business differently from the U.S. with respect to fish management. The common thread or influence that I have found by reading Canadian history is our preoccupation with "*peace, order and good government*," words which hold a dominant position in our new Constitution; words which are typically "Canadian" not "un-American."

Canadians, throughout their history, have asked for and indeed expected more government intervention in their daily lives than did their American cousins.

Look briefly for a moment at the development of the western portion of North America. The "taming" of the west, south of the 49th P, and its early place in your history has been chronicled in your literature and by the movie industry. North of the border, we find that our western frontier was opened up only after the Hudson's Bay Company and the Northwest Mounted Police led the way.

It came as little surprise to me to learn that "Overseers of the Fisheries" were appointed in Nova Scotia as early as 1772, some 95 years before Canada became a country. Neither was it a great surprise to learn that the agreement between the U.S.A. and Britain of 1818, which permitted U.S. fishing activity along "certain seacoasts, shores, bays, harbours and creeks" of the British/American Colonies, excluded areas already allocated to the Hudson's Bay Company.

Within a year of becoming a Country, Canada passed its first *Fisheries Act* on May 22, 1868. Among other provisions the Act created a staff of fishery

officers and wardens, established fishing seasons, weekly closed times, pollution control measures, and regulations respecting types of fishing year and their use; a fishing lease and license system was established for both sport and commercial fisheries.

My point is that Canadians have inherited a tradition where government is expected to lead the way in ensuring "peace, order and good government." It is not surprising then that, while Canada and the U.S. have much in common with respect to faith in private enterprise, the public sector has established a much stronger presence in Canada. So, as pointed out, the regulation of fishing came hand in hand with the development of the industry and the Country.

B. Jurisdiction

The British North America Act, the major document creating the federal union of Canada in 1867, placed the exclusive jurisdiction over seacoast, inland fisheries and public harbours under the administration of the Federal Government. This jurisdiction was reconfirmed in our new constitution of 1982. This federal mandate is exercised by the Department of Fisheries and Oceans which administers the *Fisheries Act*, *Fish Inspection Act*, the *Fishery Recreational Harbours Act* and the *Coastal Fisheries Protection Act* among others.

Most inland provinces have signed administrative agreements with the Federal Government whereby management and enforcement roles are conducted by the Provinces; however, all regulations must be approved federally. No such administrative arrangements exist with respect to the coastal provinces. Accordingly, all aspects of the marine and fresh water fisheries are managed by the Federal Government in those provinces bordering on the sea.

While the Minister of Fisheries and Oceans for Canada has exclusive power to manage the fisheries, much consultation takes place with his provincial colleagues as well as the fishing industry. If you are interested, I will be pleased to elaborate further on the process for the development of the annual groundfish fishery plan later during the discussion period. In brief, the point I wish to draw to your attention is that jurisdiction is not shared in Canada as it is in the U.S. with State governments and the Management Councils established under your Magnuson Act. The Canadian Federal Government has the potential to respond more quickly to address the perceived needs of the industry through regulatory or policy changes.

C. Income and Community Dependence

While the total Canadian fishery represents less than two percent of Canada's gross national product, the picture is somewhat different in Atlantic Canada where this industry represents approximately 17 percent of the gross domestic product. The fishery employs about 20 percent of the work force in the three Maritime Provinces whereas some 55 percent of Newfoundlanders depend on the fishery for their income.

I hope that someday some of you have the opportunity to visit some of the 1,300 communities in Atlantic Canada whose economic well-being depends on the fishery. Indeed about three-quarters of these 1,300 communities have 500 or fewer inhabitants, and about 500 of the 1,300 are single industry communities which are *totally* dependent on the fishery. No fishery — no community! There is no alternate employment for those who do not wish to follow the family fishing tradition.

In these communities you will find about 50,000 fishermen whose median net income in 1982 was $6,500. At today's exchange rate that's about $4,800 U.S. The Task Force on Atlantic Fisheries in its 1982 report recorded that over one-third of fishermen families in Atlantic Canada were living below the poverty level with little or no opportunities for alternate income.

Bill McKenzie, a retired fisheries economist, summed it up best when he once remarked:

> "Fishermen are not poor because they fish
> they fish because they are poor."

As fisheries managers in Canada, we must help address this major "reality" of Atlantic Canada. Hence, the emergence of some of the basic principles of our groundfish management plans which may be somewhat foreign to the U.S. fishery, e.g., allocations in favor of local communities; allocations by size of vessel and gear types; seasonal quotas to minimize dislocation of labour and capital; limited entry to improve incomes for those currently in the fishery and a conservative fishing strategy referred to as F0.1 which targets fishing mortality 10 percent below maximum sustainable yield. This strategy prevents both growth and recruitment overfishing, and ensures higher catch rates, and a more stable resource base.

D. The Problems of Common Property Management

While struggling with our primary mandate of conserving fish stocks and addressing the socio-economic concerns noted above, we, as fish managers, must cope with Garret Hardin's "Tragedy of the Commons."

The symptoms of the "race for the fish" are common and recognizable to both nations. We can easily note the investment in "bigger and better" propulsion and electronic systems; the quantity versus quality mentality and the effect seasonal gluts of fish have in the marketplace. Of course, under the Canadian groundfish management system of quota control, these problems are often more evident and result in early closures and the resultant dislocation of labour and capital. In the past, we have attacked the problem of overcapitalization and dissipation of income through the implementation of regulations and policies to control inputs. For example, we have controls on the amount and type of gear used and vessel replacement. In this respect, our foot-for-foot vessel replacement policy is perhaps well known to many of you. Of course, input controls will never prevent the invention of a "better mouse trap." Even though there are restrictions on gear and vessels, the rapid development of technology has recently added considerably to the catching power of the Atlantic fishing fleets; especially to the traditional inshore fleet.

This reality of the Atlantic fishery must be, and is being, addressed within the constraints imposed by the socio/economic realities of low incomes and community dependency outlined above. This is being accomplished primarily by moving to what I call "output" controls rather than the "input" controls of the past.

For example, in several of our fisheries, we have introduced the concept of quasi-property rights in the form of Enterprise Allocations. This means that all groundfish vessels greater than 100 feet in Atlantic Canada now have, at the beginning of each year, a certain portion of the annual quota allocated to them on a company-by-company basis. Feedback from industry on this management approach is most favorable as the race for the fish has been eliminated and companies can not concentrate on matching their fishing activity to suit market demand. Small inshore draggers on the West Coast of Newfoundland have been experimenting successfully with a similar scheme for the past three years.

Within Nova Scotia, the Bay of Fundy herring fishery has been managed for the past three years on vessel quotas; another form of Enterprise Allocation or output control. It's interesting to note that, in this fishery, smaller 65 foot vessels have become the popular replacement for the older much larger and capital intensive vessels. Additionally, our offshore lobster fishery

moved to Enterprise Allocations in 1985, and most recently the offshore scallop fishery, which takes place primarily on Georges Bank, has moved to a quota management system with agreed upon company allocations of scallops.

I certainly don't want to leave you with the impression that everything is under control. Significant strides have been made; however, much more must be done to rationalize capacity in an orderly fashion in several fisheries. In many of our fisheries, and in particular, some nearshore groundfish fisheries, the reality of "too many fishermen chasing to few fish" still exists. Unfortunately, as previously mentioned, we do not have the industrial base of New England to absorb the excess labour created by rapid unstructured rationalization.

E. The Port Market

The reality of the marketplace between the primary and secondary producer in Atlantic Canada complicates the life of any fishery manager. As we all know, there is no such thing as an "average" fisherman. In Canada, as in the U.S., we have the offshore fisherman versus the inshore fisherman; the fixed gear fisherman versus the mobile gear fisherman; the owner/operator versus the salaried crewman, etc. The relationship between these "many faceted" fishermen and the secondary industry takes several forms, e.g., we see vertical integration in the larger offshore companies; strong union/management relationships in Newfoundland and Northern New Brunswick (fishermen's unions are prohibited by law in N.S. and P.E.I.); large fishermen associations such as the Eastern Fishermen's Federation and literally hundreds of local small associations scattered along the coastline. In many communities, where only a single buyer exists, paternalistic "company store" relationships are very evident and complex.

Returns to labour and capital vary widely depending on location and buyer concentration. In some locations buyer competition is so severe that short-term costs of production are sometimes ignored in order to maintain sources of supply and a presence in the marketplace. In other locations where only a single buyer exists, the fishermen have no bargaining power whatsoever. The reality of the port market, as just described, renders the interface with government, the regulator, extremely difficult. Fishermen, as a general rule, feel powerless to influence policy as they have no strong collective voice and most often argue with each other rather than with government.

In Canada much thought has been focused on the ways to cope with this sometimes self-defeating port marketplace. In New England you have the added dimension of the fish auction as the great equalizer. Some have

suggested a similar solution for parts of Atlantic Canada, but we do not have the large consumer market in our backyard as you do in New England. This leads me to the final "reality" which I wish to leave with you today, namely, the Consumer Market.

F. The Consumer Market

As some of you may know, Canada is the number one exporter of seafood in the world. There is a very good reason why this is so. In Atlantic Canada we possess one of the world's greatest fishery resources, but, unfortunately, Canada does not have sufficient population to absorb a high percentage of its landings and must, therefore, depend almost entirely on the world market. Accordingly, management measures designed to stabilize the Canadian fisheries must cope with periodic recessions, strong or weak Canadian currency, developing third-world competition, and the lack of hard currency in many consuming countries. Large, externally influenced price swings and the health of other foreign fishery resources which compete in a common offshore market dictate domestic fishing strategies at home and often render catch predictions invalid. One often wonders if management measures will ever be able to cope with the cyclical nature of world economics, but one must continue to try.

In the brief time available, I have attempted to bring to your attention some of the underlying realities which dictate why we manage our fisheries the way we do. I feel that it is important to "walk in each other's shoes" from time to time to gain a better appreciation and understanding that the common needs of fishermen can be addressed in different ways, for different reasons, to reach a common objectives.

The "*classical*" approach to fish management taken by Canada is typically "Canadian" not necessarily "un-American." In general terms, the approach has worked extremely well. For instance, in 1977 Atlantic Canadians landed about 20 percent or some 470,000 tonnes of groundfish from the Canadian economic zone. Our figures confirm that by 1983, we had landed 80 percent of the groundfish in the zone or some 760,000 tonnes. However, we recognized we still have problems to resolve which are extremely challenging.

In seeking solutions to these problems, a Canadian fisheries manager is often able, because of the legislative base, to move much more quickly than his American counterpart. But he must be constantly aware of a number of realities within this industry.

- The reality of Canadian history which indicates that government has been expected to lead the way in solving the problems.

- The reality that about one-third of Atlantic fishing families live below the Canadian poverty level with little or no opportunity to shift occupations.

- The reality that a great number of Atlantic coastal communities can only continue to exist through the wise husbandry and use of the fish resource.

- The reality that, despite the lack of an industrial base as a safety net for excess labour, overcapitalization must be addressed, and effort must be reduced on some fish stocks.

- The reality that issues must be addressed through co-operation and consultation with a fishing industry in a very confused and complex port market.

- And finally, the reality that, whatever management measures may be introduced, we fish for money not protein and, therefore, must remain efficient if we wish to compete successfully in the world marketplace.

Some may say that one must be crazy to enjoy a job faced with the above realities. I admit that I enjoy my chosen career in fisheries management and look forward to the many challenges.

Thank you.

Status of U.S. Fisheries Management in the Northwest Atlantic

Richard H. Schaefer
Acting Regional Director, National Marine Fisheries Service
Gloucester, MA

Introduction

Ladies and gentlemen, I appreciate the opportunity to participate with you today and wish to commend the Marine Law Institute for sponsoring this timely conference on East Coast Fisheries Law and Policy. I am especially happy to share this session with Paul Sutherland, my friend and counterpart from the north, because for the last two years or more we have developed a close working relationship which has been both productive and enjoyable. During this period we have come to realize that although our management systems differ and our trade goals are often competitive rather than cooperative, we share fundamental concerns for the common resources off our coasts. Ultimately, the condition of these shared fishery resources will dictate the amount and value which will accrue to each of our fishery interests. Thus, we are dependent upon each other — we are truly our brother's keeper — at least with regard to those transboundary stocks which ignore our political boundaries and insist on complicating our lives and the management process.

There are, of course, other reasons for us to work together. We and our neighbors to the north have shared many mutual domestic and international concerns over the years. We share a common open border, speak the same language (at least one of them), and have similar conservation objectives. All of us share the responsibility of being good neighbors — that means showing some tolerance and understanding even if we do things differently. It seems to me that if the U.S. and Canada can't work through their conflicting views and systems, then there is little hope for world accord on any of the major issues which currently plague our international relations.

I mentioned earlier that Paul and I have developed a close working relationship over the past two years. This association between the Northeast Region of the National Marine Fisheries Service and the Scotia-Fundy Region of the Department of Fisheries and Oceans really began about six

Crouter. The players are largely changed now on both sides of the border but the spirit of cooperation and openness which began back then has taken root and flourished. Now we can and do call each other regularly and meet at least twice a year, each with our key staffs, to discuss mutual fishery issues. One of the outgrowths of these meetings has been the development of a close working relationship between the enforcement officers of our two agencies. With a long boundary line splitting major fishing areas off our respective coasts, these officers have only minimal resources to effectively enforce fishery regulations in their respective jurisdictions. In those instances where regulations of both nations coincide (such as with the haddock spawning season closure) mutual surveillance by patrol boats and aircraft has been utilized effectively to obtain convictions against vessels fishing the closed area.

Since the beginning of this relationship, we have attempted to avoid political or international considerations. We meet as neighboring professionals each charged with resource responsibilities that are not made different by political boundaries. Each of us shares mutual problems with our respective constituencies and political leaders. In fact, we have both learned how similar our problems are — if I could speak French, I sometimes think we could swap seats and hardly miss a beat!

So it is a pleasure to share this panel with Paul and, if you believe as I do, that good communications will lead to increased understanding of respective goals and objectives, then let us use the opportunity presented by this meeting to better understand each other's management systems — maybe we'll find more in common than appears on the surface.

U.S. Fisheries Management Policy

Marine fisheries management policy issues in the United States have, since 1976, been addressed primarily through the eight Fishery Management Councils established under the Magnuson Act. In the Northeast, the New England and Mid-Atlantic Councils set policy through Fishery Management Plans or FMPs which, when approved by the Secretary of Commerce, are implemented through federal regulations by the National Marine Fisheries Service. One notable exception to this system is management of Atlantic bluefin tuna which, as a highly migratory species, is exempted from U.S. jurisdiction under the Magnuson Act. For this species, U.S. fishermen are subject to regulations developed by NMFS to implement the conservation measures of the International Commission for the Conservation of Atlantic Tunas, otherwise known as ICCAT. Foreign fishermen catching tuna within the U.S. 200-mile limit are not regulated by us but, if they are members of

ICCAT, they are legally bound to abide by the same general conservation measures we are. Incidentally, this is not the case within the Canadian 200-mile zone since tunas and other highly migratory species are not exempted under their extended fisheries jurisdiction act. Last year, when we informed the Canadians that we believed, on the basis of our foreign fisheries observer reports, that Japanese longliners had reached or exceeded their ICCAT bluefin tuna quota off our coast before they moved to the north, the Canadians requested detailed evidence and then closed their waters to the taking of tuna by the Japanese vessels — thus doing what we could not do ourselves under our existing jurisdiction.

Since the Magnuson Act does not provide for the implementation of management measures unless there is a Plan in effect, not all species and/or fisheries are subject to federal regulation. Further, since FMPs can and do differ in their objectives, scope, and implementing regulations, fisheries management policy, as contained in the individual FMPs, varies considerably and is constantly being amended. For example, in the Northeast Region, we have Plans in effect which range from severe effort limitation systems on surf clams to a single size limit restriction on sea scallops. If the range in this management style is perplexing to us here in the states, I can only guess at the concern it must cause north of the border. As a matter of fact, even the two Councils with which we interact here in the Northeast have substantial philosophical differences that have led to unresolved jurisdictional issues in two or more FMPs. And, unfortunately, I must also point out that in several instances in the last two years NMFS has demonstrated a significant disagreement with the Councils by disapproving FMPs which they had laboriously developed.

Thus, our management actions under the Magnuson Act have not provided a very stable or clear cut pattern to anyone not close to the intricacies of the system. This is not necessarily wrong for those most affected by the management measures. Our Congress intended to build flexibility into the system to allow the Councils to reflect local opinions and interests. Certainly, placing policy decision-making within the jurisdiction of the Councils was a deliberate attempt to avoid a monolithic system dictated by Federal bureaucrats.

So, here in the United States, we have a relatively unstructured plan development system, heavily weighted towards achieving local input but also subject to intense review by a tremendous over-burden of public and private interests which stresses and greatly delays the entire implementation process. It is a system which, because of its attempt to take everything and everyone into consideration, becomes almost unintelligible to those it most affects. It forces our FMPs to be practically incomprehensible documents of up to 200-900 pages that are largely unread — even by some Council members who

vote their adoption. In essence, what have evolved, in many cases, are convoluted documents designed to win the approval of the multitude of official reviewers. The fact that those involved in the fishery no longer comprehend the process seems to be a minor consideration.

If I seem overly critical of the way this process has developed, it is only because I have believed in the concept of the Magnuson Act from the beginning. I wanted it to produce an effective regional management system which was truly responsive to resource and user needs. How I wish someone would produce a road map which all of us involved could use to find our way to the high ground of clear logic and understanding and even acceptance by those being regulated. Possibly that utopian objective is forever beyond our means.

Effects of U.S. Management Plans on Canadian Management

Given the rather chaotic status of U.S. management actions, it seems clear that Canadians have little desire to duplicate our complicated system. Even trying to comprehend it must be exciting. Trying to fit complementary measures on shared stocks must be like riding a roller coaster blindfolded to an unknown destination.

For example, let's take the situation with sea scallops. In a rare example of unanimity both Canada and the U.S. determined that scallop meat size regulation would be the principal method of controlling their respective fisheries. After the U.S. scallop plan was implemented, both nations began to move toward an ultimate goal of a 30-meat count per pound average which scientists agreed would protect juvenile scallops and increase yield per recruit. Subsequently, at the request of industry interests, the U.S. twice delayed the attainment of the 30-meat count average standard by emergency action but continued to urge Canada to move to that level. The next change was for the U.S. to propose a *minimum* meat count rather than the average which had been advocated earlier. The purpose of this change was to decrease the mixing of small scallops with a few larger ones to achieve the average count. The Canadian authorities and industry resisted this change for good reasons, but nevertheless indicated they would continue to move toward the originally sought 30-meat count average.

The U.S. amended its Plan to provide for the minimum count change and included a new implementation date. The Canadians picked a similar date for implementation of the 30-meat count average and hoped that the U.S. would continue to allow Canadian caught scallops into U.S. markets. Then our

Agency, facing a rebellious industry, postponed implementation of the minimum count, thus retaining the 35-meat count average while Canada moved to its previously agreed to 30-meat count average. At the present time, this discrepancy in meat count sizes still exists but hopefully a new amendment to the U.S. scallop plan will bring us to a 30-meat count average within a few months.

This scenario for sea scallops has been more involved than management for some of the other shared stocks such as lobsters, groundfish and herring. However, changes have occurred in these other Plans and regulations, making it difficult on both sides of the border to maintain similar complementary or compatible regulations. Since much of the Canadian catch of all these species ends up in U.S. markets, primarily in the fresh or even live form, Canadian interests cannot afford to ignore U.S. regulations, particularly those pertaining to possession size limits. Realistically, U.S. size limits on lobsters and groundfish dictate the sizes of these species which Canada ships into the states since, in most cases, sub-legal specimens could be seized either because of state or federal possession size limits. The regulations pertaining to lobsters such as the possession of egg-bearers or lobsters from which the eggs have been forcibly removed also apply to Canadian lobsters in most coastal states. We have worked recently with the Department of Fisheries and Oceans to preclude shipment of these illegal lobsters into interior states that have no possession laws. Canada adopted regulations prohibiting shipment of egg-bearers but, to my knowledge, they did not include lobsters from which the eggs have been removed. At the present time, U.S. federal legislation is being considered which would make this illegal in all of the states.

Another problem which arose was the meat count size for sea scallops. The original New England Council plan called for the same size limits to apply to Canadian scallops coming into the United States unless I developed a system whereby the Canadian authorities could certify that the scallops being exported to us were taken under similar conservation regulations. Such a program was worked out between our two regional offices and has been in effect since the U.S. scallop plan was implemented in 1982. This certification program has worked very well for both countries and is a good example of what can be accomplished if a cooperative approach is taken.

Incidentally, this is not just a Canadian industry problem. There is, here in the States, a substantial dependence by U.S. buyers and processors, truckers, etc. on the flow of Canadian product through the entire seafood industry. Not all of our fishing industry is opposed to Canadian imports — on the contrary, without these products, particularly in the fresh form, many of our market needs could not be filled. Our domestic fishermen currently cannot supply

without these products, particularly in the fresh form, many of our market needs could not be filled. Our domestic fishermen currently cannot supply the total U.S. market for such species as groundfish, lobsters, scallops, herring and swordfish. Thus, through these extensive trade arrangements, our two industries are tied together even if our management systems vary considerably and our regulatory actions are rarely in tune.

Future Considerations to Avoid Conflicts

Given the facts that we share some of the same stocks of fish and that the U.S. is a principal market for Canadian caught seafood, how can we avoid conflicts, especially given the variability of the U.S. management system and the differing objectives of our utilization of the fishery resources?

I can offer three suggestions which might help to alleviate these problems:

1. Increased recognition by all parties on both sides of the border that consistency and compatibility of conservation regulations on shared stocks must be addressed despite our differences over management style and marketing strategy.

2. Cooperation, from the onset, by working-level management plan developers to ensure consideration of issues of mutual concern.

and finally,

3. Better communications on management issues so that everyone involved is more aware of pertinent regulations and why they read as they do.

The above suggestions would help to provide a more logical approach until we might finally arrive at a formal arrangement on the management of these shared resources.

Thank you.

Chapter 2
Status of the Fishery and Scientific Bases for Management

The Scientific Basis of Fisheries Management

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Abstract

The biological basis for fishery management is discussed in the context of long-standing analytical techniques for assessing the yield and recruitment potentials of fish stocks, and in view of a new approach which simultaneously assesses the potential for both growth and recruitment overfishing. It is demonstrated that the two biological control variables for fishery management purposes are fishing mortality and the age at which a species of fish is first subject to catch in the fishery. Three generalized strategies for regulating the fishery are reviewed and evaluated in terms of their impact on the control variables. It is concluded that significant technical limitations exist with respect to the effective application of all three management strategies,and that some are more compatible than others given the limitations imposed by our technical knowledge of both the fisheries and the stocks upon which they depend.

Introduction

There are many examples of fishery management in practice throughout the world that could serve as models for the fisheries of the Northwest Atlantic. But close examination of these programs reveals a delicate balance between science and policy that typically makes them unique in relation to the particular set of fish stocks and policy goals of the beneficiary nations. Although the principles and methods of fishery science that have been developed elsewhere can be validly applied to indigenous stocks, the policie that dictate the best choice of management tools must be developed locally.

In the United States, the policy for managing the nation's marine fisheries resources is articulated in the Magnuson Act. Seven National Standards, which are set forth in §301 of the Act, are used by the Secretary of Commerce to judge the acceptability of fishery management plans developed by regional management councils. Three of the standards which offer the best insight into the biological goals of fishery management state:

- conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from the fishery;

- to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination; and

- conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Optimum yield is defined in the Act as the amount of fish taken through a fishery that will provide the greatest overall benefit to the Nation, with particular reference to food production and recreational opportunities and that may be determined on the basis of "maximum sustainable yield" (MSY) from the fishery as modified by any relevant economic, social, or ecological factor. Overfishing is understood as having two components: growth overfishing, which is wasteful of potential physiological production, and recruitment overfishing, which undermines the ability of a stock to replace itself with its own progeny.

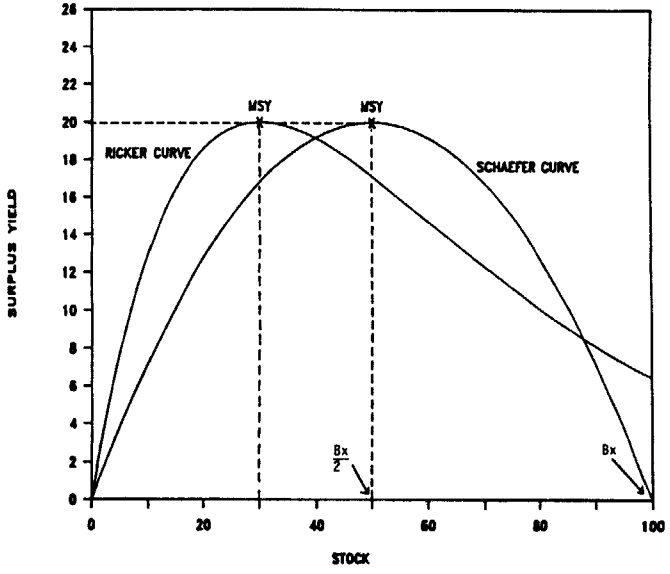
Notwithstanding the need to determine what constitutes MSY and overfishing in particular fishery situations, fishery managers are required to design a regulatory regime that will result in the most favorable level of long-term production from the fishery that utilizes a particular stock or stocks. This task is not enviable, particularly in view of the difficulty of measuring the condition of the resource (which one can only blindly sample), the uncertainties of the complex marine ecosystem, the multispecies nature of many fisheries, the socio-economic character of the fishery, and the practical limitations of the management tools. Of all natural resources under management in the United States, open-ocean fisheries is among the most problematic.

Basic Concepts in Fishery Science

We have already introduced the term MSY. The concept of MSY is quite simple. Fishery science has principally defined it to be the maximum long-term average level of yield that can be produced by a fish stock. In essence,

term average level of yield that can be produced by a fish stock. In essence, MSY is a theoretical value that is based on the apparent productivity of the stock and assumes both intense (yet responsible) fishing and a stable environment. A common approach to estimating MSY is to explain the observed changes in a fish population using a mathematical model whose properties are logically consistent with the dynamics of other natural populations. In several fishery management situations, particularly tropical tuna, MSY has been estimated using a yield expression that assumes a parabolic relationship between equilibrium yield (Y) and stock biomass (B) as illustrated in Figure 1.

Figure 1
Production Models



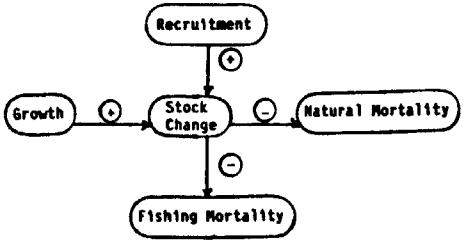
The fishery model developed by Schaefer (1954) is probably the best example of this approach. The yield expression has the basic form:

$$Y = kB - (k/Bx)B^2,$$

where k is the intrinsic rate of stock increase and Bx is the maximum biomass that the environment will support. The expression indicates that as B approaches its maximum value (Bx), yield becomes zero; but differentiation

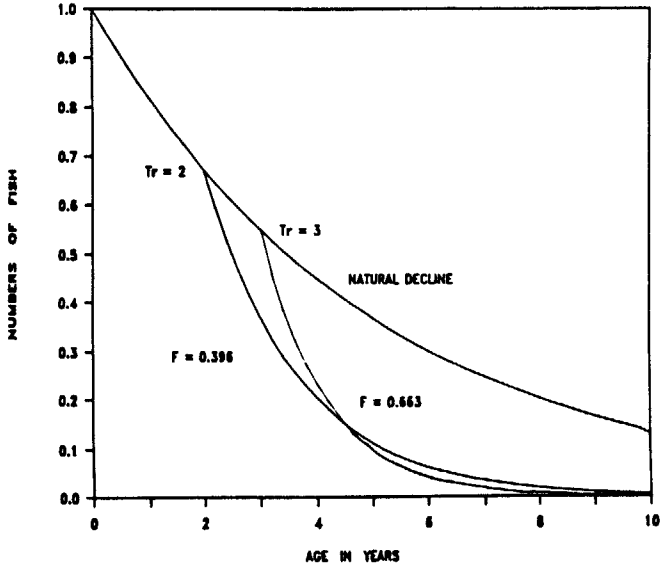
of the model equation reveals that yield is maximized when B is exactly equal to 1/2 of its maximum value. Yield that is not taken by the fishery accrues to increased stock biomass, so unless fished, the stock will grow to its maximum value where it will maintain itself. In a fishery sense, it is appropriate to keep the population at B = Bx/2, because that is the level where growth potential and harvestable yield are simultaneously maximized. The level of fishing (F) that keeps the population at Bx/2 and produces the greatest amount of yield is called Fmsy. Actual, population-specific values for MSY and Fmsy are obtained by a statistical procedure called "fitting" the model to observed catch and effort data from the fishery.

Another approach to estimating MSY takes greater advantage of what is known about the factors that influence changes in stock biomass. These factors include physiological growth, the recruitment of individuals to the stock, and the loss of individuals from the stock as a consequence of natural mortality and fishing mortality.



There are several methods for calculating the expected yield of an average recruit over its life in the fishery, which are collectively referred to as yield-per-recruit (YPR) analysis. The most commonly used YPR method for Northwest Atlantic species is that of Beverton and Holt (1957). Yield-per-recruit analysis attempts to simultaneously account for weight gain through physiological growth and weight loss through natural mortality, under various regimes of fishing mortality (F) and specification of the age at which a recruit first become subject to catch in the fishery (age-at-entry). Figure 2 illustrates the decline of a cohort (in numbers) from the year it is spawned, through the year it first becomes vulnerable to fishing, and beyond, as fishing and natural mortality combine to ultimately remove it from the population. If the numbers at age are multiplied by weight at age, then it is possible to calculate the potential yield from a year class by knowing the fraction removed at each age due to fishing mortality.

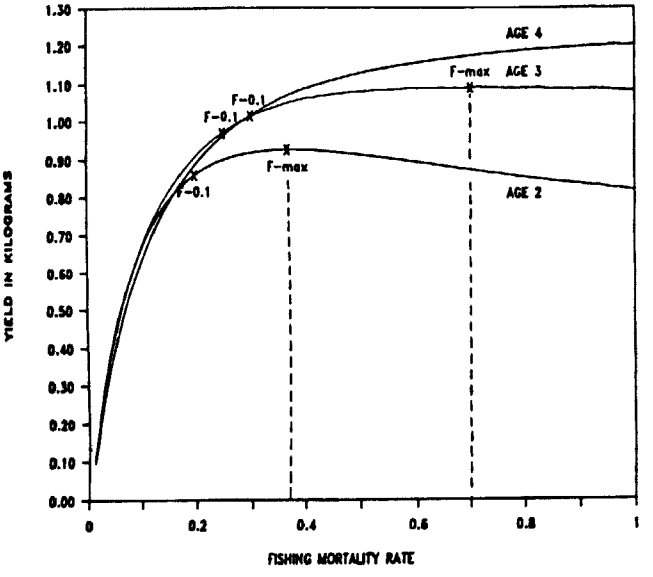
Figure 2
Population Decline



In general, delaying age-at-entry has the effect of increasing YPR, as illustrated in Figure 3. Because YPR is a function of both fishing mortality rate (F) and age-at-entry, it is possible to calculate the appropriate level of fishing mortality that will maximize YPR (Fmax) for each value of age-at-entry. In this way it is possible to determine an appropriate fishing mortality strategy that may lead to MSY, so long as other factors in the fishery are taken into consideration, such as the size selectivity of the gear or the minimum marketable size of a particular fish species.

Because Fmax does not implicitly take into consideration anything about the reproductive potential of the population, and because the Fmax strategy has, in some cases, not prevented stock declines, another reference point, F(0.1), has been defined which is believed to buffer the resource against declining recruitment with little sacrifice of potential yield. By definition, F(0.1) corresponds to the point on the YPR curve where the slope is equal to 1/10 the slope at the origin. In other words, F(0.1) corresponds to the point where very little additional yield is gained by an increase in fishing mortality.

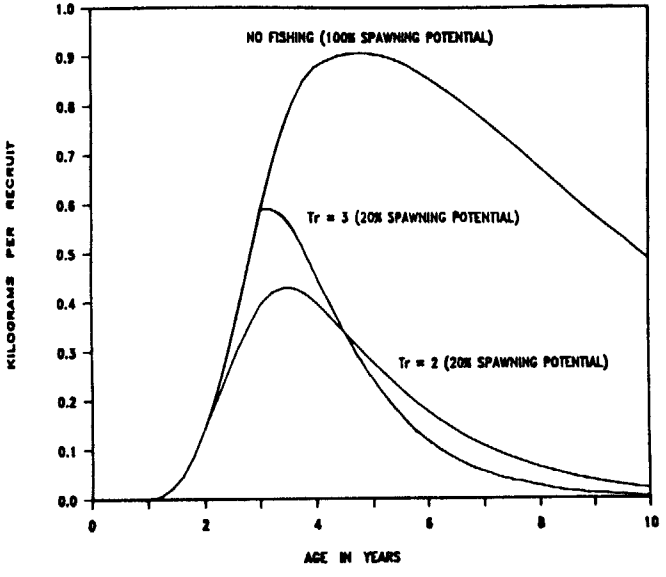
Figure 3
Yield Per Recruit



Both Fmax and F(0.1) are commonly used biological reference points for guiding fishery management decisions.

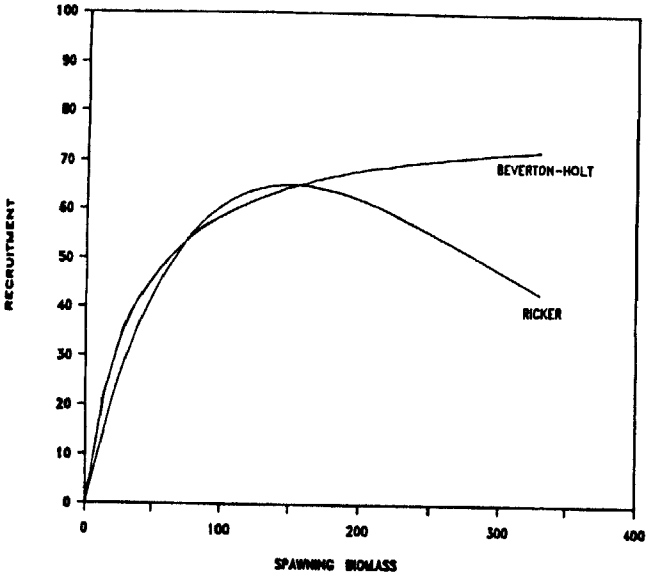
Similar to yield, fishing mortality and age-at-entry also affect the spawning potential (in terms of either biomass or eggs) produced by a year class over its life in the population. Spawning biomass, which may also be normalized for recruitment to yield spawning biomass-per-recruit (SPR), is calculated as the product of numbers, weight and percent maturity summed over all ages. Figure 4 illustrates three spawning biomass profiles generated by a year class as a function of age. Spawning potential is determined by calculating the area under (integrating) each curve. The top profile illustrates no fishing, which results, by definition, in the achievement of 100% of the spawning biomass potential; and the other two profiles illustrate the achievement of 20% spawning potential through two combinations of age-at-entry and F.

Figure 4
Spawning Potential



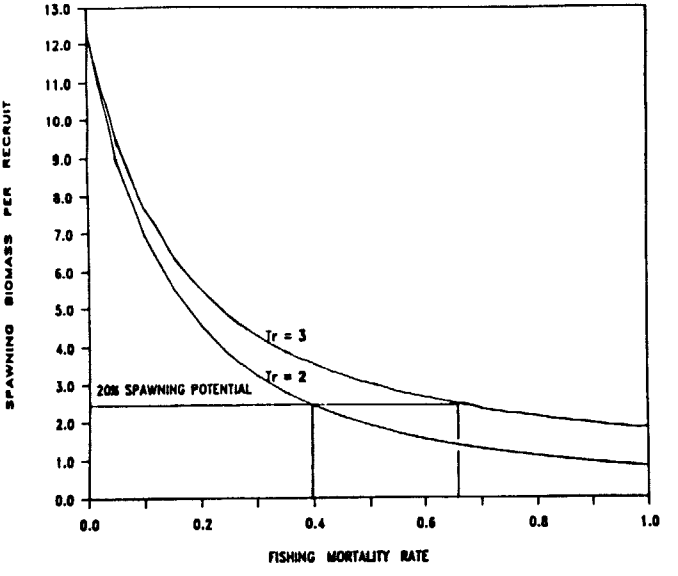
Recruitment is the addition of new fish, known as cohorts or year classes, to the fishable stock. Recruitment results from successful reproduction and the subsequent survival of young, pre-exploited fish. Intuitively, the size of a cohort, as it recruits to the fishery (becomes subject to capture in the fishery), is related to the size of the spawning stock that produced it. Several models have been postulated to describe the relationship between spawning stock and subsequent recruitment. Perhaps the best known models are those of Ricker (1958), who hypothesized increasing recruitment with spawning stock size followed by diminished recruitment at high stock sizes, as a consequence of cannibalism, and Beverton and Holt (1957), who also hypothesized that recruitment increases with spawning stock, but that recruit mortality increases in proportion to their own number as a consequence of competition for limited food resources. The Ricker model is dome-shaped, whereas the Beverton and Holt model is assymptotic, as illustrated in Figure 5. In both cases the models are conceptually based, reflecting basic understandings of density-dependent biological processes.

Figure 5
Stock - Recruit Models



For both models, each point on the curve represents an equilibrium condition where recruitment will be (theoretically) sufficient to replace the parental stock and thus maintain it at that level. The equilibrium point that will be achieved under a particular fishing mortality regime is determined by the intersection of straight lines, emanating from the origin, with the curve. These lines, called replacement lines, reflect the potential of each recruit to regenerate spawning stock. To better understand the basis for calculating these replacement lines, one must look back at spawning potential. Spawning biomass-per-recruit, derived from the spawning biomass at age analysis described above, is plotted as a function of fishing mortality (F) in Figure 6. The information contained in Figure 6 is significant because it is possible to translate (by inversion) the value of the SPR curve (at the point defined by some level of F, say Fmax) into the slope of a replacement line which overlays the stock-recruitment curve as illustrated in Figure 7. In this way, the reciprocal of the value of spawning biomass per recruit, at a given level of F, identifies the average level of recruitment required to replace a specific level of stock abundance under a specific regime of fishing mortality and age-at-entry.

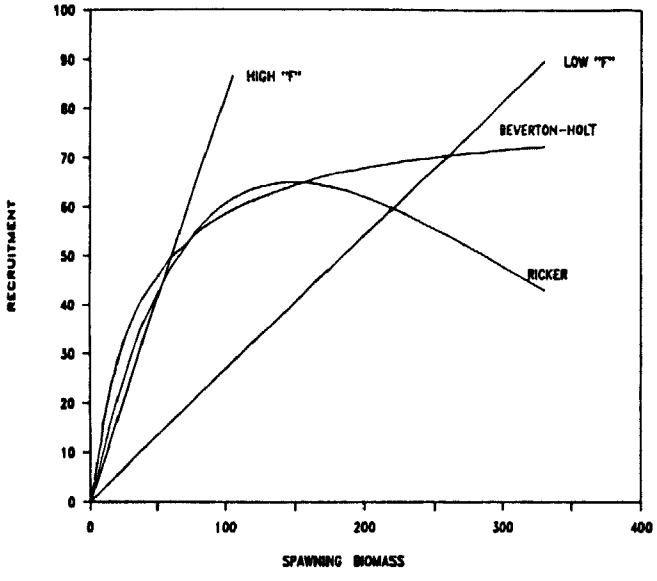
Figure 6
Spawning Potential



For any level of stock, recruitment values above the replacement line wil tend to increase stock size, whereas, recruitment values below the line will tend to decrease stock size. In order to achieve an equilibrium, the tendenc to increase stock should be matched by the tendency to decrease stock. In general, as fishing mortality increases, the recruitment required to maintain the stock also increases. Unfortunately, this analysis is not particularly usef in many cases because these traditional stock-recruitment models are rigid i form and they seldom explain observed stock and recruitment data (which a highly subject to density-independent as well as density-dependent factors) with acceptable statistical confidence. Furthermore, these models provide little guidance with respect to overfishing, except to the extent that high levels of F either correspond to low values of SPR or do not correspond to a equilibrium point on the curve, and recruitment failure is assumed.

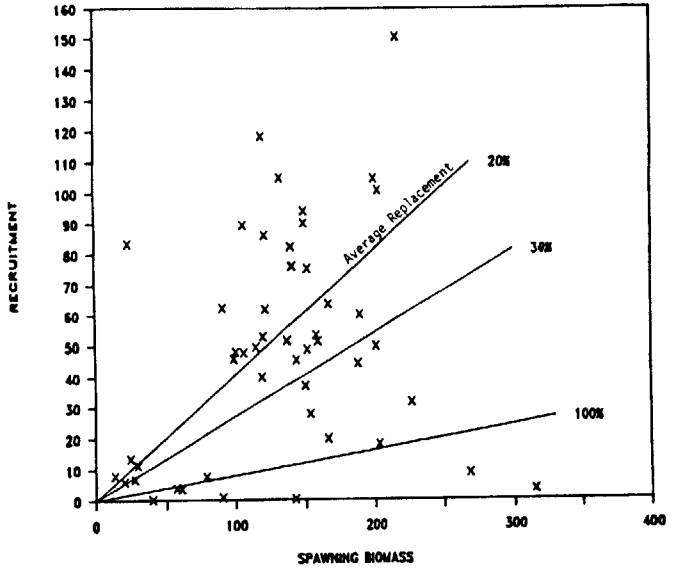
To overcome the limitation presented by stock-recruitment data that are not well described by the traditional, density-dependent models, Sissenwine and Shepherd (in press) have proposed that the mean value of R/S from empirical recruitment and spawning stock data should be used to define the

Figure 7
Stock Replacement



slope of an "average replacement" line, which will correspond with stock maintenance on an average basis. The value of fishing mortality that corresponds to average replacement is called Frep, which may be used as a reference point to evaluate the risk of recruitment overfishing. The average replacement line may also be defined in terms of percent maximum spawning biomass, as illustrated in Figure 8. In general, if fishing mortality exceeds Frep for an extended period of time, the stock will likely decline, assuming that the basic pattern of stock and recruitment doesn't change. The actual value of Frep is not fixed because SPR from which it is calculated depends both on fishing mortality and age at entry. Frep does, however, represent a constant level of spawning potential. The approach suggested by Sissenwine and Shepherd may, in fact, be quite robust for minimizing the risk of recruitment overfishing. That is, if recruitment does exhibit the density-dependent mechanism postulated by Ricker and Beverton and Holt (i.e., compensation), then average recruitment at low stock levels should be underestimated by the average replacement line, which would in turn lead to stock rebuilding and a stable population. This approach has been used in the management of New England groundfish as discussed in Sissenwine and Marchesseault (1985).

Figure 8
Stock Replacement

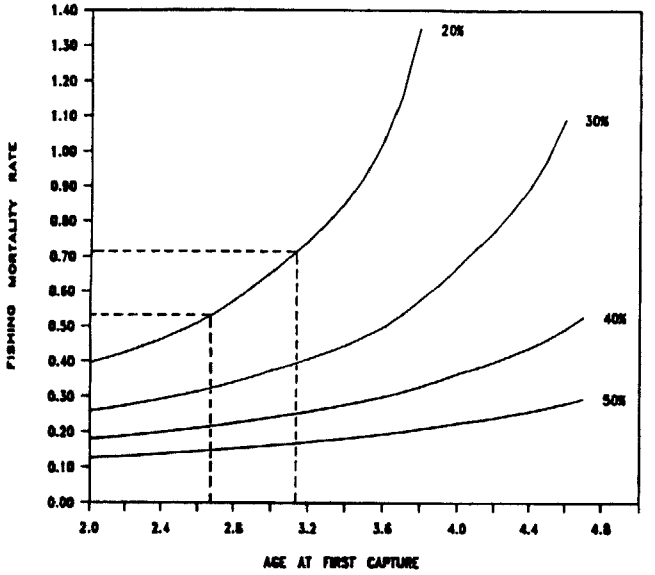


As a direct consequence of the ability to define both the productivity of a year class and the recruitment requirements for stock maintenance in terms of fishing mortality and age-at-entry, it becomes possible to define a suitable management regime in terms of its ability to control both variables. Assuming that an appropriate level of spawning potential has been defined for a particular stock, along the lines indicated above, then fishing mortality and age-at-entry become control variables that must be manipulated to manage the stock. Figure 9 illustrates the relationship between fishing mortality and age-at-entry for various target levels of spawning potential.

Applying the Basic Concepts

Section 303 of the Magnuson Act identifies a full range of measures that may be used to manage the fisheries. These measures include limitations on gear, effort, catch, area, season, and vessels. In scope, these measures are no different than the measures that have been used in fishery management throughout the world. In practical terms, all of these measures are directed at the same thing: the control of fishing mortality and/or the age-at-entry to the fishery. In most cases, the selection of management measures has more to do

Figure 9
Spawning Potential Isopleths



with economic objectives or operational considerations than any fundamental disagreement with the biological condition of the resource.

Three major strategies are available to managers to effect the control of overall fishing mortality or age-specific fishing mortality. These strategies include: 1) catch control, 2) effort control, and 3) operational control, the latter including when, where and with what gear fishing can take place. In most cases, fishery managers will not rely exclusively upon one strategy. They will choose from the strategies whatever measures are most desirable to accomplish their goals in the particular context of their fishery. Nevertheless, it is useful to review the fundamental management strategies independently to understand their motivation.

Catch Control. This general strategy has been widely used in fishery management. Conceptually, the purpose of a quota is to control fishing mortality on a particular stock by controlling what is landed. Presumably, the level at which one wishes to control fishing mortality has already been determined to be Frep, Fmax, or some other value derived from the basic biological analysis. In practice, quotas are typically established to conform as closely as possible with what would otherwise result from fishing the current population at some target level of fishing mortality. Quotas may also be designed to prevent further stock decline or initiate stock rebuilding, but

here too, a knowledge of the current stock condition is required. Almost nothing in the way of knowledge is easy to come by for open-ocean fisheries, but a current estimate of stock size is among the most elusive. Unfortunately, the methodologies available to the assessment scientist for estimating stock size and composition, such as virtual population analysis, are retrospective in orientation and ill-equipped to provide useful estimates of current stock size. Survey abundance indices are available in most cases, and are relied upon to assist in estimating current stock conditions. Again, survey abundance estimates of current conditions are highly subject to measurement error.

In summary, quota management is very demanding of current information on the status of the stock, and highly vulnerable both to uncertainty and the need for constant correction. By imposing an optimum equilibrium situation on the fishery, quota management forces the industry to bear the immediate cost (in the form of forgone catch) of uncertainty in stock size estimation and normal variation in stock recruitment. In addition, by relying heavily upon what is landed, quotas may not reflect what is actually caught. This situation becomes particularly problematic when, as was shown earlier, the selection of the target F value relies heavily upon certain assumptions of age-at-entry. Where numerous small fish are caught and discarded, even technically competent quotas will fail to meet their objective. Finally, quotas have other properties of a non-biological nature that make them more or less desirable as management measures, and the latter may be the major basis for their acceptance or rejection in certain management situations.

Effort Control. The general strategy of effort control has also been attempted in various management situations, but less frequently than catch control. In concept, effort control is appealing because it holds promise for direct and efficient manipulation of a major biological control variable, fishing mortality. The methods used in effort control range from a limit on participating vessels to a limit on days fished, but they all have as their basis a calculated relationship between units of effort and units of fishing mortality. In most single-species fishery management situations where an identifiable fleet is dedicated to the harvest of a particular stock, it is possible to derive the amount of effort (e.g., vessels or days fished) that will achieve the fishing mortality goal. The major benefit of effort control is that it should not need much correction; it should be established at an appropriate long-term value equivalent to Frep, Fmax or whatever, and left alone. The level of catch which is derived under effort control would be expected to fluctuate appropriately with natural fluctuations in the stock. Only if the basic mechanisms affecting growth, recruitment, and natural mortality change, should one ideally have to change the management program.

Unfortunately, the application of effort control is less than ideal. Many of the fisheries with which we are familiar in the Northwest Atlantic use gear that is not selective for different species of fish. As a consequence, effort units of vessels, days fished, or gear deployed, cannot be directly related to

fishing mortality on a single stock. Even when the world is simplified in the single-species fishery case (e.g., surf clams), the effective effort of a fleet is as much associated with technological innovation as it is with vessel units. The fact is that the effort control strategy can only work well when effective effort is controlled. This implies that adjustments must be made when inefficient vessels are replaced by newer, more efficient designs, gear configuration is modified to fish more efficiently, or electronics are added to increase the efficiency of each day on the grounds. Unfortunately, the only solution to effort control in some single-species fisheries situations may be rigid control on vessel efficiency with a concommitant sacrifice of vessel flexibility. The latter flexibility, of course, includes the ability to switch among fisheries. Finally, like catch control, effort control also imposes on the industry the optimum equilibrium solution defined by Frep, Fmax or whatever, without regard for the time frame in which benefits are likely to accrue to the fishery. Additionally, unless age-at-entry is accounted for in the design of an effort control program, achievement of the biological objectives will be placed in jeopardy.

Operational Control. The general strategy of operational control has frequently been used in fishery management. In concept, operational control focuses most directly on the age-at-entry control variable. The biological rationale for its use is that if effective control is established on the age at which a species is first subject to fishing mortality, and if that age is old enough, then the spawning potential of the stock will be relatively robust to fluctuations in fishing mortality. For example, reference to Figures 3 and 9 indicates that both YPR and %MSP become relatively insensitive to changes in fishing mortality as age-at-entry increases (in the case of %MSP, a 20% value has been judged appropriate for many northern finfish species).

Operational control may take the form of gear, area, or seasonal restrictions or landings restrictions with respect to size. In relation to the control variable age-at-entry, the measures that might be employed to minimize the catch of certain age groups include specification of the minimum size that may be retained or specification of minimum mesh size. Control on product size is being used, for example, in both the sea scallop and lobster fisheries, and mesh size control has been an important part of management programs for groundfish. In relation to fishing mortality, operational control may have a mitigating effect on discard mortality or on by-catch mortality. Operational control in the form of closed areas or seasons may be used to enhance spawning activity or minimize the vulnerability of species to non-selective gear.

Operational control has the major advantage of being highly compatible with the operation of a mixed-species fishery, because it can be manipulated

to simultaneously achieve stock-oriented objectives without significantly impeding flexibility at the vessel level. Operational control typically does not impose inappropriate short-term costs on the industry in the attempt to achieve long-term benefits. The major disadvantage with operational control is that it is relatively imprecise and must be continually monitored for effectiveness. Finally, the measures of operational control are typically demanding of at-sea monitoring/enforcement resources, and rely heavily on the cooperation of the industry.

Conclusions

The following points may be concluded with respect to the biological basis for management.

1. Biologically-based reference points are available to guide management decisions. These reference points include Fmsy, Fmax, Frep and others. These reference points are drawn from models that describe yield or spawning potential on a long-term average basis. The management guidance suggested by application of these reference points has limited value for achieving short-term goals.

2. Fishing mortality calculated to achieve average stock replacement (Frep) satisfies the need to define a biological reference point which incorporates both physiological growth and the maintenance of adequate spawning potential. That is, as a reference point, it meaningfully addressed both growth and recruitment overfishing.

3. In the design of any management program for fisheries, the control variables are fishing mortality and age-at-entry.

The task of fishery management is to construct the set of measures that will appropriately manipulate the control variables so as to achieve the management objectives over the long term. The measures that are available for regulating the industry are incorporated into three general strategies: catch control, effort control and operational control. With respect to the selection of an appropriate management strategy, the following conclusions may be drawn.

1. Both catch and effort control focus on the parameter F and are designed to directly effect the achievement of a desired, long-term resource or fishery condition. Both strategies suffer in their

implementation from technical limitations to the ability to relate functional units of the fishery (e.g., vessels) to theoretical values of the control variable.

2. In practice, catch and effort control attempt to achieve instant equilibrium conditions in the resource and as such tend to impose costs (forgone catch) in a time frame when benefits are uncertain.

3. Operational control primarily focuses on the parameter age-at-entry and attempts to indirectly effect the achievement of long term resource conditions by placing a regulatory emphasis on measures that husband year classes as they recruit to the fishery. Operational control measures typically require continual monitoring and place a heavy burden on at-sea enforcement.

4. Most operational measures do not extract costs from the fishery in anticipation of uncertain benefits, but rather impose costs in the same time frame that benefits are being realized.

5. Management strategies that do not consider some element of control over age-at-entry are in jeopardy of either overregulating or failing to achieve their objectives.

Finally, it is important to reiterate several other limitations on our ability to apply biological principles to the management of fisheries. First and foremost, many fisheries in the Northwest Atlantic are complex in their use of gear and in the species upon which they are based. This complexity extends beyond unit fisheries to encompass the participation of certain vessels in multiple fisheries. The management problem quickly escalates to one of simultaneous achievement of biological and economic objectives that exceeds the limits of our knowledge. The use of management measures must be judicious, with full appreciation for the limited basis that currently exists for evaluating resource potential or quantifying fishery-species interactions. Finally, the fishery science community must escalate it efforts to unravel the complexities of the fisheries so that its advice is increasingly relevant to solving the management problems that face us in the Northwest Atlantic.

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U.S. Fishing Affected by the 1984 U.S.-Canadian East Coast Maritime Boundary Decision

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Material presented in this paper was condensed from a large report by the authors. Opinions expressed in this paper are the authors' and do not necessarily reflect those of the authors' employer. The authors wish to acknowledge significant contributions from Robert Reidman, James Kirkley, Joan Palmer, Art Gallagher, Pat Kurkul, Jack Terrill and Jack Doll. Special thanks go to Robert Temple for his encouragement and Debbie Greenwood for her assistance in preparation of this paper.

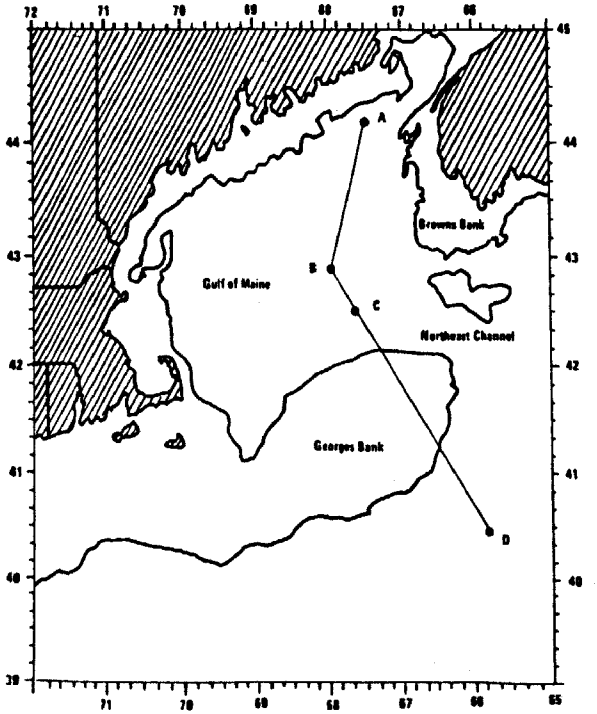
Abstract

At least one out of every five U.S. fishing vessels over 5 tons from the seven major New England ports was affected by the ICJ decision. From 1979 to 1983 these affected vessels on average landed 43.3 million pounds valued at $19.4 million, representing 7.6 percent and 10.3 percent of the quantities and revenues, respectively, generated in these ports. New Bedford received the highest proportion of the U.S. revenues from the Canadian zone; $10.2 million out of $19.4 million. Sea scallops was the most prominent species, contributing nearly half of the revenues from the zone.

Introduction

In October 1984, after almost three years of deliberations, the International Court of Justice (ICJ) in The Hague, The Netherlands, announced its decision regarding the disputed east coast maritime boundary between the United States of America (USA) and Canada. The binding ICJ decision established the geographical/political boundary between the two nations, and provided each nation exclusive rights to their respective Zones (Figure 1). The ICJ, in making its decision, did not accept the boundary claims of either nation; rather, the overlapping area of disputed jurisdiction was essentially bisected by the final boundary.

Figure 1
International East Coast Maritime Boundary Between U.S.A. and Canada



Point A: 44° 11'12" N latitude and 67° 16'46" W longitude
Point B: 42° 53'14" N latitude and 67° 44'35" W longitude
Point C: 42° 31'08" N latitude and 67° 28'05" W longitude
Point D: 40° 27'05" N latitude and 65° 41'59" W longitude

A straight line sequentially connecting points A, B, C and D forms the maritime boundary. The area east of the line is under the exclusive jurisdiction of Canada, and the area west of the line is under the exclusive jurisdiction of the U.S.A.

The ICJ decision divided productive fishing grounds of the Gulf of Maine and Georges Bank, with approximately 18 percent of Georges brought under Canadian jurisdiction. This division may have important implications for the long term conservation, management, and development of the entire area's fishery resources. Fisheries based on the same resource now are subject to separate national jurisdictions, and potentially conflicting management and exploitation policies. The decision, however, did not provide for resolution of future management conflicts between the two countries. It is, therefore, essential in these early post-decision stages for assessments to be made of the possible biological, economic, and social impacts, as a guide to future policy direction. This paper was written to provide basic economic information that could be useful in the formulation of U.S. policy.

Approach

Landings data were examined for seven major New England ports, for the five year period, 1979-1983. The ports were Rockland and Portland in Maine; Gloucester, Boston and New Bedford in Massachusetts; and Newport and Point Judith in Rhode Island. The purpose was to determine the historic dependence of these ports on the boundary zone that is now under Canadian jurisdiction.

Four variables are used to describe dependence on the Canadian zone: (1) number of vessels, (2) number of crew, (3) landings of 12 major species, and (4) ex-vessel revenue. All information is presented on an average annual basis for a five year period using 1979-1983 data. The principal data source is the National Marine Fisheries Service's (NMFS) commercial fisheries "weighout" data base, which includes data records of sales between vessels and dealers and detailed trip information obtained through interviews with vessel captains and crew. For fishery statistical areas bisected by the boundary, these trip interview data were employed to estimated data for the Canadian zone. Landings are given in live (round) weight for both finfish and shellfish. Revenues are given in nominal dollars, that is, unadjusted for inflation. Vessel data are summarized by time and place of landings. Activity at each port includes that of vessels native to the particular port and that of vessels native to other areas.

The analysis is restricted to the harvesting sector and is essentially a statistical description of U.S. fishing activity in the disputed boundary zone prior to the ICJ decision. No assessment was made of possible switches of displaced vessel effort to other U.S. zone fisheries unaffected by the decision, nor was the impact of the exclusion of Canadian vessels from areas in the U.S. zone analyzed.

New England Fishing Performance and Dependence on the Canadian Zone

A. Number of Vessel and Number of Crew

In an average year, prior to the ICJ boundary decision, 237 New England vessels and 1743 fishermen fished in the Canadian zone. These represented about 19 percent and 29 percent of the New England vessel fleet and fishermen, respectively (Figure 2). Nearly all these vessels landed the bulk of their Canadian zone catches at one or more of the seven major New England fishing ports. In fact, of the 237 New England vessels fishing in the zone, 221 vessels (93%) were based in one of these major ports (Figure 3). New Bedford is the most important port relative to the Canadian fishing zone,

Figure 2
New England Fleet Activity by Fishing Zone
1978-83 Average

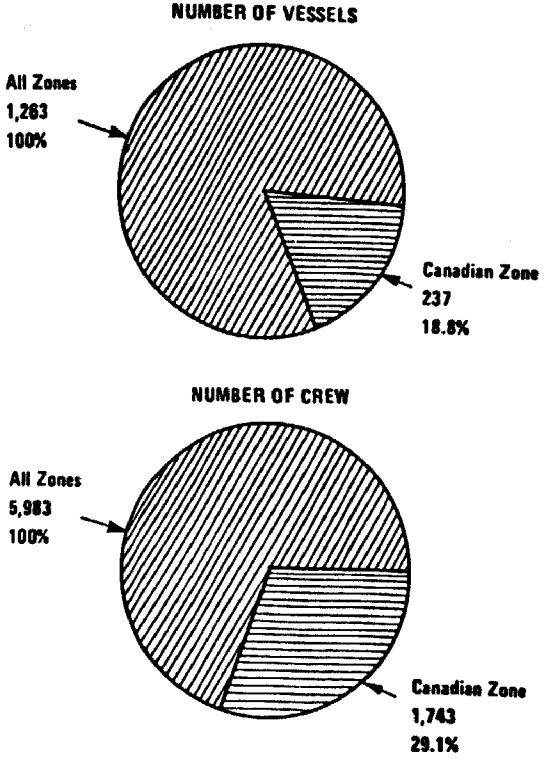
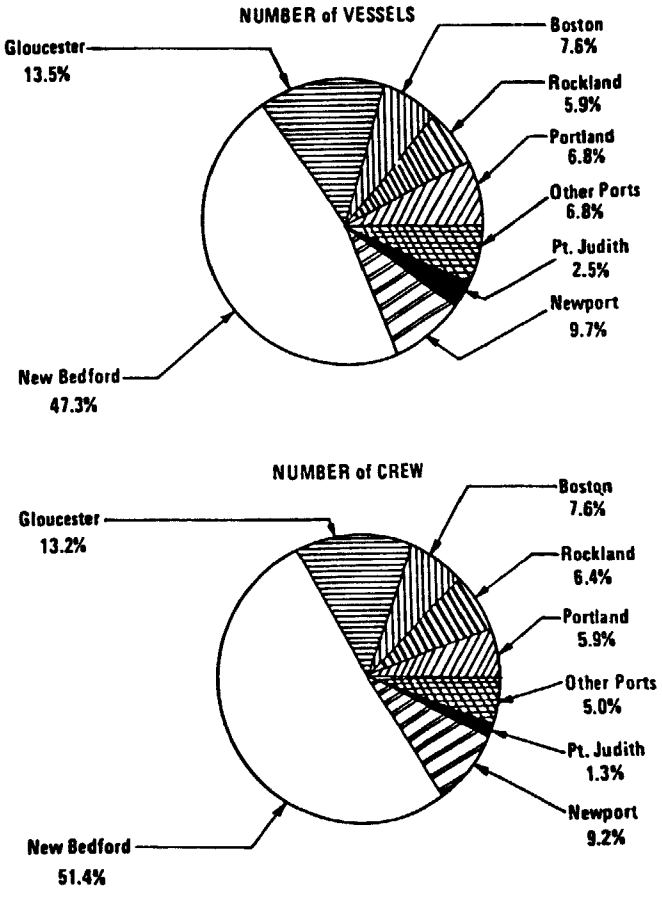


Figure 3
Share of New England Activity in Canadian Zone by Port
1979-83 Average



accounting for more than half of the vessels fishing the zone from these major ports, 112 out of 221 vessels, New Bedford was the most important port relative to the Canadian zone fishing (Table 1). For individual ports, about half of the fleets in New Bedford and Boston are involved in fisheries of the zone. This figure was about 40% for the Rockland fleet and 20% or less for the fleets of the other major ports (Figure 4). Crew reliance on the zone parallels vessel activity.

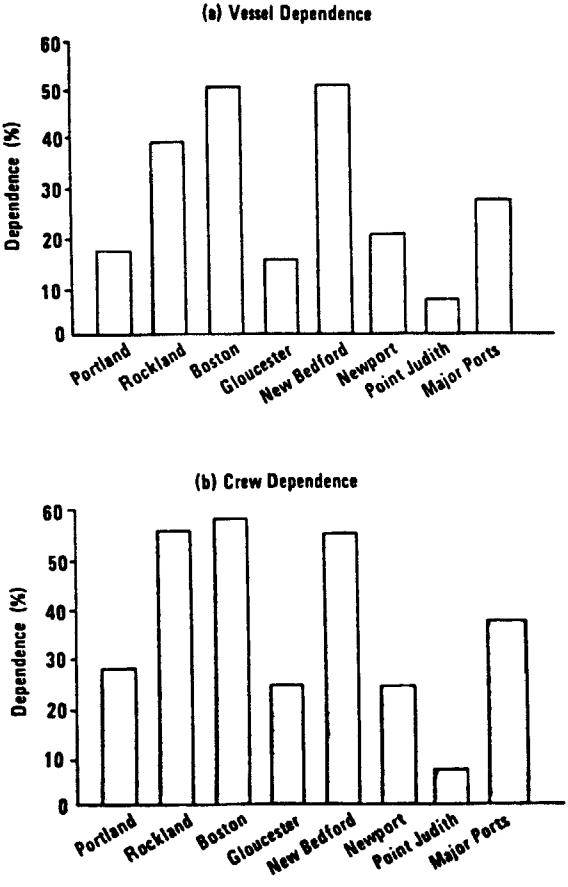
Table 1

Number of Vessel and Number of Fishermen by Port for the Major Ports of New England

Annual Average (1979-83)

	Total		Fishing in Canadian Zone		Dependence on Canadian Zone	
Port	Vessel	Crew	Vessel	Crew	% of Vessel	% of Crew
Rockland	36	203	14	111	38.9	54.7
Portland	95	376	16	103	16.8	27.4
Gloucester	221	1001	32	230	14.5	23.0
Boston	36	231	18	133	50.0	57.6
New Bedford	222	1656	112	896	50.5	54.1
Newport	115	691	23	160	20.0	23.2
Point Judith	94	357	6	23	6.4	6.4
Total	819	4515	221	1656	27.0	36.7

Figure 4
Dependence of New England Major Ports on the Canadian Zone
1979-83 Average



B. Landing Quantity and Landing Value

For the seven major ports, *landings* from the Canadian zone annually averaged 43.3 million pounds valued at $19.4 million, equivalent to 7.6% of quantity and 10.3% of *ex-vessel revenue* for annual landings from all areas at these ports (Table 2). Approximately 50% of the landings from the Canadian zone, both in quantity and revenue, were accounted for by New Bedford

Table 2
Landings by Port (Quantity and Ex-Vessel Revenue) for the Major Ports of New England
Annual Average (1979-83)

	Total Landings		Landings from Canadian Zone		Dependence of Port on Canadian Zone*	
Port	Million lbs.	Million $	Million lbs.	Million $	% of Quantity	% of Revenue
Rockland	40.9	9.1	4.8	1.7	11.8	19.0
Portland	61.3	14.5	2.9	1.2	4.7	8.7
Gloucester	175.1	39.0	7.7	3.1	4.4	8.0
Boston	30.7	12.1	5.2	2.2	17.0	18.1
New Bedford	173.2	81.7	20.8	10.2	12.0	12.5
Newport	33.0	16.5	1.8	0.8	5.5	4.6
Point Judith	53.2	16.4	0.1	0.2	0.2	0.9
Total	567.4	189.3	43.3	19.4	7.6	10.3

* Percentages calculated prior to rounding of landings data.

(Figure 5). Remaining landings were accounted for by Gloucester, Boston, Rockland, Portland, Newport, and Point Judith in decreasing order of importance. Three ports — Rockland, Boston, and New Bedford — each derived over 12% of their annual revenue from fisheries in the Canadian zone; for Portland and Gloucester it was about 8.0%; and for Point Judith and Newport, it was less than 5.0% (Figure 6).

Figure 5
Shares of New England Landing and Revenue Derived From the Canadian Zone by Port
1979-83 Average

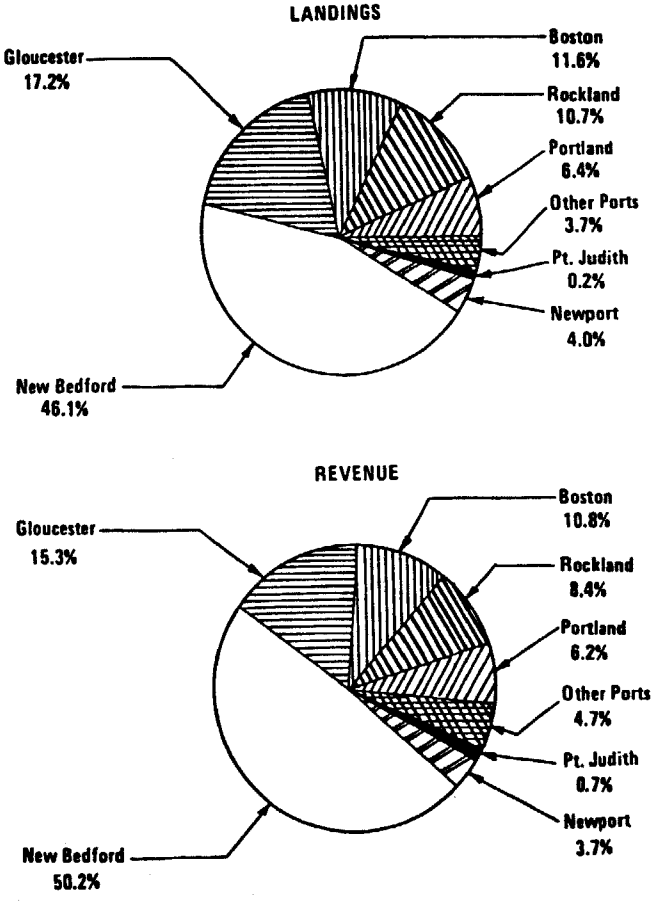
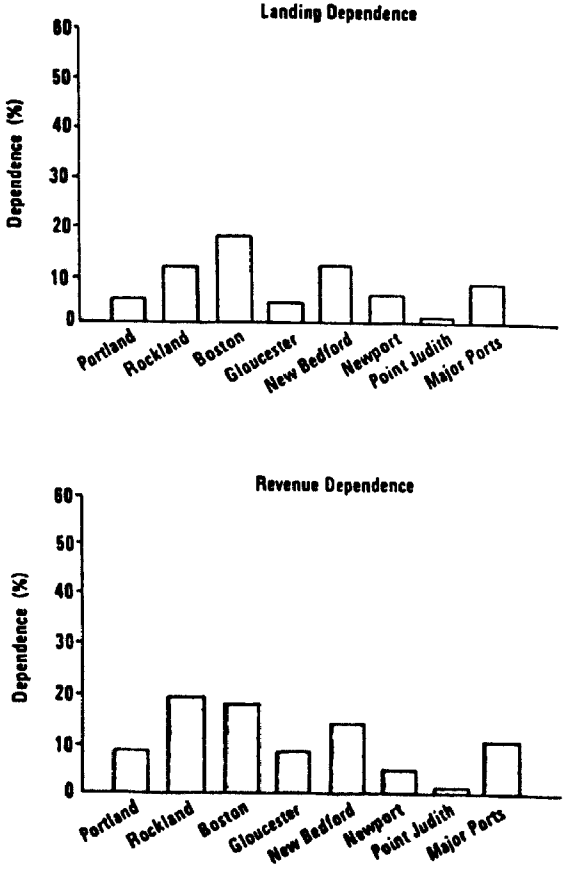
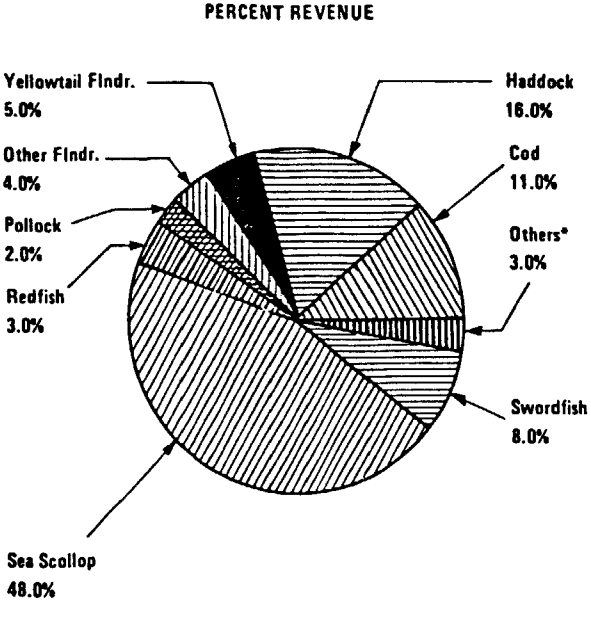


Figure 6
Landing and Revenue Dependences of New England Major Ports on the Canadian Zone
1978-83 Average



In terms of *species*, sea scallop revenues represented approximately 50% of the $19.4 million derived from Canadian zone landings (Figure 7). Haddock, cod, and swordfish were next in importance with about 17%, 12% and 7%, respectively. All other species represented 5.0% or less of the total value of landings from the Canadian zone. Individual species revenue dependence on the Canadian zone, however, exhibits quite a different pattern. Fisheries for swordfish, haddock, and sea scallops, each depended on over

Figure 7
Species Share of New England Ex-vessel Revenue Derived from the Canadian Zone
1978-83 Average



*Other species include whiting, red hake, white hake, lobster and other unspecified species, and each accounts for less than one percent.

15% of their revenue from the Canadian zone, with swordfish revenue dependence as high as 25.2% (Table 3). Revenue dependence for redfish, pollock, cod, white hake, and yellowtail flounder was between 5.0-12.0% for each species. Revenue dependence for each of the remaining species was less than 3.0%. Table 4 shows, *by port*, the importance of the Canadian zone to fisheries for particular species. Sea scallop revenues represented the largest relative share of revenues from the Canadian zone for New Bedford, Portland, and Gloucester. Other sources of revenue from the Canadian zone to particular ports were swordfish, haddock, cod, and yellowtail flounder.

Table 3
Landings by Major Species (Quantity and Ex-Vessel Revenue) for the Major Ports of New England
Annual Average (1979-83)

	Total Landings		Landings from Canadian Zone		Dependence of Species Landings on Canadian Zone*	
Species	Million lbs.	Million $	Million lbs.	Million $	% of Quantity	% of Revenue
Cod	78.8	25.0	7.0	2.2	8.8	8.9
Haddock	41.5	18.8	7.1	3.2	17.0	16.7
Yellowtail Flounder	37.3	18.6	2.1	1.0	5.8	5.3
Other Flounders	53.1	25.2	1.3	0.7	2.4	2.9
Pollock	26.6	5.3	2.3	0.5	8.8	9.0
Redfish	21.4	5.2	2.3	0.6	10.9	11.7
Whiting	17.8	3.0	0.1	0.01	0.5	0.3
Red Hake	2.2	0.3	0.01	0.002	0.4	0.7
White Hake	7.6	1.5	0.5	0.1	7.0	7.7
Sea Scallop	117.0**	57.5	19.5	9.5	16.6	16.5
Lobster	2.2	5.7	0.04	0.1	1.6	1.7
Swordfish	2.4	5.3	0.6	1.3	25.2	25.2
Other Species	159.5	17.9	0.5	0.2	0.3	1.1
Total	567.4	189.3	43.3	19.4	7.6	10.3

* Percentages calculated prior to rounding of landings data.
** 14 million pounds of meats; to convert from live weight to shucked weight of edible meats, divide by 8.33.

Table 4

Revenue Shares and Revenue Dependence of Canadian Zone Landings for Top Species by Port

Annual Average (1979-83)

Port	Species	Revenue Share*	Revenue Dependence**
Rockland	Haddock	28%	31%
	Sea Scallop	23%	22%
	Redfish	20%	21%
Portland	Sea Scallop	41%	17%
	Haddock	20%	15%
	Swordfish	17%	24%
Gloucester	Sea Scallop	32%	31%
	Haddock	28%	11%
	Cod	19%	7%
Boston	Haddock	39%	24%
	Cod	25%	15%
	Sea Scallop	10%	30%
New Bedford	Sea Scallop	68%	15%
	Yellowtail Fl.	8%	8%
	Cod	8%	8%
Newport	Sea Scallop	58%	12%
	Yellowtail Fl.	16%	4%
	Cod	8%	9%
Point Judith	Swordfish	94%	36%
	Yellowtail Fl.	3%	0.1%
	Cod	2%	1%

* This column shows, for a given port, individual species revenue from Canadian zone landings as a percentage of landings of all species from the Canadian zone.

** This column shows, for a given port, individual species revenue from Canadian zone landings as a percentage of that species' landings from all areas.

Landings made by medium and large sized fishing vessels — those over 50 gross registered tons (GRT) — represent essentially all of the landings (both quantity and revenue) from the Canadian zone: 99% by quantity and 98% by revenue. The large vessels (over 150 GRT) derived 18.7% of their revenue from fishing in the Canadian zone while medium vessels (51-150 GRT) derived 6.0% (Table 5).

Seasonal revenue dependence on the Canadian zone was quite pronounced on a monthly basis, and it varied from port to port (Table 6). Generally, for vessels from New Bedford, Portland and Newport, their revenue dependence was high during the summer months and low during the winter months. In contrast, for vessels operating out of Boston, Gloucester and Rockland, their dependence during the winter was equal to or higher than that during the summer. The highest monthly dependence was 33% for Boston in February.

Table 5
Landings by Vessel Size (Quantity and Ex-Vessel Revenue)
for the Major Ports of New England
Annual Average (1979-83)

	Total Landings		Landings From Canadian Zone		Dependence on Canadian Zone**	
Vessel Size	Million lbs.	Million $	Million lbs.	Million $	% of Quantity	% of Revenue
Unspecified*	12.9	3.7	0.26	0.14	2.0	3.9
5-50 Gross Tons	62.7	19.7	0.17	0.24	0.3	1.2
51-150 Gross Tons	271.9	94.1	11.9	5.6	4.4	6.0
151 Gross Tons and Over	219.9	71.8	31.0	13.4	14.1	18.7
Total	567.4	189.3	43.3	19.4	7.6	10.3

* Unspecified are vessels smaller than 5 gross tons, and larger vessels which are not identified when their landings occur.

** Percentages calculated prior to rounding of landings data.

Table 6
Seasonal Revenue Dependence (%) on the Canadian Zone by Ports
Annual Average (1979-83)

Port	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Portland	8	9	3	11	12	14	12	11	7	6	5	4	9
Rockland	20	19	21	22	20	21	19	18	12	17	25	16	19
Gloucester	9	22	7	4	5	12	11	6	5	5	7	5	8
Boston	28	33	14	5	6	26	26	22	14	14	16	10	18
New Bedford	6	12	7	10	17	21	15	13	11	12	11	7	13
Newport	0	1	0	0	3	7	11	8	5	4	4	1	5
Point Judith	0	0	0	0	0	0	3	4	2	0	0	0	1
Total (Major Ports)	8	14	7	8	11	16	14	11	8	8	9	6	10

Summary and Conclusion

At least one out of every five U.S. fishing vessels over 5 tons from the seven major New England ports was affected by the ICJ decision. From 1979 to 1983 these effected vessels on average landed 43.3 million pounds valued at $19.4 million, representing 7.6 percent and 10.3 percent of the quantities and revenues, respectively, generated in these ports. New Bedford received the highest proportion of the U.S. revenues from the zone: $10.2 million out of $19.4 million.

Sea scallops was the most prominent species, contributing nearly half of the revenues from the zone and 17 percent of value of all sea scallop landings at the major New England ports. Other species caught in the zone in significant quantity included haddock, cod, yellowtail flounder, and swordfish. The latter represented 25 percent of its total landing values.

The Canadian zone dependence by New England vessels varied with the seasons. New Bedford scallopers derived a significant share during the spring and summer. Boston and Gloucester groundfish vessels received important contributions from the zone during the winter months.

The historical performance of U.S. vessels in the newly established Canadian zone provides only a gross estimate of the impacts of the ICJ decision on U.S. fleet operations. Further analysis is required to estimate the net impacts. Some of the displaced U.S. operations possibly could be compensated for by U.S. vessels replacing Canadian vessels now excluded from the U.S. zone. By the same token, displaced U.S. vessels may move into other U.S. fisheries and have an impact on catch rates, prices, and profitability. In addition, there may be international trade impacts stemming from the boundary decision. In brief, a true estimate of the net impacts of the ICJ decision must look beyond the simple array of statistics presented in this paper and delve into the complex bio-economic system in which the fishing industry operates.

Approaches to Fisheries Management in the North-Western Atlantic: A Canadian Perspective

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Abstract

Fisheries Management systems in the North-Western Atlantic have generally consisted of two components:

1. Decision making on the overall objectives of fisheries management involving biological and socio-economic concepts. These objectives are then translated into reality through the employment of strategic (such as F0.1) and tactical (such as fish size) measures.

2. Construction of resource dynamical models using the historical data bases, which allow evaluation of management decision impacts. In the past this component has primarily involved the assessment of resource status by biologists but more recently has included input from economists.

In the existing North Atlantic management framework, these two components are handled separately by two distinct administrative units. The nature of the flow of information between these two bodies has and continues to be a problem area in many management organizations. Related to this problem is the relative lack of sophisticated models required to properly evaluate the complex regulatory measures often routinely employed in fisheries management. Some solutions to these problems along with future research directions are suggested.

Introduction

Fisheries resources in the North Atlantic have been managed by various national and international organizations since the early 1950s. Initially, management systems were simple with the guiding biological principles and

models being based on the work of Beverton and Holt (1957). Since then, these systems have become more elaborate, dealing not only with biological, but also socio-economic issues.

Given the costs of current management systems, it is timely to ask whether or not fisheries management attempts in the North Atlantic have been successful and if not, why not. Canadian management efforts are, as elsewhere, plagued by overcapacity (Copes, 1982; Kirby, 1982). Finch (1985) reviewed U.S. management efforts under the Fishery Conservation and Management Act of 1976 and concluded that although the machinery is working relatively well, there has been only partial success in stock conservation and restoration. Frost (1984), Hannesson (1984), and Cunningham (1980) describe problems in European management efforts which originate in the policy and decision making process. Thus, current fisheries management systems are not without their difficulties and have been only partially successful in achieving their goals. Although specific problem areas have been identified, an overall system analysis approach has not yet been undertaken. It could be that there are fundamental problems relating to how the various components of the management system interact.

This paper outlines the key components of fisheries management systems and describes how these interact. The role of each component is examined, highlighting problem areas, drawing heavily upon the Canadian east coast experience. Some solutions to these problems are suggested.

The Components of a Management System

Management can be defined as the rationalized deployment of available resources to meet a specific objective(s), which are formulated according to broad, policy considerations. Thus, a successful management system must include:

1. A management component responsible for defining specific targets based on broad policy guidelines plus considerations of the risks involved with various biological, social, and economic tradeoffs and guidance of the system towards these targets using a set of regulatory measures, and

2. An information or research component responsible for conducting research on the processes driving the system and for monitoring the activities of the system being managed to gauge the appropriateness of the management action.

The interaction of these two components is critical to the success of the system. It is self-evident that in order to get somewhere one must constantly evaluate where one is now in relation to where one is going. Consequently, the ability of managers to achieve their goals is limited by the ability of researchers to fulfill their role. Similarly, the ability of researchers to provide sound advice is influenced by the complexity of the management plans defined by managers. Complex objectives require an elaborate information structure to monitor system behaviour. The level of sophistication of a management system is thus constrained by its capacity for self-monitoring.

The next two sections describe how the management and information components interact both in the establishment of long-term management targets and the day-to-day regulation of the system.

The Definition of Management Targets

Policy ultimately defines the management targets. Consequently, there is a significant link between the two. As policy changes, so too should the target.

During this century the development of fisheries policy has followed a parallel course on both sides of the Atlantic. Prior to 1950, explicit fisheries management policies did not exist. The marine resources seemed limitless and consequently fishing effort was unrestricted. During 1950-75, the high demand for cheap sources of protein following World War II led to heavy exploitation of fish populations and the realization that marine resources were not limitless. Policies were developed that emphasized resource conservation — not as an end in itself but rather to allow further fleet growth. These policies were translated into conservation strategies and regulations by managers using fisheries science as described by Beverton and Holt (1957).

During the 1976-80 period, a shift in policy created a number of problems, particularly in relation to the definition of strategies designed to meet policy objectives. Large fishing companies became increasingly involved and came into conflict with vessels operating out of small, coastal communities. In Canada, as a result of these conflicts, new policy statements were provided in 1976 (Anon., 1976). Although well intentioned, these statements were broad in scope and left much to personal interpretation. Needler (1979) summarized these policies as:

> "to obtain from exploitation of the resource the greatest possible benefits to society as a whole and, more particularly, to assume the economic welfare of fishermen and fishing communities, including the fish processing industry and the fish trade."

Similar policy statements have been made in the USA and Europe (Cunningham, 1980; Finch, 1985). Cunningham (1980) makes the observation that these statements mean different things to different people and it thus becomes difficult, if not impossible, to reach agreement on specific management goals. Conservation is a visible and acceptable objective for all, but it is difficult to define management objectives when social and economic considerations are added. Aspects of regional development, employment, and marketing can become part of the management system. Nevertheless, if guidance is to be provided to managers, clear policy statement are required.

This was noted by Kirby (1982) and Pearse (1982) in their reviews of the Atlantic and Pacific Canadian fisheries, respectively. According to Kirby (1982), the more operational and thus more definitive a statement, the more open to attack it becomes. It is open to less individual interpretation. To circumvent this problem, Kirby (1982) stated his prioritized objectives for East Coast fisheries management, in as specific terms as possible:

1. The Atlantic fishing industry should be economically viable on an ongoing basis, where to be viable implies an ability to survive downturns with only a normal business failure rate and without government assistance.

2. Employment in the Atlantic fishing industry should be maximized subject to the constraint that those employed receive a reasonable income as a result of fishery related activities, including fishery-related income transfer payments.

3. Fish within the 200-mile Canadian Zone should be harvested and processed by Canadians in firms owned by Canadians wherever this is consistent with objectives 1 and 2 and with Canada's international treaty obligations.

Policy is translated into strategic targets using analytical models constructed by the information component. Manipulation of the input parameters of these allows examination of alternative management scenarios and thus choice on the best strategy to follow. Thus as policy evolves, so too should the analytical models and their derived strategic targets. This has not happened.

The first strategies were linked closely to the policy of conservation. Maximum Sustainable Yield (MSY) was calculated using the Surplus Production Models of Graham (1935) and Schaefer (1954), whereas maximum yield per recruit, to prevent growth overfishing, was calculated using the age-structured, dynamic pool models of Beverton and Holt (1957). Since the 1950s, the latter type of model has become pre-eminent in establishing

fishing strategies in the North Atlantic. In addition, the prevention of recruitment overfishing has been added to the formulation. Nevertheless, the general tendency has been for embellishment of the original models with more detail on the fish-fishermen interaction rather than expansion to include fish-fish (biological) or fisherman-fisherman (socio-economic) interactions.

In the first case, the description of predator-prey relationships has proven exceedingly costly and difficult. There are promising current developments (Anon., 1984) which are still in the development stage. Regarding socio-economic concerns, fisheries economics had a relatively recent start in the 1950s with the work of Gordon (1954) and Scott (1955). Incorporation of these principles into information models has been slow. Current strategic models attempt to include economic considerations under the guise of $F_{0.1}$, as will be discussed below. Models of social interactions are also lacking. An extensive amount of work has been done on technological or gear interactions (Mahon, 1985; Murawski, 1984), but these efforts have yet to make it to the management component. Work by Allen and McGlade (1986) on fleet cooperation is still too recent to influence strategic target setting.

Consequently, strategic models currently in use are characterized by the following:

1. Individual fish populations are modelled rather than fisheries. The "management unit" is the fish stock rather than the fishery or community.

2. They are deterministic and assume equilibrium conditions.

3. They involve determining stock production as some function of biomass and from this allow the choice of an exploitation rate which will optimize yield taken from the resource.

4. They either implicitly or explicitly decompose stock production into

    A. Recruitment production — increase in biomass due to recruitment to the population as defined by some stock/recruitment relationship.

    B. Growth production — increase in biomass due to the growth of an individual once in the population.

Given their importance, some time will be spent here discussing these models and the problems encountered in their use.

Maximum Sustainable Yield

The first model used to define a harvest strategy was the Surplus Production Model (SPM) of Graham (1935) and Schaefer (1954). It expressed the rate of change of the total biomass in a population as a sigmoidal function of the biomass at a particular time, or

$$\frac{dB}{dt} = \frac{KB \cdot (B\infty - B)}{B\infty} \qquad (1)$$

where: B is the population biomass
$B\infty$ is the maximum attainable biomass and thus reflects the carrying capacity of the ecosystem
K is the instantaneous rate of increase in biomass at population sizes approaching zero

From this one can derive (Ricker, 1975)

$$Y_E = F_E \; B_E = B\infty F_E - \frac{B\infty}{K} F_E^2 \qquad (2)$$

where: Y_E is the yield when the biomass is in equilibrium
F_E is the rate of fishing which maintains the biomass in equilibrium at mass B_E
B_E is the biomass at equilibrium

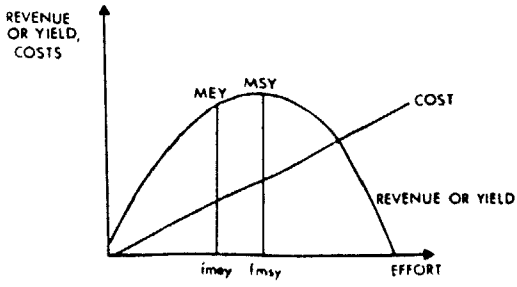
It can be shown that the effort, f_E, is a linear function of the fishing mortality, F_E, and thus equation (2) becomes

$$\frac{Y_E}{f_E} = \alpha - \beta f_E \qquad (3)$$

In other words, yield Y_E, is the quadratic function of effort, f_E (equation 2) and catch rate, $\frac{Y_E}{f_E}$, is an an inverse linear function of effort, f_E (equation 3).

These equations are used to define equilibrium harvest levels at specified effort levels. The Maximum Sustainable Yield (MSY) is defined as the greatest yield that is sustainable from a population at equilibrium (Figure 1).

Figure 1
The relationship between revenue, yield, and cost as described by the Schaefer Surplus Production Model



The revenue curve from a fishery has the same shape as the yield curve. However, fishing at MSY will not lead to an optimum economic strategy. Maximum Economic Yield (MEY) occurs where the stream of net benefits (i.e. revenue - costs) over the long-term is maximized (point MEY of Figure 1, with a corresponding effort level of f_{MEY}). MEY occurs to the left of MSY. Both MEY and MSY have been used as strategic targets of fisheries management systems in the North Atlantic.

The SPM has a number of deficiencies which result from two sources of error: systematic (model structure inappropriate) or measurement (model fit inadequate). The SPM combines recruitment and stock growth processes into one pool. This can lead to model error because different stock-recruitment relationship (Shepherd, 1982) will affect the shape of the SPM parabola. Delays between changes in production and changes in stock size are not explicitly considered. The inability to consider changes in the population age structure under different management strategies also detracts from its usefulness. Finally, environmentally induced fluctuations in population size or production are not explicitly considered. These can be so large as to obscure the underlying relationship between production and biomass (Sissenwine and Kirkley, 1982).

Parameter estimation has always been a source of difficulty in applying the SPM to management schemes. Early attempts relied on fitting equation (3) to a set of catch-effort data. Sissenwine (1978) showed that this approach had severe limitations on account of autocorrelation within the data set. More recent attempts (Rivard and Bledsoe, 1978; Schnute, 1977) have relied on more sophisticated, computationally intensive, mathematical algorithms to avoid this problem. Nevertheless, no matter what procedure is used to fit the

model, the data must cover a large range in biomass and the effort series must be standardized across the time interval covered. This generally requires a long time series, causing problems due to the increased likelihood of technological change, confounding interpretation of the effort series.

All these problems have led biologists to consider models which treat recruitment and growth processes separately to avoid growth and recruitment overfishing (Cushing, 1973).

The Prevention of Growth Overfishing

Growth overfishing occurs when fishing pressure prevents individual year classes from attaining their full growth potential (Cushing, 1973). This is investigated through the use of age-structured or Dynamic Pool Models (DPM) of Beverton and Holt (1957). These describe the population as a number of linked pools (ages) through which biomass flows. The simplist DPM describes the growth and mortality processes of one cohort. Since recruitment fluctuation is not explicitly taken into account, this model is referred to as the Yield Per Recruit (YPR) analysis.

A number of variations of the original YPR analysis exist, many of which are comprehensively dealt with by Ricker (1975). All do fundamentally the same thing — search for a balance between biomass gained due to an individual fish's growth and biomass lost due to fishing and natural mortality.

More specifically, growth of an individual can be expressed as

$$W_{t+1} = W_t e^{G} \quad (4)$$

while mortality in the population can be expressed as

$$N_{t+1} = N_t e^{-(F+M)} \quad (5)$$

where G, F, and M are the instantaneous Growth, Fishing Mortality, and Natural Mortality rates respectively. Multiplying equation (4) and (5) together gives

$$N_{t+1} \cdot W_{t+1} = N_t \cdot W_t e^{G-(F+M)} \quad (6)$$

or

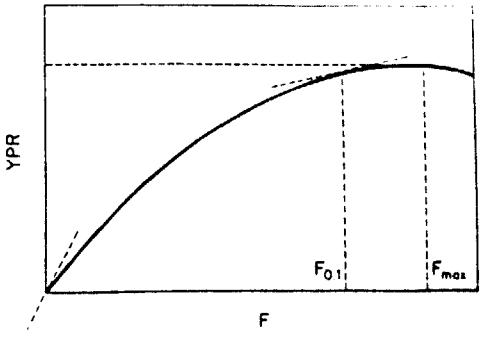
$$B_{t+1} = B_t e^{G-(F+M)} \quad (6)$$

In this formulation, maximum biomass of a cohort occurs at some middle age. Beyond this age, population biomass declines because mortality exceeds growth. Thus, in establishing a harvest strategy, if F is set too high, then the full growth potential of the population will not be realized.

The age-specific input parameters (growth and natural and fishing mortality rates) are used in the YPR analysis in the following manner. A range of fishing mortalities are used, with all other inputs held constant and for each option, the yield from the cohort calculated. The yield from the cohort, expressed on a per recruit basis, is plotted as a function of the fishing mortality. In general, as F increases, the YPR first reaches a maximum and then declines (Figure 2). The F at this maximum is termed F_{max}. Growth overfishing is said to be occurring when fishing mortalities observed in the fishery exceed this value.

Figure 2

Relationship between yield per recruit from a year-class and fishing mortality using the Yield Per Recruit (YPR) model



Use of concepts such as MSY and F_{max} as targets for management could result in overfishing, because of random fluctuations in production (Doubleday, 1976) caused by environment. In addition, the Maximum Economic Yield (MEY) is lower than MSY due to the relative drop in revenue/cost at higher fishing mortalities (Larkin, 1977; Gulland and Boerema, 1973). In respect to the YPR analysis, it has been shown (White, 1983) that the value of F_{max} is non-linearly sensitive to variation in model input data. Thus, an alternate target was sought below MSY and F_{max} is non-linearly sensitive to variation in model input data. An alternate target was sought below MSY and F_{max}, to act as a buffer against parameter estimation and environment

induced problems. The reference levels of $E_{2/3MSY}$ and $F_{0.1}$ were introduced by Doubleday (1976) and Gulland and Boerema (1973) respectively to provide such a buffer.

The concept of $F_{0.1}$ is currently the main management strategy in the Canadian East Coast fisheries management system. It is formally defined as:

> "the level of fishing mortality at which the increase in yield by adding one more unit of fishing mortality is 10% of the increase in yield by adding the same unit of effort in a lightly exploited stock."

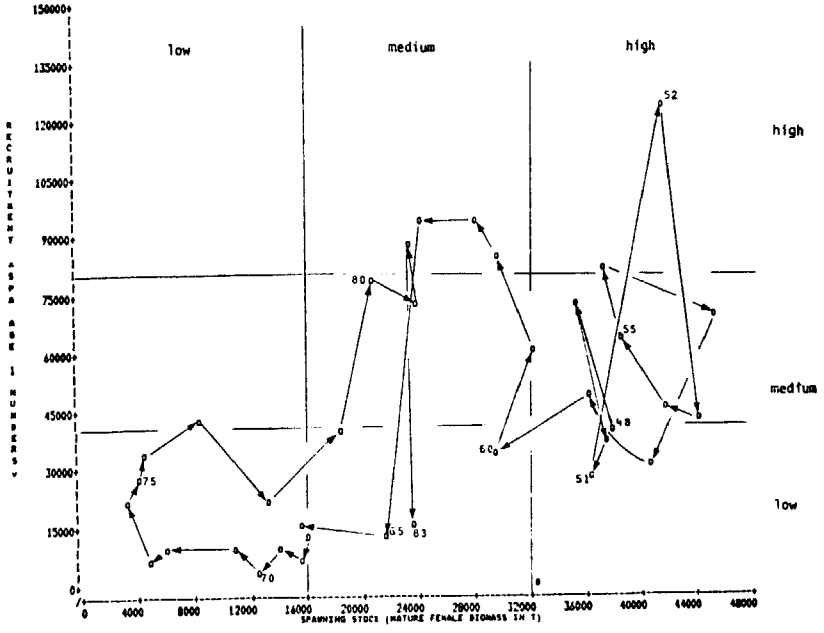
Fishing at $F_{0.1}$ will obtain about 90% of the F_{max} yield with about 60-70% of the effort. Commercial catch rates will tend to be higher at $F_{0.1}$ due to higher biomass levels. Therefore, this strategy takes economic considerations into account. Also, being more conservative than F_{max}, it will in the long term result in more age groups in the population and tend to lower interannual variability in yield.

The Prevention of Recruitment Overfishing

Recruitment overfishing occurs when Spawning Stock Biomass (SSB) is reduced by fishing to the point where future recruitment to the population is impaired. This implies some minimum SSB and requires that recruitment be a function of SSB. The search for such relationships using current theory (Beverton and Holt, 1975; Ricker, 1954; Shepherd, 1982) has been thwarted by the presence of high variability in existing data sets. Many have assumed that this "noise" is due to environmental or unaccounted for biological influences. Walters and Ludwig (1981) argue that measurement errors need to be taken into account before assuming this. A more pragmatic approach is to simply reduce the stock-recruitment data to a Probability Transition Matrix (Getz and Swartzman, 1981). An illustration of this approach is provided by Mahon et al. (1985) for Scotian Shelf (4VW) haddock. At levels of mature female biomass (MFB) below 16,000 t, consistently low recruitment has occurred historically (Figure 3). Thus, a harvest strategy which in the long term reduced MFB below this level would cause recruitment overfishing.

A minimum SSB is not a formal part of the current Canadian and European management systems, due to the difficulties in establishing such levels. This topic has received much attention by the US's New England Fisheries Management Council (NEFMC) in development of their Atlantic Demersal Finfish (ADF) plan.

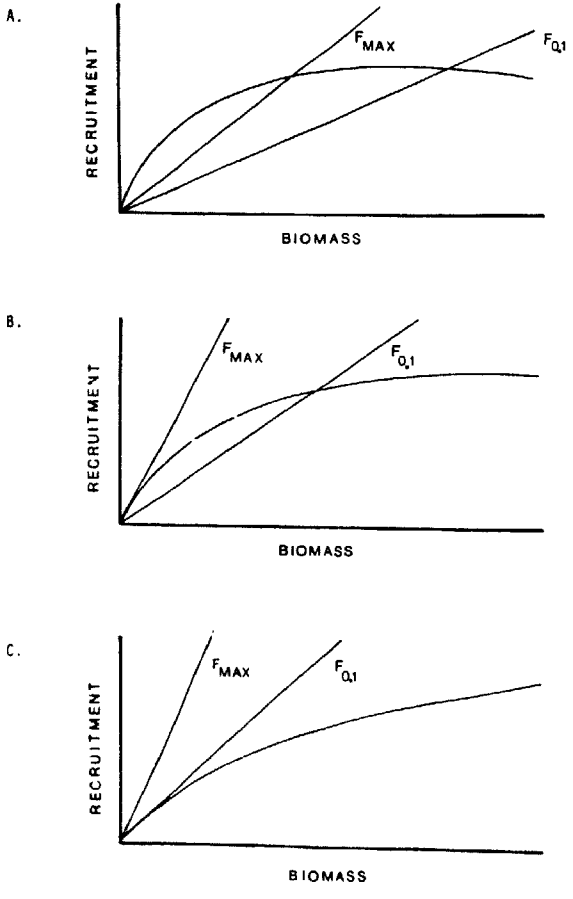
Figure 3
Examination of NAFO Division 4VW Haddock SPR Using the Probability Transition Matrix Approach of Getz and Swartzman (1981)
(from Mahon *et al.*, 1985)
(Numbers beside points indicate year of spawning.)



Prevention of Recruitment and Growth Overfishing

There have been recent attempts to combine the Stock-Recruit (SRR) and YPR relationships (Mohn, 1986; Shepherd, 1982), thus emulating the behavior of the Surplus Production Models. The YPR model is used to calculate SSB per recruit at various fishing mortalities. The reciprocal of these are then superimposed on either the functionally or empirically derived SRR's. Figure 4 provides some hypothetical situations using the SRR-YPR model. In the first case (Figure 4a) both F_{max} and $F_{0.1}$ would not cause recruitment overfishing. Either one could be used as a management strategy although there were economic benefits to $F_{0.1}$. In the second case (Figure 4b), F_{max} causes recruitment overfishing and thus a move to $F_{0.1}$ is the wise choice.

Figure 4
Combinations of YPR and SRR Which Would Require Differing Management Strategies



Finally, in the last case both F_{max} and $F_{0.1}$ (Figure 4c) cause recruitment overfishing. Consequently a very conservative fishing strategy would be called for.

Regulatory Measures

Regulations have evolved over time from simple measures, such as mesh size regulations, to more complex ones involving property rights. Indeed, the complexity of the fisheries systems has made systematic study of regulations very difficult. This has been exacerbated by the lack of models for regulatory measures, analogous to those available for strategic targets. Problems experienced by North Atlantic fisheries management systems relate mainly to an inability to construct a regulatory framework which allows the achievement of established strategic goals, whatever they may be.

Before discussing the various types of regulations currently in use, let us first review the essential elements of a regulatory system.

First, the regulatory system must do the job. The system must encompass all parts of the system being managed. This is more difficult than it seems since a major influence on the regulatory system can be political intervention. Some authors (Chatterton and Chatterton, 1981; Frost, 1984; Hannesson, 1984) have gone as far as to suggest that exclusion of these factors from the system will add a great deal of uncertainty to its outcome and may even make management action inconsequential. Much of this pressure comes from lobbying groups with vested interests. It is important to include these in the management system. In addition to the system being comprehensive, its parts must act in a complementary manner. There is no value in having two regulations working at cross purposes. For this reason, a view of the overall system must be maintained.

Second, the regulatory system must be cost effective. It is possible to create a regulatory system which impacts every aspect of the resource being managed. The system would probably cost more to run than revenue gained from the resource. This is unacceptable. Ideally, the administration of the management system should be financed by rent earned from the fishery.

Third, the regulatory system must be enforceable and allow monitoring of system activity. A regulation on paper and in the field are two entirely different things. For instance, experience has shown that mesh size regulations are notoriously hard to enforce. For this reason a key factor in enforcement is voluntary compliance which, as Stokes (1979) states, along with peer pressure, is vital to the success of any fisheries management measure. Achievement of voluntary compliance can only be obtained through the design and publicizing of a system that is seen as being fair to all concerned and for the common good. Another essential feature of regulations is that they allow the collection of reliable information on the system being managed. On Canada's East Coast, it is a regulatory requirement for all fishing

vessels over 25.5 tons to maintain a log of catch and effort data by trip. These data are used to enforce quota violations. This regulation is much like the police demanding "speed" logs be maintained by all drivers so that infractions can subsequently be identified. Needless to say, the quality of the data collected under this system would be suspect. Experience has shown that data collection for monitoring and enforcement have to be separated in the management system.

A Regulatory Model

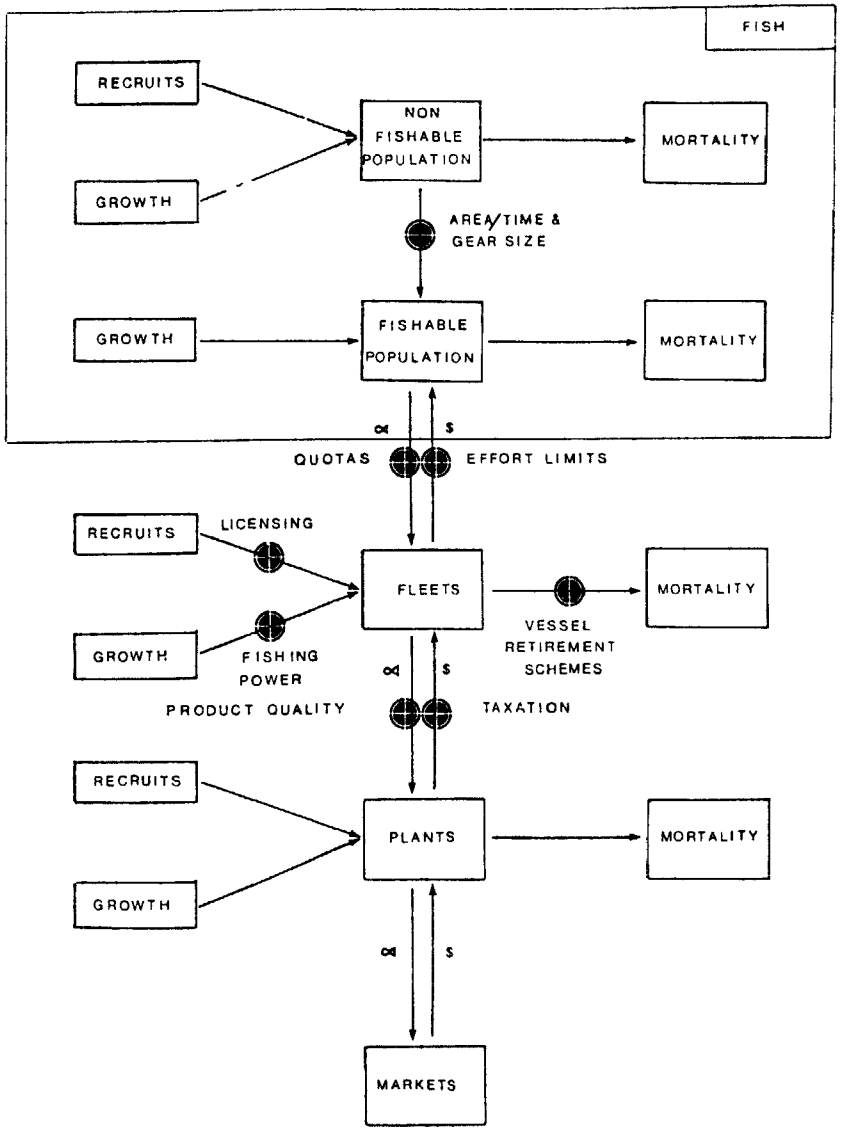
Past attempts at developing regulatory systems have failed to regard regulations as just that - a system. An attempt is made here to provide a model to categorize existing regulatory tools and indicate where they impact the system. The model considers the interaction between fish and fishing as a predator-prey relationship. Both the fish population and the fishery experience recruitment, growth, and mortality. Four components are considered — fish, fleet, processors, and markets — each with recruitment, growth, and mortality processes (Figure 5). The fish cell is further broken down into two components, the nonfishable and fishable populations. The fleets "expend energy" (spend money) to "eat biomass" (acquire catch), as do the plants and markets. Regulations control the flow among the various model components. Given this framework, one can systematically discuss the relative merits of the various controls now in place and identify where gaps exist. Let us consider separately those regulations directed at conserving the fish and those directed at controlling the fleet.

Resource Conservation Regulations

These regulations deal strictly with the protection of the growth and reproductive capacity of the fish population. Together they involve the control of the flow of nonfishable into fishable biomass. Protection of juveniles is of importance in achieving full growth potential. Regulations include gear size (mesh) restrictions backed by minimum landed size limits as well as area/time closures to protect nursery areas. To ensure adequate reproduction, area/time closures are used along with overall harvest limits (quotas) to conserve spawning stock biomass.

It is worthwhile to note that with the exception of overall harvest limits, these measures are passive, i.e. they indirectly limit fishing effort (Sissenwine and Kirkley, 1982). These authors feel that fishing mortality is theoretically unbounded when only passive regulatory measures are used.

Figure 5
A framework for the investigation of fisheries management regulatory systems



Fleet Control Regulations

There are two links between the fish and the fleets — catch and effort. Both are subject to regulation and there has been much discussion on the relative merits of regulating each. Given a constant fishing mortality strategy such as $F_{0.1}$, it would seem that the most direct way to achieve this is simply to control effort. However, the relationship between fishing mortality and effort is complex. Experience has shown (Stokes, 1979) that with direct effort limitation, fishing mortality can still rise because of "effort substitution," which is caused by the investment by fishermen in new gear technologies ("capital stuffing"). This rise in fishing power generally leads to an increasingly complex system of regulations involving gear design and use.

The more direct way to control the exploitation rate is to control the harvest level or the catch, i.e. set quotas. Contrary to the effort approach, the use of quotas requires the on-going monitoring of stock abundance and fishing mortality. This can cause problems when the resource conditions change rapidly relative to the time required to collect and analyze the scientific data. On the positive side, as catch can be expressed in widely accepted terms, i.e. tons, it makes resolving not only domestic allocations problems but also meeting UNCLOS III commitments on surplus yield far easier to meet than would be the case under an effort based system.

There are two approaches to control recruitment to the fleet — 1) open access and 2) limited entry. There are conflicting ideas as to which approach to use. Most economists (Crutchfield, 1979; Kirby, 1982; Pearse, 1982; Scott, 1979; Stokes, 1979; Turgeon, 1985) feel that some form of limited entry is required. Others (Townsend, 1985) argue that the social costs to the community of limited entry are large and the decision is not clear cut. At the root of the issue is what is referred to as the "Tragedy of the Commons" (Hardin, 1968). The following elements are characteristic of a common property resource (Keen, 1983):

1. The incentive to take the best first.

2. The incentive to continue exploitation as long as the user's opportunity costs are met even though the resource is greatly reduced in productivity.

3. The incentive to continue to increase investment in exploitation even after the MSY is exceeded if the demand forces the value of the resource up.

4. A lack of incentive to invest in productivity of the resources even though to do so would, in terms of total productivity, provide a handsome return on the investment.

It was to mitigate the effects of the common property resource that limited entry was first introduced. There are two ways of doing this — 1) property rights and 2) taxation. The first sets the degree of entry prior to the fish being caught whereas the second effects the incentive to fish. The difference between the two is one of the perceived risk to the fisherman. Scott (1979) evaluated the two and favoured property rights over taxation schemes. However, the latter have been suggested as a means to fund the administration of the management system (Pearse, 1982).

The biggest difficulty in establishing property rights is exactly how to do it. As discussed above, there are problems with system based on catch (quota rights) and effort (trip limitations). The former involves the splitting up of a stock-specific TAC among the various participants and is administratively difficult. On the other hand, the definition of an effort right is technically very difficult.

We must ask, at what level should the right be allotted — the fisherman, the boat, or the fleet? Experience has shown that allocation on a fleet basis does not stop the tendency toward overcapitalization. There are indications that the problem even persists at the boat level. At the individual level, Keen (1983) has made the observation that fishermen are harvesters, not growers. As such they will always have an incentive to invest in their business, harvesting rather than in resource husbandry. He argues that sole ownership is the solution to this so that the licensed unit has final say on how the basic resource is going to be used from production to sale of the products.

The other issue is the definition and selection of entrants from the total population of available fishermen. There are two ways of doing this — discriminatorily, in which the entrants are limited by exogenous (to the management system) factors such as politics, lottery, etc., and non-discriminatorily in which entry is limited by endogenous factors, i.e., competition among the potential participants. The discriminatory method demands that the right be non-transferable while the second makes the right transferable.

The other key aspect of regulation is monitoring. As with the Strategic models, this generally has focused on the biological aspects of the system, particularly the current fishing mortality rates and population sizes. These two pieces of information are used to either restrict or expand fishing effort and thus decide yield in the coming year. This "assessment process" is a critical part of the Quota based systems of Canada and Europe. Two broad model types are available to determine current population conditions.

The first — referred to here as the a posteriori approach — makes no prior assumptions about the dynamics of the population being managed. What is

generated by the model is a database in which dynamical relationships can be investigated. The second class of models — referred to here as a priori approach — assumes, through a set of equations, a population structure and its dynamical relationships. These equations are then fit to the empirical database to determine the relevant equation parameters. The a posteriori approach is prevalent in the North Atlantic while the a priori approach is prevalent on the North American West Coast.

The A Posteriori Approach

Gulland (1965) introduced a technique that, given the consecutive catch-at-age of a year-class, would determine the size of that year-class when it initially entered the fishery. The procedure was referred to as Virtual Population Analysis (VPA) because the calculations were done using the so-called "virtual" population (that part of the year-class at a given time that will be caught in the future (Ricker, 1975)). The calculation is done in a recursive manner, starting with the oldest age fish and working back along the cohort, solving iteratively the Baranov Catch Equation at each age (Figure 6). Given

Figure 6
The calculation steps of Virtual Population Analysis (VPA)

1. Provide estimates of population numbers at age for last year and oldest age in analysis.

2. Solve

$$\frac{N_t}{C_{t-1}} = \frac{Z_{t-1}\, e^{-Z_{t-1}}}{F_{t-1}\,(1 - e^{-Z_{t-1}})}$$

for F_{t-1} using a numerical (such as Newton-Raphson iteration) procedure.

3. Using F_{t-1} and C_{t-1} solve the Baranov Catch equation.

$$N_t = \frac{C_t\, Z_t}{F_t\,(1 - e^{-Z_t})}$$

4. Go to 2.

5. Follow steps 2 to 4, working sequentially back up along a cohort.

a catch-at-age matrix consisting of a number of year-classes, VPA can be used to define the history of each year-class separately as it has been prosecuted by the fishery.

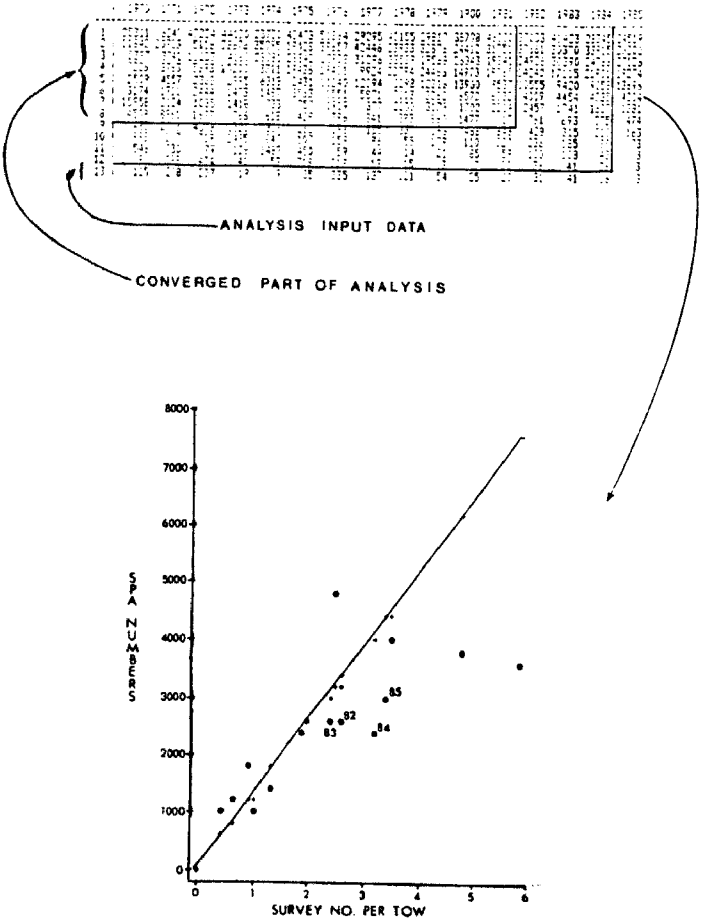
Pope (1972) provided an approximation to the Baranov Catch Equation which would not require an iterative solution and was thus amenable to pocket calculators. This technique, referred to as Cohort Analysis (CA), provides output virtually identical to that of VPA for considerably less cost and is thus the favoured analysis throughout many North Atlantic fisheries research centres.

Both VPA and CA, generically termed Sequential Population Analysis (SPA), provide population and fishing mortality estimates that become increasingly reliable as the cumulative mortality along a cohort increases (Pope, 1972). Thus, SPA can be run using relatively inaccurate starting fishing mortality estimates and generate reasonably reliable historical estimates of year-class size. By itself, this "Principle of Convergence" is a valuable property when it comes to analyzing population dynamics. Given an SPA generated population and fishing mortality matrix, one simply ignores the unconverged parts of the data set. However, its real worth is in SPAs conducted to estimate current year stock size. In management systems that require up-to-date estimates of stock size, such as those under Quota Management, it is necessary to precisely determine the SPA input parameters. This can only be done with independent estimates of abundance, such as research survey or fishery catch rates (Pope and Shepherd, 1982) in a process referred to as "Calibration." In this process, an SPA is run using initial guesses at starting conditions. Using the converged part of the matrix, relationships between the SPA results and the independent estimates of stock size are developed using regression analysis and from these new starting conditions are calculated (Figure 7). The SPA is rerun, the regression recalculated and new starting conditions calculated. This iterative process is continued until the starting conditions have met some defined criteria.

The ubiquitous use of SPA has led to a considerable amount of work on calibration. Pope and Shepherd (1985) conducted an extensive review of procedures used in ICES. Doubleday (1981), Collie and Sissenwine (1983), and Paloheimo (1980) all provide automated fitting procedures. On Canada's East Coast, calibration is generally conducted on either an age by age basis or some aggregate such as partially recruited and fully recruited age groups. Here the criteria defining best regression fit of starting conditions to historical relationships include position of intercept in relation to origin, maximization of relationship's correlation coefficient (r), and minimization of standardized residuals around the regression line either along a cohort or along an age. Mohn (1983) presents one of the few studies which examines the relative

Figure 7

An illustration of the use of the converged part of the SPA matrix in the calibration process (example from 1985 4X haddock assessment). Only the age 6 plot of SPA numbers (mid-year) versus survey catch rate is shown.



merits of different calibration criteria. A major, more fundamental problem, is the assumption concerning the regression model's variance structure. Typically, ordinary least squares analysis is conducted with the SPA estimate on the Y axis and the independent estimate of abundance on the X axis. This assumes that the ratio of the variances $\frac{S_y^2}{S_x^2}$, is infinite (Sprent and Dolby, 1980), which is not often the case. Alternative models have been

used, chief among these the Geometric Mean Functional regression (Ricker, 1973). However, there is considerable debate on the appropriateness of these (S.J. Smith, BIO, pers. comm.) particularly when knowledge on the variance structure is lacking. These comments not only apply to the A Posteriori Approach but also to the A Priori Approach discussed below.

The A Priori Approach

This approach receives its name from the fact that a population structure and its dynamical relationships are assumed prior to the model-fitting process. Typically, equations are defined for stock-recruitment, and density-dependent growth and mortality effects. Fitting of the model to the data employs either least squares (linear or non-linear) or maximum likelihood (MLE) estimation procedures. For this reason, these analyses are computationally more intensive than those used in the A Posteriori Approach. They have been used in the Pacific Stock Assessment Review Committee (PSARC) of Canada's West Coast.

Two varieties of this general technique exist. The first, developed by Deriso (1980) is a partially age structured model in that the population is considered in three pools — recruits, uncatchable adults, and catchable adults. Equations are derived for each pool which allow description of biomass flow through the population. Non-linear least squares procedures are used to fit the model to the data.

The second version is that of Fournier and Archibald (1982). It is fully age structured, dividing the population into dynamic pools according to their age. Sets of equations defining stock-recruit relationships, density-dependent growth and mortality, Baranov catch equation dynamics and relationships between population size and abundance index are then fit using MLE procedures. Variations of this method have been used on Pacific cod (Fournier, 1983) and herring (Stocker, *et al.*, 1985).

The A Priori Versus A Posteriori Approach

The approach most prevalent in North Atlantic management systems is the A Posteriori technique whereas the A Priori approach is used on the North American West Coast. Both methods have their advantages and disadvantages. The A Priori Approach forces the scientist to think hard about the dynamics of the system prior to using the computer. The negative side of this is that systems of equations can be written for which the available data are

not sufficient. As well, given the lack of knowledge of data error structures, model fitting at times becomes problematical. The A Posteriori Approach allows the data to define the level of sophistication of knowledge of the resource. The more data (in quantity and range) and less variance, the more visible the population dynamics in the SPA generated database. From this point of view, data and model are well matched, meeting a major criticism of Ludwig and Walters (1985). On the negative side, calibration procedures are still primitive which allows for much subjectivity in the choice of SPA input parameters.

The Administration of the Information/Management Component Interaction

The discussion thus far has focused on the roles and functioning of the management and information components. The success of the system critically depends on the effective linkage of these two components. This in turn depends on the degree to which the effective administration of the whole can be maintained. The following section examines this, by tracing the historical development of the administrative structures that currently link the management and information components on Canada's East Coast. In this process, deficiencies are identified in the system which can only be rectified through fundamental changes in the operation of the components and their interaction.

The Development of the Management-Information Links

Prior to World War II, the North American Council for Fisheries Investigations (NACFI), consisting of scientists from Canada and the USA, conducted primarily biological discussions on the marine resources in the Northwest Atlantic. The dramatic rise in fishing pressure following World War II led to the development of a fisheries conservation policy, to be enacted by the International Commission for Northwest Atlantic Fisheries (ICNAF). The data sets necessary to support conservation measures began to be collected by the information component. For instance, ICNAF started the systematic collection of catch/effort statistics in 1952. Because policy was primarily conservation oriented, the information component was dominated by biologists.

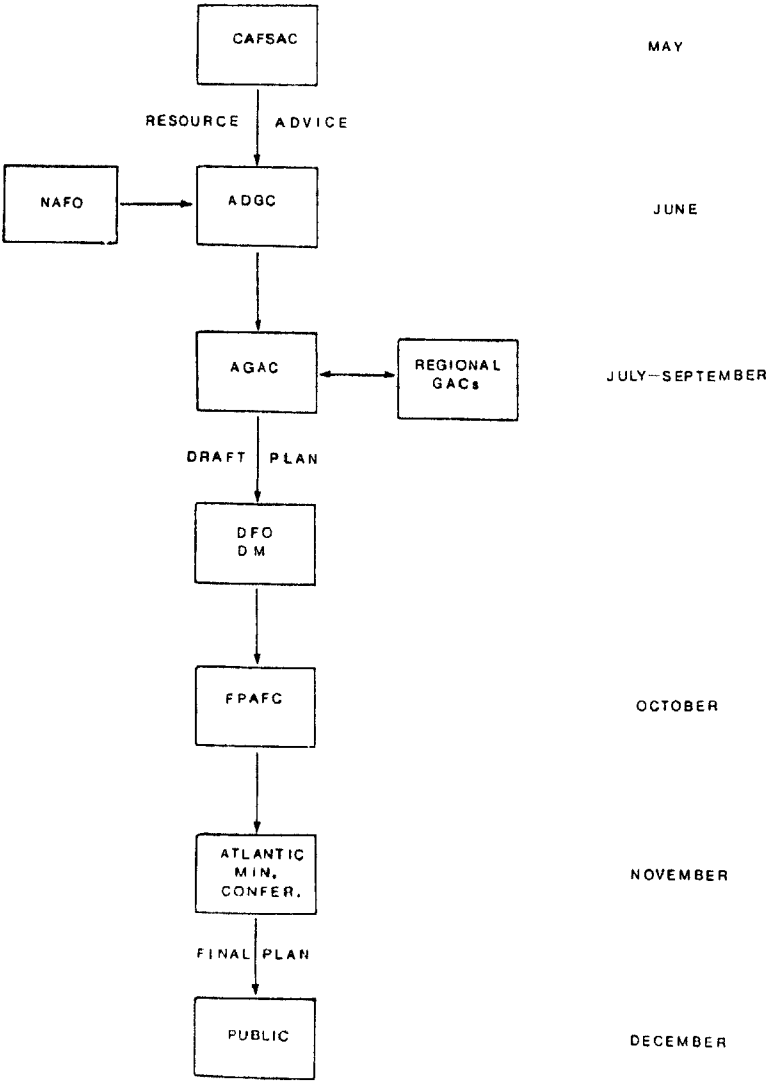
As fishing pressure increased, more regulations to control it were brought into effect. In 1957, ICNAF introduced mesh regulations to prevent the capture of small fish. Canada introduced limited entry to its lobster fishery in

1967. This became a general feature of all East Coast Canadian fisheries in 1973. Further fishing pressure prompted the establishment of the first quotas on Georges Bank haddock in 1969 ever adopted by an international organization. Browns Bank haddock was similarly controlled the following year. All these measures were aimed at stock conservation. At the same time, the information component was very active in monitoring the biology of the system. The USA standardized groundfish surveys in 1963 while Canada started its own series in 1970. The further increased exploitation during the early 1970s resulted in novel experiments in regulatory measures, one of which was called the two-tier quota system (O'Boyle, 1985). It was during this time that thought was given to a change in fisheries policy, from predominantly biological in nature to one including an economic direction. The concepts of $F_{0.1}$ and 2/3 E_{MSY} were introduced to replace F_{max} and MSY, interestingly enough, justified on predominately biological, not economic grounds. Nevertheless, by the time ICNAF shut its door in 1977, there had been a de facto change in fisheries policy in the Northwest Atlantic. When Canada extended its territorial limits to 200 miles in 1977, the stated policy was the optimization of resource utilization for society's benefit. The fishing strategy was $F_{0.1}$ and the regulatory system quota-based. Thus Canada implicitly embraced socio-economic objectives and used $F_{0.1}$ as a means of attaining these.

The two main components of the Canadian system are the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) along with the Northwest Atlantic Fisheries Organization (NAFO) which represents the information component and the Resource Advisory Committees (FAC) which represents the management component. Both operate along species lines, i.e. groundfish, pelagic, and one for each of the major invertebrates. Annual management plans are developed separately by each RAC.

In the case of development of the Groundfish Management Plan (GMP), the first step in the process is the evaluation of the stock status by CAFSAC and NAFO (Figure 8). Biologists from the Atlantic Region conduct analyses on the status of the resources each April and present their findings to CAFSAC for peer review in early May. CAFSAC and NAFO then pass the advice to the first step in the management component, a June meeting of the Atlantic Director-Generals' Committee (ADGC). This body reviews the advice and initiates development of the next year's management plan. The resource advice is passed to the Atlantic Groundfish Advisory Committee (AGAC) in early July. This is the industry-government body which is responsible for compiling a draft management plan. In its July meeting, the overall Total Allowable Catch (TAC) for each stock is established, taking into account the biological advice and the economics of the fisheries. Preliminary splits of the TAC by gear sector are then established. This draft

Figure 8
Administration used to formulate the annual Canadian Atlantic Groundfish Management Plan



plan is sent to Regional Groundfish Advisory Committees (RGAC) for their input. During the July-September period, the plan is modified to meet both industry's and Government's desires. Government scientists take part in this exercise in an advisory capacity. When necessary, studies (biological and economic) are undertaken to answer specific questions. By September, the draft plan is handed back to DFO which presents it to the Federal/Provincial Atlantic Fisheries Committee (FPAFC). The larger impact of the plan on the regional economy can be considered at this stage. The final plan is presented at the Atlantic First Minister's Conference in November and made public in December.

This process has essentially remained unchanged since 1976. Administratively, it works quite well. However, when one closely examines the nature of information transfer between the two components, some fundamental problems become apparent. As was stated earlier, policy directions in DFO currently have a socio-economic direction. The advice given by CAFSAC is solely a harvest level, albeit based on $F_{0.1}$, and is based on biological considerations. Virtually no information on fleet size or profitability is passed between managers and scientists. This is understandable as the existing strategy does not have specifically defined socio-economic targets and the information component is not collecting the appropriate information. Indeed, there appears to be a decoupling between policy, the management strategy, and the activities of the information component. The system is supposed to be directed along one trajectory but is being regulated and monitored along another. Socio-economic objectives are sought but the system is managed and monitored on biological grounds.

Some Reasons for the Decoupling

In examining the historical development of the current management system, it is apparent that fisheries policy has evolved faster than the other components of the system. The question remains — why has not the information component changed with a change in policy?

First, the administrative structure is very important. ICNAF was predominantly a scientific forum which provided the genesis of the subsequent systems. It was well organized with a clear hierarchy of duties, peer review process, and document trail. When new structures were established after 1976, the biological legacy of ICNAF became a dominant feature of the new system.

Second, the establishment of data bases to monitor the resource has been a long and difficult process. Many years are required to compile a long enough time series to allow development of patterns. The initial conservation policy featured the establishment of the biological data sets which are required no matter what subsequent policy direction is followed. The development of new monitoring exercises would be in competition with the long established biological ones.

Finally, the "Rational Model Syndrome" of Peters and Waterman (1982) is evident. Decision makers understandably will take the path of least risk (Fricke, 1985; Douglas and Wildavalsy, 1983). Risk is reduced by collecting information on the system being managed and assimilating this information through analytical models, which run under different management options, describe system behaviour. Thus, there is perceived to be a "certainty" in one's actions. The system should do what the model says it will. There is a fundamental flaw in this thinking. Models are man's attempt to understand the complex interactions existing in the natural world. They are not perfect and generally oversimplify the situation due to not only the lack of data but also the state of current theory in a particular field. The first, simple models of marine resources have developed into the more complex biological models existing today, but they cannot hope to provide other than an understanding of overall system functioning. There has been a general lack of socio-economic models due to data deficiencies and the level of our knowledge on the complex interactions involved. For this reason, biological models have tended to dominate fisheries management systems. Use of these models alone to guide management essentially ignores the missing socio-economic pieces and leads to significant problems in the management system. Although policy has developed beyond the stage that allows comprehensive analytical model construction for strategic purposes, there has been an unwillingness on the part of managers to use other than the output of the predominantly biological models to manage the fisheries. Fricke (1985) has made similar observations on the US fisheries management system.

Some Solutions

What can be done to rectify the problems in current North Atlantic fisheries management systems?

The first priority is to realign policy, strategy, regulation, and monitoring. If policy now emphasizes socio-economic objectives, then the strategic targets need to be changed to reflect this and monitoring programs need to be established to determine the degree of attainment of these objectives. Alter-

natively, policy can be restated in very simple conservation terms in which case there would have to be a relatively simple change in strategy with hardly any change in the monitoring systems. Although the latter approach is cheaper and simpler, it ignores the reality that fisheries have a significant socio-economic component. Ignoring this may undermine the system's ability to meet the conservation objectives.

Once one has reestablished the balance between management and information, then one has to resolve some of the communication problems identified between the two components. It is important to redefine the role of analytical models in system management. There is a level of uncertainty in these models that needs to be quantified and explicitly stated. This calls for work on the estimation of variance in analyses such as SPA. Also, work is required on how to deal with this uncertainty in making management decisions. This is in the realm of Risk Analysis. Finally, it must be realized that the system is complex and cannot be completely described by analytical models. Although variance estimates provide knowledge on measurement error, they provide no insight into problems associated with model error — parts of the system which are not described by existing models. For this reason, methods need to be devised that allow for the inclusion of "soft" sources of information into the management process. This would require an enhanced consultative process between the components of the management system. Changes to the existing administrative structures are necessary to ensure this.

Summary

In the management systems considered here, all consist of a management component responsible for development and enactment of regulatory measures and an information component responsible for monitoring the resource being managed. An examination of the co-evolution of these two components indicates that, increasingly, resources in the North Atlantic have been managed for socio-economic reasons whereas monitoring continues to be oriented toward to biological processes. This decoupling of management and information has its roots in the history of management organizations, the development and availability of information data bases and the inherent tendency of managers to use analytical models in all their decision making (the Rational Model Syndrome). What is necessary to rectify this situation is a decision to realign policy and information gathering, based on the cost effectiveness of different management objectives. Then there needs to be an enhancement of communications within the existing management organizations. Finally, methods need to be developed that minimize the perceived

risk to industry of particular management actions. These involve not only the employment of different analytical models but also the incorporation of "soft" sources of information into the management process.

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Chapter 3
Trade

Patterns of Fish Products Trade Between Atlantic Canada and New England

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The research upon which this paper is based was funded by a research grant from the Donner Canadian Foundation and also by a grant from the Department of Fisheries and Oceans subvention program.

Abstract

In this paper, an analysis of the marketing channels of fish products trade between Atlantic Canada (particularly Nova Scotia) and New England is presented. The policy implications raised by the existence of different market channels and the pattern of trade flows are then discussed.

Introduction

The flow of fish products from Atlantic Canada to New England, particularly fresh fish products, has been a source of contention between various groups of the two industries for a number of years. On April 29, 1986, the United States International Trade Commission (U.S.I.T.C.) ruled on the latest countervailing duty petition filed against fresh groundfish imports from Canada. The Commission ruled unanimously against a duty on fresh groundfish fillets but split 3-3 on a decision to maintain the 5.82 percent tariff on fresh whole groundfish. This was the first time the U.S. industry was able to obtain a countervailing duty on any fresh fish product since the first petition was filed in 1978.[1]

In this paper, I examine the recorded trade flows between the two regions and compare the volume of imports from Canada to U.S. production and

landings statistics. Next, I look at the market structure and distribution channels by which fish products from Atlantic Canada (in particular, Nova Scotia) enter New England. Finally, I discuss some policy issues concerning the interaction between market structure and trade flows.

Trade in Fish Products

In 1984, fish products accounted for nearly 43 percent of Atlantic Canada's[3] exports to the New England states by value. For Nova Scotia, 32 percent of the value of its total exports to the U.S. in 1985 were fish products, with the bulk going to the New England area, at least as first entry point (Statistics Canada, 65-003).

Tables 1a and 1b contain total exports (in quantities) from Canada to New England of selected species and product types. For comparison purposes, U.S. landings and production are presented. Because these are total figures (except for destination of exports), both coasts of the U.S. and Canada are represented in the statistics though, of course, certain species (such as cod) are found only on the Atlantic Coast. Thus, the statistics do not precisely indicate trade flows between only Atlantic Canada and New England, but they provide a fairly good approximation of such trade.

In general, Canadian exports have been rising as a percentage of U.S. landings and production. Two main factors are at work. First, U.S. landings, after reaching a peak in 1982/1983 have started to decline (Table la). For some species, such as haddock, the decline in landings reflect many things: weather, biological cycles, the imposition of the Gulf of Maine boundary by the International Court of Justice in 1984 and, possibly, as some scientists believe, the result of U.S. management policies which have not been felt to be effective in preventing overfishing.[3] The second reason is the premium the U.S. dollar has enjoyed over the Canadian dollar. This premium has raised the Canadian dollar returns to Canadian processors, making the U.S. market more profitable in general than either the domestic or European markets.

There does not, however, appear to be a major displacement of U.S. production by Canadian imports, as indicated by the growth in U.S. production over this period. This would suggest that demand has been rising fast enough to absorb any increased imports. But the increasing ratio of imports to domestic production suggests that, unless domestic production grows at the same rate as demand, further increases in demand will have to be at least partially met by imports.[4]

The flow of fish products to New England has a seasonal pattern, varying by species and product type.[5] For cod, the seasonal pattern is quite distinct. Fresh whole cod is shipped to New England primarily during the winter months, when low domestic landings and increasing demand put upward pressure on prices. During summer, when domestic landings increase and

Table 1a
U.S. Landings and New England Imports of Fresh Whole Fish from Canada

Volume - Selected Species

('000 lbs.)

	Cod			Haddock		
Year	Landings	Imports	Imports/ Landings (%)	Landings	Imports[a]	Imports/ Landings (%)
1977	64558	2603	4.0	24939	5101	14.8
1978	74134	1594	2.2	34639	5292	15.3
1979	99352	2661	2.7	41882	5599	13.4
1980	118245	4027	3.4	55188	7762	14.1
1981	100463	5828	5.8	55324	14496	26.2
1982	116907	7170	6.9	42022	16559	36.9
1983	112189	11273	10.0	32568	20354	62.5
1984[b]	96781	26213	-	26014	31854	-
1985[b]	82893	33073	-	14329	39455	-

[a] Includes a small percentage of hake.

[b] The figures for 1984 and 1985 are for exports to the U.S. as a whole, not just New England. Over 90 percent of the cod and approximately 80 percent of the haddock go to New England, however.

Sources: Fisheries of the United States; Statistics Canada, unpublished data, U.S.I.T.C. (1986), p. A-29; Statistics Canada (65-004).

prices decline, it becomes more profitable for Canadian processors to salt or freeze the cod.

Exports of fresh whole haddock tend to show less seasonality. Haddock does not lend itself to salting and thus is sold primarily as fresh or frozen product. The unsystematic variation over the year reflects temporary perturbations in supply and demand for fresh and frozen product rather than any seasonal trend.

Fresh cod fillets are exported primarily in the first quarter. In winter, there are few U.S. cod fillets available because of decreased landings due to weather. Demand for fillets is relatively high, both because demand for fish

is higher in winter and because the Lenten season begins in February. This increased demand, which cannot be met by domestic supplies, is filled by fillets imported from Canada. Canadian offshore trawlers are less subject to vagaries of weather and hence are better able to supply fish to the market in winter than are U.S. vessels.*

Exports of fresh haddock and flounder fillets are subject to less seasonal fluctuations than cod fillets are. Again, this is probably because neither species is salted, so supplies are not diverted during the summer to salt fish. Also, in the New England market, haddock tends to be preferred by consumers, suggesting the demand for fresh haddock remains relatively constant over the year.

In general, exports of frozen product exhibit less seasonality than fresh whole or fillet exports. Fish dealers report that the usual seasonality arising from Lent and the start of the school year has become less pronounced. Periodic fluctuations in the demand for frozen product occur, but these are related mostly to shortages of supply of fresh fish arising from low landings. The lack of seasonality is, of course, partly due to the nature of the product; frozen product can be stored, fresh product cannot.

Trade in fish products is not uni-directional. Table 2 indicates the flow of fish products from the U.S. into Atlantic Canada. Although data on exports from only New England are not available, the data on exports from the U.S. as a whole provide a general overview of the two-way trade in fish products between the U.S. and Atlantic Canada. In 1985, U.S. exports of seafood to Canada were $262 million, with the bulk (over 60 percent) going to Quebec, Ontario, and British Columbia (Statistics Canada, 65-007). Of that amount, $15.3 million went to Atlantic Canada, only a fraction of the amount Atlantic Canada shipped to the United States. Although the total amounts are not large, certain fish product imports, such as sardines or whole hake and pollock, from New England to Atlantic Canada play a larger local role than is indicated by the aggregate figures.

Fish from the New England area go primarily to three types of Canadian buyers, depending upon the species, product type, and time of year. Salt fish producers in Nova Scotia often buy whole fresh fish from (primarily) Maine fishermen during the summer months. Fresh fish prices tend to decrease* in summer as landings increase and demand decreases as people shift to barbecues and salads. As a result, fishermen, particularly in Maine, are left without a market in the U.S. for fresh whole pollock and hake. Instead, they sell these species to those Nova Scotia salt fish producers who wish to augment supply from Canadian fishermen and/or who find the U.S. fishermen handle the fish better, resulting in a higher quality fish. Also, depending upon which banks are fished, American fishermen often have larger fish, which command a higher price in the market for finished salt fish products. The Nova Scotia market is an important one for Maine fishermen, although it is difficult to find exact figures of the amount of fish traded. The fishermen

Table 2
U.S. Atlantic Coast Production

($'000, constant (1981) dollars)

	Newfoundland	Nova Scotia	P.E.I.	New Brunswick	Atlantic Canada	All Canada
1977	36.2	2301.5	98.8	12,062.6	14,499.1	197,115.3
1978	0.0	3260.1	0.0	14,093.9	17,354.0	202,443.6
1979	0.0	3574.8	0.0	23,836.2	27,411.0	236,240.6
1980	9.2	5387.9	122.4	20,972.5	26,492.0	269,788.3
1981	285.0	3281.0	0.0	13,674.0	17,240.0	225,455.0
1982	373.4	2971.8	0.0	12,697.6	16,042.8	189,070.1
1983	308.5	3726.2	1.7	9,250.4	13,286.8	204,609.2
1984	486.3	4569.3	80.5	15,985.9	21,122.0	223,674.7
1985	944.3	2282.4	23.9	8,929.2	12,179.8	210.367.5

Source: Statistics Canada, Bulletin 65-006. Deflated by the Consumer Price Index for fish.

were definitely affected by the slump in the world salt fish market in the first half of 1984, leaving them with only a small market and low prices for their pollock and hake. The second buyer of U.S. fish in Atlantic Canada are the New Brunswick sardine canneries. In years when the sardines (small herring) are caught mostly in U.S. waters, large amounts are shipped to Canadian canneries for processing and vice versa.[8]

Fish wholesalers and distributors in Toronto and Montreal are the third type of Canadian buyer from the New England area. For example, the majority of fish, particularly fresh fish, entering Toronto is estimated to come from the New England area, especially Boston.[9] Montreal, being physically closer to Atlantic Canada and the Gaspe Peninsula/Gulf of St. Lawrence region, buys more fish directly from Atlantic Canada than does Toronto, but nonetheless, imports from New England are significant. Wholesalers in Toronto and Montreal find it advantageous to buy fish from New England, even species available from Canada's Atlantic Coast, for three reasons. First, the market in Central Canada demands a wide variety of species, not all of which are available in Canadian waters. It is easier for the wholesalers to buy a wide variety of North Atlantic and other species from New England, rather than buy a few species each from a number of geographically dispersed suppliers. Second, the physical distribution network from New England to Central Canada is more highly developed than that between Atlantic Canada

and Central Canada.[10] A third reason, harder to quantify, relates to the cost of changing longstanding relations. Some ties between buyers and sellers have existed for many years. The cost of looking for new sources is often greater than staying with old customers. There are also financial ties, such as loans or equity investment, which make it difficult to shift from one customer to another.

Market Structure and Trading Channels [11]

There are approximately 220 processing plants in Nova Scotia. They range from small feeder plants that do little more than collect the fish from fishermen and truck them to a larger processing plant, to National Sea Products' plant in Lunenburg which, at peak production, employs over 1000 workers. Approximately 70 percent of the plants are individually owned and operated, with the remaining 30 percent either owning more than one plant or belonging to a larger conglomerate company (Apostle et al., 1985, p. 10).

A wide diversity of product is produced. In terms of volume the most important product lines are frozen fillets, fresh whole fish, frozen blocks, and salt fish. In terms of value, shellfish (fresh and frozen), frozen fillets, salt fish, and frozen blocks are the most important.[12] The industry tends to be split among one large firm, several medium-sized firms, plus an active group of competitive smaller firms, which are located primarily in southwest Nova Scotia.[13] The large and medium firms' main competitive strength is continuity of supply, which is primarily due to ownership of large groundfish trawlers. The competitive sector's edge is its ability to pay personal attention to the needs of clients and its lower overhead costs.

The distribution channels are varied. Because of their large population bases, the Boston-New York axis absorbs a tremendous amount of North Atlantic fish, whether it comes from the U.S., Canada, or Europe (in particular, Iceland, Norway, Denmark, but also European Community countries). Not all of it is consumed in these areas. The Boston area (including the Massachusetts coast and Rhode Island) channels fresh and frozen fish throughout New England and points south and west. New York is the hub for salt fish going to the Caribbean and local New York markets. It also takes fresh and frozen fish for local (New York state) consumption. Maine absorbs some fresh fish, which is then usually processed, and much of the live lobster. Many of these distribution channels have existed for more than thirty years.

Fish are sold from Nova Scotia through a distribution network of brokers and commission agents, traders, value-added processors, and wholesalers/distributors with a small amount going directly to retail outlets or restaurants.[14]

The brokers and commission agents take fish on consignment and earn revenue from commissions on sales of the product (usually 3-7% depending upon the product and species). Traders take legal title to the fish (though not necessarily physical possession) and make their money on the mark-up. This mark-up varies substantially, depending upon the terms agreed upon with the buyer regarding who pays transportation, insurance, and so forth. Processors who fillet whole fish tend to buy through brokers, but processors who are buying frozen product to bread or to turn into frozen dinners usually buy directly from Canadian processors. There are often arrangements where Canadian processors will pack under a U.S. processor's label or even under a distributor's label. Wholesalers/distributors can work either on a commission basis or operate on mark-ups. They usually do not have a brand name of their own, but market the processors' brands or fresh fish to chain stores, retailers, food service institutions, other processors or other distributors.

In Nova Scotia, it has been estimated that 55 percent of the processors ship some of their product through brokers, 41 percent sell to other fish companies (76 percent of which are located in Atlantic Canada), 18 percent ship at least some of their product directly to retail outlets, 8 percent have their own distribution network, 5 percent sell product directly to restaurants, and 2 percent sell some product to government agencies (Apostle and Barrett, 1985, p. 6).

The advantage to the processor of not having his own sales force is the cost savings in terms of salaries, physical overhead, and fringe benefits. Only the largest companies can afford sales personnel. Even then, at this level of distribution, those that do have their own sales force rely on a mixture of the sales force and a network of independent brokers/distributors. The disadvantage to using outside agencies for sales is the lack of direct control over sales, particularly when dealing with a broker as opposed to a trader or wholesaler. That is, in the former case, the broker does not always have the incentive to push for an additional 5 cents a pound (7 percent of an extra, say, $10,000, may not be worth the effort for the broker, who would only receive $700, although the extra $9,300 may be crucial for the processor) and/or may be selling the products of the processor's competitors at the same time. A wholesaler or trader, on the other hand, pays directly for the fish and takes ownership of it. Any problems in selling become the wholesaler's rather than the processor's.

Which system is used depends upon species, product type, and historical accident. Fresh whole fish from Canada are sold primarily through brokers. Fresh fillets are generally sold directly to retail outlets or to distributors. Finished value-added products tend to be sold through a trader/distributor network or directly to chain stores or food service institutions. Salt fish is usually sold to traders, who then sell to distributors/wholesalers in the country of final sale.

The working of the distribution system for fish products is rather like the intricate mechanism of a clock. Participants in the system, when asked what determines price, answer "supply and demand" and talk about a "market price". What determines supply and demand depends upon the level of distribution, seasonal factors, general economic conditions, and a host of temporary perturbations in the market caused by, among other things, someone's need for a cash flow or restrictions on the amount of hard currency a country can spend. The demand for fish at every level but the final retail level is a derived demand. As such, in the final analysis, fish must compete against all other goods (protein products in particular) for the consumer's income. Thus, relative prices, incomes, and tastes of final end users percolate through the system to become a demand for fish and fish products at the processor/distributor level.

On the supply side, the supply of fish depends upon stock availability, the weather, and captains' catching abilities, which include such diverse factors as knowledge of fishing grounds and technology. The availability of fish in the market is also influenced by expected returns. An expected price of $.20/lb. for dressed cod will most certainly keep most U.S. boats tied up. In Canada, where operating costs are lower, fishermen in the northern areas (Newfoundland, Labrador, and possibly Cape Breton) might still fish, but fishermen in southwest Nova Scotia would be less likely to.

Supply of various product types also depends upon expected returns. Given the capability of adjusting product lines, a processor will shift from fresh to frozen to salt, from whole fish to fillets, depending upon which product line yields him the greatest net return. Canadian processors appear to have greater flexibility in this regard than do U.S. processors. Processors without this ability to shift are more likely to have less bargaining power when negotiating a price for their product and, in Canada, are more likely to use other processors as the market in which to sell their excess fish. It is expected that the countervailing duty on fresh whole fish will affect most heavily those processors without ability to shift into other product lines. What will probably happen is processors who normally ship whole fish to the U.S. market will start to sell more to other Canadian processors with filleting and/or freezing capability or who are better able to absorb the duty.[15] A similar shift in selling patterns occurred as a result of the salt fish dumping duty. Smaller salt fish processors with larger duties began to market their product through processors who had a lower duty imposed on them.

There is, of course, a cost to switching product types. Switches thus do not occur unless the price differential is large enough to warrant it. Even then, temporary losses on one product type are often tolerated to keep customers and, particularly in the case of value-added frozen products, to maintain shelf space.[16] A shortage this year may become a surplus next year. A quid pro quo, up to a point, is then established. Fish will be supplied to long-standing customers in years of shortages as much as possible with the understanding, usually implicit, that the buyer will take extra fish in years of surplus.

Nonetheless, switches of product type do occur. In 1983, large inventories of frozen blocks resulted in historically low prices. This signalled processors to move out of blocks into other product types such as frozen fillets and fresh fish. In 1984, demand for salt fish was low and demand for fresh fish was high, depressing prices in the former market and raising them in the latter. Fish were thus channeled into the fresh fish market. When the salt fish market recovered in the late fall of that year, there was actually a shortage of salt fish because fish that would normally have been salted and dried had been sold fresh. As a result, prices in the salt fish market rose above their 1983 levels. As a final example, in 1985, shortages of fish, particularly haddock, kept fresh fish prices high, even through the summer when prices are traditionally depressed. The diversion of fish to the fresh fish market has meant other markets go short. For example, frozen inventories were lower than usual in 1985 because of a general lack of fish and because of the diversion of fish to the fresh market. In this respect, Canadian processors are in general better able to weather downturns in the different product markets than are the majority of U.S. processors who rely exclusively on the fresh fillet market.

Policy Issues

A major complaint of the New England fishing industry against the Atlantic Canada industry is the level of government assistance that is perceived to be given to the latter.[v] Feelings about the amount of government assistance are strongest at the harvesting level. U.S. fishermen feel lower-priced fish imports from Canada keep U.S. ex-vessel prices low. U.S. processors are ambivalent. They need the supply of Canadian fresh whole fish to meet the demand for fillets. This has been the case particularly in the last two years since U.S. groundfish landings have declined substantially. At the same time, to the extent they face competition from fresh fillets and frozen product from Canada, they resent what they perceive to be "unfair competition". That is, they argue Canadian processors can cut prices below costs since the government will bail them out if they lose money. This price cutting then lowers the general level of prices in the market as the U.S. processors must also lower their prices, at least somewhat, in order to compete. Brokers and distributors are not greatly concerned one way or the other. Their job is to move product at the best price possible. Thus, it is essentially irrelevant to them whether the company producing the product received government assistance or not.

There are two distinct strands to the argument that Canadian fish lower market prices, although a distinction between the two strands is not always made. Since the argument is made primarily in the context of the fresh fish market, I limit the analysis to the fresh whole and fresh fillet markets. The first strand is that the presence of imports lowers market price below what it would be without the imports. In terms of the standard perfectly competitive model, this argument assumes a shift in the supply curve for a given demand

(Figure la). The resulting fall in price is what one would expect to occur in an efficient market; the extra supply is absorbed by inducing consumers to buy more by lowering the price. The second strand of the argument is that Canadian processors deliberately offer their product at a lower price than the going market price so as to increase their share of the market. This price cutting results in a fall in market price for all participants since U.S. processors must follow suit if they wish to sell their product.

With regard to the first strand of the argument, the available data on prices and imports to the U.S.[a] suggest that imports from Canada tend to be highest when prices are the highest. This relationship implies that fish imports are

Table 1b

U.S. Atlantic Coast Productiona and New England Imports of Processed Fish from Canada

Volume - Selected Species and Product Type

('000 lbs.)

1. Fresh Fillets

	Cod			Haddock			Flatfish		
Year	Production	Imports	Imports/ Prod. (%)	Production	Imports	Imports/ Prod. (%)	Production	Imports	Imports Prod. (%)
1977	17600	1649	9.4	13200	786	6.0	n.a.	883	
1978	17600	1753	9.9	16000	1126	7.0	n.a.	481	
1979	22490	3270	14.5	15422	1320	8.6	30360	271	0.9
1980	23368	2537	10.9	13742	1415	10.3	29429	263	0.9
1981	21104	3350	15.9	14066	2699	19.2	31871	641	2.0
1982	23020	4781	20.8	10912	2329	21.3	21796	516	2.4
1983	26834	7721	28.8	9721	2698	27.8	24105	680	2.8
1984		13578[c]	-		1994[c]			2471[c]	-
1985		27047[c]	-		2667[c]			6503[c]	-

2. Frozen Fillets

	Cod		Haddock		Flatfish		Ocean Perch	
Year	Production	Imports	Production	Imports	Production	Imports	Production[b]	Imports
1977	3900	17324	2100	4018	7300	27404	12800	24721
1978	6700	25595	2000	9795	6900	28836	10800	28121
1979	6230	33444	3519	9043	3616	29103	9900	29927
1980	5101	37221	3413	9748	3183	28892	6894	19999
1981	13224	58240	3711	11164	3551	33475	4859	32439
1982	3332	75618	2039	7691	3493	30949	3527	32995
1983	3364	77571	1621	4992	6156	23603	12125	21752
1984		97853[c]		3484[c]		24297	6393	24627
1985		76333[c]		4559[c]		22504	9259	20392

[a]U.S. production includes fillets made from whole fish imported from Canada and elsewhere.

[b]Production includes fresh ocean perch fillets.

[c]The figures for 1984 and 1985 are for exports to the U.S. as a whole, not just New England. Only approximately 50 percent of fresh fillets go to New England. Over 85 percent of the frozen cod, flatfish, and ocean perch fillets are shipped to New England, but less than 50 percent of the haddock fillets are exported directly to New England.

Sources: Georgianna and Dirlam (1983), pp. 27-29; U.S.I.T.C. (1984); pp. 54-56; Statistics Canada, unpublished data; Statistics Canada (65-004).

responding to price changes rather than the other way around. That is, supply is adjusting to shifts in demand (Figure 1b) rather than the case suggested by the U.S. industry, where demand adjusts to shifts in supply (Figure la). This

Figure 1
Effects on Price of Shifts in Supply and Demand

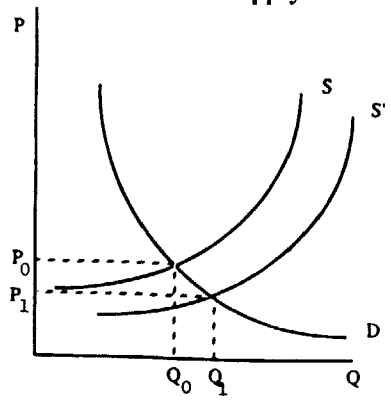

FIGURE 1a

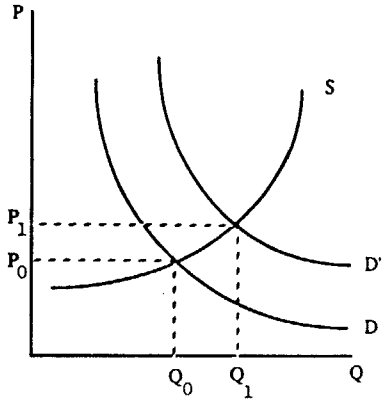

FIGURE 1b

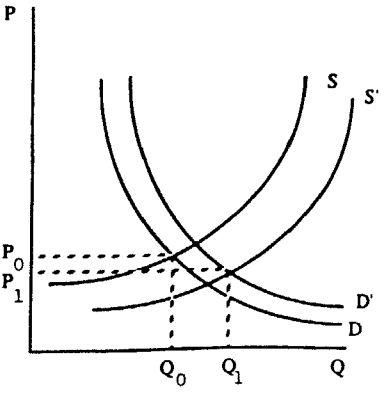

FIGURE 1c

point is further supported by the observation that imports of fresh fish have been increasing yet fresh fish prices in 1985 rose to historic levels." Prices have been so high that wholesalers and retailers report that consumers have started to substitute high quality frozen fish, freshwater fish, and other protein sources such as poultry for fish fillets. Increased imports will thus lower price only if they represent an exogenous rightward *shift* in the supply curve rather than an induced movement *along* the curve and if demand does not also simultaneously shift by more than the shift in the supply curve (Figure 1c).

The question of the impact of imports on market price is one that has not been adequately investigated. There have been some studies of the demand side of the market, such as Wang and Norton (1985), Bockstael (1977), and Houtsma (1970), but all suffer from major methodological problems. The difficulty in modelling the market arises because both the supply curve and the demand curve shift simultaneously. Lack of data on supply-side variables makes it difficult to disentangle the separate effects of demand shifts and supply shifts on price, and the effect of price in inducing changes in supply and demand.

The second strand of the argument is much more difficult to substantiate or refute since it requires individual company transactions data. Analyzing pricing behavior in the fresh fish market is difficult because there is no single price in the market for a given species and product type. Rather, there is a whole structure of prices that vary by size of fish, freshness, origin of the fish, and the demand prevailing at any given moment in the market where the fish are being sold (retail, restaurant, and so forth). Thus, it is difficult to determine whether price cutting has occurred unless one knows the two prices being compared are for products with identical characteristics.

This hierarchy of prices appears to cause the most problems in the fresh whole groundfish market where prices often do not seem to reflect actual supply and demand conditions. It has been suggested (Wilson, 1986) the problem with pricing in the fresh whole fish market is due to the unpredictability of supply on any given day and the perishability of the product. Coordinating supply and demand on a daily basis is thus difficult. In the fresh fillet market, the problems with unpredictability of supply and perishability also exist. The larger amount of direct contract sales for fresh fillets appears to be the way the market has adapted to deal with these uncertainties. In the fresh whole fish market, the contracts appear to be more informal.

In the fresh whole fish market, the highest prices in the market are usually, but not always, the Boston auction prices. Fish landed at the Boston Pier are destined primarily for the "white tablecloth" restaurant trade. As such, they command a premium price. But even the board prices (that is, the stated auction prices) do not necessarily reflect the actual transactions prices since the board price can be renegotiated downwards if the buyer finds the size or quality of the fish less than expected. The board price is used as a rough

indicator of excess demand in the market, but can be misleading as buyers may manipulate the price for certain ends.

Prices on the New Bedford auction are generally lower than the Boston auction prices. In New Bedford, problems of manipulating price are even greater than in Boston because the buyers must buy the whole boatload, rather than individual species.[20] In this case, the price of one species may be artificially bid up to ensure receiving the boatload of fish. Thus, price may merely reflect a buyer's determination to obtain the boatload rather than reflecting the market supply and demand conditions for that particular species.

Outside of the auctions are other New England port sales, usually made on the basis of informal contracts. These markets are influenced by the prices set by the two auctions (which are often used as reference prices) as well as local landings and demand. Prices are usually lower than Boston, though not necessarily New Bedford, partly because the markets for these fish are generally not the high class restaurant trade and partly because of transportation costs to the Boston area.

In addition to port sales, there are "over-the-road" sales of fish from Maine and Atlantic Canada. The price of over-the-road fish is almost always lower than the auction prices because the fish are assumed to be "a day old". That is, over-the-road fish are presumed to be a day older than fish caught by local vessels. This means a shorter shelf life for the fish, and the price falls accordingly. Canadian fish often receive an even lower price because of quality problems, whether alleged or real.[21]

In the fresh fillet market, there also is no one "market price". The price received for any given fillet depends upon the relative negotiating powers of the buyer and seller, the terms on which the product is sold (for example, if the seller wants cash on delivery, he may have to accept a lower price than if he is willing to wait 30 days), the care the seller uses in handling the fish, the cut of the fillet, and many other qualitative factors. The market seems to work quite well in setting prices which differentiate among these many factors.

In the fresh whole fish market, on the other hand, there are problems with the price mechanism. These problems are due to asymmetries in knowledge of relevant supplies and demands (buyers generally have better information than sellers). Problems also occur because of the dominating role played by the Boston and New Bedford auctions in establishing the hierarchy of prices on any given day, although only a relatively small amount of landings and virtually no imports pass through these auctions.

A question that has been raised is whether the fresh whole fish market can be restructured so as to better reflect actual supply and demand conditions. The establishment of the Portland auction is an attempt to provide such a restructuring. The purpose of the auction is to improve the flow of market

information and reduce some of the uncertainties regarding supply and quality that now exist (Wilson, 1986). The success of the Portland auction in achieving these objectives will depend to a large extent on whether it is seen to be an improvement over existing channels of distribution. Given the low volume of New England landings in Maine relative to Massachusetts,[a] it is not entirely clear what effect the auction will have in improving the flow of fish through the market and in establishing prices that better reflect supply and demand conditions, particularly as the demand for fresh fish lies predominantly outside of Maine. Those supporting the Portland auction are hoping to deal with part of this problem by allowing and encouraging Canadian whole fish to be sold on the auction. This would increase volumes and encourage the participation of buyers from Massachusetts and other areas. One wonders, though, whether Canadian fish would still receive a discount because of being "Canadian" or "over-the-road" and whether there will still be complaints that Canadian fish unfairly lower market prices.

Given the complexities of the fresh fish market, it is not entirely clear that the market institutions and distribution channels that have developed over the years are not the best for dealing with the many uncertainties of the market. On the other hand, the structure of demand and supply have been changing, particularly since 1977. There has been a shift in demand towards fresh product. The composition of supply, in terms of species, product form, and country of origin, has also been changing. Perhaps, then, new distribution channels and pricing mechanisms are needed. The success of the Portland auction will provide further information on whether this particular type of structural change results in a more efficient distribution of product.

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Notes

1. The tariffs on fresh whole fish and fresh fillets, prior to the countervailing duty, ranged from one-half cent per pound to two cents per pound, depending upon species and product type. It was designed primarily as a revenue tariff and had little, if any, effect on the flow of fresh fish products to the United States. The tariffs on frozen and

canned fish products are higher, but have been decreasing over the past few years as part of the Tokyo Round tariff cuts.

2. Atlantic Canada refers to the four provinces of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland.

3. See, for example, the dispute in 1986 between the National Marine Fisheries Service and the New England Fishery Management Council over the latter's Fishery Management Plan for the Northeast Multi-Species Fishery.

4. Although this paper concentrates on U.S.-Canada trade, it should be noted that Iceland, in particular, exports almost the same volume of frozen product to the U.S., or more for some product lines, as does Canada. Further, the strength of the U.S. dollar has made it profitable for European countries such as Iceland, Norway, and Denmark to airfreight fresh fillets. See Georgianna and Dirlam (1983) for some statistics on this trade, plus U.S. Department of Commerce, *Fisheries of the United States.*

5. The following discussion is based on data found in Mazany (1986). Because U.S. landings of groundfish declined by approximately 24 percent from 1983 to 1985, some of the seasonality in trade flows has disappeared as seasonal price fluctuations have not been as large due to scarce supplies during the summer as well as winter.

6. It has also been suggested (U.S.I.T.C. hearings, Washington, D.C., April 1, 1986) that U.S. suppliers are unwilling to commit themselves in advance with regard to prices and quantities to large supermarket chains for the Lenten season. Thus, the buyer for a major chain in the U.S. has indicated that for the Lenten season, he buys fresh fillets from Canadain sources because he can receive assurances on prices and quantities in advance which he cannot from U.S. sources.

7. This did not happen in 1985 due to low catches.

8. The arrangement of transporting whole sardines across the U.S.-Canadian border is a unique one and one that might serve as a model for free trade in fish products. This trade is variable and is partly reflected in the statistics in Table 2 for New Brunswick.

9. Exact figures are not readily available. However, as much as one-third of the fresh fish imports are estimated to originate from Atlantic Canada but to be distributed via New England. (U.S.I.T.C. hearings, Boston, September 3, 1984.)

10. One of the major complaints about marketing made by Nova Scotia processors concerned the difficulty of shipping fish directly to Ontario and Quebec due to inadequate distribution systems. They also find airfreighting fish, while potentially profitable, to be fraught with logistical difficulties.

11. The information presented in this section is based on interviews undertaken by the author and two colleagues in 1985 with 24 key informant Nova Scotia processors and 27 key informant fish dealers in the Boston area, Maine, New York, Toronto, Montreal, and Nova Scotia. Because of the concentration on Nova Scotia, the description is not representative for the Atlantic Canada region as a whole. In particular, the information is not likely to describe the situation in Newfoundland well because of Newfoundland's isolated bays, its unionization of the fishing industry, the

dominance of Fishery Products International and the Canadian Saltfish Corporation in the industry, and its short fishing season.

12. Department of Fisheries and Oceans, *Annual Statistical Review*.

13. Southwest Nova Scotia is usually defined as Queens, Shelburne, Yarmouth and Digby counties, but can also include Lunenburg county.

14. There are no absolute distinctions among these categories. Processors can be wholesalers, brokers can be distributors, and so forth. Usage of terms varies across localities.

15. Although by law it is the importer who is supposed to pay the duty, there is some evidence that in many cases the duty has been pushed back onto the Canadian processor.

16. Selling frozen foods to chain stores requires a one-time payment of several thousand dollars for space in the frozen food case. In addition, a certain level of turnover must be maintained the keep the space. Should a product be withdrawn and then be put back on the market, the one-time payment must be made again, plus there is no guarantee shelf space will still be available. Thus, those processors who sell frozen products directly to chain stores always allow enough fish for frozen production in order to maintain their presence simply because re-entry costs are so high. In addition, once a brand disappears for a time, one has to start all over to build brand name recognition, another cost.

17. Although the New England industry also receives government assistance, it is about one-half that received by the Atlantic Canada industry, according to U.S.I.T.C. staff. Such estimates, of course, depend upon whether regional development programs are included as assistance or not.

18. See U.S.I.T.C. (1984, 1986), plus the transcripts of the related hearings. See also the U.S. Department of Commerce, Department of Fisheries and Oceans, and Statistics Canada publications listed in the bibliography.

19. The rise in price is partial due to the fall in *total* supply (domestic landings plus imports) since 1983 (U.S.I.T.C., 1986, p. A-11), suggesting a leftward shift in the supply curve for fresh fish.

20. See Peterson (1985) for further details on how the New Bedford auction works.

21. There is some evidence that the perception of Canadian fish as lower quality arose from European fishing industries which were disgruntled about being excluded from Canada's 200-mile exclusive economic zone. See, for example, Agra Europe (1981), p. 3.

22. Of total New England landings, 19.1 percent are landed in Maine versus 65.8 percent in Massachusetts (U.S.I.T.C., 1986, p. A14).

Countervailing Duties as a Marketing Response: The Case of *Certain Fresh Atlantic Groundfish from Canada* [1]

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The support of the MA/RE program director, Dr. Mark L. Chadwin, is gratefully acknowledged.

Introduction [2]

Since 1983 New England fishermen have been experiencing increasingly severe financial problems. There is reason to believe that only a small percentage of fishing vessel operations are at or above the financial breakeven point. Many of the fishermen may be forced to cease currently unprofitable operations.

During the years from 1983-1985, there has been a dramatic increase in the amount of Canadian harvested fish products that have been imported into U.S. markets. Fresh fish imports into northeastern U.S. markets have consisted almost entirely of fish caught by the Canadian Atlantic fishery (Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, and Quebec).

By late 1984, most of the New England fishermen had concluded that their financial difficulty was due to Canadian fish product imports. A major New England fishery product is fresh groundfish, either whole or filleted.[3] Canadian exports had captured a more than 20 percent share of the overall fresh fish market and market penetration was still increasing. New England fishermen believed that Canadian fish were being offered routinely at prices below the market price of domestic landings, that this price undercutting was suppressing domestic prices, and that this competition was possible only because of Canadian government subsidization of its Atlantic fishery.

U.S. trade law provides a remedy for domestic industries that aims at offsetting the effects of such foreign subsidization and at restoring the domestic market to a level of "fair trade," undistorted by foreign anti-

competitive subsidization. This remedy is the imposition of a countervailing duty. As its response to the Canadian market penetration the New England fishery chose to seek such a duty on Canadian imports of fresh whole groundfish and fresh groundfish fillets.

This paper first explains briefly the law of countervailing duties. It then compares the competing fishing industries to illustrate why, in the author's opinion, the Canadian government supports and will continue to support, socially and economically, its Atlantic fishery, regardless of U.S. trade laws. The paper also describes the highlights of the disposition of *Certain Fresh Atlantic Groundfish from Canada*, the countervailing duty petition and its recent administrative conclusion, one which is which is unsatisfactory to all parties. And finally, the paper considers possible Canadian responses that would create a new, imminent threat to New England fresh fish processors and in the long run, exacerbate the difficulties of the New England fresh fish harvesters.

Countervailing Duty Law[4]

A successful countervailing duty petition must give the proper government agencies sufficient evidence to support two administrative determinations:

1. A country under the certain agreements[5] that interpret the General Agreement on Tariffs and Trade (GATT), or a citizen, national or any organizations in that country is providing a direct or indirect subsidy of manufacturing, production or exportation of merchandise being imported into the United States, and

2. That an industry of the United States is materially injured, threatened with material injury or is having its establishment as an industry materially retarded by reason of imports of that merchandise. The countervailing duty imposed is to be the amount that offsets the net effect of the subsidy.

The procedure required before such a duty can be imposed is as follows: The petition is filed simultaneously with the "administering authority" and with the International Trade Commission (ITC). Currently, the administering authority is the International Trade Administration (ITA), Department of Commerce. The ITC is an independent federal agency. Each body has distinct adjudicatory responsibilities. The ITC resolves the issue of material injury. The ITA determines whether there is a countervailable subsidy and its net amount. Each agency must make both preliminary and final determina-

tions in its respective areas of decisional responsibility. A strict procedural timetable must be met:

	Days After Filing of Petition
1. ITA determines if the petition is sufficient. That is, are necessary elements alleged? Does the petition contain all information reasonably available to support allegations?	20
2. ITC preliminary determination: Is there a reasonable "indication" of material injury?	45
3. ITA preliminary determination: on basis of best evidence available, is there "reasonable evidence to believe or suspect" a subsidy exists? What is the best estimate of the net countervailable subsidy.	85

Note: The timetable for the ITA preliminary determination may be extended to 150 days after filing if, as was true in *Certain Fresh Atlantic Groundfish from Canada*, the case is extraordinarily complicated.

	Days After ITA Preliminary
4. ITA final determination: A countervailable subsidy exists. Net amount of subsidy is calculated.	75
5. ITC final determination: Material injury exists or is threatened, or a domestic industry is being materially retarded "by reason of the subsidized" imports.	120

Note: An ITC final determination must be made within 120 days of an ITA preliminary affirmative determination or within 45 days of an ITA final determination, whichever is later. The ITC final determination must be made within 75 days of an ITA final affirmative decision that has been preceded by an ITA preliminary negative determination.

The foreign exporter will first feel the impact of countervailing duty when ITA makes a preliminary affirmative determination; that is, when ITA determines there is a reasonable basis to believe or suspect that there is a

countervailable subsidy and that its net amount is more than *de minimus*. At that juncture, U.S. Customs will begin to require collection of the estimated duty, by requiring a cash deposit, bond or other security, *ad valorem*.

"Subsidy"[6] is not explicitly defined in U.S. statutes. Rather, the meaning is partially described by reference to two non-exclusive lists of examples. An "export" subsidy is one that either raises the return on or lowers the cost of an export activity. The possible range of countervailable export subsidies includes, but is not limited to the subsidies listed in Annex A of GATT. A domestic subsidy is one which provides benefits to the production or sale of goods, regardless of exports. A domestic subsidy generally bestowed on industries within the exporting nations is not countervailable. If government action, direct or indirect, is targeted at either a specific enterprise or industry or a specific group of enterprises or industries and is bestowed on manufacture, production or export of merchandise, a domestic subsidy may possibly be countervailable. A nonexclusive list of countervailable domestic subsidies is found in 19 USC §1677 (5)(B).

The subsidy calculation is a three-step process.[7] First, the cash flow differential between the countervailable government loan, equity investment or grant and the appropriate market alternative is calculated. Then an appropriate discount rate is chosen. Finally, the stream of benefits of the net subsidy is allocated over a reasonable period and in a reasonable fashion. ITA asserts that it has "wide latitude" in determining the amount of the subsidy. To calculate the subsidized amount of a loan, the cash in (receipts) and cash out (repayments) under the government program are matched with a cash in and cash out of a comparable commercial loan. Any positive cash differential obtained under the government loan is a subsidy. For equity investments, it is the excess that the government paid over what the market would pay for that equity. For grants, the subsidy is the face value of the grant.

For the benefit of both agencies, the ITA maintains the official record of the countervailing duty proceedings. Each agency relies upon the evidence submitted by the parties. However, in conducting the subsidy investigation ITA is required to do an on the spot verification of the information submitted by the respondent. ITC, on the other hand, obtains much of its data by questionnaires sent to a sample of an industry's member firms.

In summary, to establish that a countervailing duty must be imposed, a petitioner must demonstrate:

1. that an exporting nation bestows an export subsidy or a targeted domestic subsidy, (ITA), and

2. that the subsidy is causing or threatening to cause material injury or retardation to a domestic industry (ITC).

Comparison of the Competing Fishing Industries[1]

The competing industries are a study in contrast: in economic structure, available resources, domestic, political, and social significance, and degree of government support.

	New England	Atlantic Canada
Regional population	12.5 million	8.8 million
Number of fishing vessels	1,000	30,000
Number of fishermen	10,000	50,000
Number of processing plants	125	300
Number of processing employees	3,000	22,000

In the New England fishery most vessels are owner-operated. Crews are paid on one of several "lay" systems; this means that crews share the operating costs of the voyage with the owner-operator. Although employment of fishermen has declined by ten percent since 1983, the harvesting capacity of the fleet has increased slightly. This is because of a shift to large size vessels.

The Atlantic Canada fleet consists of many small vessels fishing seasonally and inshore, a growing nearshore owner-operator fleet, and a processor-owned fleet of more than 350 well-equipped, year-round vessels fishing offshore. The offshore fleet accounts for at least half of the groundfish catch.

Fresh groundfish fillets are produced along the entire east coast of the United States, but eighty-three percent of the production is in Massachusetts. Two-thirds of the processing plants employ less than twenty people. The industry is competitive. The largest firm has less than a ten percent market share; the largest eight, forty-one percent. The processors' normal channel of distribution is to wholesalers. Direct marketing to retailers has begun recently.

The Atlantic Canada processing industry has been an oligopsony. In 1983 and 1984, horizontal integration increased dramatically. With national and provincial government support, the eight largest processing firms merged into two "supercompanies", National Sea Products, Ltd. (NSP) and Fisheries Products International (FPI). NSP and FPI own most of the offshore fleet. They account for seventy-five percent of frozen fish production and fifty

percent of the groundfish harvest. Although actual data is business confidential, it is fair to say that NSP dominates the fresh whole groundfish export market, and the two companies together dominate the fresh fillet export market. In the context of the case of *Certain Fresh Whole Groundfish from Canada*, it should be noted that the shift to significant fresh fillet production has occurred only in recent years.

Over the last decade the advent of the 200 mile economic zone and the resolution of the Canadian-American boundary dispute have reduced the New England fisheries harvesting area and its access to the fish stocks it had previously harvested. This loss had been preceded by the intensive pulse fishing of the same grounds in the 1960s by distant water fishing fleets. As a result, U.S. groundfish landings declined by a third between 1968 and 1974. Groundfish landings remained nearly constant over the 1979 to 1983 period, averaging almost 330 million pounds. Landings declined in 1984 and again in 1985 to about 266 million pounds. Almost all of these landings were sold to processors, processors-distributors, and restaurants in the northeastern United States.

The Canadian Atlantic fishery harvests essentially the same species as are taken by the New England fisheries. These Canadian fish stocks are controlled, in almost every respect, by the Department of Fisheries and Oceans (DFO). Groundfish stocks in 1983 were almost four times as large as the New England fisheries stocks. Except for haddock, stocks were ample. The harvesting sector had the capacity to harvest about 80 percent of the total allowable catch of each species.

Canadian Atlantic fish stocks benefit from a management plan that is more conservative than that utilized for the New England fish stocks. By the use of quotas and of enterprise allocations, entry into the Canadian fishery is limited and fishing effort is controlled.

A salient feature of the Atlantic fishery is that national social policy for eastern Canadian provinces and the economic well-being of the industry are inextricably bound. Nowhere is this better stated than in the Kirby Report,[9] the seminal work about the Atlantic fishery today.

> "To try to create an economically efficient industry as an end in itself without regard to the social values, or to try to preserve a way of life without that life being meaningful, self-supporting work is like trying to separate body and soul. Our approach, therefore, recognizes the inseparability of economic and social issues in the fishery."

In 1983, the Atlantic fishery had three principal characteristics: an ample resource base; an industry internally divided, uncertain and in financial crisis; and a major accessible market for its products, the United States. The viability of the Canadian Atlantic fishery was and is a matter of importance at all levels of government. This importance is attested to tacitly by the number of governmental programs designed to manage its resources well, to unite the industry on a sound social and economic footing, and to aid in marketing its products (See Table I on page 119).

On the other hand, the New England fishery is a traditional, but non-essential part of its regional economy. Its health is necessary for the economic well-being of some coastal communities but not to the economic viability of the region as a whole. The industry's members may represent a significant constituency of members of Congress from coastal districts, but as a knowledgeable government staff member said, "Fisheries don't exist in D.C."[10]

Canada must insure the economic and social well-being of its Atlantic fishery. It is in Canadian national interest to utilize its fisheries resource and to seek markets for that abundant resource. In the case of fresh groundfish products, that market is and will continue to be the United States.

The Case of *Certain Fresh Atlantic Groundfish from Canada*

The export of fresh fish products from Canada to the United States increased dramatically from 1982 to 1985.[11]

	1982 (million pounds)	**1985** (million pounds)	**Three-Year Increase**	**Annualized Rate of Increase**
Whole Fish	36.0	94.0	161%	38%
Fillets	16.4	26.0	58	17

By 1985, Canadian exports had attained a 22 percent share of the U.S. fresh whole fish market and a 19 percent share of the U.S. fresh fillet market.[12]

By late 1984, the New England fishermen (harvesters) had come to believe that the rapid increase in Canadian market share was harmful, *per se*.

processors were being affected in two ways. They were increasingly dependent upon Canadian whole fish during seasons of low domestic landings. (Canadian supplies are somewhat countercyclical to New England landings.) Yet processors were increasingly concerned by the increase in competition presented by the growing Canadian share of the fresh fillet market.

Since 1977, four prior American fishermen's efforts to use U.S. trade laws to protect their markets from Canadian competition had met with failure.[13] The fifth effort was initiated by the North Atlantic Fisheries Task Force, an unincorporated group of New England fish harvesters and fish processors who, in August, 1985 petitioned for a countervailing duty to be imposed on imports of Canadian fresh whole fish and fresh groundfish fillets.

Why did the Task Force believe that it would succeed where other fisheries groups had not?[14] By December, 1984, the Task Force had in hand the detailed ITC investigation of the competitive conditions in its market. This report provided invaluable research that the Task Force could not otherwise have obtained and that it believed would tend to support a countervailing duty petition. The belief that Canadian imports were *per se* harmful and the existence of a timely authoritative analysis of the industry where the principal factors motivating the filing of the fresh groundfish petition.

There were additional Task Force considerations. An increase in cod imports was thought to be disrupting the normal cycle of resource availability and market opportunities for harvest of other species. The Task Force knew that Canadian interests were beginning to acquire ownership interests in American distributorships and believed that there was a favorable, "fair trade" political climate in Washington, D.C. The 1979 amendment of the U.S. trade laws made a successful outcome more likely. Limiting the petition to fresh whole groundfish and fresh groundfish fillets was a more sophisticated strategy than had been chosen in the earlier efforts to use the trade laws.

The petitioning Task Force believed that the New England fresh fish processors did and would continue to support the petition for a countervailing duty. In fact, the public position of the processors on this matter was ambivalent throughout the course of the investigation. From the outset processors had privately opposed a duty on whole fish. Many depended on Canadian whole fish for their filleting operations; but they wanted a heavy duty on fillets, the competing import. The processing segment agreed not to oppose publicly a modest duty on whole fish. This silence gave political credence to their desire for a duty on fillets. As will be seen, after the ITA final decision, processor support for the petition almost totally eroded. The ambivalence of the processors has had a significant legal and practical effect on the final disposition of this petition.

The positions of the parties remained the same throughout the proceedings.[43] The petition alleged that once the daily price of U.S. fresh fish products was set, "like" Canadian fresh fish products were offered at significantly lower prices. Over time this Canadian price competition depressed the U.S. prices for fresh fish products. Canadian price undercutting was possible only because the Canadian government was subsidizing its fresh fish industry and that industry's exports to the United States. This price suppression was materially injuring the New England fishing industry. And, finally, because the subsidized price competition had resulted in rapid and still increasing market penetration by the Canadians, there was a threat of still more material injury.

The petition alleged that sixty-one Canadian, federal, joint federal-provincial, and provincial programs constituted an aggregate countervailable subsidy estimated at 10 to 20 percent, *ad valorem*. The range of programs identified as subsidies was broad (see Table I on page 119). It included grants for vessel construction and improvement, construction and improvement of shore side facilities, vessel operations, and fishing technology improvement. Government marketing service programs were included. There were targeted economic development grants. Certain investment tax credits were included. Financial subsidies ranged from interest free loans and interest rebates to massive equity infusions into the processing sector, all on terms inconsistent with commercial considerations.

The principal respondent in opposition to the petition was the Fisheries Council of Canada. It asserted that Canada's exported fresh fish products simply did not affect market price. The U.S. market was characterized as one of steadily increasing demand that could not be satisfied by domestic landings. Market prices, which had risen to all time highs during the period in question, were unlikely to rise further because of the ready substitutability of other protein products, principally poultry. The Fisheries Council also contended that Canadian fresh fish products were of lower quality, lower yield, generally less fresh, and did not command the same price in a competitive market as did the higher quality U.S. groundfish products. From this the Canadians concluded that there was no demonstrable price suppression. The Fisheries Council did not deny or attempt to refute the petitioner's claim of economic distress in its harvesting sector. Rather, the Council argued that American long term overfishing and poor stock management were the sole cause of the financial plight of the New England fishing industry.

The preliminary ITC determination[44] was that there was reasonable indication of material injury to the New England fishing industry. The industry was defined as the harvesters of fresh, whole groundfish and the processors who produce fresh groundfish fillets. ITA's preliminary determi-

nation was also favorable to the petitioners.[17] That agency found reasonable evidence to suspect that a countervailable subsidy of 6.85 percent, *ad valorem*, was being provided to the Canadian Atlantic fishery with respect to fresh groundfish products exported to the United States.

After verification, which lasted a month, and a public hearing, ITA made a final determination that fifty-five Canadian federal, joint federal-provincial, and provincial programs constituted an aggregate subsidy subject to U.S. countervailing duty law. The subsidy was found on all fresh groundfish products. The duty was set at 5.82 percent.[18]

ITC then made its final injury determination.[19] In doing so, it redefined the New England fishery as two separate industries, harvesters and processors. On a 3-3 vote it found material injury to the harvesters. (The statute mandates that a tie vote is a determination in favor of petitioner.) On a unanimous vote it found no material injury or threat of material injury to the processors. At that point Customs ceased collecting a countervailing duty on fresh fillets.

Two of the many issues raised in the proceedings will be addressed. The first is the petitioner's claim that Canadian unemployment insurance, as administered for self-employed fishermen, is a targeted domestic subsidy. This is a case of first impression; no petitioner had ever before attempted to prove that unemployment insurance could be a countervailable subsidy. Had unemployment insurance been found to be such a subsidy, the duty imposed would have been significantly larger. And one can make a strong argument that ITA erred in not finding unemployment insurance to be a subsidy.

The second issue is whether the petitioner actually had standing to represent the New England fish processors. This issue was raised at every stage of the proceedings and the failure of ITC to resolve it with respect to the injury determination contributed to the unsatisfactory disposition of the petition.

Unemployment Insurance

Not every subsidy that causes or threatens injury to a U.S. industry is countervailable. If the subsidy is available throughout the exporter's economy, it cannot be offset by an import duty even if it is harmful. And unemployment insurance is just such a generally available government service. Why is it then, that petitioner pursued with zeal the idea that the Canadian unemployment insurance program, available nationwide, was a subsidy benefiting self-employed fishermen? It was simply a matter of numbers.

Fully half of the Canadian Atlantic fishermen are self-employed and would probably leave fishing if unemployment insurance did not guarantee an off-season income for half of every year.

The self-employed fisherman's program is an atypical unemployment insurance program. The processor is the fictitious employer of the self-employed fisherman and pays employer premiums on the basis of catch purchased, not on the basis of wages earned. A fisherman's benefits are calculated from his ten highest weeks earnings during the eligibility period; although other Canadian workers' benefits are based on a longer period. Other workers earn one weeks benefits for every week worked; fishermen earn only five weeks benefits for every six weeks worked. Extended benefits are similar, but fishermen may receive benefits only during one of two six months off season periods. In other words, fishermen are paid benefits on a predictable seasonal basis while most other workers are paid whenever unemployed. And the latter payment schedule is more consistent with the notion of insurance against random, unpredictable periods of unemployment. From this comparison of dissimilarities, ITA concluded that Canadian unemployment insurance for self-employed fishermen, while somewhat unusual, was not a subsidy targeted at the self-employed fishing industry.

Unmentioned in the ITA final determination were the following facts, presented by petitioner, without rebuttal. The unemployment insurance administering Commission is authorized to permit the self-employed fisherman's program to differ "with respect to any matter" from all other unemployment insurance programs. Normally, benefits paid by the Commissioner are drawn from employer and employee premiums that have been paid into the insurance fund. Any shortfall is covered by borrowing, at interest from the Consolidated Revenue Fund, the Canadian treasury. Self-employed fishermen's premiums, however, are paid directly to the Consolidated Revenue Fund and benefits are paid to the fishermen without regard to premium shortfall. Payout ratios, little more than 1:1 in other industries were variously estimated from 12:1 to 17:1 by petitioner's uncontradicted evidence.[20]

The administering Commission has described this unemployment insurance program as an "income supplement". The Kirby report, discussing the program in the context of fishermen's income observed:

> "The current system of unemployment insurance (UI) is the only program providing significant income stability and supplementary revenues for fishermen."[21]

ITA based its decision on an incomplete program comparison. Its failure to consider the features of greatest contrast suggests that its decisions may be

in error. It simply did not address the central issue: Does the high payout ratio for unemployed fishermen constitute, in large part, a grant? Is it a grant aimed at keeping these workers in the industry and in their present homes? Does it maintain the economy and traditional way of life of Atlantic Canada? And if it does, does it benefit the production and export of fresh fish?

Petitioner made a strong showing that all of these questions should be answered, "Yes". But "unemployment insurance" has rhetorical power. One thinks of it as a salutary government service to protect workers from the random, temporary loss of the opportunity to work. Perhaps the power of the word belies the possibility that such a program could ever be viewed as a subsidy.

Task Force Standing to Represent Processors

ITA must, when reviewing a petition for sufficiency, determine if the petitioner represents the majority of the petitioning industry. ITA's current view is that neither the trade laws or Department regulations requires more than the petitioner's assertion of standing. The burden of showing lack of standing is that of the respondent. During the course of the subsidy investigation ITA received many letters from U.S. fish distributors and processor-distributors. Most of these firms were largely dependent on Canadian fish for their operations. Some processors objected to a duty on whole groundfish but not on fillets. Others objected to a duty on either product. ITA required an affirmative showing that a majority of the processors opposed a duty on the competing imports of their product, fillets. The evidence was insufficient, so ITA found that the Task Force represented a majority of the processors.[22]

The ITA final determination that fresh fillets were not being subsidized more than fresh whole fish was not the outcome desired by the processors. Processor support for the petition eroded rapidly. When the proceedings were resumed before the ITC, few of the processors supported the petition.

The standing issue was further complicated by the ITC's problem of how best to define an industry in agricultural cases. In its preliminary determination, it viewed harvesters and processors of fresh fish as one industry. Its rationale was founded on the following considerations. Ninety percent of the fresh fish harvest is sold to be processed into fresh fillets. This is the primary purpose of the harvesting operation. Thus harvesters and processors form a continuous line of production and one industry.[23]

The ITC reversed itself in making its final determination. It viewed the petition as involving two separate industries, not one. The harvesters were seen as the suppliers of the processors' raw materials, but no further economic integration was found. There were no direct economic ties, no legal ties, and no commonality of interest. There were, in ITC's second opinion, two separate industries.[24]

If the Task Force had standing to represent each industry, that is, if it represented a majority of the membership of each industry, this would require the Commission to make a material injury or threat of material injury determination for each industry. If the Task Force did not have standing to represent the processors, then the Commission did not have jurisdiction in this proceeding to make a processor injury or threat of injury determination.

The power of the ITC to make a decision on standing, on its own initiative, is debatable. It is fundamental that any court of law has the power and the obligation to determine its own jurisdiction. But here one is dealing with an adjudicatory body within the Executive Branch, an administrative tribunal; that is, a creature of statute. And one can argue, as petitioner did, that the statute that vests in ITA the responsibility to, at the beginning, determine the standing of the parties, by implication requires the other party in this two-agency, bifurcated proceeding to defer to ITA's jurisdictional determination.[25]

Without mentioning "standing," the Commission concluded that the processor industry did not seek the Commission's assistance in combating unfairly traded imports...." This can be read as a tacit recognition that the Task Force did not have standing to represent the processors. The majority of processors did not cooperate by responding to the Commission's questionnaires. The Commission's subpoena power was needed to elicit response from processors who had joined in the original petition. And by the time of the ITC final determination there was "overwhelming, unconditional opposition of the processing industry to the petition...."[26] These observations, it is submitted, should have obviated the need for a processor industry injury determination.

Paradoxically, the Commission then adjudicated the issue of material injury to the processors. That determination was that there was no injury or threat of injury to an industry that did "not seek Commission assistance,"[27] has not provided significant evidence and was opposed to the petition. The determination is gratuitous and questionable.

Material Injury to the Harvesting Industry

Are Canadian fresh fish exports causing material injury to the New England fisheries harvesting industry? The ITC was evenly divided on this issue, voting 3-3. A tie vote constitutes a finding of material injury.[28] The rationale of the divided commission reflect the two diametrically opposite ways in which the price suppression evidence in this case can be viewed.

A financial and economic profile of the harvesting industry is the starting point for both points of view:

	1983	1985	% Change
Groundfish landings	416.4	331.5[29]	-20%
Total Vessels	1032	1038	+/-1
Vessel Employment			-10%
Gross Revenues			-6.6
Expenses as % gross revenues	101.5%	106.6%	
Net Loss Before Taxes	1.9%	7.1%	374%

Of the small sample upon which this data was based, less than three percent of the groundfish fleet, 71 percent of the vessels reported losses in all three of the years 1983 to 1985.

The Commissioners who found material injury considered the following: from 1983 to 1985 Canadian whole fish imports increased 203 percent and the Canadian whole fish market share increased from 10 percent to 22 percent. They noted the concurrent, possibly harmful, decrease in domestic groundfish landings. But in their view, the statute requires ITC to determine if Canadian subsidies are a cause of material injury, not the sole cause or a major cause. These Commissioners saw the decline in landings as a factor making the domestic industry more vulnerable to subsidized imports. They saw the equivocal evidence of price behavior as a reflection of Canadian price cutting in 1984 and 1985, and they concluded that in the face of declining domestic supply and a steady rise in prices, imports will tend to counteract the increase in prices "to some degree." This price is a cause of material injury. There is intuitive appeal to the argument that when imports double in three years and capture almost one fourth of the market, the magnitude and speed of market penetration must have a harmful effect on the domestic industry.[30]

The Commissioners who found no material injury began by considering the recent steady decline in domestic landings. Faced with a declining

domestic supply, processors had turned to imported groundfish. Not only did imports benefit the processors, but one commissioner argued that imports may have benefited the harvester as well. In a time of steadily rising prices and declining supply, imports may have prevented the fresh fish industry from pricing itself out of the market. Faced with the equivocal evidence of price behavior, these Commissioners conclude that any price differential was due to proven differences in quality and yield of the competing harvests. In accepting the existence of an almost six percent subsidy, they discounted it as undetectable in a volatile market, where a twenty percent per month price change is not unusual. These Commissioners saw the troubles to the domestic industry being caused by reduced domestic landings, not Canadian fish.[31]

Neither rationale is satisfactory. Both are based on equivocal price data. The Commissioners who conclude that there is material injury ignore the issue of the present level of fresh fish prices. There is considerable persuasive evidence that prices are so high that consumers will soon begin to shift to substitutable goods. The commissioners who do not find material injury do not address the impact of the rate of increase of imports and of market penetration. It strains one's credulity to believe that such a dramatic increase in market share could occur without some significant impact on the domestic industry. Nor can one readily accept the view that the impact of imports is beneficial. This assumes that the price of fresh fish products is at a level so high that a small marginal price increase will cause demand to decrease to near zero. Such a position is untenable in the absence of an understanding of the demand curve. Neither party could provide such understanding.[32]

Neither Commission's view of the material injury issue is founded on evidence and reasoning that is entirely satisfactory.

Lack of Material Injury to the Processing Industry [33]

The decision that there has been no material injury to the processing industry was based on the following economic profile of the domestic industry:

	1983	1985	% Increase (in Million Pounds)
Fillet production	98.3	105.2	7
Net Sales	$92.8M	$109.3M	18
Operating Income	$ 1.63M	$ 12.9M	78
Cash Flow	$ 2.3M	$ 3.9M	70

Only one processing firm showed an operating loss in either 1984 or 1985. This is an industry with traditionally low profit margins. Even in a period of increasing imports of fillets, it is difficult to argue that the above profile is one of an industry sustaining material injury. But this profile flatly contradicts the description in the petition of a declining domestic supply of whole fish, increasing fillet imports, and a declining return on sales that has caused many processors to leave the industry, either voluntarily or through bankruptcy. Which view is correct?

The disparity in the petitioner's view and the Commission's view of the processing industry points up a major evidentiary problem in the Commission's methodology: Its use of surveys to conduct its investigation. In the Commission's preliminary survey, only two processors provided useable data . In the final survey of 97 processors (out of 125 plants identified as part of the industry), only 10 furnished useable income and loss data relating to processing operations. To calculate industry wide operating income and cash flow from such a small sample is questionable at best.

Lack of Threat of Material Injury to the "Whole Atlantic Groundfish Industry"

The Commissioners who found no material injury to the harvesting sector also found that the industry, as a whole, did not face the threat of imminent material injury. They considered the following facts. Subsidized fish imports have not displaced domestic production. Because of the perishable nature of fresh fish there can be no increase in inventories in the United States that would create the potential for injury. Canadian groundfish landings in 1985 were 11 percent lower than in 1982. Canada regulated its fisheries to the point where an increase in production capacity was unlikely. And finally, fresh groundfish products are a small part of overall groundfish production; over 90 percent of the catch is frozen or salted.

The issue of whether the domestic fresh fish processing industry is subject to threat of material injury is not addressed. A duty on whole fish only invites Canada to maximize its imports of countervailing duty free fresh fillets. A duty on whole fish increases the cost of materials of the American processor who, at the same time, faces the influx of duty free fresh fillets. The determination itself creates the threat of material injury to domestic processors.

Conclusions

The petitioner or opponents of the petition may ask the United States Court of International Trade to review the final determination as to material injury, existence of countervailable subsidies and the *ad valorem* amount of the countervailing duty. Appeal must be taken within thirty days of the date of the ITC notice of a final determination, May 14, 1986. The standard of review is the usual one for a federal court review of the action of a quasi-judicial administrative body. Does the record as a whole contain substantial evidence to support each determination? Are the agency decisions otherwise in accordance with the law? There will not be a trial *de novo*, that is, no additional evidence can be offered. The appellate court looks at exactly the same documentary evidence and hearing transcripts that were available to ITC and ITA.

There are, in this writer's opinion, appealable issues. Petitioners, for example, could conceivably obtain a reversal of the ITA no subsidy determination concerning unemployment insurance. The respondent would have similar prospects if it chose to question whether there is substantial evidence on the record of material injury by way of price suppression in the fresh whole groundfish market. Considering that an appeal by either party would trigger an appeal by the other party and would put at issue important determinations favorable to each party, an appeal in this case appears risky.

If the final determination is unsatisfactory to all parties, it is also true that most of the adversaries made some gains. The New England fishermen have established the fact that Canadian Atlantic fisheries subsidization is injuring the domestic industry. If the Canadian marketing strategy continues to emphasize increased market penetration and market share growth, this case should be the starting point for more effective future political and legal response by the harvesters. The case simply spotlights their plight.

The Canadians, on the other hand, are faced with a duty that is not a great burden on the export of whole fish. It is possible for Canada to impose a 5.82 percent offsetting export duty on like products. U.S. trade law would then call for elimination of the countervailing import duty. And Canada could simply recycle the collected duty, less administrative costs, to the benefit of its own economy.

The effect of this determination that bears watching is the incentive for increasing the Canadian duty free, fresh fillet export that now exists. As an extreme example of the existing potential consider that a Canadian decision to process all the fresh whole fish before export would double the amount of fillets available for export to U.S. markets. And consider also that every

frozen fillet is, at one stage in production, a fresh fillet. Canada has the ability to maximize in the short run, the potential benefit of increasing its share of the fresh fillet market. To the extent that it chooses to do so, there would be immediate and palpable injury to the New England processors. There would be insufficient whole fish to process and traditional customers would have to shift to Canadian fillets. In an industry that cannot maintain any inventory to insure customer supplies, the potential for material injury is real. Should Canada respond to the incentive for increased fillet imports, it is unlikely that a processor petition for a countervailing duty would provide timely response. And, while the domestic harvesters might, in the short run, command the higher prices that they now seek, in the long run material injury to the processing sector would deprive the harvesters of their traditional and necessary markets and further injure an already economically fragile industry. Some U.S. processors who have the choice are opting to deal exclusively in frozen fish products."

While it is unlikely that Canadian interests will be willing to forgo all of the marketing opportunity provided by the end result of this case, one would hope that the Canadian government would recognize that it is not in the long term interest of the Atlantic fishery to injure the American processors. Canada needs its U.S. fresh fish products market. Should Canada maximize this opportunity, the practical demise of the northeastern fresh fish processing industry will occur. Sooner or later a protectionist response to permit future harvesting of U.S. fish stocks is likely. A viable alternative would be for Canadian interests to develop more distant U.S. fresh fish markets and to limit head-to-head competition in northeastern U.S. markets. With the already effective effort to improve the quality of Canadian fresh fish exports and the increasing use of air transportation, Canada can continue to develop markets such as the ones being developed in the southwestern states where increased fillet imports are less likely to harm the processors of the New England fishing industry, who still tend to supply a traditional regional market.

The processors, alone, do not seem to have benefited in any way as a result of this countervailing duty petition. It is speculation to draw any conclusion as to how the outcome might have differed had the processors wholeheartedly supported the petition. But it may well be that processor support would have provided evidence that this industry was not as economically sound as it has been portrayed by ITC. It might have been that ITA would have looked more closely at the question of whether subsidies such as the equity infusions into the supercompanies impacted American processors as well as American fishermen. All that one can say for certain is that the decision to impose a countervailing duty on wholefish only creates a potential for material harm to the processors that did not exist before the petition was filed.

Table I

Certain Fresh Atlantic Groundfish from Canada

International Trade Commission No. 701-TA-257
International Trade Administration No. C-122-507

Summary of ITA Preliminary and Final Subsidy Determinations*

Programs Found To Confer Subsidies	Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
A. Federal Programs		
1. Fishing Vessel Assistance Program;	0.715%	0.743%
2. Department of Fisheries and Oceans (DFO) Promotion Branch;	0.001	0.001
3. Assistance for the Construction of Ice-making and Fish Chilling Facilities;	0.059	0.060
4. Certain Types of Investment Tax Credits;	0.162	0.166
5. Program for Export Market Development;	0.001	0.005
6. Regional Development Incentive Program;	0.447	2.102
7. Industrial and Regional Development Program;	0.001	0.034
8. Fisheries Improvement Loan Program;	Not Counter-vailable	Not Counter-vailable
9. DFO Grants to Fishermen and Fish Processors from SRCPP Funds;	0.079	-
10. Preferential User Fees to Fishermen under the Small Craft Harbor Program; and	0.046	-
11. Government Equity Infusions into National Sea Products Limited and Fishery Products International Limited.	1.876	2.188
B. Joint Federal-Provincial Programs		
1. Agricultural and Rural Development Agreements;	0.005	0.002

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* Preliminary Estimate 51 Federal Register 1010-1025 (January 9, 1986); Final Determination 51 Federal Register 10041-10069 (March 24, 1986)

		Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
B.	Joint Federal-Provincial Programs, cont.		
2.	Prince Edward Island (P.E.I.) Comprehensive Development Plan;	0.039[1]	-
3.	General Development Agreements;	0.181	See #5 below
4.	Transitional Programs;	0.060	
5.	Economic and Regional Development Agreements; and	0.007	
6.	Interest-Free Loans to National Sea Products Limited	0.018	0.283 Includes #3 Above
C.	**Provincial Programs**		
1.	New Brunswick: Loans from the Fisheries Development Board;	0.259	0.028
2.	New Brunswick: Fish Unloading Systems and Ice-Making Programs;	0.010	0.006
3.	New Brunswick: Insurance Premium Prepayment Program;	0.004	0.004
4.	New Brunswick Interest Rate Rebates	0.018[2]	-
5.	New Brunswick: Technical Services;	0.015[2]	
6.	Newfoundland: Grants for Purchasing and Constructing Boats:	0.150	0.143
7.	Newfoundland: Grants for Rebuilding and Repair of Fishing and Coastal Vessels;	0.005	0.003
8.	Newfoundland: Grants to Cover Operating Expenses;	0.096[3]	
9.	Newfoundland: Loans from the Fisheries Loan Board;	0.245	0.158
10.	Newfoundland: Loan Guarantees from the Fisheries Loan Board;	0.013	0.001
11.	Newfoundland: Operation of Fisheries Facilities and Services;	0.001[3]	-
12.	Newfoundland: Construction and Repair of Fisheries Facilities;	0.009[3]	-

C. Provincial Programs, cont.	Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
13. Newfoundland: Enhancement of Fishing Operations	0.001[3]	-
14. Newfoundland: Marketing Assistance;	0.001[3]	-
15. Nova Scotia: Fishing Vessel Construction Program;	0.014	0.015
16. Nova Scotia: Loans from the Fisheries Loan Board;	0.375	0.363
17. Nova Scotia: Industrial Development Division Grants;	0.81	0.187
18. Nova Scotia: Market Development Assistance	0.008	-
19. P.E.I.: Fishing Vessel Subsidy Program;	0.015	0.015
20. P.E.I.: Near and Offshore Vessel; Assistance Program;	0.004	0.004
21. P.E.I.: Engine Conversion Program;	0.806	0.006
22. P.E.I.: Commercial Fishermen's Investment Incentive Program;	0.003	0.003
23. P.E.I.: Assistance for the Construction of Ice-making and Fish Chilling Facilities;	0.003	0.001
24. P.E.I.: Fish Box Pool Program;	0.002	Terminated
25. P.E.I.: Technical Upgrading Program;	0.001[1]	-
26. P.E.I.: Fresh Fish Marketing Program;	0.090[1]	-
27. Fishing Industry Technology Program	0.012[1]	-
28. P.E.I.: Technology Improvements Program;	0.002[1]	-
29. P.E.I.: Onboard Fishing Handling Systems Program;	0.001[1]	-
30. Quebec: Vessel Construction Assistance Program;	0.028	0.034
31. Quebec: Gear Subsidy Program;	0.041	0.028

	Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
C. Provincial Programs, cont.		
32. Quebec: Insurance Premium Subsidy Program;	0.043	0.044
33. Quebec: Large Vessel Construction Program;	0.144[4]	-
34. Quebec: Loans from the Ministry of Agriculture, Fisheries and Food;	0.045[4]	-
35. Quebec: Grants for Engine Purchases;	0.021[4]	-
36. Quebec: Grants for Fish Transport and Seafood Processing Tanks;	0.029[4]	-
37. Quebec: Grants to Processing Enterprises for Capital Equipment	0.109[4]	-
38. Quebec: Ice-making and Fish Chilling Assistance.	0.077[4]	-
Programs Found Not to Confer Subsidies		
A. Federal Programs		
1. Atlantic Fisheries Management Program	-	-
2. DFO Marketing Intelligence and Industry Services Branch;	-	-
3. Enterprise Development Program (EPD);	-	-
4. Section 146 of the Unemployment Insurance Act;		Insufficient Information
5. Import Duty Remission Under the Machinery Program;	-	-
6. Fishing Vessel Insurance Plans	-	0.187
7. Federal Assistance for Best Service Program		Insufficient Information
B. Provincial Programs		
1. New Brunswick: Marketing and Promotion Activities;	-	-
2. New Brunswick: Training Services;	-	-
3. Newfoundland: Exemptions from Sales and Gasoline Taxes;	-	-

	Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
B. Provincial Programs (cont.)		
4. Newfoundland: Newfoundland and Labrador Development Corporation (NLDC);	-	-
5. Newfoundland: Rural Development Loan Program;	-	-
6. Newfoundland: Loan Deficiency Guarantee Program;	-	-
7. Newfoundland: Market Development Information Service;	-	-
8. Newfoundland: Construction of Fisheries Access Roads;	-[3]	-
9. Newfoundland: Market and Product Development Program (MAPD);	-	-
10. Newfoundland: Rural Development Assistance Program;	-[3]	-
11. Newfoundland: Small Business Program;	-[3]	-
Programs Determined Not To Be Used		
A. Federal Programs		
1. Community-based Industrial Adjustment Program (CIAP)	Not Used	Not Used
B. Joint Federal-Provincial Programs		
1. Fisheries Development Program for Coastal Labrador	Not Used	?
C. Provincial Programs		
1. New Brunswick: Fuel Subsidy for Fishermen;	Not Used	-
2. New Brunswick: Winterization of Fish Plants Programs;	Not Used	Not Used
3. Newfoundland: Secondary Processing Interest Subsidy Program (SPISP)	Not Used	Not Used
4. Newfoundland: Ocean Industries Development Program (OIDP)	Not Used[3]	-

	Percent Ad Valorem Subsidy ITA (Final)	Percent Ad Valorem Subsidy ITA (Preliminary)
C. Provincial Programs (cont.)		
5. Newfoundland: Ocean Industry Capital Assistance Program (OICAP)	Not Used[3]	
6. Newfoundland: Newfoundland Oceans Research and Development Corporation (NORDCO)	Not Used[3]	
7. Quebec: Tax Abatement Program (TAP)	Not Used	0.007
8. Quebec: Aide a la Promotion des Exportations (APEX)	Not Used	Not Used
9. Quebec: Technological Assistance Service for Small Business Program (TASBP)	Not Used	Not Used
10. Quebec: Societe de Development Industrial (SDI) Expansion Program	Not Used	Program Terminated
Programs Found Not to Exist		
1. New Brunswick: Fish Chilling Assistance Program	Nonexistent	Nonexistent
2. Newfoundland: Bait Services Program	Nonexistent	Nonexistent
3. Newfoundland: Production Machinery and Processing Technology Program	Nonexistent	Nonexistent
4. P.E.I.: Fish Chilling Assistance Program	Nonexistent	.002
5. P.E.I.: Fish Holding Limit Program	Nonexistent	Nonexistent
6. Quebec: Joint Federal-Provincial Development Program	Nonexistent	Nonexistent

NOTE: In addition to the programs alleged by petitioner to be subsidies, the ITA investigatory staff during verification identified 25 additional programs that might have constituted subsidies and determined that 19 of them were in fact countervailable subsidies:

1. Prince Edward Island, Department of Fisheries and Labor, Annual Report
2. New Brunswick Department of Fisheries, Annual Report
3. Public Accounts of Newfoundland Department of Fisheries
4. Annual Report of the Ministry of Agriculture, Fisheries and Food, Quebec.

Notes

1. International Trade Commission Investigation No. 701-TA-257; International Trade Administration Investigation No. C-122-507.

2. Unless otherwise noted, the introductory material and the section of this paper entitled, "Comparison of Competing Fishing Industries: are based on data contained in *Conditions of Competition Affecting the Northeastern U.S. Groundfish and Scallop Industries in Selected Markets*, United States International Trade Commission Report to the President on Investigation No. 332-173, USITC Publication 1622 (December 1984), (hereinafter Section 322 Report); and the appendix to the *Determination of the Commission in Investigation No. 701-TA-257* (Final), USITC Publications 1844 (May 1986), (hereinafter ITC (Final)).

3. The species include cod, haddock, pollock, hake and flatfish (including flounder and sole). The ITC also included Atlantic whiting (silver hake), but not cusk, redfish and catfish. ITC (Final, *supra*, Note 3, at 4-5.

4. 19 USC §§ 1671; 1671 a-h; 1677 y and 1677 a-g.

5. "Agreement on Interpretation and Application of Articles VI, XVI, and XXIII of the general Agreement on Tariffs and Trade" and the "Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade." See "Historical Note" after 19 USCA & 1671.

6. 19 USC § 1677 (5).

7. "Subsidies Appendix" 49 Federal Register 18016 - 18023 (April 26, 1984).

8. See footnote 3 above.

9. Michael J.L. Kirby, Chairman, Task Force on Atlantic Fisheries, *Navigating Troubled Waters: A New Policy for the Atlantic Fisheries*. (Highlights and Recommendations), (Minister of Supply and Services Canada, December, 1982, p. 6).

10. Not for attribution, interview of U.S. Federal Government staff members.

11. ITC (Final), above, Note 3, Table 15, page A-39 and Table 18, page A-42.

12. *Ibid*, Table 17, page A-41; Table 18, page A-42.

13. *Ibid*, Appendix C, pages A-80-81.

14. The information in this and the following three paragraphs was provided to the author by a member of the Task Force and, in each instance, corroborated from a second source outside the Task Force.

15. *In the Matter of: Certain Fresh Atlantic Groundfish From Canada* petition, filed August 5, 1985; Brief of the Fisheries Council of Canada, filed August 30, 1985; ITC (Preliminary) Petitioner's Post-Hearing Brief (ITC (Final)) filed April 8, 1986.

16. 50 Federal Register 41921 (October 16, 1985). *Determination of the Commission in Investigation No 701-TA 257* (Preliminary).

17. 51 Federal Register 1010-1025 (January 9, 1986).

18. 51 Federal Register 10041 - 10069 (March 14, 1986). USITC Publication 1844, above, footnote 3.

19. 51 Federal Register 17679 (May 14, 1986). USITC Publication 1844, above, footnote 3.

20. Petitioner's Pre-hearing Brief, ITA (Final), filed February 8, 1986, pages 17-41; Petitioner's Post- hearing Brief, ITA (Final), page 2 - 14.

21. Kirby, above, footnote 10, page 115.

22. Above, footnote 19, page 10043.

23. ITC (Preliminary), above, Note 17, pages 6-8.

24. ITC (Final), above, footnote 3, pages 5-8.

25. 19 USC § 1671 a(c).

26. ITC (Final) above, footnote 3, page 18.

27. *Ibid.*

28. 19 USC § 1677 (11).

29. These landings include hake. The 226 million pound figure referred to on page 6 of the paper are the reported landings less hake. That adjustment was necessary to compare ITC (Final) data with Section 332 Report data, since the latter does not include hake landings.

30. ITC (Final), above, footnote 3, pages 13-17.

31. *Ibid*, pages 20-22.

32. *Ibid*, pages 17-19.

33. *Ibid*, pages 22-25.

34. Above, footnote 20.

35. Interview with a New England professor, June 2, 1986.

Canada-U.S. Trade Relations

Patrick McGuinness
Vice President, Fisheries Council of Canada

Introduction

The Fisheries Council of Canada is Atlantic Canada's fishing industry trade association and the voice of the commercial fishing industry.

The Council is made up of seven member associations representing more than 143 individual processors and marketers of fishery products and vessel operators in Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, Quebec, and Ontario. Firms belonging to the member associations and the Council represent about 80 per cent of the seafood products produced in Atlantic Canada.

Member companies of the Fisheries Council of Canada produce about $1 billion (Cdn) of seafood annually: exporting about $850 million (Cdn). Exports to the United States amount to about $700 million. Other important markets include Japan, the European Economic Community, and Portugal. The Canadian market absorbs only a small portion of our output.

Member companies employ about 47,000 plant workers. In addition, another 45,000 full-time and part-time fishermen are dependent on the continuing existence of our companies to buy the fish that they land in ports throughout Atlantic Canada.

The intent of this presentation is to review three key areas in Canada-U.S. East Coast fisheries relations: Canada-U.S. East Coast Fisheries Relations after Countervail; Canada-U.S. Trade Liberalization Discussions; and the GATT Multilateral Trade Negotiations. In each of these areas, the Fisheries Council of Canada proposes actions and directions which we believe will bring results that are mutually beneficial to Canadian and American East Coast fishing interests.

1. Aftermath of Countervail

After almost two and a half years of debate, submissions, and hearings, hopefully the countervail issue has come to an end. Both sides claim minor

victories and losses. The Canadian side had hoped that the subsidy level of 1.22 per cent found in the 1980 review by the U.S. Department of Commerce would have been confirmed. However, the new level established is 5.82 per cent — higher than what the Canadians had hoped for, but at the same time lower than the 10 to 20 per cent sought by New England fishermen. In addition, the Canadians felt that we could demonstrate conclusively that if some New England fishermen were experiencing economic hardship it was solely attributable to the depleted stock conditions of certain high value species — haddock, flounder, and to some extent, cod. Our arguments were sufficient to get unanimous support that our exports of fresh groundfish fillets do not injure U.S. fishing interest but only obtained a split vote (3 to 3) concerning our exports of fresh, whole groundfish. Since a tie vote is a vote in favour of the U.S. petitioner, imports from Canada of fresh, whole groundfish will be subjected to a 5.82 per cent countervailing duty.

What is the impact? Basically, none. The 5.82 per cent tariff is insufficient to reduce the level of exports and cause a shift in exports from whole fish to fillets. At the same time, U.S. fishermen cannot expect to see the prices they obtain for their landings to increase because of the imposition of the duty. In fact, most likely the reverse will happen. United States retailers of fresh fish are advising the industry that the retail price of fresh Atlantic groundfish is too high. The market is switching to lower priced fresh catfish from southern U.S. East Coast waters and other types of species such as orange roughy from Australia. Consequently, the record prices received by U.S. fishermen for their landings of haddock, flounder, and cod will be, and are, under considerable downward pressure.

The question is — where do we go from here? Our suggestion is that the countervail route has proven to be non-effective and costly. If incomes of U.S. East Coast fishermen are to rebound to previous levels, landings of high value species such as haddock and flounder will have to revive. If we look at haddock, scientists agree that the condition of the Gulf of Maine haddock stock is dependent on the fishery pressure both in Canadian and U.S. waters. In fact, the stock fished by U.S. fishermen spawns in Canadian waters. In view of the importance of this stock to Canadian and U.S. fishermen, particularly with respect to the vital part it plays in the New England fishery, we propose that discussions should begin between the respective management authorities and the industries to determine whether there are cooperative conservation actions that can be taken in order to revive the stock and ensure a continuous high level of landings by both Canadian and American East Coast fishermen.

2. Canada-U.S. Trade Liberalization Discussions

With the U.S. Senate Finance Committee's approval in April, Canada and the U.S. are embarking on trade liberalization discussions. The Fisheries Council of Canada supports these discussions. However, by and large the

U.S. East Coast fishing industry has requested that the fisheries trade be exempted from the discussions. We believe that the discussions could bring mutually beneficial results for both industries.

With respect to tariffs, most fisheries trade between Canada and the U.S. is duty-free or at low levels of duties. However, value-added consumer packaged goods do experience what could be considered as medium to high tariffs.

Canada exports annually roughly $1 billion worth of fish products to the U.S. and imports roughly $300 million from the U.S. It is interesting to note that on a per capita basis Canada imports from the U.S. three times as much seafood as the U.S. imports from Canada. Each Canadian eats $12 of U.S. seafood products while each American consumes only $4 of Canadian seafood.

The sensitive issues in a Canada-U.S. trade liberalization discussion that effect the fisheries will be the issue of Canada's subsidies to its fishing industry and U.S. countervail rules and regulations.

As you can appreciate, after defending five countervail petitions since the mid-1970's, the Canadian fishing industry believes that the U.S. fishing industry is using the U.S. countervail laws as a means of harassment and not as legitimate protection devices. The Canadian fishing industry seeks clearer rules and definitions as to when an investigation can be initiated and as to what constitutes an unfair subsidy. For example, we believe that a U.S. petition should be required to demonstrate that 40 per cent of the U.S. industry supports the petition. In Canada, this is the rule. And if it was the rule in the U.S., the fillet portion of the recent countervail case would not have been initiated — thus saving the U.S. and Canadian industries sizeable sums of money (the Commissioners voted unanimously 6 to 0 that the U.S. industry was not injured by Canadian imports of groundfish fillets). We believe there is merit in attempting to come to an agreement on what constitutes a subsidy and what types of subsidies, if any, are acceptable. For example, income support assistance directed to fishermen and farmers in Canada and the U.S. which can be demonstrated not to provide a competitive export advantage should probably be exempted from countervail action.

The trade liberalization discussions will provide a focused opportunity for both the Canadian and U.S. fishing industries to take a good hard look at the financial assistance programs administered by federal, provincial, and state governments. We know that U.S. fishermen on the East Coast say their programs have not helped them. The Fisheries Council of Canada and the Atlantic fishing industry say the same thing about many of the Canadian programs — they are redundant, and often counter-productive, fragmenting the industry and undermining efficiency. Some of the programs have already been eliminated — for example, Canada's Fishing Vessel Assistance Pro-

gram. (Perhaps the U.S. government should eliminate its Fishing Vessel Capital Construction Fund Program.)

The point is simply that the Canada-U.S. trade liberalization discussions will provide Canadian and U.S. fishing interests the opportunity to look at the irritants and determine whether there are mutually beneficial solutions.

3. GATT Multilateral Trade Negotiations

The GATT multilateral trade negotiations (MTN) will probably begin in the fall of 1986 and continue until at least 1988. The last MTN negotiations (Tokyo Round) delivered very little in tariff reductions in fish products. This was in recognition that with the movement toward the declaration by coastal states such as Canada and the United States of 200-mile fishing zones and 200-mile economic zones, world fisheries trade was entering an era of adjustment. Also, fish products were placed in a grouping with agricultural products — a grouping that was bound to show little progress in tariff reductions. Consequently, tariffs on fish products in general remain high. The EEC in particular has been successful in maintaining a high level of tariff protection. We suggest that a main Canadian and U.S. fisheries objective in the MTN will be to obtain satisfactory fish tariffs as a result of EEC enlargement to include Spain and Portugal and, in addition, to obtain significant reductions in some key EEC and Japanese tariff and non-tariff barriers.

However, it is clear from statements by the EEC and Japan in the OECD and other forums that the *quid pro quo* for reduced tariffs is more secure access to our 200-mile fishing zones. Their position is that identification and allocation of surplus stocks by Canada, the United States, and other coastal states represent distortions and barriers to trade and have not met fully the Law of the Sea obligation to promote the optimum utilization of the living resources. Consequently, in return for significant tariff reductions, the EEC and Japan will be demanding a greater role in the provision and assessment of scientific advice and the establishment of surpluses of stocks and their allocation.

To obtain significant tariff reductions and to avoid erosion of our sovereignty over surplus stocks, it will be very important for both the Canadian and U.S. fishing industries and our negotiators to work together closely.

Conclusion

In conclusion, the East Coast fisheries is comprised of Canadian and U.S. fishing interests. Our interests, like the fisheries, are integrated and can be developed to the benefit of both parties if we work together.

Chapter 4
Regional Perspectives

Trends in East Coast Fisheries

Robin Alden
Editor/Publisher, *Commercial Fisheries News.*

GOOD AFTERNOON. I have been asked to share some of my personal perspective on East Coast fisheries. Where are we? Where have we come from? Where are we going? And what does it all mean? A tall order, which I don't have any delusions of being able to fill completely.

I alternately feel I have the best perspective possible and the worst for this task. I sit in a pivotal position in the New England fishing industry with an exceptional staff dedicated to knowing what is going on and understanding WHY it is happening. On the other hand, I am plagued by such an information overload that it often feels impossible to get any perspective at all.

What I have done for today, is to shed some of my own personal perspective on some of the issues and opportunities which face the New England fishing industry. The list is not definitive. And my perspective is not the last word.

My thoughts are, however, presented in the best spirit of the free press: At the least they are meant to get a reaction; they will hopefully improve understanding; and best of all, one or two might spark an idea in someone and spur him/her to action.

I am going to talk about conservation and management, the Portland Fish Exchange, and Canada in some detail, and then give you a quick tour through the other issues which I feel will shape the industry's next five years.

Are We Facing Disaster Because of Declining Resources?

No. Yes, stocks of traditional fisheries are low, gear is ever more effective, and there is more widespread concern about the state of the resource than I have ever seen from within the industry.

I want to say three things about this. First, the resources are not ENDANGERED. Recent large year classes of fish and scallops out of severely depressed stocks are a reminder of the resilience and abundance of the sea. The real danger in low stocks is not ecological disaster but market disaster — that US production of a given species could get so low that US producers could lose their place in the international market.

Second, the health of the industry depends on preserving its ability to be flexible. Flexibility is an ESSENTIAL tool that fishermen *must* have in order to use a variable ecosystem. That means making sure a fisherman fishing on groundfish can shift to something else when stocks get low. This is as much a conservation tool as it is a social policy. It keeps the government out of the bail-out business, and gives fish a rest. There is not time to expand on this but I feel that preserving flexibility is the single most important criteria to meet in designing management programs. And the flexibility, adaptability and innovation in the New England fishery is the reason for our current relative health, and what contrasts us most with Canada.

Now, as market development has opened up more and more alternatives, such as dogfish, mussels, red crab, mahogany quahogs, you name it, we all begin to experience a small fear: What happens if ALL these resources get stressed?

So conservation must be confronted. That is the third point I want to make. Conservation must be kept in the context of the REAL WORLD. What can we really accomplish in the ecosystem? What can we afford to, and what do we know how to enforce?

I used to feel that the regional fishery management council system set up by our 200-mile limit insured these realistic views. Early on in the late 1970s, the New England Fishery Management Council set out to manage groundfish. And step by step, the open, democratic, scrappy process sent proposed management measures back to the drawing board saying: "that simply won't do what you think it will" or "that won't do what it is meant to do." And so, quotas went down. They looked nice on paper but were useless in a multispecies fishery and useless in a political system where it is unacceptable to tie up boats. This is something Canada is struggling with right now.

The result is an exceptional and realistic fishery management plan — ADF. The Atlantic Demersal Finfish plan protects fish until they get big enough to spawn and it protects groupings of small fish. The plan is modest in its expectations, and realistic. It can accomplish what it sets out to do.

But in the mean time, the council system has been undermined. The PROCESS has lost its power and politics and influence peddling has taken its place. The result — we do not yet know whether ADF will be accepted in Washington. The primary fault lies at the top in NOAA, in this Administra-

tion. Tony Calio, the Administrator of NOAA, has made himself too accessible. In a democratic system, those at the top, Congress and the Administration, must have the discipline to throw petitions for personal favors back down to the council. As Massachusetts Congressman Gerry Studds, until just recently, has said, "No, I believe in the process. Take that up with the council."

The council shares the blame for the deterioration of the process. Good individual leadership from council members is essential in order to make group decisions which have the conviction and clarity which keep special interests, such as the scallopers from New Bedford and the mid-Atlantic, from attempting to make an end run. That leadership has been sadly lacking on the council in the last several years and the credibility of the process and its ultimate decisions have been — I feel often unfairly — undermined.

But ultimately, the burden rests on the industry, to represent itself in the council arena and to make the system work. Democracy is a time-consuming, frustrating, expensive process. We are currently in a time of industry leadership transition. The biggest danger to industry leadership is the lack of discipline at the top. As long as it is possible to get what you want in the short run by going to Washington, true leadership, and the value of the council process, will be lost. Nonetheless, new groups are emerging, groups such as the Atlantic Offshore Fishermen's Association, the New England Gillnetters Association, and the North Atlantic Fisheries Task Force. New leadership is taking old strong organizations in new directions, most notably at the Point Judith Co-op. The changes in WHO is participating are changing WHAT is happening.

Enforcement

I'd like to use ENFORCEMENT as an example of what I mean by REAL WORLD management.

Enforcement is a problem for both state and federal level agencies. It is worst at the federal level, and that is where I will concentrate my remarks.

Enforcement is a problem which is very sensitive to funding levels. Canada is willing to spend far more money than we are on fisheries enforcement, and this is something we must face. So, we have to be realistic about what we can do with the dollars we have for the purpose.

Federal fisheries enforcement as it now stands is a travesty. It has been used as a pawn in the power play between the councils and National Marine Fisheries Service. The result: it is not working.

So what are we doing? What good is the holier-than-thou, so-called pro-conservation attitude of an agency which will not establish an effective enforcement regime?

Enforcement is critical to making any rule work and this is why it is such an important function for National Marine Fisheries Service. We need a good presence in the field. We need a sensible penalty schedule where the punishment fits the crime. We need even-handed actions and full follow-through without favoritism. Enforcement will not work without the cooperation of the industry — unless we want to pour enough money on the situation to make it an armed camp. And all these elements are essential to build the respect necessary to make sure the conservation rules are followed.

And that, back to realism, is what this exercise should be about.

Instead, enforcement has been used to discredit the councils, as it was with the lack of mesh size enforcement during the Interim Groundfish Plan. It has been used to "prove" that the councils' measures do not work. And now, both National Marine Fisheries Service and councils fear that enforcement is being used to seal the council system's fate.

We need to see National Marine Fisheries Service stop complaining about its enforcement budget and start responding to the creative solutions for effective enforcement that are surfacing: strike forces, spotter planes for closed areas, etc. And if they do need more money, let's see them enlist the help of all of the industry and council to get them more money.

But whatever happens, if nothing can be done to enforce any plans — let's not do anything. No more paper management.

Portland Fish Exchange

This could be the beginning of a profound change in East Coast fresh fish business. The market is what makes the world go round and this is a profound change in its structure. It will open the market and provide a chance for more niches. It will ease entry into the business for buyers. Buyers who want to specialize, or only buy small lots, will be able to get in the business because they will be able to get what they need without having to buy mixed species lots, or huge trips. Buyers will be able to operate buying from boats without waterfront facilities. A price may be paid for quality — good or bad. Fishermen will get this return, will be paid promptly.

All this and far more awaits us if and when it gets off the ground. Right now the entire fisheries community is hovering over it, saying, "will it work?" and gloating at every misstep. From what I can see, it is working. It is working the way most businesses start up — SLOWLY. This is a tall order, since a successful start-up for the auction requires changing a whole market. So, stand back, don't calculate whether they are handling their average daily volume for break even yet, and give the thing a chance.

The auction is the most exciting change to the industry since the 200-mile limit.

Canada

Relations with Canada are always an extremely significant factor in the health of the East Coast fishing industry.

I used to think that if we were diligent about getting our differences, and our different interests, on the table, we could make solid progress toward doing fish business across the border. (Doing business, incidentally, and not creating model international structures, is the purpose of solving our fisheries problems with Canada.) But good faith negotiation depends on being willing to put your demands, needs, and desires on the table.

And now, I am very discouraged about the ability or willingness to get those differences on the table effectively. Why?

First, because our relations are increasingly clouded by rhetoric with the inevitable attendant drop in forthright effort being made to find real solutions. Right now, the Canadians are in the driver's seat. The Canadians are particularly good at posturing and as long as they are successful in manipulating the international situation, there is less incentive for them to be straightforward.

The Canadian system is less pluralistic than ours, and less open. They, too, have internal problems, but those do not spill over into the international arena the way ours do. Our fishery management council system ensures that we will be airing all our inter-fishery rivalries and all of our management failures for all to see. But, while the Canadians argue internally over quotas and shares, when it comes to international matters, they are unified and take two simple positions: 1) The US is a poor fishery manager, and 2) There are no market problems between the two countries except those caused by protectionist forces in the US. Neither one is true.

And Canadians — fishing industry leaders — neither hear nor listen to the US side to the argument.

Now, fisheries relations between the two countries have deteriorated so far that fishermen on both sides are angry. Before the Georges Bank/Gulf of Maine boundary decision, US and Canadian fishermen got along with each other just fine. Now, with the countervail and the continued disregard which many American fishermen are showing for the line, Canadian fishermen are angry with the US industry. US fishermen are angry because they are being treated as criminals by Canada, and because the implications of Canadian fish in the market have become clearer and clearer. Fishermen may not count for much in this international arena, but their anger complicates the already delicate politics.

The press must take responsibility for allowing the escalation of rhetoric and the deterioration of constructive discussion. This is a particular frustra-

tion of mine. The US position in fisheries issues is NOT getting a fair hearing in the Canadian press.

As an editor of a small newspaper I am aware of how difficult it is to cover a foreign country with high standards of insight and understanding on a limited budget. It is expensive and difficult to get close enough to the ground in another area to understand motives, predict reactions, and to understand how the business system REALLY works. *Commercial Fisheries News* frequently must resort to printing official Canadian statements or positions rather than collecting first hand information about Canadian reactions to events. And thus, we perpetuate the rhetoric from both sides. At other times, however, we do print interviews with Canadian industry and government leaders. And, I will add, have taken considerable heat from the US industry for presenting even this lopsidedly balanced coverage.

I am sharing the podium with a representative from *Atlantic Fisherman*, a Canadian trade paper for which I have great respect. It is truly becoming a paper for the fishermen of Atlantic Canada. A voice and a tool, just as I try with *Commercial Fisheries News* for New England.

HOWEVER, in international news, whether it is the *Toronto Globe and Mail* or the *Sou'wester*, misinterpretation, or NO interpretation, of the US position is consistently the fare. Canadians are fed those two positions: the US is a poor fishery manager and protectionist about the market.

A free press is essential to any progress on this issue. The public on each side of the border MUST be informed about the facts and opinions on the other side of the border. Right now, the Canadian view of the US is greedy, opportunistic and undisciplined. In fact, our two countries ARE very different. We may look alike, but our social system, and therefore our expectations from the business of fishing are very different. Both sides need to realize that they must understand the facts about the other side if substantive progress is to be made.

No, the US is not irrationally spending its fishery resources for short term gain — it is just approaching the problem completely differently. Canadians must be exposed to this, be convinced to set aside their usual feeling of inferiority in dealings with the US, and be convinced to listen if serious negotiation is ever to be possible. And that is the job of the press.

Specific issues facing the two countries?

Free Trade Talks. Who knows what they will bring, if anything. Certainly, the US industry does not yet know how to influence them. It must try. For the US industry, the talks offer the small danger of losing what trade balance the industry has. The talks also offer a greater potential of using them to keep the Canadians from taking actions which could further unbalance the situation.

Tail of the Bank, NAFO, and cooperative management. We are miles apart. The Canadians' new position that they might trade "good behavior" on the Tail of the Bank and our joining NAFO for allocations of fish inside Canadian waters has put us even further apart. Before, they talked about linking access to fish to market access. We might have been able to talk. Right now 20-40 of our bigger boats are successfully fishing on the Tail of the Bank. They need those fish. Our management systems are far apart philosophically and the Canadians insist on attacking our system, instead of listening to why we do what we do. And the differences in our social systems and form of government and fishery management mean that any cooperation will not come easily.

Market issues. First, countervail is NOT a protectionist measure. I do not need to tell any of you in this room, including the Canadians, that countervailing duties are a legal remedy under international law to even out the effect of subsidies which occur in an exporting country but not in the importing country. Nonetheless, the countervail is repeatedly called protectionist by Canadian officials. It may be convenient rhetoric to describe them as protectionist, but it does a grave disservice to the US fishing industry which has sought the duties, and to the cause of international cooperation and understanding.

Second, you will see more countervailing duty petitions filed, and existing ones protected or strengthened. The 5.82% duty on Canadian fresh groundfish may not create major adjustments in the market but it has created a group of US fishermen representatives with strong resolve to defend their interests against what they see as the effects of Canadian fish in the US market. They won't go away; the US processors and importers were unsuccessful in silencing them; and all sides should start taking this movement seriously.

Third, the Portland Fish Exchange offers a major constructive opportunity for mutually beneficial improvements in the market situation between US and Canada.

The argument is this. Why are Canadian fish so cheap in the US market? Because there are a lot of them and they are cheap so they hurt — says the US industry. Why? Because the buyers have the Canadians over a barrel. Canada has a lot of fish; its industry has been production driven; and the fish has been generally poor quality. But buyers also often have US fishermen over a barrel.

The display auction in Portland offers a chance to buy and sell fish in an open market which can only weaken the power of the big Boston brokers and the big Canadian companies, creating opportunities for many different types of business arrangements between Canadians and Americans.

Other Subjects

Waterfront Access. It is critical to the survival of the industry. The pressure along the East Coast is astounding. The problem is on everyone's lips, whether he be part of the industry or just following coastal real estate prices. Will the industry be able to preserve a place for itself?

Individual leadership will again make the difference. And the tools those leaders in the industry use will vary. Will the industry depend, as it has in Gloucester, on being preserved because it is quaint? Will it be preserved for other people's gain because it is quaint, as in the proposal currently being worked on in Greenport, Long Island, where Snelling Brainard of Seabank fame is proposing a condo-shop development that will allow boats to operate without berthing or lease fees because their presence will turn Greenport into an attractive place?

Or will, as has happened in Portland, certain individuals in the fishing industry take hold and create a place for themselves by investing in waterfront real estate? To mention just a few specifics: in Portland, fishermen now own the fuel and ice plant on the Fish Pier; two industry people are the developers for the service building on the pier; and a group of eight or so fishermen and industry members have bought and are rebuilding nearby Hobson's Wharf as a fishing industry wharf.

Portland is a symbol of hope for me on this subject, but it is sobering to realize that it is also the furthest north of the major ports on the East Coast, where the pressures of development are still new, and perhaps slightly less intense and, most significant, less entrenched.

In Fall River, Massachusetts, fishermen have won an interesting legal battle against residential waterfront use; however, I fear they have not won the war. The Connecticut shore is largely lost to working waterfront. No matter what coastal town you mention, this issue is a major one.

Pollution. This is a time bomb for the fishing industry. Pollution puts fishing in a particularly terrible double bind. They cannot even start discussing it because to do so is to admit a problem. And let consumers even get a suspicion that seafood is not pure and there is no second chance. The market is devastated. The recent *New England Journal of Medicine* article about shellfish (which has been widely discredited) is a case in point.

Nonetheless, pollution problems must be addressed and I feel that the solution is to band together with environmental and citizens' groups, as is happening in Massachusetts with Save the Harbor — Save the Bay so that the fishing industry is not condemning itself in its effort to save its future. The fishing industry can offer these groups proof of the economic consequences of a ruined environment, and a credibility these groups often must struggle to attain.

And pollution needs a new approach and it must be taken. As Walter Bickford, commissioner in Massachusetts said recently, we must become advocates for the resource, and that can no longer be done just by regulating fishermen.

We have PCBs in lobster, we have some fish banned for sale because they are unfit — stripers for one. We have PCB watches in bluefish and mercury scares in swordfish. We have millions of dollars worth of shellfish lying fallow because of bacterial pollution. The ocean is the end destination for everything: for the radioactivity or metals in the air and rain, for all of the streams and rivers. So the sediments in the ocean collect much of this and they are just lying in wait.

Recreational Fishermen. The conflict will get worse. They are politically powerful and likely soon to make progress in New England where the fisheries politics has long been dominated by commercial interests. Right now, all the southern New England states are seeing the conflict. State fisheries management in Rhode Island in particular has been a nightmare for the last few years because of this in striped bass, bay scalloping, gillnetting, — you name it. As recreational fishermen get stronger, several dangers emerge. First, government may start courting the recreational fishermen as a source of money in an era of declining budgets. Second, there is a serious lack of solid information or objective reporting in this field and so it will be difficult to reach understanding. And in an arena where assertions become "truth" because they have been repeated by several thousand people, commercial fishermen could be put into the position of continually compromising with unreasonable demands and edging, by half-steps, inexorably toward their demise.

Gear Selectivity. This is the next frontier in fisheries development. We will see new gear such as the shrimp separator trawl, size selective scallop drags, better groundfish gear such as square mesh to select out the small fish without causing meshing problems when fish are destroyed by sticking through the big holes. Lobster traps have long been improved this way, with vents for sub-legal escapement, and now biodegradable panels to eliminate ghostfishing. And the research may be quite unorthodox — from rejuvenating old techniques such as longlining, to Maine marine resources commissioner Spencer Apollonio's favorite example: a photo showing mackerel herding herring.

All of this will take research on fish behavior, and engineering on gear. The idea of using our considerable expertise on fishing gear to this end is one of the most constructive developments in years, but it comes at a time when federal R&D monies are being cut. Given the management and allocation problems we face, it is of top priority for the entire fishing community to find a way to fund continuing selectivity work — whether through public funds or private. In fact, it is ironic that this may be one of the most justifiable uses of public money for fisheries development.

Aquaculture. Lobster hatcheries, mussel leases, salmon farms. No matter what you imagine with the word aquaculture, it will grow in the next ten years. There is great potential here. It's going to become part of the mainstream of the inshore commercial fishing industry. It will change markets for traditional species. It will bring some new people into the fishing industry and it will provide new, different opportunities for others. It will cause conflicts the way any new fishery will. And it is an exciting frontier.

Freezer Trawlers. When there are resources close by, big enough for these boats to work on, they will undoubtedly cause conflicts with traditional wetfish boats. However, few people have realized what has happened. The East Coast now has an international fleet. We now have 8-10 freezer trawlers on the East Coast, built, by and large, by entrepreneurs who have previously been part of the regular fishing industry. Four, soon to be five are currently fishing on butterfish in the Gulf of Mexico. One is currently considering going to Alaska. The Falklands are talked about. And freezer trawler managers eye the opportunities in Canada as well. The industry needs to look at what the implications of this brand new sector of the US fishing industry are.

Seals and Whales. Finally, one point which I cannot pass up mentioning to a group of lawyers and policy people. Marine mammal protection is causing a BIG problem and it it going to get bigger. It is the height of idiocy to manage one part of an ecosystem — fish — and preserve another, the marine mammal predators. Crippling user conflicts, parasites in fish, and stock problems all face us if we don't right this wrong. Ask Canada. They know.

Conclusion

No, the East Coast commercial fishing industry is far from crippled or dying. It IS changing dramatically, and it faces some substantial challenges. Individual leadership from within the industry — leadership in business and in politics — is its key to success and who emerges will determine the course for the future.

Thank you very much.

Sink or Swim
What are the Prevailing Trends in Atlantic Canada's Fishery?

Sharon Fraser
Editor, *Atlantic Fisherman*

Just recently, I was talking to an active representative from one of the fishermen's organizations. I asked him how were things going and he sighed despondently. "I find that no matter what you do," he said, "the fishery doesn't get better. It just gets different."

I had caught him on a bad day, a day when his fellow fishermen were planning a protest to give away their mackerel because the federal minister refused to make a response to a marketing plan that their group had arranged.

But bad day or not, it seems to be a prevailing attitude in the Atlantic fishery. Although studies are constantly being undertaken, fishermen's organizations are constantly planning, and federal ministers come and go, one old rule seems to be in effect: the more things change, the more they stay the same. Especially, fishermen might say, when it comes to the prices they're paid for their fish!

Atlantic inshore fishermen are up against a system which believes that centralizing the power of the fishery in a few hands is the road to prosperity. That belief exists so strongly that all the studies, many of the ministers, most of the local politicians, and indeed, some of the fishermen accept that as their conclusion. Once the conclusion is accepted, of course, the next step is always backwards — trying to make the facts of the fishery lead to that conclusion.

The facts don't lead there, however, but that doesn't seem to change anyone's mind; it just causes day-to-day, sector-to-sector, area-to-area change — superficial at best, harmful at worst.

There have been two major events in the Atlantic Canada fishery over the past 10 years. The first was the declaration of the 200 mile limit. The second was the restructuring of the processing sector whereby several companies leaning toward bankruptcy were amalgamated into two large companies — National Sea Products and Fishery Products International. Both were assisted with taxpayers' money through two levels of government and with concessions from the banks who held the notes.

The restructuring came a few years after the 200 mile limit was declared, but as a direct result. It suddenly occurred to certain people that this ancient and traditional industry which had partially supported about one quarter of the population of Atlantic Canada for generations was going to be worth big money — money too big to be entrusted to a bunch of isolated fishermen selling to small processors in small coastal communities. No indeed. The time had come to enlist the big capital and try to concentrate much of the fish in one or two places — the better to control its ultimate fate. Not to mention its ultimate price.

The concept of bringing in money to facilitate the quick development of a resource is not new to Atlantic Canada. It's happened in the forestry and mining industries, to name just two. Not surprisingly, it has never managed to provide stability to the local economies. It simply allows the resource and the people to be exploited and then abandoned.

If the same energy, financial assistance, and faith were placed on the small boat fishery as is being placed right now on offshore oil development, Atlantic Canada would gain far more in employment and local economy growth.

Two maritime scholars, Gene Barrett and Anthony Davis, in an academic critique of government policies, say, "It would be difficult to overstate the significance of the fishing industry to the socio-economic base of the Atlantic provinces."

They offer these statistics, more than one quarter of the region's 2.1 million people live in fishing villages of populations under 10,000. At least half of those communities have single-sector economies, with fishing and processing plants occupying more than 30% of the labour force. In these communities, fishing and fish processing account for at least 62,000 direct jobs: 42,000 in fish processing and 20,000 in fish harvesting. It's not difficult to understand, as Barrett and Davis point out, that the fisheries are a king-pin of the struggling regional economy.

So all this being true, why aren't our fishermen and fish plant workers having a better life? The answer is partly to do with Mother Nature. The small boat fishery is seasonal, highly dependent on the co-operation of the elements. A supplementary source of income — unemployment insurance — is essential for most of our inshore fishery.

It used to be that the inshore fishermen fished a few months, worked in the woods for awhile, did a bit of farming, and lived in perpetual debt to their merchants. The fishing and the debt remain, but stringent regulations about extra income have curtailed some of the off-season work that fishermen used to do.

That aside, the methods of processing and marketing have not been developed to the advantage of the inshore — which most people agree, produces the best fish there is. To this day, fishermen in some of the communities complain that the plants keep them waiting under a hot sun to sell their fish simply to avoid hiring extra processing staff. Then, when the fisherman gets to the head of the line, he finds he's getting a lower price because the quality of his fish has deteriorated!

The fishery infrastructure, as well as the stocks, obviously need some efficient management.

In Canada, we have probably the most regulated fishery in the world. As a positive consequence of this, we have excellent stock management. As a negative consequence, we have a bureaucratic ball of red tape.

Our federal bureaucracy — the department of fisheries and oceans — has 6000 employees, more than 600 of them in Ottawa hundreds of miles away from the fish. Their jobs, in many cases, are esoteric observation of the fishery and their reaction is to regulate. The issuing of regulations is a source of constant frustration to fishermen — not because we are unaccustomed to government involvement in our lives, but because the many divisions of Fisheries and Oceans often don't seem to know what the others are up to. Because of that, we occasionally get calls from certain sectors demanding total de-regulation; but that's unlikely to happen. All Canadian things considered, it would be most unnatural.

The federal government we have right now is Conservative — by name and by nature. Its instinct, I suspect, is to simply lift all regulations which are in place to protect the smaller operators and let the mighty take over. It seems to realize, however, that those very conservative, total free enterprise notions are somewhat of an aberration in Canada and it restrains itself somewhat. More than anything else, it has lately been accused of not offering the direction which the fishery needs and almost seems to have adopted a hands-off attitude — another frustration for fishermen.

It is this government which is attempting to negotiate a free trade deal with the USA, even as our industry is being called subsidized and countervailing tariffs are being applied to some of our fish as it crosses the borders. Free trade is a huge and complex subject and in the fishing industry, feelings are as mixed about that issue as about so many others. There is certainly one segment which believes that if the fishing industry were isolated and alone, free trade would be good. But taken as an integral part of Atlantic Canada's economy, free trade is looked at with a wary eye, to put it mildly. To put it strongly, it's likely that free trade would be disastrous for Atlantic Canada.

A countervailing tariff, on the other hand, is applied in particular cases where government subsidies can be proved. Now in Canada, the word "subsidy" has no negative connotations. It's simply part of the fabric of our

society to pay for and thus receive certain services, and the benefits of social programmes. Your country has recently decided what we decided long ago — that paying our fishermen unemployment insurance benefits is not subsidizing them. You have yet to be convinced about many of our other programmes.

Remember, we live in a huge country where a population one-tenth the size of yours snuggles along the border of a very large, very different country. Our country would be unlikely to survive without the kind of economy we have, as many of our fishermen would be unlikely to survive in a system of laissez-faire, total free enterprise, survival of the fittest.

Our country, after all, was first bound together by the Canadian Pacific Railway. Today, part of the reason it stays together is the Canadian Broadcasting Corporation. Both institutions are heavily subsidized, both often criticized. But when too strong an attack is made on the symbols of our unity, it becomes an attack on the fragile threads that keep us unique.

Our Atlantic fishery will always need the support of government. It's a socio-economic fishery as well as an industry, and the fight to protect that aspect of it will go on.

Chapter Five
Prospects and Proposals

Prospects For Canadian - U.S. Fisheries Relations

Stephen Greene
Canadian Consulate, Boston

In a recent magazine article, which I happened to read yesterday over the shoulder of a fellow I was sitting beside on an airplane, there was a quote by Carlos Fuentes, a Mexican writer. Senor Fuentes said, "America is best at understanding itself. It is worst at understanding others." I was struck by the accuracy of that quote and contemplated that probably only a Mexican or a Canadian could fully appreciate the wisdom of that remark.

In my view, understanding itself is the root of America's strength. The desire to understand itself, I think, lies at the heart of the open principles of democracy which describe the successful republican system here. The key to this, I think, is process. And by that I mean, process, process, process, until process becomes virtually more important than outcome and that accommodation is made prior to decision. The train doesn't leave the station until everyone is squeezed on.

In the American fishery, process appears to be at least as important as outcome and maybe more so. The commitment to process, and making sure that everyone is on board that train before it leaves, including, to Canadian eyes, people who are a bit questionable through the use of public hearings, makes the fishery probably the most American of industries as well as America's first.

In Canada, the notion of bipartisanship (in our case it would actually be tripartisanship) does not sound right in our ears. We have a parliamentary system where partisanship, conflict, and hardball politics are the natural order of things. Everyone does not have to be on board in order for the train to leave the station. In our need to build an industrial fishery, we were able to decide some time ago that the fishery would not be open. Further, we don't

have a system of checks and balances, to coin a phrase, such as found here, in which the regional council proposes but NMFS decides.

Americans have told me that our system is tyrannical. A fisheries dictatorship. But that is very wrong. For the people in the industry, for those with an economic stake, there is tremendous consultation. Sometimes it seems even too much. Most policy initiatives, like Enterprise Allocations, for example, originate with industry. Nothing happens without the advice and consent of industry. But it may not be unanimous. When a fisheries decision is made, our government has the power and will to enforce it.

The management framework of our two fisheries spring from our institutions and the way we've developed as peoples and view our respective fisheries. In Atlantic Canada, we've determined that the fishery must be the engine of growth for an otherwise underdeveloped region. Atlantic Canadians don't want to be a hinterland to a metropole in Central Canada. The fishery is the way up and out. For that reason, we are trying to build an industrial fishery. And, because the resource is common property, in order to achieve industrial goals the common property must either be limited as to entry or transformed into quasi-private property. The enclosure movement in the UK and the range wars of the old West were all about turning common land into private land and thus allowing the accumulation of private wealth enabling capitalist development to take place.

Unlike in Atlantic Canada, there is no regional need in New England for the fishery to be industrial except that those who fish should make some money. Other motivating factors in New England appear to be that the fishery be open to all, be democratic in the republican sense, and be run by New Englanders (as opposed to Washington, D.C.). None of these are industrial goals.

I've taken time to make these points because I think that unless they are understood by both sides, and appreciated, the prospects look dim and the proposals are bound to fail.

And now, in typically Canadian fashion, the rest of this speech will be partisan, hardball and mud-slinging.

When I was first asked to speak here the title of this session was "Prospects for Cooperation". Luckily for you, the session name was changed to "Prospects and Proposals". Under the previous title, you would have had to sit through a very dismal speech.

Why am I gloomy on the prospects for cooperation on fish between New England and Atlantic Canada? First, because I don't think my preamble is understood well by either side. Although, with reference to Senior Fuentes statement at the outset, I think Canada has the edge in understanding others. But, I also honestly don't see the same will in New England to cooperate with Canada as I see in Atlantic Canada to cooperate with New England, which may also may have something to do with the big/small relationship between our two countries. Cooperation with the United States is burned into our psyche as the only sure way to survive. We don't want the elephant rolling over on us in the middle of the night.

What are the indicators of lack of will to cooperate? Just as Canada's approach appears to you to be monolithic, there seems to be a party line here, to me. I've been to many a meeting in which someone has said something positive about Canada or Canadian fish, or even National Sea Products, only to be verbally assaulted by a dozen people and rendered into silence. New England certainly has its heresies. Talking positively about Canada is one. Talking positively about limited entry while actually mentioning the term "limited entry" is another. The existence of a party line would seem to stand in opposition to the democratic fishery that's been created. But then, Canadian issues are not subject to public hearing and industry decides on them, God knows how.

To Canadians, it even seems that New England's fishing leaders go out of their way to take positions in opposition to those held in Atlantic Canada. "If it's a Canadian idea, there's something wrong with it. Take seafood promotion. A few years ago we were about to launch a campaign to promote seafood generically in the United States. It was to be targeted directly at the American consumer to get him or her to eat more seafood. We weren't interested in promoting just Canadian fish, but all fish. New England's fishing leaders opposed it on the ground, not that it would hurt New England fish (no one could possibly make that case), but that it would really only benefit Canadian fish.

Another example is the New England fishery's position on fish as part of the trade liberalization talks between our two countries. They want fish excluded from the talks. Free trade in fish and seafood could mean more employment in New England as Canada drops its tariffs on frozen fish and American producers gain a market that consumes more fish per capita than Americans. Free trade in fish will lead to cheaper seafood for the North American consumer. Free trade in fish will benefit the US fishery as a whole. On a per capita basis, Canada imports three times more fish from the United States than we export to it. Free trade in fish will not affect countervailing duties including the current duty of 5.82% on Canadian whole fish.

Countervailing duties and other trade laws will continue to be a vehicle by which both countries can offset unfair advantages in the other.

When I ask the reason for the New England fishery not wanting to include fish in the talks, the answer I receive usually does not relate to the actual trade in fish. Rather, it appears the reason for the position is political and strategic, not substantive. New England appears to want fish off the table during the bilateral trade discussions so that fish trade issues can be "saved" for the day when Canada and the United States get down to talking about access to resources (i.e., American vessels fishing in Canada) and resource management in the Gulf of Maine and Georges Bank. Then there is that old warhorse of an argument: "if Washington gets its hands on it, we're done."

Let's examine these things. The bilateral trade discussions are generally about tariffs, but they may also include a process by which Canada's so-called social fishery, which New England claims exists, can be examined, in a package of fishery and agricultural issues of both countries. There are no tariffs on Canadian fresh fish except for the countervailing duty, which will remain. Thus, whether or not fish is included in the talks makes no substantive difference, with respect to tariffs, to New England's fresh fish industry, but could lead to an even more critical examination of Canada's fishery than even the countervailing duty case offered. Thus, at least the way I see it, including fish in trade liberalization appears to be in both our interests.

New England appears to want to talk about the fish trade with Canada only in a negotiation confined to fish. That is puzzling to me because in that setting, Canada would be the elephant and New England the mouse. Tariffs, however, do not appear to be one of the things New England can talk about. New England can't offer to take off a permanent tariff on fresh fish because there are none. And, the countervailing duty can't be offered up because, according to U.S. Trade Law, a negotiation like that is not one of the ways by which a countervailing duty can be terminated. Thus, whether or not fish is included in the bilateral discussions is irrelevant to any trade discussion between New England and Atlantic Canada strictly on fish. Further, Canada's so-called social programs in fish couldn't be a subject for discussion in a negotiation confined to fish because many of our programs are not confined to fish. What is more, the New England fishery has little to put on the table in the way of a trade, unless it is cooperation in resource management. And, Canadian industry has already determined that it won't link trade issues with resource management because if it did its policy would be inconsistent vis-a-vis other countries. Atlantic Canada is not terribly interested in the subsidy programs open to New England fishermen and processors because the bulk of trade is one way, although that is not true on a

nation-to-nation basis. Has the issue been thought through or are we seeing merely a gut reaction?

I think the impetus to include trade with a discussion on resources and access comes from the gut and is almost wholly impressionistic. It is along the lines of: "You have the resources; we have the market. Let's talk." That, of course, leads no where. It misses the fundamental fact that the American seafood market is not America's. It is Scandinavia's, it is Japan's, it is Canada's, and also America's. Just as the market for wines in Canada does not only belong to Southern Ontario or British Columbia but to Germany, Spain, Italy, California, and, France.

One of the major concerns of New England fishermen is that some order be brought to the marketplace, and specifically, that our exports be somehow controlled. They are at a loss, however, to suggest mechanisms whereby we could do this, assuming we could or would interfere with the market. Assuming we could be levered, how would we do it? We can't say to one company they can only send fish down between 6:00 and 6:05 on a Thursday or advise another that he sent too much fish down last week so his exports are cut off until March. The marketplace is a very disorderly place and people do sometimes get hurt in it. But surely New England fishermen, with all their free enterprise notions about competition for a dwindling resource, wouldn't want to see artificial constraints in the marketplace. The only way to put order into a naturally disorderly market is with a marketing tool, such as the new auction in Portland. As is shown by the fact that Canadian exports of fresh fish are highest when New England landings are lowest and prices highest, we don't set out to antagonize anybody. All we want is top dollar for our fish.

Interfering with the market, however, appears to be of growing interest to New England fishermen. Increasingly,fishery management plans include provisions to manage resources, not at sea, not at the dock, but in the market by a possession rule usually involving a size restriction. Unfortunately, the result is that all fish, not just American fish, gets caught up in these rules. Exporters of fish into this market now argue that it is easier, at customs, to enforce the rule against foreign fish than for NMFS to enforce against American fish throughout the U.S. Therefore, the rule becomes more of a non-tariff barrier than a resource management tool. Not enough enforcement dollars may be being committed at sea but that is not the problem of foreign countries.

When will Canada want to talk about fish with New England? Answer: whenever New England is ready, Canada is ready. In fact, we've been ready for a long time. In November, 1984, only a few weeks after the Gulf of

Maine boundary decision, Canada formed the Gulf of Maine Advisory Committee, which consists of all sectors of the Canadian fishery and provincial and federal governments. The purpose of the committee was to come to grips quickly with issues in the Gulf of Maine and to be ready for a negotiation which we all expected soon. As we saw it, there were two real issues. One, now that the World Court had ruled that we share resources in the Gulf of Maine, which species could we manage on our own and which were so transboundary in swimming pattern that we required American cooperation. That work was completed in six months and eventually we formally requested that talks begin on the cooperative management of haddock and herring. The enthusiasm in New England for these talks does not appear to be overwhelming. The second issue before the committee was access to resources. Would Canadian vessels ever again fish off Cape Cod, off New Jersey, or off the Carolinas? Would American vessels ever again fish on Brown's Bank, on the Scotian Shelf, or in the Gulf of St. Lawrence? A final decision hasn't been made on that one accept to rely on the emerging Canadian policy of providing access in return for cooperation on transboundary stocks. But now we ask whether a will can be found to cooperate on those stocks.

On the question of access to Canadian waters, I would like to make a proposal. I propose that American vessels stop fishing in Canadian waters. I can understand why they do it. As a result of ineffective resource management and inadequate enforcement, the New England resource is in decline. In fact, New England's combined landings of cod, haddock, pollock, redfish and yellowtail have declined every year since 1980. The resource is at the point where it can be fairly argued that, by relying on nature's resiliency to offset yearly increases in fishing pressure, the benefits of the 200-mile limit have been squandered.

After the 200-mile limit, fishing and processing capacity expanded rapidly with the help of a wide assortment of federal, state, and municipal subsidies. These include the capital construction account and various tax deferral schemes, the Fishing Vessel Obligation Guarantee Program, the Fishermen's Loan Fund Program, the Fishermen's Protective Act, the Fishermen's Contingency Fund, Saltenstall-Kennedy Funds, the Sea Grant Program, and others. In Massachusetts, processor expansion was aided by the Massachusetts Industrial Finance Agency. In Maine, the state has provided new harbours and piers in Eastport, Vinalhaven, Stonington, Saco, Kennebunk and Portland, which also has a new auction built with public funds. As a result of these initiatives, the expansion that has taken place has enabled the capacity of plants and vessels to outstrip the nearby resource. According to the Massachusetts Marine Fish Division, there is more American effort on the water than combined American and foreign effort prior to the 200-mile limit.

Canada is not guiltless on this either, but at least a fundamental goal of policy is to match capacity with resources. We could argue forever on this and lay accusation and counter accusation. But we must agree that there is a problem in the Gulf of Maine, and because the resource swims back and forth, that the problem must be solved together. Resource rehabilitation in the Gulf will improve the incomes of people who use the resource. When these incomes rise, the number of irritants and problems we have on fish will decline. We must work towards that.

I would like to raise a final problem for which I have no proposal and for which the prospects are confusing, that is, U.S. vessels fishing on the Grand Banks outside 200 miles. Those waters are international but the fish are transboundary with Canada. American vessels have every legal right to be there but Canada has problems with them there because the fishing pressure of American vessels is in excess of what's agreed on by the NAFO of which the U.S. is not a member. Our chagrin at U.S. presence on the Banks is compounded by the LOS which requires that we must provide innocent passage through our zone. Thus, we must help you get to where we don't want you to be. The amounts taken are not significant yet by Canadian standards. But, by New England standards they are. In 1985, fully 35 percent of New England's flounder catch came from the Grand Banks.

This is a problem for us not only because Americans are putting pressure on two transboundary areas, Georges Bank and Grand Banks, but more importantly, the less dependent New England becomes on resources in the Gulf of Maine, either through fishing on the Grand Banks, or by attracting more whole fish down from Canada, the less incentive there will be for American fishermen and processors to become involved in the processes they have created and to try to reverse resource decline. If incentive falters through New England's ability to get fish from outside New England, then the prospects for my major proposal to you of resource rehabilitation through cooperation looks very dim.

Industry Prospects and Proposals

James B. Morrow, P. Eng.
Executive Vice President, National Sea Products Limited
Halifax, Nova Scotia

It is a pleasure to have been asked to take part in your conference as a Canadian representative of a Canadian company. I personally welcome the opportunity to give you my perspective on the changing conditions and future directions in East Coast fisheries, and it is my hope that my remarks will be constructive and informative and will make some small contribution to improve relations and promote an understanding of major issues facing our industry and our two countries.

First, I shall tell you about our company, National Sea Products Limited. It is Canada's largest privately-owned seafood corporation with over 500 products reaching consumers in more than 20 countries around the world. It is a vertically integrated company as we control and coordinate every aspect of our operation, from harvesting and processing the catch to transporting and marketing the finished products. The company owns 59 vessels and purchases fish from many independent fishermen. Most of this is landed in the fresh, gutted and iced form except for the production from one factory freezer trawler, which is the first such ship in the Canadian fleet. In 1985, over a third of a billion pounds of fish was landed at company wharves.

National Sea Products operates 19 processing plans in Canada and the United States. We employ about 8,000 people. The three United States plants are located at Rockland, Maine; Portsmouth, New Hampshire; and Tampa, Florida. Our sales in 1985 were about $455,000,000 (Canadian). We market our products under the *High Liner* brand, and as of this week have added the *Booth* and *Fisher Boy* brands. This now places our company as number four in your retail frozen market with Mrs. Paul's, Gorton's and Van de Camp the leaders.

Our head office is in Halifax, Nova Scotia, and our United States headquarters and marketing office is in Portsmouth, New Hampshire.

I should add that National Sea Products is a profitable company. It is listed on the Toronto and Montreal stock exchanges. During recent times there were reports and rumors that we were restructured or "bailed out" or

owned by the Canadian federal government. This is not true. The company was privately refinanced in 1984 by a group of Nova Scotia investors and the Toronto Dominion Bank through $20 million from the investors and $75 million from the bank — an infusion of $95 million without any government guarantees. The federal government does own a minority interest through a takeover of shares of a previous, financially troubled owner, and they did purchase $10,000,000 in preferred shares of the company in 1984. The bottom line of all this is that the company is today, as it always has been, a private company held by investors who have a profit motive. Most of the shareholders are every day Atlantic Canadians.

I cannot let today's comments about National Sea Products go by without comment. This so-called big, bad Company, as I heard the implications, was not formed by government. It had its beginnings in predecessor companies who started in the salt fish business in 1889 and the fresh and frozen fish business in 1926. It was fishermen who formed these companies and my grandfather was one of the schooner captains.

An economist, Dr. Stewart Bates, of Dalhousie University wrote a paper on the fisheries in the early Forties stating it was going nowhere as an industry with splintered small companies and he recommended that some of the larger united get together and form one company with enough power to advertise on a national basis. In 1945 this became a reality and two companies got together and created National Sea Products, Ltd.

Thus, National Sea Products was formed from fishermen beginnings and a marketing concept. The marketing concept worked and we predominate in retail frozen fish and, in fact, are number two in the frozen food business in Canada. One essential ingredient to good marketing is a twelve month supply of fish on a continuous basis, hence our involvement in the large offshore vessels.

The one point I want to make to all National Sea critics including my press friends, who sometimes see us as the only evil other than the civil servants, is "what if" National Sea did not exist? Our Canadian marketing principles keep one-third of our fish in Canada so I wonder about the impact if most of that fish were added to the U.S. market.

Again, I heard today all about the money poured into National Sea Products by government plus the statement we were restructured by government. We cannot deny that over the years we took advantage of government programs intended for all those participants in the industry. We did not receive special handouts. Even your own Department of Commerce investigators found very little involvement by government, but such was not the

case for Fishery Products International. Hence, I resent lumping those two companies into a general statement of bailout. I will tell you what did save the company in those troubled days:

1. Number one reason was the private investor involvement

2. management change

3. divestitures of some plants, assets and unprofitable businesses

4. overhead costs, product line rationalization

5. market strategies changes, union contract agreements

6. Also, we were assisted by consumer trends, market prices, exchange rates and interest rates. These were the major items which saved the company and government was a minor factor.

I will make only one more statement about the company. We are basically against any government subsidies for any industry including our own, and we are an outspoken proponent of free trade. With this background you may better understand the balance of my inputs to your conference.

I will start on the trade issue between our two countries. We first need to examine the realism of Canada's overall trading position with the United States. In Canadian dollar terms, the U.S. accounted for $94.7 billion our of Canada's 1985 exports of $120 billion. The United States was the source of $74 billion of the 103.3 billion worth of goods imported into Canada. Thus, the United States accounted for 78.8 percent of Canada's exports and for 72 percent of its imports last year.

The edible fish products portion of this total trade picture is very low — about one percent both ways. Canada buys $107.4 million (U.S.) from the United States our of your total edible exports of $1,010.3 million (U.S.), whereas you import from Canada about 20 percent of your total imports of edible fishery products, i.e., $840.8 million our of total imports of $4,064 million.

Both Canada and the United States are the world's leaders in exports of edible fishery products, with both countries' exports in excess of a billion dollars each. This should put us on an equal basis when it comes to talks about free trade and access to world markets. We have a basic common interest in fisheries exports.

There seems to be an impression in the eastern United States that Canada is a great fishing nation. This is not so by world standards. Our commercial catch is less than two percent of the world's catch. The United States lands four times Canada's catch. You are fourth in the world's fishing nations. Canada is seventeenth. It is worth noting here that while your 3.3 billion pounds of domestic landings is impressive it only looked after 36 percent of your total edible supply. Sixty-four percent of your edible supply had to be imported. On this basis one must ask the question as to what possible purpose does a duty on these imports serve.

About seventy percent of all Canadian exports enter the United States either duty free or nearly so. This includes most seafood products. Existing tariffs, where applied, are only about three percent ad valorem. The main significant exception is value added products such as sticks and portions which encounter tariff barriers of eleven percent. A relaxation of these tariffs by both countries would have little effect on the overall industry. In Canada, the only company with something to lose in removing tariffs from sticks and portions would be my own company as we are the leading supplier of such products in Canada. We are willing to accept this and take on the added competition in exchange for a free flow of seafood products between our two countries. We know we will have to compete and innovate in a less forgiving market. It will take some fancy stepping to be noticed on a crowded dance floor.

It is my belief that our two nations will resolve our trade problems. There is a need for Atlantic Canadians to reduce the wide differences of approach and misunderstandings we seem to have in matters of trade with you in the eastern United States. Both countries need to look at a solid and united North American trading block in order to offset the powerful economic unions forming throughout the world, such as the European economic community and the Pacific rim nations.

The small tariffs we have on each other's fishery products is not changing the flow of product. It is merely increasing the consumers' cost. Our East Coast Canadian industry has survived six countervail applications by United States interests since 1975. The latest one resulted in a tariff of 5.82 percent on fresh, whole groundfish. This merely aggravated your importing processors who need this fish to survive. In my opinion, it has added to the ultimate consumer cost of fish. There are no winners with this type of activity, so we welcome a comprehensive trade agreement with the United States where the ground rules will be on top of the table and understood by both sides, along with a mechanism to solve disputes in a fair and equitable manner. Countervail of course will likely remain in place for proven unfair trade practices.

Resource management is another area considered to be a major issue between our two countries. The only things I hear are that we have considerable misunderstandings, we have different philosophies and Americans are angry at Canadians because we now own a small section of George's Bank.

I have been told to minimize the fisheries management argument as it is unproductive and irritating. However, I will not avoid the issue, and I do hope to be productive and direct my remarks to the problem with a fresh approach.

There are certain facts we can deal with. We know our catch rates are down in our fleet in our southern waters. We know your haddock landings dropped 45 percent in 1985 compared with 1984 and have been virtually wiped out. Even Jake Dykstra says the managers must step in when this happens. To me, we need not debate whose management system is working. They have both failed. Mesh sizes, quotas or closed seasons all have failed to do anything for haddock. Someone will have to explain to me what we plan to accomplish when we have a closed haddock season for spawning and then spend the rest of the year catching every last large haddock we can find leaving next to nothing to spawn.

Our government likes to discuss species management problems on a government to government basis. They have been unsuccessful to date. When I ask, "who should we talk to in Washington," the answer comes back that management lies in the hands of the regional councils. It is my impression that these councils seem to have their hands full of regional problems and either do not have the time, or possibly the authority, to talk about international species management. I would like to see carefully selected fishermen from each country talking to each other about their comparative catch rates or their ideas on the state of various species. It seems to me plenty of ideas will be generated by such a forum when men talk about their livelihood and their future.

Then, maybe they can develop serious recommendations and work through the various authorities up to governments. The end result could well be that management of our common fish stocks will be underway. One proposal would be to have a fisherman's conference with updated scientific advice available to them in order to stimulate discussion, but not to overrule their consensus.

Some people indicate that Canada has done a great job with the management of its fisheries since the 200-mile limit was declared. This is true only in certain areas, but it is not true in the area closest to you, that is, our southwest Nova area. We have more than double the sixty-five footers

needed to catch the available fish, and while the licensed vessel numbers have stayed static, we have unlimited horsepower; hence, an unlimited catching ability has been built into these vessels. Thus, fishermen's discussions will be made more difficult, but it could be a start to enhance the raw material supply.

In our own case, my company measures the success of Canada's management system by our own allocation of the resource. Our share of the quota in the form of enterprise allocations was 211,000 metric tons in 1984. In 1986 we find ourselves reduced to 178,400 metric tons. This is a reduction of 15 percent. To be fair, the overall industry in this time span had about a two percent increase. (You can see the Canadian political system likes the "big company" too! Much of our decrease comes from the mismanagement in our southern waters. Hence, I must confess we have a selfish reason to see a different approach taken to management. We do believe in the enterprise allocation system provided the rules stay in place which, in Canada, is a political impossibility.

While we will not solve our trading problems and our species management problems overnight, there are many areas of common interest our two countries should be concentrating on together.

As mentioned earlier, we are both the world's leaders in exports so we need to work together to overcome the trading difficulties with the EEC and Japan and eliminate the non-tariff as well as the normal tariff barriers set up against North American fish.

We have common marketing problems. Fish must compete with other proteins. Therefore, we need to look at how we can best promote further increases in per capita consumption of seafood even though the increase in consumption was impressive in the past two years. Joint funding of generic advertising and joint funding of research to prove the health benefits of fish are concepts worth exploring together.

Common quality standards may be another area to explore together in order to enhance the public image of seafood and hence increase demand.

Seal control is another vital area which is of common concern. The seal population is exploding and expanding from North to South. There are estimates that there are 400,000 seals in Canadian waters alone. Their annual fish consumption is about 800,000 metric tons. Thus, seals are a real competitor for our raw material and they are winning. Anyone who has any ideas on this let me know. We are not talking about baby white coats here!! These are full grown gulping gluttons.

I am willing to volunteer my services or those of my company to help in solving our mutual problems. However, it appears the "big company" is not wanted, so I would prefer to be a listener at the next fishermen's conference. It is time to work together and stop jabbing at each other from great distances. We do have common problems and tactics such as countervail applications will not stimulate discussion and will not create solutions for anyone.

I trust this will be a helpful contribution to your conference.

East Coast Fisheries Relationship

Ambassador Edward E. Wolfe, Jr.
Deputy Assistant Secretary of State
for Oceans and Fisheries Affairs

Good evening. I am pleased to be here in Maine to discuss our East Coast fisheries relationship with Canada. The people of Maine are well known for their pragmatism, and it is in this way that I would like to share my thoughts with you this evening. Often, those who discuss U.S.-Canadian relations begin by noting that the two countries share the world's longest undefended border. They also stress the similarity of outlook and harmony of interests on both sides of that border. While I would deny none of this in other areas, fisheries are more troublesome.

For those who have followed our East Coast fisheries relationship since 1977, it is perhaps all too easy to despair. Some have alleged that the relationship was characterized by more similarity of outlook and harmony of interests before 1977 than at any point since that time. What happened?

As coastal States struggling to protect traditional fisheries from distant water fleets, the United States and Canada had much in common. We cooperated extensively in the International Commission for the Northwest Atlantic Fisheries, ICNAF, and frequently saw each other as allies in the cause of conservation.

In 1977, all of this changed. In that year, both countries extended their jurisdiction over fisheries to 200 miles. This single event set the stage for much that followed. In retrospect, a number of subsequent events were no more than the logical consequence of extended jurisdiction.

The immediate result was a significant maritime boundary dispute. This arose because each country used different principles in drawing its line. The immediate solution was an interim agreement that enabled both to continue traditional fisheries in the zone of the other. The agreement bought time to sort out the implications of extended jurisdiction.

Sorting out these implications was to involve two unsuccessful efforts — one to negotiate a solution to the maritime boundary dispute, the other to

implement a comprehensive fisheries agreement. By mid-1978, we found that the interim agreement had ended and could not be renewed. At that time, each side retired to its side of the undisputed maritime boundary, although each continued to fish under its own laws and regulations in disputed areas.

Both realized in 1978 that a negotiated settlement of the boundary dispute could not be achieved. By mid-1979, it was clear that the comprehensive fisheries agreement also was in trouble.

Two years later, the United States and Canada agreed to implement a boundary settlement treaty, leaving fisheries issues aside. In October, 1984, the International Court of Justice split the difference in the boundary dispute, and each side retired once again to its side of the new line.

If the history I have briefly recounted appears more as a series of retrenchments than a testament to bilateral cooperation, this is essentially what occurred. I would suggest, however, that no one failed, nor is anyone to blame. The rule of exclusive economic zones is often a harsh one and does not easily tolerate exceptions. When countries assert exclusive rights, they are usually just that. Certain things inevitably follow. On the East Coast, the end of reciprocal fishing was one of these. It occurred not because of problems in the bilateral relationship, but as the result of the fundamental change both countries saw fit to make with respect to their jurisdiction over fisheries.

We do not now fish in the Canadian zone. In my view, we are unlikely to do so, except perhaps in limited circumstances, in the future. The reasons are fairly simple. Of the species and in the areas likely to interest us, Canada has little enough for its own fishermen. But more importantly, what have we to trade? You may recall that many criticized the 1979 agreement for trading apples and oranges and pitting one segment of our domestic industry against another. I have not since then met a New Bedford scalloper willing to see the Canadians back in the Great South Channel so that Rockland redfish boats can return to the Canadian zone.

I believe it will also be difficult to change the currency involved, that is, to use other chips to barter for access. If there is any theme that has been clear and unambiguous since October 1984 it is that Canada will discuss fishing access only in terms of reciprocal fishing access.

As I have indicated, I believe that all of this renders the possibilities for returning to what is now the Canadian zone rather remote. These observations are made not to defeat the hopes of those within our industry who have suffered, but in an effort to face the new 200-mile era with the pragmatism it demands.

But what of the other aspects of our East Coast fisheries relationship? What of management and what of trade? Where are we now and where are we going?

In some respects, cooperative management was the great victim of the 1979 agreement, and the failure of that agreement may well have retarded efforts to begin exploring this issue anew. On the other hand, critics of the agreement argued that it would forever have locked in a single species approach to the management of mixed stock fisheries when scientists and others had long recognized the need for a multispecies approach.

Whatever may be said of the 1979 agreement, it is clear that it was ambitious. The agreement made a frontal assault on the management of a vast range of stocks. It would have established three categories of coordinated management for over 16 species of fish and shellfish in over 30 designated areas. It would have established a 14-member commission with two co-chairmen and a variety of potential committees. It would also have established a dispute settlement mechanism, including an independent arbitrator.

In retrospect, the 1979 agreement may have been too ambitious too soon after 200 miles. The Regional Councils were yet in their infancy, and both countries were jealous of their newly won management prerogatives in their respective zones.

Recall that shortly after the First World War the United States and Canada sought on the West Coast to establish a comprehensive bilateral regime to deal with fisheries management. The effort had its origins in the close co-operative relationship both countries had developed as the result of the War. Recall, too, that the agreement never went beyond a draft. Perhaps it too tried to accomplish too much too quickly.

When that comprehensive agreement failed, neither side gave up, but both lowered their expectations. They sought instead to deal with the fisheries one at a time. The result in 1923 was an agreement that led to the establishment of the International Pacific Halibut Commission which exists to this day and has served as a model for many other such commissions. Then, in 1930, the United States and Canada signed the Sockeye Salmon Convention which has only recently been replaced by the Pacific Salmon Treaty.

There may be lessons to be drawn from this. Those involved with fisheries know how complex they are, and how important and how emotional. Those who become involved quickly find out. There is no such thing as a simple fisheries agreement.

Since 1979, we have also come to question the role of government in general and the need for regulations in particular. Increasingly in the fisheries we have come to believe that only that should be managed which truly needs to be managed. We have sought to balance the costs and benefits of regulation and to keep clearly in view the burdens on the fishing industry.

In our fisheries relationship with Canada, this is not to suggest that transboundary stocks might not benefit from coordinated management measures. It is to suggest that we should look closely at which stocks in which areas, and that we should have a clear idea of what kind of coordination is required.

For example, Atlantic mackerel is clearly transboundary in nature and would be regardless of where the maritime boundary were drawn. But is there a need to coordinate management measures for Atlantic mackerel when it is now both plentiful and underutilized?

If relative abundance and degree of utilization are appropriate criteria on which to consider the need for coordinated management, what of groundfish? Haddock, for example, is neither plentiful nor underutilized. Since 1979, however, both countries have largely gone their own and separate ways with respect to groundfish management. The New England Council long ago discarded quotas and trip limits in favor of gear regulation and closed areas. This approach would be broadened and considerably elaborated in the Atlantic Demersal Finfish Plan recently resubmitted to the Department of Commerce.

Canada, on the other hand, has continued its original approach to groundfish management, including quotas and trip limits and limited entry, and has most often viewed the Council's plan with concern if not outright skepticism. These different management regimes do not readily lend themselves to coordinated approaches.

Is this to say that coordinated management of abundant and underutilized stocks is unnecessary, and that coordinated management of scarce and fully utilized stocks is impossible? Not necessarily. But it is to suggest that different fisheries may require different approaches. It may be well to avoid general solutions to specific problems, and to recognize that what is appropriate to one fishery at one time may not be appropriate to all or forever.

Immediately after the maritime boundary decision, and for some time thereafter, many anticipated that the United States and Canada would launch a major negotiating effort similar to that undertaken from 1977 to 1979 to address the fisheries issues previously set aside. We did not at first because of the need on both sides to assess the implications of the new boundary.

Since then, recognition of the need for specific solutions to specific problems has increased. I believe that the hiatus since 1984 has been helpful in fostering this recognition.

But while consensus on the need for specific solutions to specific problems may have grown, consensus on what these problems are has not yet emerged.

How is it likely to do so? Potentially in various ways. Periodically, regional federal fisheries officials meet to discuss current problems. Scientists on both sides also hold periodic meetings. Members of the New England Council have participated in at least one meeting of Canada's Atlantic Groundfish Advisory Committee and Canadian officials have attended New England Council meetings. New England Governors meet periodically with Provincial Premiers. Congressmen McKernan and Studds have visited Canada, as have Senators Mitchell and Cohen and Kennedy. Members of the fishing industry in both countries are frequently back and forth.

These contacts in many cases are admittedly informal. They are also not designed to address particular problems or identify particular solutions. That to me is not the point. Rather, it is that only discussion and exchange of ideas and information are likely to lead to consensus on the fisheries problems both countries face.

There may be ways to improve on this process. We could consider the possibility, for example, of establishing a bilateral consultative mechanism to deal with East Coast fisheries issues, starting first perhaps with science. I suspect that both sides ultimately will move in this direction. While such a mechanism may be a new approach, it is not without precedent. On the West Coast, the United States and Canada established the Canada-U.S. Groundfish Committee as long ago as 1959 to coordinate scientific assessments of transboundary stocks.

I would caution again, however, against approaches that are overly ambitious. For too long, in my view, we have thought rather narrowly that any agreement we undertake must be comprehensive. I would point out that our Pacific salmon negotiations began on a somewhat similar assumption — and it took some 13 years to conclude that agreement. I submit that we may make more progress more quickly if we lower our sights and seek to walk before we run.

I would also suggest that there are various potential ways agreements may be undertaken. For example, the United States and Canada were able to

agree, even during the pendency of the boundary dispute, on an average minimum size limit for Georges Bank scallops. Agreement on this issue has not been contained in a treaty submitted to the Senate for its advice and consent. Rather, it was adopted unilaterally by each side in its domestic regulations. The net effect, however, was the same.

The fact that this scallop "agreement" was not contained in a treaty may actually have provided more flexibility for each side to meet changing conditions in its fishery. Canada has since implemented a more stringent average size limit. We ourselves are in the process of considering alternatives to size regulation. At some point we may adopt similar management measures once again, but neither side has been constrained in dealing with its fishery.

While the scallop "agreement" was implemented through domestic regulations undertaken by each side, there is obviously also the potential for more formal agreements, whether memoranda of understanding between Federal agencies, executive agreements or treaties. What is essential is not the form ultimately adopted but mutual recognition of the problems and mutual agreement on the solutions required.

I would also submit that fisheries trade issues, like management issues, are not well enough understood. The history of our East Coast fisheries trade relationship since October 1984 has largely been the history of the recent countervailing duty petition. Ironically, both sides have claimed a significant victory in the decision rendered.

Aside from subsidies, I believe that there are many other legitimate questions at issue in our trade relationship. A great problem in that relationship seems to be the scarcity of efficient market clearing mechanisms. As the result, fish from far afield ends up in the same market regardless of where it is ultimately retailed. It is difficult to conceive that fish trucked from Nova Scotia and sold in Boston can actually be consumed in Montreal, but I understand it has happened.

I believe the most hopeful development in years may be taking place right here in Portland. The Portland Fish Exchange holds not only the potential to improve fish quality significantly, but also to encourage the development of similar institutions elsewhere. The result could just be that fishermen are paid for quality, that consumers in many new areas can find fresh fish consistently in their markets, and that some of the hard feelings may be lessened between fishermen who get lower prices because of trucked fish and fishermen who get lower prices because they truck fish.

Meanwhile, we will also be addressing fisheries trade issues in the context of our comprehensive trade negotiations with Canada. The first round of substantive negotiations is being held in Washington, June 17-19. All sectors, and all issues of trade significance, are on the table. Free trade will not happen over-night, and transitional arrangements will be especially important for some sectors. U.S. trade laws, such as our countervailing duty laws, continue on the books. The Administration is committed to close and on-going consultations with the Congress and the private sector.

I think it safe to assume that market clearing problems are not likely to disappear at the stroke of a pen. Solutions to these will likely require greater regional efforts over a longer period.

With the countervailing duty petition presumably now behind us, it will be important to channel energies toward exploring some of the unanswered trade questions. Where is our fish finally retailed? In what other areas could markets be opened? What is the effect of timing on the operation of the auctions? In my view, trade is a field fertile with opportunity for economists, fishermen and processors to explore and to benefit from their new knowledge.

Finally, what of cooperation in multilateral arenas? Both countries are members of the North Atlantic Salmon Conservation Organization and will meet again in Edinburgh next week. Canada announced this spring that it will close its fall fishery in Newfoundland and Labrador beginning October 15 in order to minimize interceptions of U.S.-origin salmon. This represents an important first step. We will work with Canada and with the other contracting parties to the NASCO Convention to achieve meaningful conservation measures in other areas as well. We have invested too much in our domestic restoration efforts to catch fewer salmon in our rivers than are intercepted by other nations, as is now the case.

We are not now a member of the Northwest Atlantic Fisheries Organization, NAFO, although we were a founding member of ICNAF from its inception in 1950 through 1976, and though we participated actively in the negotiations that led to the NAFO Convention in 1979. Since 1977, we have largely been preoccupied with fisheries issues in our own zone. From that time until 1984 U.S. fishermen, other than those operating for swordfish, rarely ventured to the tail of the Grand Banks to what is now the NAFO Regulatory Area.

However, following delimitation of the maritime boundary and the loss of fishing opportunities closer to home, U.S. fishermen have renewed these traditional fisheries.

Total allowable catches and quotas in the NAFO Regulatory Area are established each year by the NAFO Fisheries Commission. While we are not the only nation whose fishermen operate in the NAFO Area outside the framework of the Convention, all such fishing creates an obstacle to the Organization in its efforts to manage these fisheries.

On the other hand, without some assurance of fishing opportunities within the Organization, non-members are somewhat reluctant to join. To deal with this problem, a balance must be struck between the Organization's desire to assure that fishing by non-members does not undermine its conservation objectives and the concerns of those outside the Organization that membership will not spell the end of their fishing opportunities.

In coming to grips with this issue, I would urge that linkage to other issues in our bilateral fisheries relationship be avoided. Linkage can only complicate issues that are complicated enough.

While there are perhaps other things I have not touched upon this evening, I think that they are best left to another time. Thank you and good evening.

Part Two

Fisheries Management

Chapter Six
Overview

The Future of Fisheries Management

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Please note: The views expressed in this paper are those of the author, and should not be construed as representing the views or policy of the National Marine Fisheries Service, NOAA.

Introduction

In the "good old days," one used to hear the line, "I'm from the Federal government, and I'm here to help you." As public attitudes and expectations change so do government policies, and Federal fishcrats are no longer — if they ever were — able to help people achieve unlimited catches of fish with no regulatory strings attached. Cap'n Perc Sane's column in the *National Fisherman* is a frequent reminder of the expectations, reality, and the politics of fisheries. However, Cap'n Perc and his friends in Saturday Cove rarely share with us their ideas about the future of their fisheries and the roles they and others must play if these fisheries are to be productive.

Our sessions today will examine fisheries management, and since I am to provide an "overview", I intend to speak from my personal perspective as a fishery manager. I believe that the role of government in marine fisheries management is as "conservator" or "steward" of the resource, with a secondary task of creating a stable climate for the businesses and consumers of fish. Conversely, I believe that industry, not government, must be at the cutting edge of ideas, technology, and product development. These are hardly new ideas, though rarely discussed, and I would like to take this opportunity to lay them out for you in a way which may help us all to clarify our ideas about the future of fisheries management.

Fishery Management as Social History

Man has been managing fisheries since the fourteenth century in order to achieve a sustainable yield. The lawyers in the audience will recall that Grotius, in his 1609 treatise "Mare Liberum," argued that the seas should be open to all because the resources were limitless. Since Grotius argued this in 1609, the world's population has burgeoned and the limits of marine fishery resources have been reached and, in many cases, exceeded. One hundred and fifteen years ago the United States Fisheries Commission — the ancestor of the National Marine Fisheries Service (NMFS) — was created as a Congressional response to constituent complaints of overfishing and declining fish stocks in New England and elsewhere.

Since then the Federal Government has changed it's role in dealing with such situations. At first, the role was seen as that of biological researcher and stock enumerator, which is exemplified in the century of service provided by the Woods Hole fisheries laboratory. A role which emerged later was that of gear developer and market enhancer for the fisheries. The development of new technologies, markets, and product forms reached its peak in the 1960s, and Congress supported the modernization of the fisheries with vessel construction and loan funds for the fisherman who wanted to take advantage of these new developments. A lot of the gear now used in New England was introduced with government assistance — assistance sought and welcomed by fishermen. It is a moot question whether this government assistance in market and gear development, and low-cost vessel construction and modernization funds, hastened the decline of the fish stocks off the shores of the United States.

The decline in fish stocks off New England since the 1950s has been attributed by many to overfishing by large, modern fleets from other nations, and the lack of adequate international management of the resource. These fleets were a factor; however, testimony before Congress by NMFS prior to the passage, in 1976, of the Magnuson Fisheries Conservation and Management Act (Magnuson Act) shows that many of the most heavily stressed stocks were fished primarily by United States fishermen.[1] During that period and prior to the passage of the Magnuson Act, regional fisheries management occurred within the framework of the International Commission for Northwest Atlantic Fisheries (ICNAF). Although the concepts of sustainable yield were espoused by the ICNAF, the managerial buck was passed to the diplomats; the agreed upon quotas often reflected greater concern for national honor than the survival of the stocks, and the lack of enforcement induced an occasional state of near anarchy.

For these reasons, the Magnuson Act was a major step forward in resource conservation and management. However, the warnings of Senator Mike Gravel of Alaska,[1] that the Act would mean management of both domestic *and* foreign fishermen, apparently fell on deaf ears. What we now face is management of our domestic fisheries, and that is the underlying reason for this conference.

In the ten years since the passage of the Magnuson Act we've learned a lot. The NMFS, a non-regulatory body, learned about regulations the hard way. [As author of the original "horse-blanket" which detailed the necessary administrative steps, I can attest that NMFS staff were as surprised as the staff and members of councils and the fishing industry with the complexity of the system.] The Council system has generally worked in reflecting the concerns and attitudes of regional commercial and recreational fishermen. After our initial effort at "rational" management in the scientific sense, all parties seem to have adopted patterns of actions which build upon past experience and reflect the increasing levels of knowledge about the resources. This is as it should be; the management of fisheries should be at the regional level to best respond to regional concerns, knowledge, and experience. National involvement in fisheries management, in my opinion, should focus on the National Standards, applicable law and Executive Orders, in dealing with government-to-government issues such as foreign fishing allocations, and participation in international bodies such as the Northwest Atlantic Fisheries Organization, the successor to ICNAF.

The role of government has thus evolved from that of researcher and enumerator into one which combines scientific research, development and market services to the fishing constituencies, and the management of fisheries. Changes in this role have reflected the policies of several Administrations and the wishes of their fishing industries expressed through Congressional action. Thus, government reflects society's ideas, but does not lead them. As social and political changes have occurred, government policies have changed too. We have seen society move from an era of policies of maximum resource use to an era of conservation of resources for use in future generations and for the maximum benefit of the Nation. In a democracy such as ours, these shifts in public desires have been reflected in the way we do business in fisheries management.

The Magnuson Act

As I have noted, the Magnuson Act is part of the evolution of present day fishery management. The Act juxtaposes management and conservation goals which are somehow arbitrated through the determination of optimum

yield. While there is some general agreement on what constitute maximum sustainable yield for a fishery, the determinants of optimum yield have never been articulated in the way the framers of the Act envisaged. Rather, the different user groups have developed a pattern of raising allocation issues to Councils which, in turn, often have trimmed conservation goals. If the resource is to be available for long-term harvesting, it would seem prudent to ensure that the conservation goals are met prior to allocation.

It is under these circumstances that government frequently finds itself without friends. Since the Act provides for a balancing of forces in its development of rules — with the council "legislating", the Secretary "approving", and the courts and administrative law judges providing adjudication if necessary — there is potential for conflict as well as equity. Conformity to the National Standards of the Act, the principal test applied to fishery management plans, has a very different appearance to persons at the local, regional or national levels. Moreover, Congress tied the operations of the Act to other legislation, for example, the National Environmental Policy Act and the Paperwork Reduction Act. The Executive Branch has issued orders and directives which ensure a measure of conformity among Federal rules. The result has been a lengthy review process for fishery actions under the Act. The Congress has amended the Act in an effort to expedite plan review and implementation, but the development and amendment of management plans remains a slow process.

In summary, the purposes of the Magnuson Act were seen by many to be fourfold: (1) to curb foreign fishing; (2) to conserve stocks; (3) to prevent overfishing; and, (4) to provide access to stocks of fish in the exclusive economic zone (EEZ) of the United States to domestic harvesters. As the Act has evolved and been amended, other latent factors have become evident to participants in fishery management. First, the conservation and management of resources has been redefined by many as management for maximum economic benefit or growth of the fishing industries. This is a short-term outlook which, if it is not coupled to industry restructuring, will lead to overfishing. Secondly, the need for management of domestic fishermen and fisheries is now acknowledged by the majority of participants, but few user groups have show the willingness and courage to sit down with other users to work out methods of sharing the pie. This must be, as I will discuss, the next part of the pattern of evolution. And, finally, unrealistic expectations about fishery production have arisen. The Act has apparently fostered a climate in which greater levels of investment, more employment, and a greater reliance on an unreliable, naturally fluctuating resource has occurred; if domestic overfishing was the case in 1976, then the growth of the industry since then has been the classic case of more fishermen pursuing fewer and fewer fish. If the Magnuson Act was fully successful in achieving the purposes perceived

when it was being drafted, the three latent factors I have noted have the potential for causing it to fail.

Where Are We Now in Fisheries Management?

The Magnuson Act provides management tools subject to the limitations I have described. If one were to prepare a report card on the results of the Act to date, I think we must look at four aspects: the state of the fish stocks; control of foreign fishing effort in the EEZ; the state of the domestic fishing industry; and the issue of allocation.

With regard to the fish stocks my predecessor, Roland Finch, suggested in a recent paper [1] that, of the fisheries managed under the Act, the "health" of eleven had improved in the seven years for which data is available, six fisheries were in a worse condition, and eight remained at about the same level. Given the natural fluctuations in fish stocks, this indicates that management measures may be working over the long-term, at least in some fisheries. However, that data used by Finch and others reflect the poor information that we have on actual harvest and effort in the fisheries. Improvements in scientific information in support of management need to be supplemented by catch and effort data from both the commercial and recreational fisheries. This will allow the Councils and NMFS to gauge the relationships. And although we think we are beginning to control overfishing in some fisheries, we really lack the information to draw such conclusions with any degree of certainty. Our report card shows only a C+ in the area of fish stock improvement.

Foreign fishing has been reduced to below half of the harvest from the United States' EEZ, and in the New England sector it is minimal. However, the reduction in foreign catch has been matched by the growth of joint ventures in which United States' harvesters supply foreign processing vessels. Although these activities obviously benefit the fishermen, many argue that the processing of the fish should also be carried out by domestic processors in order to obtain the highest returns to our economy. In regard to collecting fees for foreign fishing activities, the Magnuson Act limits our ability to charge more than the costs of administering and enforcing the Act. Even so, foreign fishing fees have increased considerably. It should be noted, however, that the data gathered by foreign research vessels, and from United States observers on foreign fishing vessels, are decreasing, and will continue to decrease. These data must be replaced by information gathered from our research and fishing vessels. In an era of shrinking government budgets, I am not sure how this can be done! Nonetheless, our report card shows high marks in this area.

The domestic industry — both commercial harvesting and processing, and the recreational sector — has increased since the passage of the Magnuson Act. And there have been significant changes in the commercial fishing fleet. For example, Jim Acheson in a study of the New England Fleet [4] reported that 39% of his sample of fishermen had purchased a vessel at least six feet longer than their previous boat in the five years preceding 1978. Acheson concludes that management by quota, under the early versions of the groundfish plan for the Northeast, led fishermen to invest in vessels capable of taking their catches as quickly as possible before the regional quotas were filled. The unintended consequence of the plan was, apparently, overcapitalization. And, since the quotas were soon filled, the vessels were employed in other fisheries for a relatively small increase in cost to the owner and contributed to the problems of these other fisheries. Norton, Miller, and Kenney [5] showed that the cost-earnings ratio in New England has been deteriorating since 1965, with the exception of the New England otter trawl fishery in which the ratio remained the same.

Our report card on the domestic fishery is thus mixed: yes, the numbers of people, vessels and plants involved in the fishery have increased, and no, the ratios of costs to earnings have not improved in any of the fisheries in the New England region. Even more troubling is that short-term gains in the health of the stocks have been offset by increased fishing effort and the move by fishermen to multispecies activities as a response to management restrictions.

Finally, we are now embroiled in the conflicts associated with domestic allocation of scarce resources. This should come as no surprise to New Englanders caught up in the disagreements among pot fishermen, longliners, and trawlers; between commercial and recreational fishermen over the harvest of striped bass on Long Island, and between charter vessels and commercial vessels over gear conflicts in Massachusetts Bay and Cape Cod Bay. As these conflicts increase, due to the open access characteristic of our fisheries, allocations have become more political. Although councils and NMFS have been able to restrict effort through selective use of gear, seasons, and fish size limits we have not adequately addressed the issue of allocation. Proposed management schemes rarely consider social and economic impacts in such a way that we can determine optimum yield in a "scientific" manner. Even the definition of these impacts is lacking from many of our fishery management plans, and thus our allocation schemes fail. Our report card on allocations is unquestionably clouded.

Where Do We Go From Here?

You'll recall that I said government should act as a conservator of the resource and endeavor to provide a stable climate for harvesting activities, but that it was up to the private sector to take on the responsibility for development and marketing. This leads me to ponder the future of fisheries management — specifically, whether we in government (state or federal) should manage the resource or the fishery. The Magnuson Act does not clearly spell out our duties to manage the fishery other than incorporate sociological and economic factors into our determination of optimum yield, and to ensure that plans are fair to all, and allocations are not made which are grounded solely in economic efficiency. These are rather vague instructions! Should government be the conservator of fishing activities and communities when these activities are contributing to the decline of the resources of fish and capital? When we allocate fish for social and economic reasons are we not continuing the spiral of overfishing and overcapitalization?

The Magnuson Act does provide a criterion for managing the resource: maximum sustainable yield. Complications in fishery management arise when the ouncils make their determinations of optimum yield accompanied by allocations among user groups. If one accepts that the government should be responsible for the resource and its health, management becomes much simpler. If the users cannot agree on allocations among themselves, then the fishery is open only until the maximum sustainable yield is reached, then it is closed. Simplistic but not realistic.

Are there better forms of management than those prescribed under the Act? A lot of rhetoric, money, and time has been spent on that question since the Act was passed, particularly in recent months. • Most of you are aware of the NOAA/Council Task Group and the "Blue Ribbon Panel" activities, both of which will be providing recommendations to the Administrator of NOAA before the summer is out. Without trying to prejudge the outcomes of these reports and with the purpose of stimulating discussion here today, I'd like to propose five alternative management forms, recognizing that a sixth, no management, always exists. Depending on your perspective, the no management option, however, leads either to the tragedy of the commons described by Hardin or to the survival of the economically fittest.

The first form is the present council/NMFS system established under the Act. This form of management envisions a cooperative spirit between the entities which occurs surprisingly more often than not. As the draft Task report suggests, the present system could be improved through better accountability, coordination, and participation in the management process. Unfortunately, this form of management is beginning to deteriorate as the

difficult problems such as overfishing emerge. In order to deal with problems such as overfishing under this form, the federal role has been narrowed to research on fish stocks and policing fishing practices. My experience in this area leads me to believe managing fisheries by controlling fishing efficiency is not the best game in town.

My second management form would bring all decision-making into NMFS. I have in mind here the experiences of the National Forest Service in its sales of timber leases and allocation of grazing lands. In this alternative, the Federal government would make both the fishery conservation and allocation decisions after public hearings. Allocations would take the form of the purchase of the right to catch a certain quantity of fish by fishermen for a season. If retained, the councils would have an advisory role.

The next three alternative forms of management embody the concept of "co-management." By co-management I mean the delegation of the authority to make some decisions normally made by government to another, non-government, body.[7] In the first of these three management forms, I would propose that the Magnuson Act be amended to separate the conservation and allocation functions. The government would make conservation decisions such as total allowable catch, and would enforce rules and procedures implementing both conservation and allocative decisions. Councils would allocate the total allowable catch consistent with the National Standards. Any unallocated stocks could not be fished. This would place the government in the role of conservator, would ensure that local allocation decisions firmly in the hands of regional bodies. It would place the allocation policies remained dynamic, and would reduce the players in allocation decisions to user groups and the councils.

My last two alternative forms would dispense with the councils, other than as purely advisory bodies similar to the Grazing Advisory Boards under the Taylor Act. In the first of these forms, the Federal Government would establish the total allowable catch for each species or for multispecies fisheries, and the allocations would be made by fishermen's organizations operating in a not-for-profit mode. The Canadian Bay of Fundy herring fishery operated under this pattern for some three years in the late 1970's until, according to Kearney,[8] the procedures for allocation broke down and, at the same time, the market collapsed with the recovery of North Sea herring stocks.

The second alternative in which the councils would be purely advisory, would be a system in which the conservation decisions were made by government, and property rights to the fisheries in a region assigned to harvesters as either individual transferable quotas (ITQs) or territorial user's

rights to fish (TURFS). After the initial allocation, the government role would revert to conservator and monitor of any transfers of ITQs or TURFS.

In proposing these five forms of management, I have separated conservation and allocation decisions, giving the responsibility for the former to the Federal Government while placing allocation decisions in the hands of those entities involved in the fisheries.

In Conclusion

As you will recall my objective in this presentation was to open up a dialogue on the issues of management and the appropriate roles of government within fisheries management. I have offered a very personal view of this. I feel strongly that management of the resource is necessary for its continued survival and well-being, and this is what government should be doing. With regard to managing fisheries, I feel that allocation decisions should be made by users and that government regulations can be minimized if we assign the responsibility for these decisions either to user groups or to the workings of the marketplace; in varying degrees the open-access fishery of the past will be privatized. Most importantly, I feel that government and government regulations should contribute to a climate of stability in the fisheries so that users can get on with their business or avocation of catching fish. I hope I've stimulated your thinking!

Notes

1. U.S. Senate Committee on Commerce (1976): *A legislative history of the fishery Conservation and Management Act of 1976*. Washington, DC: U.S. Government Printing Office. p. 366; Appendix 1.

2. *Ibid.* pp. 365-373.

3. Finch, Roland (1985): "Fishery management under the Magnuson Act." *Marine Policy* 9(3): 170-179.

4. Acheson, James M. (1984): "Government regulation and exploitative capacity: The case of the New England groundfishery." *Human Organization* 43(4): 319-329.

5. Norton, Virgil J., Morton M. Miller, and Elizabeth Kenny (1985): *Indexing the economic health of the U. S. fishing industry's harvesting sector*. Woods Hole, MA: Northeast Fisheries Center, National Marine Fisheries Service/NOAA (NOAA Technical Memorandum No. NMFS-F/NEC-40.)

6. See, for example, Bigford, Thomas and Clemens Bribitzer (1985): *Fishery management—Lessons from other resource management areas*. Washington, DC:

NOAA Office of Policy and Planning (NOAA Technical Memorandum); and Keen, E. A. (1983): "Common property in fisheries: Is sole ownership an option?" *Marine Policy*. (3):197-211.

7. A useful discussion of co-management can be found in Berkes, Fikret (1985): "Fishermen and the tragedy of the commons." *Environmental Conservation* 12(3):199-206.

8. Kearney, John F. (1984): "The transformation of the Bay of Fundy herring fisheries, 1976-1978: An experiment in fishermen-government co-management." In Lamson, Cynthia and Arthur J. Hanson (eds.): *Atlantic fisheries and coastal communities:Fisheries decision-making case studies.* Halifax, N. S.: Dalhousie University Ocean Studies Programme.

Chapter Seven
Compliance and Enforcement

Canadian Fisheries Enforcement

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I am very pleased to be here today and to have the opportunity to address what I think was aptly described by Ambassador Wolfe last night as a bi-national group of fisheries management and enforcement officials and representatives of the fishing industry. I stress the bi-national aspect of this conference because I feel that the value of this forum lies in the communication and exchange of views taking place between the representatives of various groups from our two countries. Too often we become preoccupied with the problems and challenges involved in fisheries management and enforcement within the borders of our own jurisdiction. We tend to look inwards rather than having a more global perspective. This is probably a natural occurrence and one which is certainly not unique to the fishing industry. Conferences such as this one are useful therefore in opening lines of communication and provide us with another perspective on issues that we face every day.

My presentation today will focus on the Canadian *offshore* surveillance enforcement program. It is my understanding that Thomas Nies will describe the U.S. Coast Guard system which employs multi-mission platforms for fisheries surveillance. In contrast, the Canadian program is largely based on both air and sea patrols dedicated solely to fisheries surveillance and enforcement. This should provide you with an interesting comparison of two types of fisheries surveillance and enforcement systems.

To better understand the Canadian offshore surveillance and enforcement program and initiatives announced by the government last Friday to improve the program's effectiveness, I would like to focus briefly on the growing challenge to conservation posed by illegal fishing activity in the Canadian fisheries waters.

First, I wish to stress that the vast majority of fishermen, both foreign and domestic, are good conservationists who fish in accordance with fisheries management regulations.

With regard to foreign vessels, our problem is mainly with the unwelcomed minority who trespass and poach in Canadian fisheries waters.

Such foreign violations have been increasing. Since the declaration of the Hague boundary line in the Gulf of Maine in October 1984, there have been 24 known incursions by American vessels into Canadian waters. Sixteen masters have been charged resulting in convictions, fines and forfeitures amounting to an average of $15,000 - $20,000 in each case. In the area of the Canadian zone referred to as the nose and the tail, the increase was even more dramatic over the same period. In 1984, a total of 27 foreign violations were investigated. This figure rose sharply in 1985 to 124 suspected foreign violations.

Besides dealing with unauthorized fishing inside our 200-mile limit, we are also faced with anti-conservationist behaviour beyond our area of jurisdiction — the nose and tail of the Grand Banks which lie outside 200 miles. While jurisdictions may be divisible, conservation is not. Protecting part of the fish stocks part of the time is futile.

I would not want to leave the impression that illegal fishing is an activity unique to foreigners. Canadian offshore fishermen have also been known to disregard our fisheries legislation. Even though we are again dealing here with a small minority of Canadian fishermen, our surveillance system must be capable of providing a deterrent to illegal fishing activity in the offshore sector.

What all this means is that our offshore surveillance and enforcement system is beginning to show signs of strain. By concentrating on the elements which make-up our offshore surveillance program — sea and air patrols, observers, and fishery officers — I wish to show where Canada stands presently and in what direction we are heading.

Ever since the construction of the first fisheries patrol vessel, "The Alliance", in 1850, the Department of Fisheries and Oceans has actively maintained and operated her own fleet of patrol vessels. Currently, five (5) vessels are actively involved in offshore surveillance along Canada's East Coast fishery. Two (2) patrol vessels are used in the Pacific for surveillance and biological evaluation of fish stocks. In addition, a limited number of sea days are provided to the Department from the Department of National Defence through a memorandum of understanding.

All Canadian fisheries patrol vessels are unarmed at the present time. When our officers run into a situation where armed vessels and armed personnel are needed, the Canadian armed forces or the RCMP are called in to assist. Of course, there are drawbacks to the process — both operational and financial. Since neither the armed forces nor the RCMP is assigned exclusively to fisheries protection, they are not at the scene when the alleged violation occurs. This means delay in a situation where a quick response is essential. The other drawback is cost. Sending a warship with a crew of 270 to arrest a fishing boat at a cost of $140,000 a day has been compared to the use of a trawler to catch minnows.

Increasing resistance to arrest, combined with increasing numbers of unauthorized incursions into the 200-mile zone, has forced us to review the merits of unarmed patrols. In a recent incident, which received a great deal of attention in the Canadian press, a pair of Spanish trawlers made a break for open waters with Canadian fisheries officials still on board. Only after a long chase were we able to effect an arrest, and then only with the assistance of an armed RCMP boarding party.

Incidents such as these prompted the government to announce last week that offshore patrol vessels operating on the Atlantic coast will soon be equipped with portable light armament similar to that used by the U.S. Coast Guard. In addition, fishery officers engaged in boarding parties will be equipped with sidearms as will all other members of the boarding party which is brought in to play when resistance is encountered.

By arming patrol vessels and fishery officers, we hope to be able to do our job in a much more efficient and cost-effective manner.

This issue is a good example of the benefits which can result from consultation between enforcement agencies. Prior to making a recommendation to our minister, DFO enforcement officials did an extensive study of the American fisheries/Coast Guard experience with armed patrol vessels. Discussions were held with USCG officials and their advice and guidance were very valuable to us in our deliberations on this issue.

Air surveillance also plays an important role in Canada's offshore surveillance program. As you are aware, in many instances, air reconnaissance is the first indicator of a problem area or violation at sea. The Department of Fisheries and Oceans is provided with several hundred air hours each year on both the Atlantic and Pacific coast by the Department of National Defence. The range, endurance and speed of these aircraft is, however, often greater than that required for tasks related to fisheries enforcement. In fact, the very speed of these aircraft can be a disadvantage in making aerial identification of smaller fishing vessels.

These points, coupled with the increasing cost of this equipment, has prompted the Department to look at other viable alternatives. For example, we are now investigating the possibility of using privately-leased aircraft to patrol some offshore areas. This would be an extension of our present practice of using privately-leased aircraft to patrol our domestic, inshore fisheries. If feasible, it would free up more DND air time for longer-range offshore surveillance.

Another option being explored is the development of an 'electronic licence'. In such a system, each fishing vessel would be issued, along with his licence, a tamper-proof, electronic transponder device. This would be the vessel's ID badge while in Canadian waters. The device would be automatically triggered on an electronic cue from our surveillance platform. Any vessel without this device would be immediately identified for closer investigation. A feasibility study of the electronic identification concept has been successfully completed and we will be proceeding in the near future with the development and testing of a prototype system.

Several agencies have expressed real interest in this project including: the U.S. Coast Guard, U.S. National Fisheries Marine Service, the Fisheries Forum of the Solomon Islands, and the Canadian Ministry of Transport and Department of National Defence. It has practical application in the search and rescue field as well as for fisheries surveillance.

Lighter-than-air vehicles are another area of interest to the Department. I understand that these vehicles are presently being looked at by three American agencies: the U.S. Navy, Coast Guard, and the National Marine Fisheries Service. Preliminary studies indicate that lighter-than-air vehicles can be purchased and operated at a much lower cost than conventional enforcement vehicles and they have a much greater endurance. A combination of the LTA and 'electronic licence' would greatly enhance the effectiveness and level of surveillance coverage in the fisheries.

Another important element of our offshore surveillance is the observer program. Observers were first placed on foreign vessels operating in Canadian waters in 1978. They have been deployed on domestic vessels since the winter of 1979. And in 1980, observers were first placed on foreign vessels operating the the NAFO management area outside the Canadian 200 mile zone pursuant to bilateral agreements. The observer program has been successfully established in many countries and is used to assist in effective management of the fish stocks.

Observers collect biological data which is used in assessing stocks and determining allocations. The information collected is a valuable tool in the overall management of the fisheries.

It must be emphasized that while observers monitor fishing activity, they do not possess any enforcement powers. Observers can only report observed infractions of the various fishery acts and regulations to the Department of appropriate action by our enforcement officers.

The Department is presently taking steps to simultaneously expand our foreign vessel observer program and to transfer its costs away from the Canadian taxpayer. This new policy will allow us to achieve 100% observer coverage on foreign vessels by transferring the entire cost of the program through a direct billing system to the foreign fishing parties.

I understand that a similar direct payment system for observers is currently in effect in the U.S. This is another instance where we in Canada have benefitted from the experience of our U.S. counterparts.

Having described the surveillance and enforcement program itself as well as the various initiatives aimed at improving it, I think I should highlight what is probably the most critical element, the fishery officers themselves. Fishery officers form the backbone of our surveillance and enforcement program. They have been vital from the beginning. Since 1850, when the first fishery officer was hired, their numbers have increased steadily. Today Canada has 756 fishery officers monitoring our fishing activity on both coasts as well as our inland waters. On the Atlantic coast there are approximately 497 fishery officers active in coastal and inland enforcement while 37 work in offshore enforcement.

The training program for fishery officers is administered on a two year basis. In the first year recruits are given extensive training both in the classroom and in the field. A five week national orientation course is held in Ottawa, at which time instruction is given on such diverse topics as habitat management, principles of law, resource management, and the organization and function of government. During the first year the recruit also attends a 5 week "skill oriented" regional orientation course. In the second year the recruits take on increased responsibilities in the field and also undergo a five-week training program at the RCMP college in Regina. We feel that through the training program, our fishery officers are capable of handling almost any situation ranging from hard enforcement to public relations.

The various elements of the offshore surveillance program are coordinated by the Regulations and Enforcement Branch of the Department of Fisheries and Oceans in Ottawa. This branch serves as the focal point for the development of national fisheries enforcement policies and the examination of new methods or tools to improve the program's effectiveness. One of our main tasks is to ensure consistent and standardized surveillance and enforcement of

Canada's fisheries management plans applying to both domestic and foreign fishermen, on the Atlantic, Pacific, and Arctic coasts.

So far I have concentrated on the various elements which comprise our surveillance program. Without proper follow-up through the courts, however, surveillance is a meaningless exercise.

In order to provide a strong deterrent to potential fisheries violators, the Minister of Fisheries and Oceans announced last week that the government will be significantly increasing maximum levels of fines. Under the Coastal Fisheries Protection Act the maximum fine for fishing without a licence in Canadian waters is not $100,000. Parliament will be asked to raise this to $150,000 on summary conviction — and to $750,000 on indictment. Presently, fines for other foreign violations range from $5,000 to $100,000. Parliament will be asked to raise the maximum fine to five (5) times the present amount i.e., $25,000 to $500,000.

As mentioned earlier in this presentation, these international symposiums offer a unique opportunity to discuss concerns and solutions with others in the same field of work. I have noted some areas in which we have benefitted from our close association with our colleagues in the United States, especially at the local levels. We, in Canada, look forward to a continuation of this close association and a strengthening of it at the headquarters levels of both our countries.

In closing, I would like to reaffirm Canada's commitment to the conservation of the resource. What protects the resource are not the resolutions you pass but the things you do, the actions you take, the funds and people you commit, the self-discipline you exercise in order to keep the stocks stable. Enforcement enters the picture where the self-discipline fails. However, enforcement resources are finite. As in any law enforcement agency, we look to the chief players, domestic and foreign fishermen, to share our conservation and management objectives and to cooperate with us to preserve a stable resource base for their own benefit and that of future generations to come.

Thank you.

Coast Guard Fisheries Law Enforcement

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The views presented in this paper are attributable only to the author and do not necessarily represent the views of the Department of Transportation or the United States Coast Guard.

Abstract

The United States Coast Guard enforces several laws that protect living resources. Patrol efforts concentrate on the Magnuson Fishery Conservation and Management Act of 1976. The enforcement program is administered at three levels, the most important being the cutters and aircraft that conduct patrols. At-sea enforcement costs, while high, must be viewed with care; comparison to shoreside costs are difficult. Better training and liaison with fishery management councils could improve enforcement effectiveness. The expansion of joint ventures, increased interest in anadromous species, and potential phase-out of foreign fishing will impact heavily on the Coast Guard's program.

I. Enforcement Responsibilities and Practices

The Coast Guard has a long history of enforcing laws written for the conservation of living resources. The original cutter BEAR was involved in early efforts to regulate the fur seal harvest in the Bering Sea, establishing a patrol that other cutters continued into the early 1960's. Responsibilities of the patrol included not only fisheries enforcement, but search and rescue, aids to navigation duties, and transportation for the federal district court of Alaska. Prior to 1966, these efforts were aimed at protection of the territorial sea and continental shelf fisheries resources, as well as monitoring bilateral agreements with other countries. In 1966, the Bartlett Act was revised to extend jurisdiction to twelve miles. Over the next ten years, the Coast Guard became increasingly involved with the enforcement of international fisheries agreements, most notably the International North Pacific Fisheries Commis-

sion (INPFC) and the International Convention for the North Atlantic Fisheries (ICNAF). It was in 1976, however, that Coast Guard fisheries law enforcement received a major boost as a result of passage of the Magnuson Fishery Conservation and Management Act (MFCMA) (16 USC 1801 *et seq.*, as amended) and establishment of the two hundred mile Fishery Conservation Zone (FCZ). The right to exercise unilateral jurisdiction over fishery resources within two hundred miles of the baseline was re-emphasized when Presidential Proclamation 5030 of March 10, 1983 established the U.S. Exclusive Economic Zone (EEZ).

As the primary maritime law enforcement agency of the United States, the Coast Guard is empowered — and tasked — with enforcing a wide range of domestic laws and treaties. These include laws against drug smuggling and other crimes on the high seas, bilateral agreements for the prevention of illegal immigration into the United States, and — of primary interest today — the various laws that target resource conservation. The MFCMA is the primary resource law enforced by the Coast Guard. With its establishment of United States management authority over all species of fish (except highly migratory species) within 200 nautical miles of the baseline, over 2.2 million square miles of ocean area were added to the Coast Guard's patrol responsibilities. Under the MFCMA, the Secretary of Commerce and the Secretary of Transportation are jointly responsible for enforcement of the fishery management plans developed by the Fishery Management Councils. Coast Guard enforcement is closely coordinated with the National Marine Fisheries Service (NMFS).

In addition to the MFCMA, there are several other resource laws enforced by the Coast Guard. The Lacey Act (16 USC 3371-3378), essentially a customs law prohibiting trafficking in and possession of resources taken in violation of state or foreign laws, has been a major issue. Enforcement of the Marine Mammal Protection Act (16 USC 1361) has resulted in the seizure of at least one foreign vessel. The Marine Protection, Research and Sanctuaries Act (16 USC 1431 *et seq.*), the Endangered Species Act (16 USC 1531), the Fur Seal Act of 1966 (16 USC 1151-1187), and five others — each assign at least partial enforcement authority to the Coast Guard. These statutes do not usually require a major enforcement effort, but periodically assume importance. Coast Guard vessels on patrol, for example, are directed to monitor marine sanctuaries for illegal activity when transiting nearby.

In addition to domestic statutes, the Coast Guard is called upon to enforce several treaties and agreements. One of the most important of these is the International Convention on the North Pacific Fisheries (implemented by the North Pacific Fisheries Act, 16 USC 1021). The United States, Canada, and Japan have joined under this Convention to limit high seas salmon fishing.

On the East Coast, the International Convention for the Conservation of Atlantic Tuna (Atlantic Tunas Convention Act, 16 USC 916) is the basis for domestic tuna legislation and enforcement. The Convention for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Northern Pacific Halibut Act, 16 USC 772) regulates U.S. and Canadian fishing for halibut. If the United States formally accedes to the North Atlantic Fishery Organization, the Coast Guard could be tasked with a share of the at-sea enforcement required of member nations.

Clearly, there is a wide range of laws relating to living resources that the Coast Guard is required to enforce. Add responsibilities to prevent illegal drug and alien smuggling and it becomes clear why some people call it the "law on the sea." The staff organization that has evolved to prosecute these missions has its roots in the search and rescue organization that was in place long before law enforcement resumed its current level of emphasis importance. There are four major levels: headquarters (or Commandant), a Pacific and Atlantic Area commander, twelve geographic districts, and the operating units themselves.

Headquarters is located in Washington D.C., with the Operational Law Enforcement Division managing all law enforcement activities. Within this division, the Fisheries Law Enforcement Branch is responsible for coordinating Coast Guard fisheries enforcement policy. Duties include assisting in the negotiation of Governing International Fisheries Agreements (GIFAs), reviewing Fishery Management Plans and proposed regulations for enforceability, and tracking enforcement costs. It's important to note that Headquarters is an administrative command and does not directly exercise operational control over Coast Guard units. That function is performed by the area and district commanders. As operational commander, the areas and districts are responsible for day-to-day patrol activities. Their major task is juggling the limited resources provided to them to successfully accomplish as many missions as possible. The operational commander sets patrol priorities after considering all his assigned missions — search and rescue, drug law enforcement, fisheries law enforcement, etc. For fisheries management, these commanders also act as non-voting members of the fishery management councils, providing early input into the drafting of regulations and working closely with the NMFS Regional Director. Headquarters and the areas are also responsible for the data management required to manage the fisheries program. Extensive sighting and boarding records are maintained on the Enforcement Management Information System, a computer network operated jointly with the NMFS.

At the bottom of the chain is the key to enforcement, the patrol unit. Within the issued patrol orders, the unit commander has wide latitude in

performing his mission. Generally, the Coast Guard performs at-sea enforcement, leaving dockside enforcement to the NMFS. The two major elements are surveillance — best performed by aircraft, which can rapidly locate and identify fishing vessels — and boardings, performed from cutters on patrol. Under the Magnuson Act, Coast Guard officers and petty officers are charged with all of the rights and responsibilities of enforcement agents. This includes the right to conduct warrantless searches and to seize vessels or their catch and arrest masters for major violations of the regulations. Unlike some countries, there are few dedicated fishery patrol officers at sea; only cutters in Alaska routinely carry NMFS enforcement agents. NMFS agents are used more frequently on aircraft patrols to identify gear types and document fishing area violations.

While the details of fisheries regulations vary widely from region to region, boarding procedures are fairly standard throughout the Coast Guard. To be precise, the Coast Guard does not conduct boardings solely to enforce fisheries laws, boardings are conducted to insure compliance with all applicable United States laws. This is a key point in explaining some of the routine boarding procedures that grate on fishermen's sensibilities. After locating and identifying a fishing vessel, the cutter will direct the vessel's master to maneuver in a way to facilitate the boarding. Boarding parties range from four person crews used on domestic vessels to the eight to fifteen person crews used on the foreign vessels. Once on board a domestic vessel, the boarding officer will typically ask the master for his vessel documentation and fishing permit. In addition to the fishing regulations, the boarding party will check for compliance with applicable safety regulations and other U.S. laws — for example, alien and narcotics smuggling. Because of these requirements, boarding parties will sometimes gather the vessel's crew in one location. This practice antagonizes fishermen, who accuse boarding parties of paranoia or excessive crew control. Unfortunately, vessels disguised as fishing boats have frequently been used for smuggling narcotics, and innocent appearing vessels sometimes carry an odd species of "square grouper."

Because most domestic fishing regulations are fairly simple, a boarding on a domestic vessel can often be completed in about one hour. Boardings of foreign vessels differ only in complexity. The boarding party will usually consist of at least eight people and is often divided into two groups. While one group, usually headed by the boarding officer, inspects the vessel's permits and logs, the second group begins the painstaking hold survey. Inspection of the logs is an extensive audit process that traces all of the vessel's operations within (and in some cases, outside of) the EEZ. Because most regulations for foreign vessels emphasize accurate logkeeping to insure foreign nations do not exceed their allocations, the logs must next be compared with the actual content of the hold. Estimating the contents of the hold

can be relatively simple if the vessel targets only one species of fish and has only one processing method; it becomes extremely complex when different species are caught and the product includes fish meal, headed and gutted fish, and roe. Hold teams can be forced to count literally thousands of fifteen to thirty kilogram blocks of frozen fish. If holds are full, tunnels are dug through the product to insure high value fish are not concealed and logged as other species. The product in the hold is compared to the logs the master is required to keep. Foreign boardings can take from five hours to three days (if a serious logging discrepancy is suspected). While this process sounds inexact, boarding parties can typically be accurate to within a few percent of the actual amount in the hold.

Because fisheries and regulations vary widely along our coasts, most fisheries training is received on the job. Local NMFS enforcement offices also provide training. NMFS special agents frequently provide specific instruction before each patrol, and can usually be convinced to accompany the cutter underway for a short period if the crew is inexperienced and needs more training. In Alaska, the agents frequently remain on board for the entire sixty to eighty day patrol. In addition, the Coast Guard conducts a five week maritime law enforcement school in Yorktown, Virginia. This school concentrates on legal principles and how they apply to at-sea boardings. Most of the instruction of this school, however, is directed towards general law enforcement and narcotics interdiction. Boarding officers are typically junior deck watch officers from a cutter, or senior enlisted personnel. While they usually have an extensive background in law enforcement procedures, their general fisheries knowledge can vary considerably. All boarding parties are armed, for both foreign and domestic boardings. Guidelines on the handling of weapons are stringent; training in the proper use of force is continuous.

If a violation is discovered during a boarding, several options are available. While a written warning documents the offense but does not usually result in a civil penalty, a written violation may subject the operator to the civil penalty process. The boarding officer will document the offense in writing and provide the evidence to the NOAA/NMFS regional counsel, who decides what penalty is appropriate. In serious cases — gross underlogging, closed area violations, prohibited species retention — the boarding officer can seize the vessel and/or its catch. In the case of foreign vessels, the proposed seizure must generally be concurred with by the NMFS Regional Director, the local U.S. Attorney, the Coast Guard operational commander and Commandant, the Department of State, the NMFS Assistant Administrator, and the Department of Justice. This consultation is necessary to insure all elements of government are aware of the proposed law enforcement action. Practice has enabled us to streamline this process down to a few hours in clearcut cases. When the seized vessel is brought into port, the case

is then turned over to the U.S. attorney for prosecution. Resultant fines have ranged as high as two million dollars for an individual seizure.

A wide range of resources are used in the enforcement program. The HC-130 airplane is used for long range surveillance, augmented by the HU-25 Falcon jet airplane for medium range searches. Close to shore, both the HH3F and HH52A helicopters are used. The HH52A can also be deployed on flight deck equipped cutters. In Alaska, the primary patrol unit is the 378-foot high endurance cutter. Other areas, where long endurance is not required or weather conditions are not as severe, rely on the medium endurance cutter classes. Inshore fisheries are patrolled by the 82- or 95-foot patrol boats, soon to be joined by a new class of 110 foot, twenty-six knot cutters. In fiscal year 1985, the Coast Guard devoted 43,226 cutter hours and 5,568 aircraft flight hours to fisheries enforcement. A total of 2,978 boardings were conducted, with 324 violations and 274 written warnings issued and two vessels seized.

II. Enforcement Costs

As is often argued, at-sea enforcement is not inexpensive and the costs are difficult to estimate because of the multi-mission nature of the Coast Guard. Cutters on patrol are available to conduct a whole host of missions — search and rescue, general law enforcement, and fisheries law enforcement, for example. Vessels are not designed and crews are not trained for one specific mission.[1] While some believe this is an inefficient way to pursue enforcement of fisheries regulations, the overall advantages to the public should be considered. There is no need to construct one fisheries patrol vessel, one search and rescue vessel, and one small combat craft. These capabilities are combined in one patrol vessel and one organization. If divided into separate organizations, there would be a heavy investment in air and water craft with overlapping duties.[2]

While assigning costs among these respective missions is difficult, an estimated $101.3 million in direct costs were spent on fisheries enforcement in fiscal year 1984. An arbitrary figure of 90% of this cost was assigned to the MFCMA, the remaining 10% believed to cover non-MFCMA statutes. The federal government recovers some of these costs through the poundage fees charged foreign fishing vessels, which are based partially on the costs of enforcement. To place these costs in perspective, they amount to approximately 3.5% of the ex-vessel value of fish caught in the EEZ by foreign and domestic fishermen.

Typically, the high costs of at sea-enforcement are illustrated by generating a cost per boarding figure. Each year, the Coast Guard publishes hourly standard rates for cutters, aircraft, and personnel. Critics of at-sea enforcement costs multiply cutter figures by twenty-four and divide by the number of boardings that can be accomplished in a day.[3] All of the cutter's costs are thus assigned to a few boardings. The implication is that only an actual boarding contributes to compliance and is of value to fisheries management. This is a questionable assumption. If the presence of a cutter deters closed area violators, for example, the fishery obviously benefits. There are several management measures that can be monitored at sea without a boarding. Boardings should not be considered the sole means — or measure — of at-sea enforcement.

Comparisons between Coast Guard and NMFS enforcement costs can be misleading. The figure the Coast Guard reports includes all MFCMA costs, not just the direct operating costs of the units and personnel performing enforcement missions. At the suggestion of the General Accounting Office (GAO) and as requested by the NMFS, beginning in fiscal year 1985, the figure included even indirect support costs. In other words, a percentage of all Coast Guard support activities costs — public affairs and recruit training, for example — are assigned to the MFCMA. NMFS, however, reports only the direct costs of their enforcement division. For a valid comparison, the NMFS figure should include not only the activities of all personnel who draft or review the regulations, but the costs of the civil penalty process (including regional counsels and the administrative law judge) and a percentage of all NMFS support activities. Table 1 is a more realistic comparison of enforcement costs, showing direct MFCMA enforcement costs.

Table 1

Estimated NMFS/USCG Enforcement Operating Costs, FY 1985
($ million))

	NMFS	USCG
Enforcement Costs	6.5	68.8
Infractions issued	403	598*

Note: An additional 132 infractions were issued jointly by NMFS/CG fro
Coast Guard cutters and aircraft.

Dockside enforcement can be an essential element of a management plan. There is little doubt that it is cheaper to hire one fisheries agent than to send a cutter on patrol. Reliance on dockside enforcement, however, can limit the regulatory options available to a fishery management council. At least one council "... recognizes that selection of the operational control strategy implies a continued reliance on at-sea enforcement."[4] Until councils are

willing to forsake the use of spawning area closures, some gear use restrictions, and bycatch handling, at-sea enforcement will continue to be necessary. Regulations designed for dockside enforcement can prove ineffective if there are numerous requirements. Witness past difficulties enforcing groundfish quota restrictions and minimum size limits. Dockside enforcement is also unable to monitor conflicts between domestic user groups, an issue of growing importance. In the Bering Sea, for example, complex regulations were imposed on trawl fishermen this year to protect the king crab habitat; new East Coast gear marking requirements are another example of this growing problem.

Table 2
Source of Infraction, Domestic Inshore Fisheries (FY 1985)

Regulation	Total Infractions	CG Surface	CG Small Unit
Corals (GOM & SA)	0	0	0
Spiny Lobster (GOM)	8	0	0
Reef Fish (GOM)	0	0	0
Migratory Pelagics	0	0	0
Spiny Lobsters (PR)	0	0	0
Snapper-Grouper	5	1	1
Northern Lobster	90	46	23
Surf Clam	8	8	2
Stone Crab	11	3	3
Shrimp (GOM)	89	32	32
Ocean Salmon (WOC)	65	6	4
Northern Anchovy	0	0	0
Halibut	18	4	4
Total	294	100	69

Notes: (1) Of infractions issued by Coast Guard, 69% were issued by small cutters or boats. Excluding the Northern Lobster fishery, which has a significant offshore component, 80% were issued by small units.
(2) Infractions include issued written warnings and violations.
(3) GOM: Gulf of Mexico; SA: South Atlantic; PR: Puerto Rico; WOC: Washington, Oregon, and California.

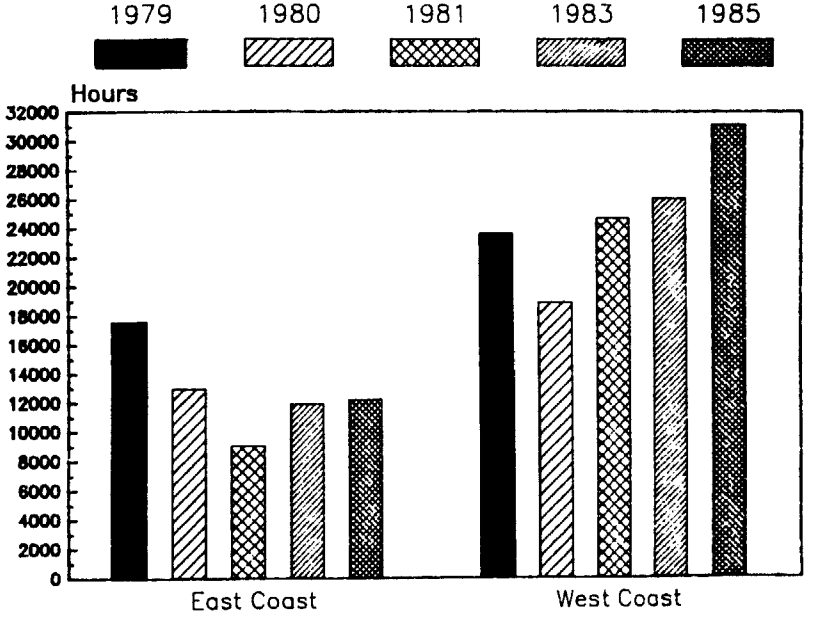
Source: Enforcement Management Information System (EMIS)

In many fisheries, at-sea enforcement can only be provided by large cutters. While the shrimp fishery in the Gulf of Mexico can be patrolled using small (and inexpensive) patrol boats, the fisheries off Alaska and New England require more capable — and more expensive — medium and high endurance cutters for the bulk of the enforcement. The often heard but never supported complaint that the Coast Guard uses major cutters to patrol inshore fisheries is simply not true. Table II lists the source of violation for thirteen inshore fisheries; 69% of the cutter originated reports are initiated by small units (primarily patrol boats). Historically, over 75% of the cod, haddock, pollock, yellowtail flounder, white hake, and redfish were caught in offshore areas in the New England multi-species fishery.[5] Large cutters were used to

patrol the areas where most of the resource was caught. As the fishery has moved into the Gulf of Maine because of the new maritime boundary with Canada, patrol boats have increased their share of fisheries patrol hours in this region from 4% in fiscal year 1984 to 27% in fiscal year 1985.

Figure 1

Cutter Fisheries Resource Hours, 1979-1985



Source: U.S. Coast Guard Abstract of Operations

The Coast Guard fisheries enforcement patrol effort has actually decreased in some areas since enactment of the MFCMA. In spite of much talk concerning the need for picket boats every two hundred miles, additional resources planned to assist with enforcement of the new act included reactivation of only one old cutter. The changes in the amount of time spent on fisheries enforcement by cutters reflects the increased emphasis on drug interdiction (figure 1). In 1979, 30% of the law enforcement cutter resource hours were devoted to fisheries enforcement. A significant decline was experienced over the following years until 1985. Last year, the Coast Guard devoted 43,226 cutter hours to fisheries enforcement — compared to 163,508 hours for other law enforcement activities. This figure is twenty-one percent of the total law enforcement cutter hours. More hours were spent on general law enforcement alone in 1985 than on all law enforcement activities in 1978.

There is not likely to be much change in these priorities in the future. Last October, faced with potential budget cutbacks, the Coast Guard reduced

fisheries patrols by 50%. This reduction has not been lifted because of uncertainties over the effects of the Gramm-Rudman-Hollings deficit reduction act. Faced with these resource limits, fisheries managers must realize that for a regulatory regime to have any chance of success, management measures must not only make economic and biologic sense, but must be enforceable. If a council wants to use at-sea enforcement, the regulations must be carefully written to clearly reflect the plan's intent and facilitate enforcement action.

III. Opportunities for Improvement

There is room for significant improvement in the effectiveness of at-sea enforcement. Better training in boarding procedures and documentation could significantly improve the prosecution of violations. At the same time, closer liaison between the Coast Guard and the fisheries management councils should result in more enforceable regulations.

While the Coast Guard has an extensive training program for general law enforcement procedures, there is a lack of specific training for fisheries enforcement boardings. As mentioned earlier, much of this training is performed on the job or by local NMFS enforcement personnel. Part of this problem is caused by the local flavor of the fisheries industry; regulations and common practices vary widely from region to region, making it difficult for any servicewide training to be designed in detail. The majority of this problem, however, is caused by the decreasing emphasis on fisheries enforcement throughout the Coast Guard. The cutters in New England, for example, are frequently deployed to the Caribbean for drug enforcement operations. This high priority mission can absorb a considerable amount of the limited training time. It is not unusual for a cutter operations officer, responsible for the conduct of the law enforcement mission of the cutter, to have no previous experience in fisheries enforcement.

This lack of training and experience is most evident in the case of documentation submitted after a violation is detected. Key elements necessary for assessing a penalty are sometimes left out of the offense investigation report, the written record used by NOAA attorneys to administer penalties. The preparation of these statements, apparently, is not given the same attention as affidavits prepared for drug interdiction cases, where the Coast Guard has an enviable conviction record. It is also evident in the conduct of patrols. Cutters patrolling the groundfish plan have been known to allow a vessel to haul back before boarding, making it easy to conceal, for example, an illegal net liner.

The Coast Guard has not been satisfied with the action taken after a violation is discovered. Considerable attention has been given to poor conviction rates for cases submitted by the Coast Guard. Much of the blame must be placed on poor documentation, as noted above, but at least a part must be placed on the NOAA attorneys who administer the civil penalty system. One written warning — whose primary purpose is to document a violation for future reference — was dismissed because, in the words of the attorney, its issuance "would serve no useful purpose." Others have been dismissed because the attorney did not fully understand the regulation being violated. Many violations have resulted in penalties that are not sufficient to deter future violators. One fisherman commented last year that, in 1984, using a small mesh net could make as much as a $15,000 difference on one trip; when faced with only a $1727 fine, the average for this violation in fiscal year 1984, and the small chance of being caught, the temptation to violate the regulation must be irresistible. The Coast Guard argument that penalties are insufficient is finally being heard. Several councils are drafting suggested penalty schedules that include stiff permit sanctions for repeat violations.

Regulations are frequently written so that they are difficult to enforce. This is by far the most frequent complaint of boarding officers. In order to prove a violation of the groundfish net mesh regulation, for example, a boarding officer must witness the net in use and then measure it in a precise manner. If a cutter's crew is lucky, they may catch one or two vessels out of a group before the other vessels can change their nets. Net liners can complicate the problem even further. One obvious solution would be to prohibit the possession of undersized nets on a boat, simplifying at-sea enforcement and allowing dockside net measurements. This step, however, would not prevent the use of double cod ends or other net liners and puts unacceptable restrictions on boats that fish for different species on one trip. The use of this management measure should be re-evaluated in view of its enforcement problems.

Other examples abound in other management plans. Gear marking requirements do not specify that the markings should be visible from above. A net is defined ambiguously in one regulation as an "otherwise standard bottom trawl net." Areas are designated using LORAN lines, in spite of strong and consistent Coast Guard objections to the use of a navigational aid as a coordinate system. Restrictions are placed on fishing after dark, an extremely expensive regulation to enforce. Complex exceptions to general regulations are authorized in certain areas or under certain conditions. All of these issues translate into less effective and more costly at-sea enforcement.

Fortunately, many of these problems are being addressed. On the East Coast, the area commander has created a law enforcement training team that

provides specific fisheries instruction. Liaison has been improved between law enforcement staffs and regional attorneys in both New England and Alaska; for example, the Coast Guard law enforcement staff in Alaska is now given the opportunity to comment on any cases the attorney intends to downgrade or dismiss. These measures should be reflected in fewer cases being dismissed because of poor documentation or misunderstandings between the boarding officers and attorneys administering the civil penalty process.

IV. Future Trends

The enforcement program has experienced major changes in the past, and more challenges can be seen ahead. Joint ventures — American catcher boats delivering fish to foreign processors — are increasingly popular on both coasts. Their presence create new management problems, some concerning enforcement. Until this year, there were few logkeeping requirements for the processor vessels, making the extensive hold count legally unnecessary. In at least two instances, boarding parties have discovered significant underlogging. While there was no justification for issuing a violation, the American partners — paid on the basis of the log — were very interested in the boarding party's findings. Joint ventures have been negotiated on an individual basis, making it difficult for boarding parties to keep abreast of exactly what restrictions are in effect for each operation. Bycatch restrictions are rarely explained clearly. This union of foreign and domestic fishermen can create odd allies; when a cutter seized a joint venture boat last fall for illegally retaining halibut, a prohibited species, complaints were heard from U.S. fishermen who lost fishing time because of the seizure.

Anadromous species outside the EEZ are consuming increasing amounts of aircraft and cutter patrol hours. The MFCMA asserts jurisdiction over U.S. origin salmon throughout their range. Under the INPFC, Japanese salmon gillnetters are restricted to certain areas and seasons. Monitoring these fleets frequently requires three day deployments of aircraft over 1200 miles from their home station. The Coast Guard has never been funded to assume this intensive patrol effort, with the result that any resources spent in this area are taken directly from MFCMA enforcement. INPFC enforcement is especially sensitive this year because of the recently concluded salmon negotiations with Japan and Canada. This is causing a crunch on resources, as enforcement in the EEZ will suffer in order to patrol the INPFC area.

One single issue could drastically restructure the Coast Guard enforcement program within the next ten years: the phase out of foreign fishing from the EEZ. The current fisheries program is heavily oriented to enforcement of the regulations for foreign vessels, primarily in Alaska. As foreign fees increase

and allocations decrease, there will be a greater incentive to violate the regulations. Ultimately, if a complete foreign phase out is implemented, the need for enforcement would shift to domestic regulations. So far, domestic regulations have been less complex than those imposed on foreigners. Until or unless this fact changes, departure of the foreigners could conceivably reduce the need for at-sea enforcement. An increased emphasis on dockside enforcement will be attractive, but will not resolve many of the problems mentioned earlier. In Alaska, for example, there have been some indications that domestic regulations are becoming more complex and are increasingly relying on an at-sea presence. Domestic processing vessels in the Bering Sea groundfish fishery are required to send vessel activity reports, and on board observers were considered for the same fishery.

Fisheries law enforcement will remain a Coast Guard mission for years to come. As additional fishery management plans are implemented, close liaison between federal and state agencies will be required to continue effective management of our living resources. The challenge will be to juggle the needs of resource management and the scarce resources of the enforcement agencies.

Notes

1. Junior officers assigned to cutters are placed in either the engineering division or one of the deck departments. Deck officers are responsible for the seamanship and operational aspects of the ship; engineering officers maintain the propulsion and auxiliary machinery.

2. Pike, Dag (1985). p. 5.

3. Palozzi and Springer (1985). p. 4.

4. New England Fishery Management Council (1985). p. 7.5. 5. Ibid., pp. 2.47-2.48.

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Fisheries Law Enforcement: Indicators of System Performance

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Effective fishery management requires a system which achieves desired levels of compliance with regulations. This paper analyzes the existing enforcement system in terms of 1) the problem of determining compliance; 2) the components and dynamics of the system; 3) the supply of detected violations; 4) the projected enforcement costs of the East Coast Fishery Management plans (FMP's); and 5) the costs per detected violation.[1]

Compliance objectives and the enforcement modes directed to these ends are important considerations in deciding on alternative fishery management measures. This particular feature was underscored by William Gordon, Director of the National Marine Service in a memo to his regional directors.

> "To implement additional fishery management plans without additional resources, we must improve efficiency in obtaining compliance and/or simplify the enforcement requirements" and "additional strategies and management options need to be developed to reduce enforcement costs without undue loss of management effectiveness." (Gordon 1983)

I. The Problem of Compliance with Regulations

Compliance with regulations is necessary if the benefits of fishery management are to be derived. Therefore, the degree of compliance is usually viewed as an indicator of enforcement performance. Using the approach identified by Sutinen and Hennessey (1986), we view compliance as a problem of choice for individuals subject to regulation. We assume that fishermen facing such contrasts have preferences concerning alternative states of the world and are capable of choosing among these. Compliance mechanisms structure the incentives of fishermen as they go about deciding whether

to comply with the regulation or not. In an attempt to obtain such compliance, government officials invest in a variety of compliance mechanisms. In doing so, they are concerned to determine the mix of mechanisms which will prove optimal in dealing with the set of compliance problems.

The regulatory process attempts to influence the private cost/benefit calculations of the regulated individuals in order to obtain acceptable compliance levels. Questions remain concerning which factors individuals will take into account in making such choices. There are a variety of such factors, but Becker (1968) identifies the following: 1) the probability of violating without being detected; 2) the benefits associated with such undetected activities; 3) the probability of being detected, but avoiding sanctions; 4) the benefits associated with 3; and 5) the probability of being detected and sanctioned and the costs of such sanctions. In making these probability calculations, the individual is assumed to compare the expected value of returns from violations with the expected value associated with compliance. Andersen and Sutinen (1983) employ Becker's paradigm in their formal model of fisheries law enforcement.

There are, however, at least two problems with using compliance measures as performance indicators. First, as shown by Andersen and Sutinen, a very high level of compliance is not necessarily desired for a cost-effective enforcement program. Second, as Sutinen and Hennessey (1986:13) note, the extent of overall compliance is nearly impossible to measure and, therefore, is not known. The data measure instead the extent of detected noncompliance which is only a part of overall noncompliance, since a significant proportion of violations will go undetected. If surveillance and monitoring were random, levels of detected noncompliance could be extrapolated to the entire population to provide an estimate of the overall levels of noncompliance. Monitoring and surveillance — especially boardings and inspections — are not random, however. The typical enforcement program focuses its surveillance and monitoring efforts on those vessels they estimate to be violations.

In sum, due to biases inherent in enforcement procedures, the extent of undetected noncompliance cannot be used to estimate the extent of overall noncompliance and compliance.

The enforcement system can be operated effectively only if public officials utilize sanctions appropriately. Stigler (1970) argues that public authorities have four basic means to improve compliance: 1) minimize the chances that violations will go undetected; 2) maximize the probability that sanctions will follow the detection of violations; 3) speed up the process from time of detection to assignment of sanction; and 4) make the sanctions large.

There is a dispute among experts, however, concerning the best mix of alternatives among the four. Some scholars have argued that the probability of being sanctioned is more important than the size or magnitude of the sanction (Becker, 1968; Tullock, 1974), while others have argued that making the charging time follow as closely as possible to the detection of illegal behavior is the most important factor in enhancing compliance.

In any case, processing speed and severity of penalty are important criteria to employ in examining the operation of the existing enforcement system. In the section which follows, we will discuss the components and dynamics of the system.

II. An Overview of the Enforcement System

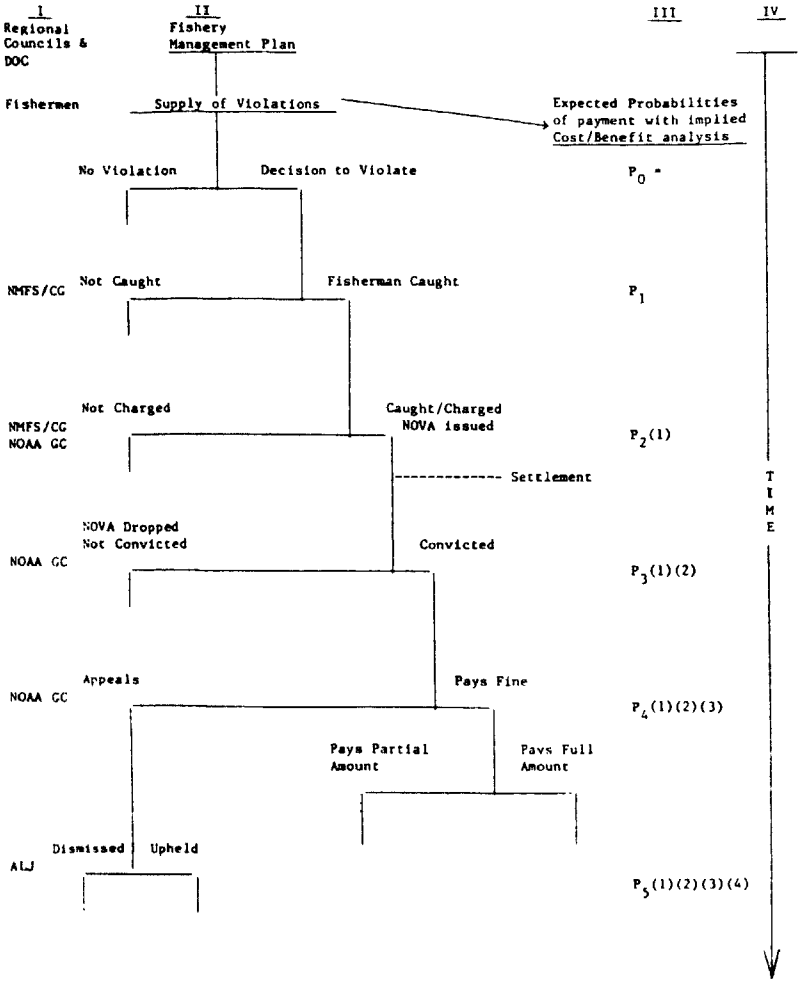
The U.S. Fishery Management Enforcement System has four main features as depicted in Figure 1. Section I, on the extreme left side of the figure, shows the various players involved at different stages of the System. These include the representative fishermen and other key actors: the eight Regional Fisheries Management Councils, the Department of Commerce (DOC), the National Oceanic and Atmospheric Administration General Council (NOAAGC) of the DOC, the National Marine Fisheries Service (NMFS) of NOAA, the Coast Guard (CG) of the Department of Transportation, and the Administrative Law Judge (ALJ).

Section II of the figure depicts the supply of violations, apprehension and charging and various stages through which a violation passes before settlement. When a fisherman is caught violating a Fishery Management Plan (FMP) by NMFS or Coast Guard enforcement officers, the violator will be charged with a violation depending on the evidence. Once charged, a Notice of Violation Assessment (NOVA) is issued by the NOAA General Council. The NOVA is the official charging document and contains the penalty amount to be either paid or negotiated.

When issuing a NOVA the NOAA lawyers decide whether to litigate or settle the case out of court. According to NOAA lawyers, 80% of all cases are settled out of court. Of these, 70% of the fines assessed are collected. It is important to note in settlement cases that NOAA considers 50% of an assessed fine an acceptable penalty.

When the NOAA General Counsel considers the violation to be serious enough to warrant litigation, the full amount of the assessed penalty is sought. If convicted, the violator is expected to pay the full amount of the fine or he or she may appeal to the Administrative Law Judge (ALJ) on

Figure 1
U.S. Fishery Management Enforcement System



procedural grounds. The ALJ may dismiss the case or uphold NOAA's decision.

Following Becker 1968, Section III of the figure depicts each stage of the system as viewed by a potential violator as he calculates an expected probability of being caught (P_1, caught and charged ($P_2(1)$), convicted ($P_3(1)(2)$) and payment of a find ($P_4(1)(2)(3)$). The decision to violate is based then on the expected probability of payment (P_5) with an implied cost/benefit analysis determined by the expected amount of a fine and the potential profit to be gained through the violation.

Section IV, on the far right of the figure, shows that the effectiveness of the System is influenced not only by the probability of sanctions but also by the time taken to process the case through collection.[4] The less time a violation takes to go through the system, the less the costs are for the NOAA General Counsel in terms of both money and work load. This decrease in time and money spent prosecuting a case increases the effectiveness of the system.

III. Indicators of System Performance

Given the general systems orientation previously presented, we will limit ourselves to indicators of system operation and performance up to the point that a NOVA is issued. In this section we examine A) the supply of detected violations/citations; B) the projected cost of FMPs for the East Coast; and C) the cost per detected violation.

A. Supply of Detected Violations

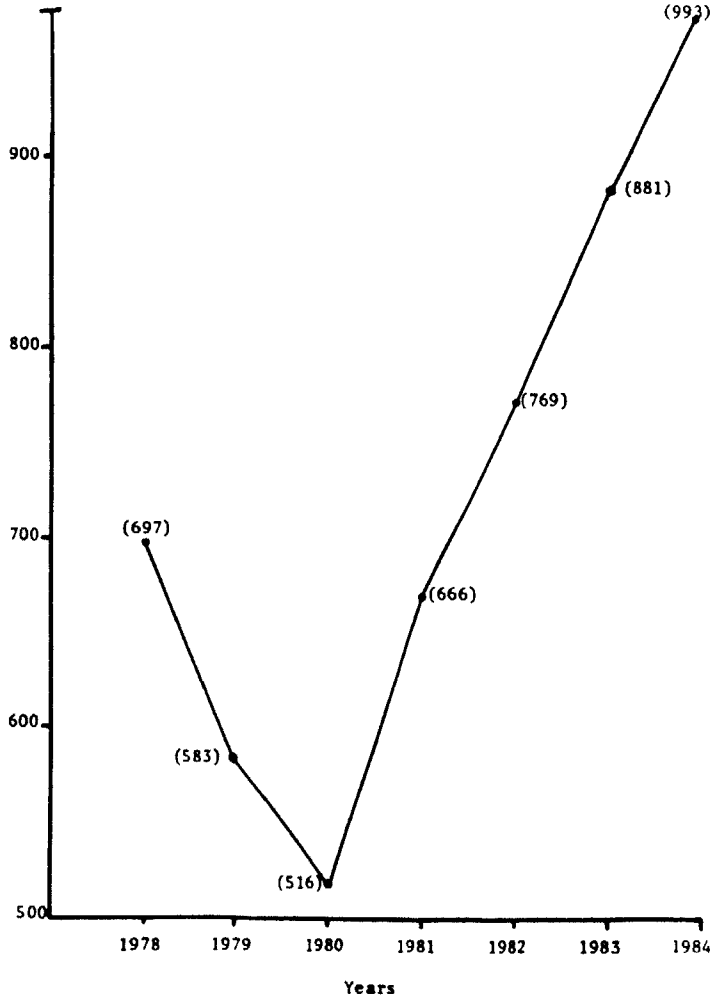
Data on detected violations and citations contained in Figure 2 reveal an overall initial decline in violations and citations for the nation as a whole between 1978 and 1980. Between 1980 and 1984, however, there is a dramatic increase. When the data is broken down for violations by foreign and domestic vessels in Figure 3, two different patterns emerge: domestic violations increase more than a fourfold while foreign violations exhibit no clear cut pattern but rather a series of convilinear fluctuations after an initial decline between 1978 and 1979.

When violations are broken down by region in Table 1, the Northeast captures the lion's share of the violations for U.S. vessels. This is partially a function of the Northeast having the largest number of plans initially. As other fishery management plans were added, the percentage of violations captured by the Northeast declines from 81% to 39% but the Northeast region still retains the highest percentage of violations for domestic vessels.

The pattern for foreign vessels by region in Table 2 is somewhat different. The Northeast initially has the lead but is surpassed by Alaska which has the largest foreign fishery. Indeed in 1983 and 1984, 77% and 60% of the foreign fishery violations took place off Alaska.

In sum, overall detected violations have been on the increase among domestic vessels while the number of foreign fishery violations exhibits no clear cut pattern after an initial declines — at least there has been no marked increase in detected violations since the advent of the Observer Program.

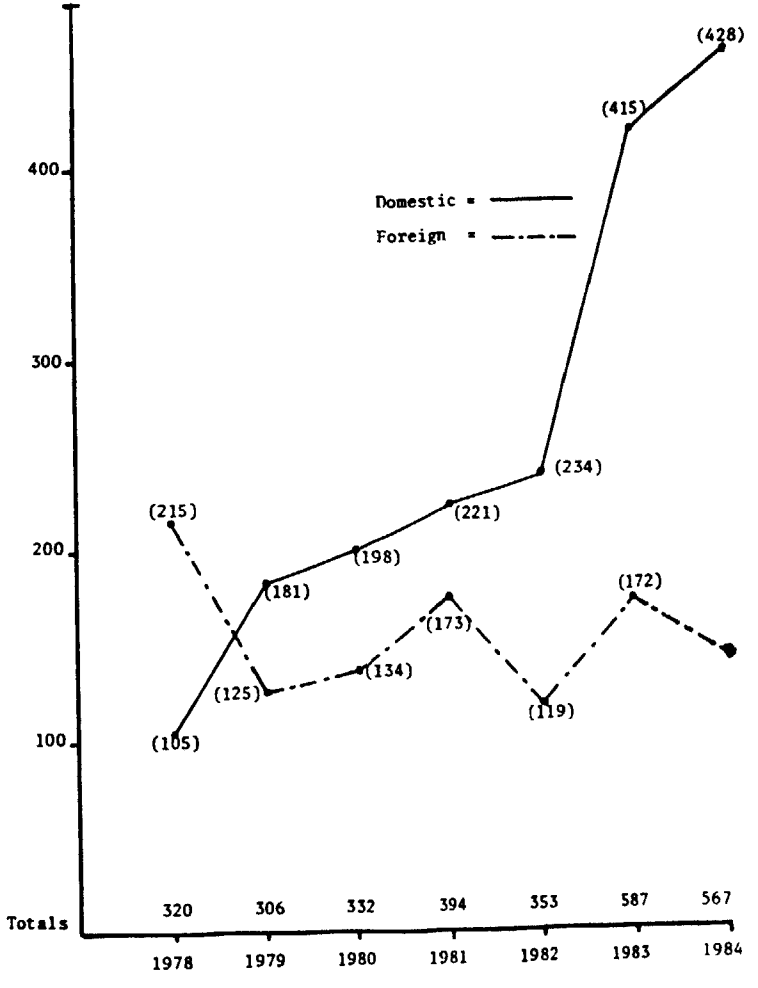
Figure 2
Violations and Citations for U.S. & Foreign Vessels — National Totals: 1978-1984*



* Excludes dismissed cases.

Source: National Marine Fisheries Service (as of 9/84)

Figure 3
Violations for U.S. and Foreign Vessels — Totals, 1978-1984*



* Excludes dismissed cases

Source: National Marine Fisheries Service (as of 9/84)

Table 1

U.S. Vessels - Regional Distribution of Violations: 1978-1984*

	1978	1979	1980	1981	1982	1983	1984
Northeast	81% (85)	81% (147)	72% (143)	56% (123)	32% (75)	40% (167)	39% (167)
Northwest	9% (9)	11% (20)	23% (45)	21% (47)	26% (61)	17% (69)	10% (41)
Southeast	1% (1)	4% (7)	1% (2)	13% (29)	23% (54)	31% (130)	33% (144)
Southwest	10% (10)	2% (4)	3% (5)	10% (21)	16% (37)	7% (31)	9% (38)
Alaska	0 (0)	2% (3)	2% (3)	1% (1)	3% (7)	4% (18)	9% (38)
Totals	100% (105)	100% (181)	100% (198)	100% (221)	100% (234)	100% (415)	100% (428)

*Dismissed cases excluded.

Source: National Marine Fisheries Service (as of 9/84)

Table 2

Foreign Vessels - Regional Distribution of Violations: 1978-1984*

	1978	1979	1980	1981	1982	1983	1984
Northeast	46% (99)	15% (19)	22% (29)	42% (73)	57% (68)	17% (30)	23% (32)
Northwest	3% (7)	16% (20)	17% (23)	8% (13)	2% (2)	1% (1)	14% (20)
Southeast	35% (76)	42% (52)	16% (21)	12% (20)	0 0	0 0	0 0
Southwest	3% (7)	1% (1)	5% (7)	20% (35)	3% (3)	5% (9)	2% (3)
Alaska	12% (26)	25% (31)	40% (54)	18% (32)	39% (46)	77% (132)	60% (84)
Totals	100% (215)	100% (123)	100% (134)	100% (173)	100% (119)	100% (172)	100% (139)

*Excludes dismissed cases.

Source: National Marine Fisheries Service (as of 9/84)

B. The Projected Cost of Plans for the East Coast

Since this conference is devoted to East Coast fisheries, we focus on this region. Our figures in Table 3 show projected enforcement costs for the Atlantic and Gulf Fishery Management Plans (FMPs) for 1985. The figures are derived from a model developed by the Coast Guard and NMFS to predict both at-sea fishery resource requirements; cutter days (CDR); aircraft hours (A/C hours); shoreside requirements; and man years (MY). (Joint National Marine Fisheries Service United States Coast Guard Fisheries Enforcement Study, 1985:5).

Table 3

Projected Enforcement Costs for Atlantic FMP's (1985)

Plan	MYR		CDR	A/C Hours		Total
Atl. Spiny Lobster	1.14	$ 57,000	48	$ 1,223,424	- $	$ 1,280,424
Coastal Mig. Pelagics	.44	22,000	22	560,736	-	582,736
Snapper-Grouper	.41	20,500	15	382,320	-	402,820
American Lobster	1.10	55,000	19	484,272	-	539,272
Sea Scallops	1.77	88,500	21	535,248	-	623,748
Atl. Groundfish	3.00	150,000	476	12,132,288	360 828,360	13,110,648
Surf Clam and Quahog	4.50	225,000	42	1,070,496	104 239,304	1,534,800
Stone Crab	.93	46,500	47	1,197,936	52 119,652	1,364,088
Squid, Mack, Butterfish	.20	10,000	2	50,976	-	60,976
Shrimp	0.00		45	1,146,960	284 653,484	1,800,444
MFCMA domestic atl. and Gulf Total	13.49	$674,500	737	$18,784,656	800 $1,840,800	21,299,956
Atl. Foreign and EEZ			70	$ 1,784,160	624 $1,435,824	3,219,984
Total	13.49	$674,500	807	$20,568,816	908 $3,276,624	24,519,940

Multipliers

MYR - $50,000

CDR (Medium Endurance Cutter) - $25,488/ day

A/C Hours (HU-25 Falcon Jet) - $2,301/ hour

Source: Joint NMFS/Coasts Guard Fisheries Enforcement Study, 1985.

The model determines enforcement resource requirements utilizing vessel population data and the regulatory requirements of each fishery in considering the mix or mode of both at-sea and dockside contacts required per year. Total annual contacts required per vessel by fishery are determined by evaluating:

1. the incentive for non-compliance;
2. the critical status of the fishery;
3. the regulatory complexity; and
4. other factors where appropriate

Table 4 shows various Coast Guard and NMFS enforcement modes and their related costs. At-sea enforcement for the Atlantic and Gulf regions utilize medium endurance cutters and a cost of $25,488/day. Overflights of these regions are performed by HU-25 falcon jets at a cost of $2,301/hour.

Table 4
Fisheries Enforcement Modes and Their Cost

	$ per day
At - Sea*	
1) High Endurance cutter	51,624
2) Medium Endurance cutter	25,488
3) Patrol Boats (82'-95')	5,520
4) Other Boats	600
	$ per hour
Aircraft*	
1) HU-25 Falcon Jet	2,301
2) C-130 Fixed Wing	3,183
3) Twin-Turbine Helo	2,482
4) Single Turbine Helo	1,739
5) Charter aircraft	400

*From Commandant Notice 7310

Source: Pallozzi, M and S. Springer (1985),"Enforcement Costs in Fisheries Management: the Alternatives." Workshop on Fisheries Law Enforcement, Oct. 21-23 University of Rhode Island.

C. Cost Per Detected East Coast Violation

The total projected 1985 enforcement cost of the Atlantic and Gulf FMPs, including foreign vessels, is $24,519,940. When this figure is divided by the total number of violations and citations in the Atlantic enforcement region (Table 6), the cost per violation and citation is $38,133.65 (Table 5). However, Table 5 also shows that the cost per violation alone is $81,461.59. It has been pointed out by Coast Guard officers that this figure should be less because the Coast Guard would be patrolling the area for other enforcement activities irrespective of fishery matters. We assume, however, that the MYR, CDR, and A/C hour figures from the joint Coast Guard/NMFS study were derived for fisheries enforcement alone. Thus, the additional effort to enforce FMP's cost enforcement entitles an additional $24,519,940.

Table 5
Costs Per Detected Violation and Citation

Violations and Citations for U.S. and Foreign vessels (1985)

Northeast	527	
Southeast	116	
Total	643	Total enforcement costs = $24,519,940

Cost / Violation and Citation = $24,519,940 / 643

= $ 38,133.65

Violations for U.S. and Foreign vessels (1985)

Northeast	(U.S.)	223
	(Foreign)	29
Southeast	(U.S.)	49
	(Foreign)	0
Total		301

Cost / Violation = $24,519,940 / 301

= 81,461.59

Table 6
Regional Distribution of Citations and Violations for U.S. and Foreign Vessels, 1978-1985*

	1978	1979	1980	1981	1982	1983	1984	1985
Northeast	60% (416)	69% (401)	58% (301)	56% (376)	50% (385)	38% (331)	36% (358)	54% (527)
Northwest	5% (36)	9% (53)	17% (87)	16% (106)	17% (133)	11% (101)	10% (95)	11% (102)
Southwest	3% (22)	1% (5)	2% (12)	8% (56)	6% (48)	6% (54)	6% (64)	4% (43)
Southeast	14% (100)	11% (64)	6% (30)	9% (59)	8% (63)	17% (154)	19% (186)	12% (116)
Alaska	18% (123)	10% (61)	17% (86)	10% (69)	18% (140)	27% (241)	29% (290)	19% (180)
Totals	100% (697)	100% (583)	100% (516)	100% (666)	100% (769)	100% (881)	100% (993)	100% (968)

*Excludes dismissed cases.

Source: National Marine Fisheries (as of 9/85)

IV. Summary and Conclusions

Initially, we noted that information does not exist on the level of compliance. We only know the number of detected violations but not the undetected violations. Since we do not know what opportunities to violate the law are forgone in light of the probability of apprehension and conviction, we also cannot calculate the total benefits associated with the law enforcement system.

Given these severe limitations, we confined our discussion in this paper to some fundamental indicators of system performance, namely, the supply of *detected* violations and the costs of enforcing the FMPs associated with these. We found that the cost per detected violation appears high. This is especially evident given the amount of assessed penalties for the East Coast, $852,142, in 1983 (Table 7).

Discussing these indicators leaves us with several questions: (1) What are we buying when we spend $81,000/violation? and (2) Is this amount too high, too low or about right? Ideally, we want to detect violations without increasing costs. Thus, we should make more efficient use of existing enforcement modes or utilize different, less costly modes. However, in determining what enforcement system we wish to purchase we must decide ways to determine levels of compliance. Currently, we simply do not know how to do this.[3]

Table 7
Final Civil Penalties Assessed for U.S. and Foreign Vessels Regional Amounts and Percentages, 1978-1983

	1979	1980	1981	1982	1983
Northeast	$553,936 (39%)	$540,796 (65%)	$704,233 (34%)	$726,076 (54%)	$536,505 (47%)
Northwest	140,615 (10%)	27,751 (3%)	64,245 (3%)	58,490 (4)	18,745 (2%)
Southeast	61,625 (4%)	15,500 (2%)	93,765 (4%)	196,486 (14%)	315,637 (27%)
Southwest	550 (0%)	152,725 (18%)	842,400 (40%)	76,299 (6%)	47,079 (4%)
Alaska	665,400 (47%)	100,000 (12%)	392,000 (19%)	298,300 (22%)	231,385 (20%)
Totals	$1,422,126	$836,772	$2,096,643	$1,355,651	$1,149,351

Source: National Marine Fisheries Service (as of 9/84).

Notes

1. A substantially different paper on regulation will appear in the proceedings of the Center of Ocean Management Studies Conference on *Rethinking Fisheries Management*, June 1-6, 1986

2. Collection has to proceed through the U.S. Attorney's Office, where in the Boston office alone, current fishery violation cases have to be added to a backlog of 15,000 existing U.S. Attorney cases.

3. Some progress has been made. See Sutinen and Hennessey, "Proceedings of a Workshop on Fisheries Law Enforcement," University of Rhode Island (forthcoming).

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Rationalizing Sanctions for Fisheries Violations

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The views expressed in this paper do not necessarily reflect those of any government agency.

Abstract

This paper examines suggestions to make fisheries enforcement more effective by increasing monetary penalties for violations. It presents penalty formulas incorporating probabilities of detection, prosecution, and punishment to be offset against illegal profits from a violation. The penalty theoretically necessary to deter a violation by removing profits, under most scenarios, far exceeds the statutory maximum. Reasons are given why assessing such large penalties becomes problematical. The paper suggests other means of encouraging compliance, particularly permit sanctions and regulations that are more easily enforced.

Introduction

The general subject of fisheries law enforcement has traditionally been treated as the bastard child of fisheries management. An embarrassing fact of life, enforcement is a subject avoided in polite discourse among managers. Consequently, those who design management schemes have given far too little serious thought to enforcement — the day-to-day reality of implementing fishery management plans (FMPs). Measures that are difficult to enforce or not really essential to management have been thrown willy-nilly into FMPs without regard to the consequences for plan enforcement.

This failure to consider enforcement needs is ironic, since we all know that fisheries managers do not manage fish so much as they try to manage

fishermen. It is in the area of enforcement that this distinction becomes critical. Enforcement officials have to influence the behavior of the fisherman, not of the fish. That job is not an easy one. Fishermen are no more eager than the general citizenry to have their affairs regulated by the government. To compound things, the highly competitive and free-access nature of most fisheries places the fisherman who obeys the law at an economic disadvantage compared with competitors who do not. From the outset, the lot of the fisheries policeman is the particularly unhappy one of trying to enforce complicated regulations against a population philosophically opposed to regulation and strongly motivated by economic forces not to comply.

When managers do focus upon the issue of law enforcement, it is usually because they have realized their plans are not achieving intended goals; the managers are casting about for reasons for their lack of success. Having identified enforcement as the problem, they urge such solutions as more enforcement (for which read money spent) and stiffer sanctions (for which read money collected). From the managers' perspective, the difficulties with management regimes then simply become a matter of increasing the enforcement cash flow.

For those involved in enforcement on a day-to-day basis, such "solutions" to management problems are anything but simple. In the current budget climate, substantial increases in enforcement expenditures are extremely unlikely to occur. Nor is increasing the level of sanctions simply a matter of opening the penalty faucet wider. The actual impact of enforcement sanctions is difficult to determine, and is subject to an array of complicating factors whose effects are often poorly defined.

Against the backdrop of the National Oceanic and Atmospheric Administration's (NOAA's) experience with enforcing the Magnuson Fishery Conservation and Management Act (Magnuson Act), this paper explores current theory on penalty assessments as a tool for enforcing fisheries regulations. Focusing on the New England groundfish fishery, we will attempt to apply penalty theory to a hypothetical violation, and discuss how practical realities affect the enforcement process. We conclude with some suggestions for assistance that managers can provide to help make enforcement more effective.

History of Magnuson Act Violations

With varying degrees of accuracy and completeness, NOAA has recorded information about reported Magnuson Act violations since the beginning of Magnuson Act enforcement. Through the Enforcement Management

Information System (EMIS), we attempt to keep track of enforcement case processing and to compile statistics on enforcement activity. Calling up data from EMIS by year and by region, we get the figures in Table 1, represented in the related graph (Figure 1).

Figure 1
Domestic Magnuson Act Violations

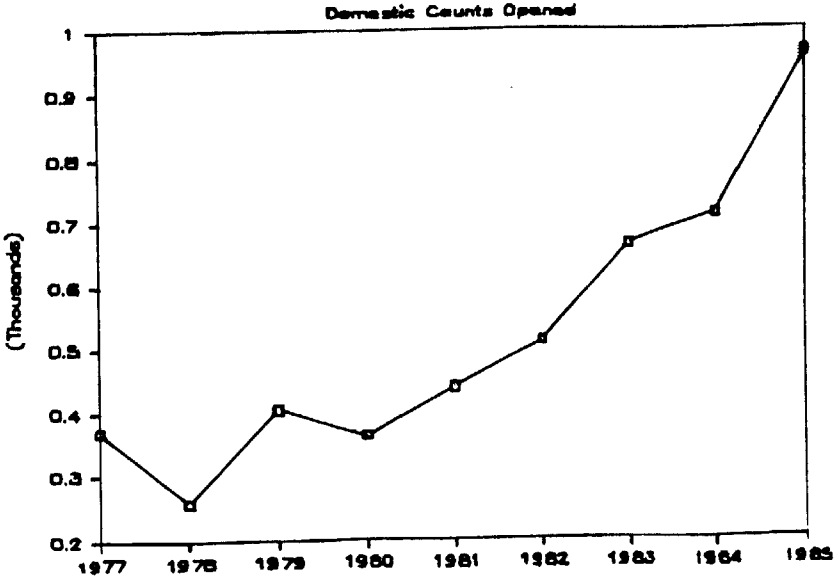


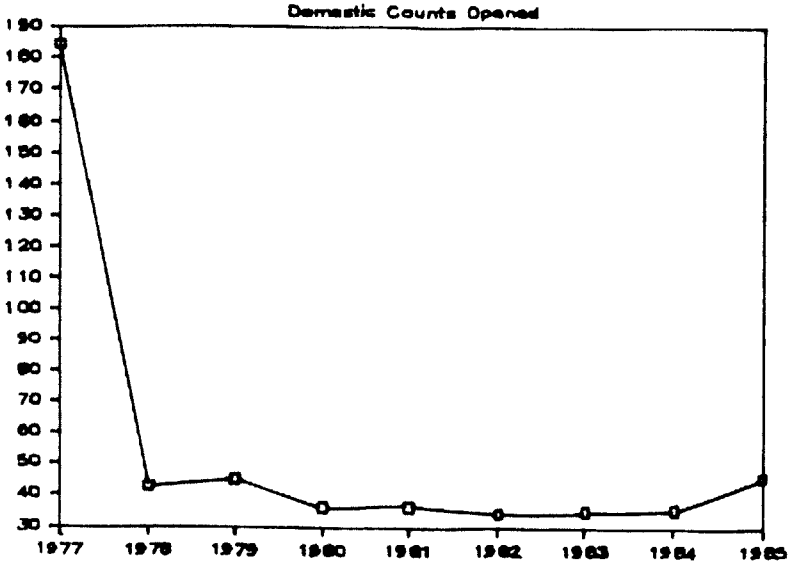
Table 1
Magnuson Act Violations

Year	Violations	FMPs	Violations/FMP
1977	369	2	185
1978	257	6	43
1979	406	9	45
1980	363	10	36
1981	437	12	36
1982	509	15	34
1983	666	19	35
1984	713	20	36
1985	962	21	46

As the data show, after some initial fluctuations, the number of domestic violations has risen steadily the past few years. However, the total number of regulations in force for the various fisheries also has risen during the same period, as reflected by the number of FMPs in place per year. As a result, the

number of violations per FMP, or the overall rate of detected violations viewed nationally, has remained relatively stable since 1978 (Figure 2).

Figure 2
Violations Per FMP



The national figures, though, tend to obscure regional differences significant to local enforcement efforts. (Compare Figures 1 and 2 with Figures 3 and 4.) The numbers from each region — both for total violations and for rates of violation — show dramatic swings for the period in question. We have not closely analyzed the data from all the regions and thus cannot provide precise explanations for the trends observed. We do know from experience that several factors may influence violation rates.

Violation rates tend to be high under newly adopted regulations — either as a consequence of ignorance about the regulations or from acts of civil disobedience — and then decrease after an adjustment period. Changes in biological or economic conditions can also affect violation rates. More importantly, shifts in enforcement effort affect the rate of violation detection, and, therefore, the apparent rate of violation. Whether each or any of these factors or others were in play during the violation rate swings graphed in a particular region is a question we will have to leave for another day.

It is in the Northeast region, the focus of this conference, that the agency expends its major Magnuson Act domestic enforcement efforts. This region (comprising the fisheries managed by the New England and Mid-Atlantic

Figure 3
Violations by Region

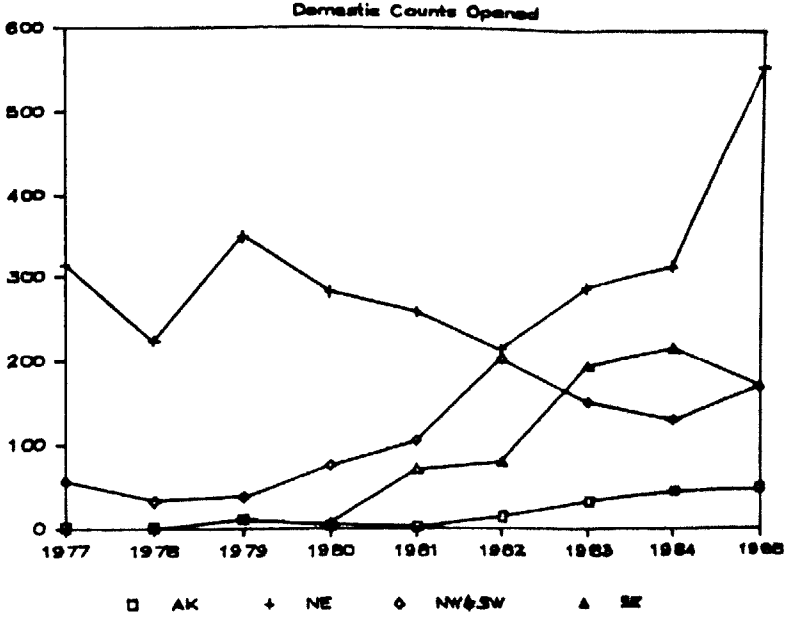
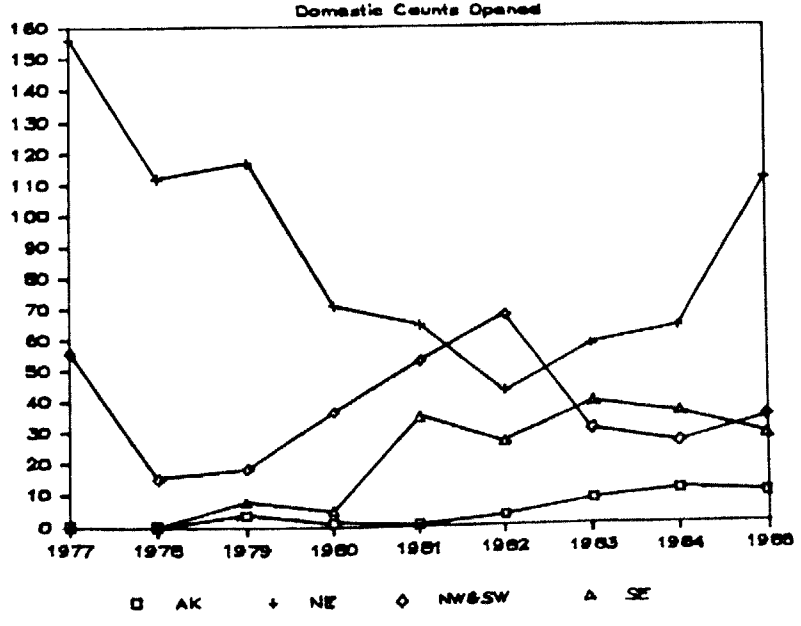


Figure 4
Violations Per FMP by Region



Fishery Management Councils) had the first domestic fishing regulations under the Magnuson Act and has one of the largest domestic fleets. Consequently, even as FMPs in other regions come into force and the total violations increase in those regions, violations in the Northeast region continue to account for 40 percent or more of domestic violations nationally (Table 2).

Table 2
Violations by Region

Year	Total	AK	NE	NW&SW	SE
1977	369	0	313	56	0
1978	257	0	223	31	0
1979	406	11	350	37	8
1980	363	3	282	73	5
1981	437	2	258	105	70
1982	509	12	214	203	79
1983	666	31	288	150	195
1984	713	44	315	130	216
1985	962	47	556	171	172

Of violations in the Northeast region, violations of the groundfish plan make up the lion's share (Table 3). Violations in the Northeast region have increased greatly in recent years, from 215 violations in 1982 to 572 in 1985. During this same period, groundfish violations increased from 110 to 261 (with a slight fluctuation in 1984).

Table 3
Domestic Magnuson Act Violations by Region

Year	Total	Groundfish	Percent
1977	313	308	98%
1978	226	195	86%
1979	350	322	92%
1980	282	275	98%
1981	260	187	72%
1982	215	110	51%
1983	290	140	48%
1984	323	115	36%
1985	572	261	46%

A breakdown of the groundfish violation totals shows that they include a substantial number of violations of regulations that do not directly affect the state of the fishery but are intended more to facilitate enforcement (e.g., the requirement to have a permit or to display vessel numbers properly) (Table 4). These "enforcement" violations account for a significant percentage of total groundfish violations — as much as 60 percent of the total. Even if the "enforcement" violations are subtracted from the total, however, the remain-

ing "resource" violations (e.g., small mesh, closed areas, size limits, possession of illegally taken fish) also show a steadily increasing trend. Of the "resource" violations, violations of the net mesh size limitations are becoming increasingly important, constituting 31 percent of all violations in 1985.

Table 4
NE Region Domestic Groundfish Violations

Year	1982	1983	1984	1985
Total	110	140	115	261
"Resource"	53	66	70	104
% of Total	48%	47%	61%	40%
Small mesh	15	34	50	80
% of Total	14%	24%	43%	31%
Closed area	11	24	3	9
% of Total	10%	17%	3%	3%
Size limits	23	6	17	14
% of Total	21%	4%	15%	5%
Possession	4	2	0	1
% of Total	4%	1%	0%	<1%
"Enforcement"	57	74	45	157
% of Total	52%	53%	39%	60%
Permit	21	10	15	25
% of Total	19%	7%	13%	10%
Numbers	23	42	23	98
% of Total	21%	30%	20%	38%
Other	13	22	7	34
% of Total	12%	16%	6%	13%

We have mentioned three possible explanations for high apparent violation rates in the case of established FMPs: changes in biological conditions, changes in the economics of the fishery (changes in costs of harvest or ex-vessel prices, e.g.), and shifts in enforcement efforts. Other possible explanations include:

- More effective methods of detecting violations;
- Growing belief by fishermen that a low probability of being detected and punished, or the low level of the likely sanction, make it worth the risk;
- Growing lack of confidence or respect by fishermen in the management scheme.

Agency prosecutors have little or no control over most of these factors. However, the one aspect we can attempt to influence is the probability that a violator, once apprehended, will receive some sanction and that the sanction will be meaningful.

The Sanction Process

When National Marine Fisheries Service (NMFS) enforcement agents apprehend a violator, it falls to the agency prosecutor to make sure the agent's efforts have the maximum effect. NOAA has several potential sanctions to apply, from imposing a civil penalty, to seizing and forfeiting vessels, gear, and catch, to suspending or revoking fishing permits. The most commonly used is the administrative, or civil, monetary penalty.

The NOAA Office of General Counsel has been responsible for initiating civil penalty cases for fisheries violations for the last eight years. During that time we have struggled to find principles to guide us in determining the amounts of these penalties. The primary statute we enforce, the Magnuson Act, instructs us to:

> ...take into account the nature, circumstances, extent, and gravity of the prohibited acts committed and, with respect to the violator, the degree of culpability, any history of prior offenses, ability to pay, and such other matters as justice may require (16 U.S.C. 1858(a)).

In an attempt to impose a degree of uniformity, while recognizing regional variances, we established penalty schedules for each fishery regulated under the Magnuson Act and for violations of several other statutes. Some schedules show a range for each violation; the range increases for second or third offenses. Others have a base penalty with additions for aggravating factors and subtractions for mitigating circumstances.

The schedules, in a rather crude way, take into account the statutory factors of nature, extent, gravity, and history of prior violations. We address circumstances and degree of culpability on a case-by-case basis. The respondent's ability to pay is also considered individually, according to regulations published at 15 C.F.R. 904.108.

The penalty assessed by the Regional Attorney's Office in the Notice of Violation and Assessment (NOVA) becomes final only if accepted or ignored by the respondent. If the respondent is willing to negotiate a settlement, the prosecuting attorney turns to NOAA's settlement policy, which recognizes

that settlement at an early stage conserves resources (ours), saves the Government money, and advances the moment when the respondent feels the pain (pays the penalty).

The respondent also has the option of going to hearing before an administrative law judge following procedures set out in 15 C.F.R. Part 904. The Department of Commerce has only one ALJ who hears NOAA cases, the Hon. Hugh J. Dolan. In civil penalty cases, Judge Dolan issues an initial decision, which becomes final unless appealed to the NOAA Administrator. If the Administrator decides to grant a petition for review, the order or decision of the Administrator on review becomes the final agency action. Dissatisfied respondents may seek judicial review of the agency's action in district court, but if timely judicial review is not sought, the penalty assessment is not subject to review in a subsequent collection action.

Few respondents have chosen to appeal civil penalty assessments to the courts. Most either negotiate settlements with agency prosecutors or simply ignore the penalty process and wait for the agency to attempt to collect the penalty.

The second most commonly used sanction under the Magnuson Act is the forfeiture of the illegal catch, or, in more severe cases, the forfeiture of the vessel itself. Magnuson Act forfeiture actions must be filed in district court in the first instance; there is no counterpart to administrative proceedings in civil penalty cases. Because the agency must be represented in judicial proceedings by Justice Department attorneys, the agency prosecutor has very little control over the course of proceedings once the forfeiture action is filed.

Although the agency's enforcement policy suggests that catch forfeiture is a more or less routine action, its use varies. Vessel forfeitures may look like a high-impact sanction, but a fisherman can usually bond out his vessel at a relatively small cost within a few days of seizure. The administrative inconvenience and costs associated with forfeiture actions tend to discourage pursuit of this sanction.

A third type of sanction, available in some cases, is the denial, suspension, or revocation of required fishing permits. This option, discussed further below, can be a very effective deterrent. At present, however, only the New England and Mid-Atlantic area fisheries require permits as a general rule.

Focus on Civil Penalty Assessments

The primary sanction used against violators of the Magnuson Act is the administrative assessment of civil penalties. Several events recently have prompted us to reexamine our penalty schedules and assessment policies.

Administrative Law Judge Dolan has long believed the penalties we assessed following our penalty schedules are inadequate to deter violations. From his perspective (an ever-increasing caseload), the penalties we assessed had become a mere cost of doing business. When determining de novo the appropriate penalty in a case he had heard, the ALJ applied his own penalty theory, using one half of the statutory maximum (or $12,500 under the Magnuson Act) as his starting point and adjusting the penalty upward or downward depending on the facts of the individual case — regardless of the amount the agency had assessed in the NOVA. (See, e.g., *In the Matter of Harold Savage*, 3 O.R.W. 222 (NOAA 1983), in which Judge Dolan increased a penalty from the NOVA amount of $1,750 to $12,500.)

Early in 1985, the agency announced that on review of ALJ decisions, the NOVA penalty assessment based on the penalty schedules would be accepted as the appropriate penalty, rather than an increased amount imposed by the ALJ, unless the ALJ had convincingly articulated his reasons for the increase. (*In the Matter of William J. Verna*, 4 O.R.W. 64 (NOAA App. 1985).)[1]

Despite this vote of confidence in the penalty schedules, attacks on the schedules started coming from other directions. Coast Guard personnel, frustrated by budget cuts and tired of taking the blame for failure to enforce unenforceable management measures, suggested higher penalties would whip the fishermen into shape.[1]

A couple of regional fishery management councils also have started focusing on our penalty assessments. The councils' enforcement committees have begun drafting their own penalty schedules. The councils had noticed a lack of compliance with the regulations implementing their FMPs, but did not seem to consider whether the cause might be that management measures either (1) might not have been necessary to begin with; (2) were obsolete because of changed conditions in the fishery; (3) were very difficult to enforce because compliance could only be monitored at sea or after measuring hundreds of fish; or (4) had political backing only until someone violated them.

An extreme example of putting all one's compliance eggs in the enforcement basket is the Northeast Multi-Species FMP. The FMP attributes noncompliance with the current groundfish FMP to four factors: high cost of

compliance, perception of unfair management measures, low risk of detection, and inadequate sanctions for violations. The FMP says the Council cannot do anything about the first two factors except to spread the regulatory burden as rationally as possible. To cure the low rate of detection, the FMP suggests that NMFS establish its own navy to replace the Coast Guard. The FMP proposes increasing penalties "to the point where even the remote possibility of a boarding [and detection of a violation] poses an unacceptably high risk" (FMP 7.102).

Finally, in the face of these pressures to increase penalty assessments, we recently have received two district court decisions that suggest our penalties may already be too high. In *Lopes v. NOAA*, (D.Mass. Civ. No. 84-2695-S, 1984), a district court judge in Massachusetts remanded to the agency for reconsideration a $25,000 civil penalty assessed for a second Atlantic groundfish closed area violation. The case was subsequently settled. In *Eickhoff v. Department of Commerce*, (D.Or. Civ. No. 84-1298, 1985), the district court in Oregon reduced the $15,000 penalty ordered by the ALJ to $2,200, the amount initially assessed by the agency for a Pacific groundfish trip limit violation. The court opinion in each case turned on the specific evidence in the record and not on some general principle of the appropriate level of civil penalties for fisheries violations. Yet the decisions have caused us to question what sort of evidence is necessary to establish the propriety of the penalty assessed in a particular case.

Theory of Penalty Assessments

In the midst of all this ferment, we were fortunate to be invited to a seminar on fisheries enforcement organized by Tim Hennessey and Jon Sutinen at the University of Rhode Island (October 21-23, 1985). Participants were a stimulating mix of academics, lawyers, and enforcement officers. Theoreticians introduced practitioners to the "economics of crime"; practitioners injected some real-world considerations into the theoreticians' assumptions.

The most provocative paper was presented by three Canadians, Edwin Blewett, William Furlong, and Peter Toews *(Canada's Experience in Measuring the Deterrent Effect of Fisheries Law Enforcement)*. The Canadian Department of Fisheries and Oceans conducted interviews with fishermen to gather data that could be used to estimate the fishermen's perception of the probabilities of apprehension, prosecution, conviction, and punishment; and to quantify the gains and losses from noncompliance with fisheries regulations.

Their findings are striking. In the Pacific Region, for example, probability of apprehension for specified violations is about 1 percent. Probabilities of prosecution, conviction, and punishment are perceived as close to 100 percent. The four probabilities multiplied together produce in the fisherman's mind a one-in-a-hundred chance of being caught and punished. Perceived gains range from $25 to $60,000 per violation. Perceived losses (penalties consisting of criminal fines, confiscated gear and catch, and lost fishing time) range from $525 to $100,000 per violation.

The economic theory of crime posits that the perceived loss from being caught for one violation must be multiplied by the probabilities of apprehension and punishment, and then compared with the perceived gain. Only if the gain exceeds the discounted penalty will the fisherman risk violating the regulation. A Pacific Canadian seiner fishing in a closed area averages an illegal gain of $5,000, against an average perceived penalty of $20,250. When the penalty is multiplied by the probability factor (of being caught and punished) of .0099, the fisherman is risking only a $200 loss for a single violation, which makes his net return for the violation $4,800. Crime pays.

The "moral" of the paper is that penalties for Canadian fisheries violations are far too low to offset the slim chance of apprehension. The authors believe it is much costlier to increase the probability of apprehension than to increase the probabilities of prosecution, conviction, and punishment or to increase the penalty levels. They regard payment of a penalty as "simply a transfer of property rights, the cost of which is entirely borne by the offender" (p. 25).[3] An increase of only $100 per fine would, according to their formulas, produce decreases in violations ranging from .2 to 17 percent.

The idea of the "economics of crime" formula so intrigued us that we have attempted to recast it, using real data from a U.S. fishery, to see how well a Magnuson Act penalty would deter small-mesh violations under the groundfish plan. We have modified the Canadian formula in several ways:

- Two formulas are presented, one for cases that are settled early in the process and one for cases that are contested through hearing, petition for review, and/or district court appeal. The reason for separating them is to highlight the different factors that come into play, depending on the length and complexity of the case. (Actual cases do not fall into two discrete categories, though; they are settled at various stages throughout the administrative and judicial process. The optimal formula probably is a complicated one that takes account of the exact stage when the case is resolved.)

- We added to both formulas the probability of collection. A penalty isn't a punishment until the fisherman actually pays the money; our experience has been that payment isn't a sure thing.

- We added to both a calculation of present value of the penalty for the period between violation and final payment. The fisherman realizes immediately the illegal gain from a violation committed today, but the present value of a penalty paid four years from now is only 76.3 percent of the amount paid.

- We added attorneys' fees to penalties in both formulas. This is certainly a cost to the fisherman that should be weighed in the equation.

We have made a number of assumptions and estimates in preparing these formulas. While we think we're in the ballpark for all of them, we want to emphasize that the exercise is hypothetical, not based on hard data. Don't let quibbles over particular numbers obscure the significance of the concept.

Assumptions:

- Violation is use of mesh smaller than legal size in the fishery regulated by the Interim Atlantic Groundfish FMP (50C.F.R. 651.7(a)).

- Groundfish vessels average 26 trips per year (per a NMFS economist).

- The penalty for a settled case is paid in two years; for a contested case, four years (educated guess).

Estimates:

- Probability of prosecution (Pp) is .9 (based on the national average for violations occurring in 1984).

- Probability of assessment (Pa) of a penalty as high as the NOVA amount in a contested case is .95.

- Settlement rate (SR) is .49 (based on the national average for 1985).

- Probability of collection (Pc) is .85 for settled cases and .5 for contested cases (another educated guess).

- Present value (PV) is .763 (8 percent for four years) for a contested case; .857 (8 percent for two years), settled case.

- Attorneys' fees (AF) are $750 for settled cases and $3,000 for contested cases (wild guess).

- We tried to come up with figures for the profit (illegal gain, or IG) from a small mesh violation but were dissatisfied with what we could find. For purposes of illustration we applied a series of illegal profit figures: $1,000, $5,000, $10,000, and $15,000.

- Probability of detection (Pd) also was hard to judge. A NMFS/Coast Guard study states an ideal boarding rate of one per vessel per year. In 1985, however, the Coast Guard boarded 591 domestic fishing vessels in the Northwest Atlantic.

That is about half the number of vessels in the groundfish fishery, but, of course, not all the vessels boarded were groundfish vessels. Assuming one boarding every other year, a uniform violation rate, and a "hit" on each boarding, we chose a worst-case detection rate of 1/52. Note this is still optimistic compared with the Canadian study figure of 1 percent. Since each of our assumptions is open to question, we have employed a series of figures for probability of detection: 1/52, 1/10, and 1.

And now for the formulas:

Settled Case

Net Revenue = IG - (Penalty + AF) x Pd x Pp x SR x Pc x PV
Net Revenue = IG - (Penalty + $750) x Pd x .9 x .49 x .85 x .857

Contested Case

Net Revenue = IG - (Penalty + AF) x Pd x Pp x Pa x Pc x PV
Net Revenue = IG - (Penalty + $3,000) x Pd x .9 x .95 x .5 x .763)

In applying the formulas, we rearranged them to find what penalty level was necessary to assess to offset a given illegal profit and yield a net revenue of $0 for the violator. In the case of an assumed Pd of 1/52, the formula for a settled case would be:

$0 = IG - (Penalty + $750) x .006
IG = (Penalty + $750) x .006
IG/.006 = Penalty + $750
(IG/.006) - $750 = Penalty

Table 5 shows the results of plugging in the different IG and Pd figures.

Table 5
Required Penalty Assessments

Settled Case

	Pd = 1/52	Pd = 1/10	Pd = 1
IG = $ 1,000	$ 165,917	$ 30,500	$ 2,365
IG = $ 5,000	$ 832,583	$155,500	$ 14,826
IG = $10,000	$1,665,917	$311,750	$ 30,403
IG = $15,000	$2,499,250	$468,000	$ 46,125

Contested Case

	Pd = 1/52	Pd = 1/10	Pd = 1
IG = $ 1,000	$ 163,667	$ 27,303	$ [1,534]*
IG = $ 5,000	$ 830,333	$148,515	$ 12,337
IG = $10,000	$1,663,667	$300,030	$ 27,675
IG = $15,000	$2,497,000	$451,545	$ 43,012

*[In this example, the penalty to be assessed is less than the assumed amount of attorney fees. The results were adjusted to make the penalty level and attorney fees equal. While most fishermen would be reluctant to pay more in legal fees than the amount of the penalty they are contesting, presumably many will pay at least the amount of the assessment.]

Depending on the assumptions you use, the penalty level necessary to offset the illegal gain can run many times over the $25,000 statutory maximum. Crime pays a lot!

These figures raise the obvious question: why not seek higher statutory maximums and higher penalty assessments to make our penalties more effective? The simple answer is that the results of the formulas are questionable, in part because some of the premises underlying the formulas are questionable. First of all, our experience shows that the different probabilities in the penalty formulas are not independent. Raising the stakes may decrease the probability of detection as fishermen take greater pains to hide their illegal activities. Higher penalties generate more vigorous defenses — much as with a traffic ticket. Most people will pay a $30 ticket for doing 59 in a 55 mph zone. But most people would fight the ticket if it were $300. Then it makes more sense to insist on a hearing and claim the speedometer said 55, or hope the cop does not show up, or depend on a sympathetic judge who thinks $300 is too much for four miles an hour. The same holds true for a fisheries violation penalty. Where the low level of the penalty makes it little more than an annoying tax or business expense, there is no reason to fight.

Each of the probabilities shrinks as penalties rise. The prosecutor looks more closely at the evidence in a big-ticket case. A high-penalty case is less likely to be settled before the hearing stage. The higher the stakes, the greater the chances the fisherman will hire an attorney and avail himself of every procedural right, including a petition for review to the Administrator and an appeal to district court. The farther along the case progresses, the less likely the decisionmaker is to appreciate the significance of the violation or the necessity for a heavy sanction. And all this time, the fisherman has not paid a dime to anyone but his lawyer. If he does have to pay eventually, he has amortized the debt over several years.

In addition, the higher the level of the assessed penalty, the greater the likelihood that the fisherman will exert whatever political influence over the process and level of sanction he can muster. In some cases, the efforts can be successful. In all cases, agency prosecutors are forced to spend valuable time preparing briefing memoranda and meeting with superiors to explain why the particular penalty was assessed in a specific case.

Another problem with our use of the formula is that we have no idea of the U.S. fisherman's perception of detection. He may perceive a much greater risk than we know exists, so that a smaller penalty suffices for deterrence.

A final reservation is that fishermen may be motivated by other than economic factors. If the management regime makes sense, if fishermen can be convinced that complete compliance will pay off in the long run for all of them, then good citizen-environmentalist considerations may get the upper hand. Most fishermen would not be violators if the rest of the fishing community would consider them outlaws and cheaters.

Decreasing the Rate of Violation

There are obvious problems in applying the penalty formula as currently written to specific cases. Yet our attempt to use the formula has served to point out factors that decrease the effectiveness of our current penalty system and that warrant further attention. In both versions of the formula, the values of one or two variables are low enough that those variables are capable of substantially diluting the impact of the penalty.

In the settled case formula, for example, the 49 percent settlement rate reduces the economic impact of the penalty by half. Since settlement rates are under the control of the prosecuting attorney, the prosecutor has the ability to increase the impact of the penalty by increasing the settlement rate.

Holding out for higher settlement percentages, however, will likely have undesirable side effects. Just as increasing the penalty increases the defense against the assessment, increasing the settlement percentage will require longer and harder settlement negotiations, reducing the number of cases that can be handled in a given time period, extending the time between violation and collection, and reducing the number of cases that settle instead of going to hearing.

There also is reason to believe that our current settlement percentages are appropriate. The combined value of the Pp, SR, Pc, and PV variables in the settled case formula is 0.32. The combined value of the Pp, Pa, Pc, and PV variables in the contested case formula is 0.33. In other words, signing a settlement agreement produces the same (or only slightly lower) economic impact for a violator as does contesting the case — and at a substantially lower cost to the government.

In the contested case formula, the probability of collection (.50) and present value (.763) variables reduce the impact of the monetary penalty by approximately 62 percent. In most areas of the country, there is little we can do to increase the probability of collection. If a fisherman does not pay an assessed penalty, in most cases we must turn the matter over to an Assistant United States Attorney (AUSA) to reduce the penalty to judgment in district court. The AUSA then must turn the judgment over to other Justice Department employees for collection. AUSA's who handle collections often have caseloads numbering in the hundreds — and understandably give higher priority to collecting very large sums resulting from criminal convictions or owing to other agencies than to the penalties normally assessed against fisheries violators. It is not uncommon for fisheries penalty collection cases to languish in some AUSA's in-basket for months or even years.

We are attempting in several ways to increase our ability to collect unpaid penalties. In a couple of the regions we have had agency attorneys appointed Special AUSA's for collection purposes. Unfortunately, convincing a United States Attorney to appoint Special AUSA's is often difficult, and we have not had much luck in the regions where the help is most needed. We are beginning to report overdue penalties to credit reporting agencies (such as Dun and Bradstreet). This summer we will turn over a batch of cases, with penalties worth more than $100,000, to a collection agency that has contracted with the federal government to collect debts.

In the few regions where federal fishing permits are common, we also have begun suspending the permit of a fisherman who refuses to pay an assessed penalty. Under our permit sanction regulations (15 CFR 904.300-904.322), since the fisherman has previously had an opportunity to contest

the penalty, we can automatically suspend the permit without a hearing if the penalty is not paid. In those instances where we have used this technique, it has been highly effective. It is of little use, however, in collecting years-old penalties from a violator who is no longer an active participant in the fishery.

We recently have begun using permit suspensions or revocations in domestic fisheries as sanctions in themselves. In the Northeast region, we have begun using permit sanctions in conjunction with civil penalties in cases of repeat violations. Permit sanctions have the advantage of being relatively swift — once the agency review process is completed, the sanction becomes immediately effective. A respondent faced with a permit sanction must obtain an injunction to prevent it from coming into effect, a slim probability at best.[8]

Another advantage of the permit sanction is that it can have an economic impact greater than the maximum monetary penalty we can assess under the statute.[9] The cost to the fisherman involves more than just lost profits; he must continue paying fixed costs (mortgage and insurance payments, docking fees, etc.) and his relationships with buyers, suppliers, and crew are disrupted. The terms of a permit sanction also prohibit the fisherman from using his vessel in any fishery or using the suspension period to his advantage by performing maintenance on the vessel during the sanction. We have observed a psychological effect on fishermen from a threatened permit sanction that goes far beyond anticipated financial loss. Perhaps enforced idleness and the public nature of the sanction make it particularly unpalatable.

Unfortunately, federal fishing permits are rarely required (and, therefore, permit sanctions are scarcely available) outside the Northeast region. In regions where a few fisheries or gear usages require permits, the impact of sanctions is perceived as being so severe that at present we feel constrained to reserve them only for the exceptional case. Thus, while permit sanctions are a potentially potent deterrent, we can use them only in a limited area until managers implement them in other fishery management schemes.

Clearly the most significant limiting factor in both the settled case and contested case formulas is the probability of detection. The 100 percent probability of detection figure we used for illustration in the formulas is obviously unrealistic. Yet most knowledgeable observers insist that for violations of regulations such as the mesh size limit, even a 10 percent probability of detection is naively optimistic, and that the chance of being caught is closer to 1 percent.

It is obvious that the probability of detection is critical to the entire enforcement process. Since increased enforcement dollars are unlikely, the

answer must be to make regulations more easily enforceable. Where possible, management measures should be enforceable dockside. A prohibition on the use of specific gear (such as the mesh size limit) drafted so as to permit the carrying of the offending gear on board requires the violator to be caught in the act at sea. At-sea enforcement of such regulations is time-consuming and costly, and limits the number of violations that can be detected. At-sea enforcement is more efficiently used to detect closed area and season or time violations. Prohibited species, individual quotas, and size or weight limit restrictions in general are extremely time-consuming to enforce. In addition, they provide respondents with the opportunity to defend against penalty assessments by challenging the details of species identification or the techniques used in counting, weighing, or measuring the individual fish. The more quickly an enforcement agent can inspect for a violation, the more catches he or she can inspect and the greater the risk of detection for violators.

Managers concerned about the effectiveness of the regulations they adopt must become more aware of and place greater emphasis on the enforceability of those regulations. To this end, agency prosecutors and enforcement personnel must better educate managers as to enforcement needs. Further, managers in all regions should seriously consider requiring federal permits, to give prosecutors stronger sanctioning and collection tools. By thus increasing the probability of detecting violations and the severity of the consequences for apprehended violators, managers can do a lot to help realize the goals of their management efforts.

Notes

1. In cases since *Verna*, the ALJ has imposed the same penalty as proposed in the NOVA (or increased the penalty but suspended the balance) in 12 cases. He has decreased the penalty in six and increased it in eight. Three of the cases in which the ALJ increased the penalty were appealed to the Administrator; of those, the Administrator upheld one increased penalty, lowered another to the NOVA amount plus $1,000, and lowered a third to the NOVA amount minus $6,140. Three other cases on appeal to the Administrator were settled for amounts lower than the NOVA proposals.

2. One officer got so carried away that he complained about the number of vessels Coast Guard overflights spot with no numbers or concealed numbers. He insisted higher penalties would deter such violations, when in fact the violator couldn't even be identified so we could send him a NOVA.

3. The imposition of penalties may be a no-cost proposition for DF&O, but public funds assuredly pay the prosecutors, judges, clerks, and process servers who chase these small fines. The NOAA Office of General Counsel budgets roughly $1 million a year for enforcement work. Add to that the budgets for the Commerce ALJ, for the

lawyers in U.S. Attorneys' Offices and the Department of Justice who handle NOAA appeals, for district judges (and their entourages) who hear the cases, and for various judicial personnel who try to enforce the judgments — the cost of imposing and collecting penalties may exceed the revenue gained.

4. The only court that has reviewed a permit suspension refused to stay the effective date of the suspension and ultimately upheld the sanction under the Atlantic Tunas Convention Act. *Britton v. NOAA*, (D.Mass. No. 84-111-T, 1985).

5. The Canadian study noted that the value of a potential penalty in the Atlantic Gulf Region lobster fishery was thousands of dollars higher than in other regions, due to Gulf Region enforcement officials' frequent and consistent use of permit suspensions. Gulf Region lobstermen perceived a 90 percent likelihood of receiving a permit sanction for a first offense. See Blewett, et al., at p. 19.

Chapter Eight
State Management

Marine Fisheries Commissions Adrift in the Murky Waters of Conflicts of Interest Law

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The views expressed herein are those of the author, exclusively, and do not purport to represent the position of the State of Rhode Island.

Abstract

Utilizing the controversy in Rhode Island generated by amendments to striped bass regulations, this paper describes the inherent tension which exists between the public policies sought to be promoted by conflict of interest laws and the membership requirements of marine fisheries commissions. It identifies general factors which may cause that tension to escalate into formal adversarial proceedings and suggests legislative and administrative approaches which may permit both public policies to be served. It concludes, however, that certain difficult legal and policy issues will persist, and that the resolution of specific disputes will be largely dependent on the unique facts of each case.

Introduction

In recent years increased attention has been devoted to attempting to ensure that public officials act in the best interest of the citizenry which they serve, without regard to their own financial best interests. The Watergate phenomenon heightened public awareness and concern about the propriety of the behavior of public officials. New legislation emanated from various state capitals; regulations were amended and tightened; and the resources devoted to enforcement activities were increased. Not surprisingly, litigation and

other adversarial proceedings followed. As with any new or rapidly developing area of the law, many unresolved questions remain to be answered.

Among the most fundamental of those questions is how to harmonize the constraints imposed by conflict of interest laws with another important public policy, the inclusion on boards and commissions of those persons with specialized knowledge concerning a regulated activity or industry. Laws creating many single purpose or industry specific boards and commissions require that the membership of such entities includes a certain number of representatives of the industry or activity over which that entity has jurisdiction. The rationale for the inclusion of such representatives, though sometimes not explicitly stated, is that such persons possess an expertise and/or perspective which is vital to the optimal performance of the particular agency. The promotion of this undeniably important function is, however, increasingly running up against the equally important public policy sought to be served by conflict of interest laws.

The Rhode Island Experience

The recent experience of the Rhode Island Marine Fisheries Council ("the Council") provides an example of the difficulties encountered when those appointed for their knowledge and experience are faced with the constraints imposed by a conflict of interest law.[1] The Council has rule-making jurisdiction over all marine species with respect to hours and seasons, bag limits, gear and manner of taking, sizes, and the opening and closing of management areas.[2] The statute creating the Council requires the appointment of citizen members with "skill, knowledge, and experience" in the commercial and recreational fishing industries, at least two of whom are to be representatives of the commercial industry and two of the sport fishing industry.[3]

Sport fishing for striped bass in Rhode Island waters has a long history and many of its adherents exhibit an almost religious fervor in their dedication to its tradition. Similarly, the commercial harvesting of striped bass, primarily by the use of fish traps, is a long-standing practice. (In 1911 there were 239 fish trap locations in Rhode Island, whereas active locations now number approximately 40).[4] For many years, a debate has taken place over whether the striped bass species is in decline, and if so, the magnitude and reasons for such decline. (In 1941, the Rhode Island Federated Sportsmens' Club was predicting that striped bass "will disappear from Rhode Island waters.")[5] In the last few years the debate has become increasingly polarized. The sport fishermen have pointed an accusing finger at the commercial industry; the commercial harvesters have, in defense, referred to statistical

evidence which indicates that the commercial takings represent an insignificant percentage of the total catch.

As a generality, neither interest group has been successful in persuading the other of its view. Positions have hardened and attempts to reach compromise resolutions have proved routinely fruitless. As the result of pressures exerted from the federal and regional level, the Council has been compelled to amend the rules governing the taking of striped bass. The controversy generated by the rule amendment process has led to a further deterioration in the relationship between the commercial and sport groups.

In this context, and with a Council equally balanced between the two interest groups, a new weapon in the increasingly acrimonious disagreement has been employed by the recreational interests. Sport fishermen began to allege that the commercial representative members had personal financial interests which were in "substantial conflict with the proper discharge" of their public duties in violation of the Rhode Island Conflict of Interest law.[6]

In early 1984, the Rhode Island Conflict of Interest Commission (the "Conflict Commission") ruled, in response to formal complaints brought by recreational fishermen, that two of the commercial representatives on the Marine Fisheries Council had "knowingly and willfully" violated the Rhode Island Conflict of Interest law.[7] (In 1982, these same commercial members had obtained an advisory opinion from the Conflict Commission which had warned them that their vote on striped bass regulations was a "potential conflict"). The Conflict Commission's decisions concerned the affirmative votes by two trap-net fishermen members in September, 1983, to impose a moratorium on the taking of all striped bass in Rhode Island waters. While it might appear that a vote to ban the taking of striped bass was an action adverse to the commercial members' own financial interest, it was seen by the sport fishermen as an act of revenge and was characterized by the Conflict Commission as "retaliation." The moratorium was perceived, by some, to be a means by which all striped bass fishermen would suffer the consequences that a 24" minimum size would have imposed on the trap net fishermen.

The Conflict Commission fined one of the members one thousand dollars ($1,000.00) and the other, five thousand dollars ($5,000.00). In March, 1985, the State Superior Court affirmed the Commission's decisions, including the fines, and no further appeal was taken.[8]

While the ramifications of this series of events and decisions are multifaceted, most of them are of primarily local interest. However, the Rhode Island experience may raise questions, and perhaps suggest some answers, of more general applicability.

The Context For Conflict

Perhaps the first question which comes to mind is, whether the Rhode Island experience is a harbinger of similar controversies in other states. While each state's conflict of interest law and the mechanism it utilizes to manage its marine resources are unique, there are perhaps certain general propositions which may aid in predicting whether or not the application of conflict of interest laws are likely to constrain the mechanism used to regulate the management and harvest of marine species. It is safe to say that the incompatibility of these two public policies is more likely to be manifested when the following factors are present.

As in most aspects of American society, the energies and resources committed to an issue are substantially a function of the financial stakes involved. In California, for example, where the financial consequences of land-use decisions are substantial, much attention has been devoted to the appropriate behavior of members of local planning and zoning boards. In Alaska, Rhode Island and Florida, on the other hand, where fishing is a major component of the state economy, the conduct of members of the boards which regulate the taking of marine species is increasingly the focus of attention.

A related factor, which increases the likelihood of controversy is the public's perception of the relative scarcity of the resource being regulated. As a consequence of the population explosion in that State, most Californians are acutely aware that undeveloped land is a finite commodity. When there seemed to be an abundant supply of striped bass along the eastern seacoast, recreational and commercial fishermen coexisted in relative harmony. However, with increased concern about dwindling stocks of this species, there has been a corresponding intensification of the acrimony between the two groups.[9]

It is also more likely that those boards and commissions which have broad jurisdiction and substantial power will be the focus of attention. A barbers', plumbers', or dermatologists' licensing board, the jurisdiction of which may be simply to approve the form of a test, oversee its administration, and award certificates to those with a passing grade, are not likely to find themselves embroiled in an alleged conflict of interest dispute. When a limited jurisdiction board performs a quasi-judicial function in disciplining one of its licensees, any challenge to a member is more likely to be a claim that he/she lacks the requisite impartiality to satisfy due process, not that his/her vote will serve a personal financial interest. Similarly, if a board serves in an advisory capacity only, even where conflict of interest laws are applicable to advisory bodies, it is more likely that adversarial proceedings will be a

function of the actions of the final decision-maker. In those states, then, where a marine fisheries commission has final rule-making authority as to seasons, bag limits and gear restrictions, and with regard to all marine fin and shellfish species, it is probably inevitable that questions concerning the propriety of a member's vote and participation will arise.

Finally, those boards and commissions which have jurisdiction over a resource which is being competed for by several distinct factions or interest groups are more likely to be scrutinized than those which have a relatively homogeneous constituency. A typical land use decision in California may draw the attention of environmentalists, builders, the real estate industry, and neighborhood groups, among others. Similarly, a marine fisheries commission is likely to be the subject of attention by well-defined interests, including the commercial fishing industry, recreational fishermen, environmentalists, and in some instances, consumers. Within these broad categories, there are not infrequently distinct and competing sub-categories. For example within the commercial fishing industry interests.may be defined by the species fished for, the type of gear utilized;[10] accessibility to fishing grounds, residency, financial resources, tradition and custom. Within the "recreational" fishermen category may be shore fishermen, those with private boats, those who operate charter boats, and those who own bait and tackle stores.

When, in addition to these general factors, there exists a fervor sometimes approaching that exhibited in the sectarian and religious strife in the Middle East, it is almost inevitable that conflict of interest charges will be leveled at members of marine fisheries commissions.

Possible Legislative Responses

If one is concerned that a situation similar to Rhode Island's may develop, another question which might come to mind is, what can be done to reduce or avoid the likelihood of its occurrence. A number of possible legislative solutions were considered in the Rhode Island context, and other possible actions are also worthy of mention.

The most obvious and direct avenue for avoiding the development of a similar scenario is, of course, to enact legislation which explicitly expresses the legislature's intent on the issue. This direct approach was proposed in the 1984 session of the Rhode Island General Assembly, in the form of a bill which would have exempted both the commercial and recreational members of the Council from any limitations on their participation as a function of their personal interests.[11] If the Rhode Island experience is typical, however, then this seemingly straightforward resolution may be more apparent than real.

In response to the proposal, the Conflict of Interest Commission made known its opposition to the bill and concerns were expressed by other groups, as well, such as Common Cause. They pointed out that exempting the Council would inevitably lead to requests for similar consideration by other boards and agencies. While it may be persuasively argued that a fisheries commission is unique, because of the special expertise required to manage a mobile, diverse, and difficult to observe resource, other boards and commissions could similarly contend that their membership ought to include those with expertise gained by participation in the regulated industry and that they, too, should be exempt. Legislators are predictably dissuaded from enacting a "solution" which will give birth to new problems, each in turn requiring its own solution. They are, moreover, reluctant to chance being portrayed as weak on "clean government" issues. The legislation died a quiet death.

However, other jurisdictions have exempted, explicitly or implicitly, those who are appointed for their particular expertise. California has, by regulation, provided the following language for the legislature's use, when it wishes to create such an exemption,

> The Legislature [or other authority] declares that the individual[s] appointed to the office of _____ is [are] intended to represent and further the interest of the [specified industry, trade or profession], and that such representation and furtherance will ultimately serve the public interest. Accordingly, the Legislature [or other authority] finds that for purposes of persons who hold such office the [specified industry, trade or profession] is tantamount to and constitutes the public generally within the meaning of Section 87103 of the Government Code.[13]

The lesson is, perhaps, that if a legislative exemption is to be sought, to have a reasonable chance of success, it should not be attempted in the midst of a public controversy in which legislators feel vulnerable.

Another response which received some serious consideration was to make the Council an advisory body to the Director of the Department of Environmental Management, who would thereby become responsible for promulgating all of the rules formerly within the Council's jurisdiction. In those states where conflict of interest laws apply to advisory board members, nothing would be gained by making the marine fisheries commissions into an advisory body. There may be resistance, moreover, on policy grounds even where such an action would solve the conflict of interest tension. Many believe that fisheries commissions are vital to ensure that the quasi-legislative function of adopting rules occur under the watchful eye of the public. The decision-making process performed by a bureaucrat is not so capable of being closely observed. In addition, the staff personnel who would become the rule makers may be reluctant to abandon their relatively warm vantage point next to the stove in favor of the well-heated frying pan on the burner.

A more drastic version of the same idea is, of course, to abolish the fisheries commission entirely. However, to the extent that the public is benefitted by the knowledge and expertise provided by the industry representatives, the formalized sharing of that resource would be lost. This draconian solution was not seriously considered in Rhode Island.

Another possible approach which received only brief consideration was to provide for alternate board members to serve when the primary board members were unable to participate because of a conflict of interest, or for any reason. The purpose of this approach was to keep the Council equally balanced between commercial and recreational interests. For this technique to be effective, it would be necessary to select alternate board members whose financial interests were significantly different from the regular board members whom they might be called upon to replace.

Legislation to require a diversification of the commercial representation was also discussed. It was thought that shellfishermen, lobstermen, and finfishermen had so little in common, financially, that it was unlikely that more than one would be disqualified as having a conflict on any particular issue. Though the recreational representation might still hold a slight numerical advantage when one commercial representative was disqualified, this was believed to be an improvement over the existing situation. The impact of the Rhode Island Conflict of Interest Law was clearly exacerbated because three of the four commercial representatives were trap net fishermen. Consequently, on any issue in which one might be disqualified it was not unlikely that the other two would be similarly affected.

Diversification might also be achieved by requiring the appointment of fishermen who utilize different gear types, rather than according to the primary species fished for. However, this means of gaining diversity may not provide an adequate solution either. In many respects the tension in Rhode Island was as much one between trap and gill net fishing, on the one hand, and rod and reelers, on the other, as between commercial and recreational interests. The adoption of rules which favor one gear type will not infrequently disfavor another type, and it is predictable that a member whose gear type has gained an advantage will be accused of a conflict of interest by those who have suffered a disadvantage. The litigation in Alaska would seem to provide an example of this scenario.[13]

A Respite

Rhode Island adopted none of the aforementioned legislative approaches and as is often the case, the situation got worse before it got better. During

the pendency of the Court appeals from the decisions of the Conflict Commission, the three trap net fishermen representatives on the Council commenced a separate action in Superior Court against the Council. They asked the Court to nullify the Council's repeal of the striped bass moratorium, which repeal had been voted without their participation.[14] Among the eight counts, the plaintiffs alleged that the Council was not constituted in conformity with the statute creating it since the commercial representatives were constrained from participating by the prior rulings of the Conflict Commission. Although, in fact, only Parascandola and Mendonsa had suffered adverse determinations, Manchester observed that he felt at risk as well. The Superior Court eventually dismissed the case in its entirety, and no appeal was filed. It would now appear that the judicial branch was unable to provide a solution which satisfied the commercial interests.

During much of 1984 and early 1985, the three commercial members, apparently feeling vulnerable to conflict of interest charges, declined to attend Council meetings. Some sport fishermen accused them of boycotting the meetings in an attempt to cripple the Council and force the legislature to except them from the Conflict of Interest law. Whatever the motivation, the consequence was a Council which, at times, had difficulty convening a quorum, and whose legitimacy was seriously questioned by the commercial industry. Important decisions were being deferred in hope that a resolution could be found which included active participation by commercial representatives.

The 1985 legislature continued to be of little more assistance than had been the 1984 legislature or the judicial branch. The only response of the 1985 General Assembly was to increase the allotted memberships from two to three for both the commercial industry and the sport fishing constituency.[15]

The passage of time has finally made possible a temporary respite in the Rhode Island crisis. By April, 1985, the terms of the three trap net fishermen had all expired. An opportunity was thus presented to the executive branch to find some accommodation. The Governor nominated three replacement commercial members, including the Executive Director of the Rhode Island Seafood Council, a professor in marine affairs who is also an attorney for the Rhode Island Shellfishermen's Association, and an active lobsterman who serves as President of the Atlantic Offshore Fishermen's Association. The commercial fishing industry constituency was, generally, satisfied that the nominees would be effective representatives on the Council.

The appointment of the three achieved the diversity among the commercial membership that had been lacking with three trap net fishermen members. If one of the new members is constrained by the Conflict of Interest

law on a specific issue, it is now much less likely that the other two members will also be disenfranchised.

Moreover, two of the new members do not participate directly in fishing or fish processing. Arguably, their financial interests are more remote and less dependent on specific species or gear type than those of the previous members. Each of the three, when nominated, sought advisory opinions from the Conflict of Interest Commission prior to accepting appointment. All were advised that they could participate and vote, despite their status as employees or agents for commercial fishing organizations, so long as their organizations had taken no "formal position" on the issue which the Council had under consideration.[18] The lobsterman was further instructed to "exercise caution with respect to issues affecting the regulation of lobster fishing...." Each was informed that the Conflict Commission was available to "render additional advisory opinions on any specific conflict of interest question which may arise for him in the future."

The recomposed Council has recently amended the striped bass regulations — this time with the full participation of the commercial members. While actions at the regional and national level have limited the state's range of regulatory options and have effectively precluded participation by the trap net fishermen in the striped bass fishery, the issue remains a hotly debated one. Nevertheless, no conflict of interest complaints were filed, nor any litigation commenced as the result of the Council's most recent actions.

The Persistent Issues

It would be unrealistic to conclude that the respite presently obtaining in Rhode Island evidences a final resolution of the tension between the statutory composition of the Rhode Island Marine Fisheries Council and the Rhode Island Conflict of Interest law. Difficult legal questions and policy issues remain.

Neither the decisions of the Conflict Commission, nor those of the Superior Court, provide in-depth, analytic guidance for determining whether a member has an interest to a "greater extent than any other member of the public or other group, business, profession or occupation which constitutes a significant section of the public."[19] Even in California, with its comprehensive statutory and regulatory scheme administered by a large staff, the issue of what constitutes a personal financial interest distinguishable from that of the "public generally" has proved to be difficult. Four California Fair Political Practices Commission Opinions on this specific issue may be of

assistance in formulating an analytic approach, but they just as clearly demonstrate how dependent each case is on its own peculiar facts.[18]

Among the other difficult questions which were raised in the Rhode Island controversy, though not in the litigation context, is the adequacy of the definition of what constitutes a substantial personal interest which is in conflict with the public interest. Most states, by law or regulation, have established a specific dollar amount as the measure of whether a member has a substantial, or only an incidental, financial interest. In Rhode Island that figure is set at two hundred fifty ($250.00) dollars. While it is obvious that a commercial fisherman who participates in a particular fishery will exceed that limit, that a particular interest has traditionally been thought of as belonging to the recreational fishing category certainly does not mean that it does not also have a valuable interest in the activities and decisions of a marine fisheries commission. At the lower end of the spectrum, the sport fisherman who catches more than a few stripers during a season may have obtained an in kind benefit exceeding two hundred fifty ($250.00) dollars. Those, of whom there are apparently sizeable numbers, who sell some or all of their catch undoubtedly reap more than two hundred fifty ($250.00) dollars in cash.

Of more significance, perhaps, are those businesses which are a part of the recreational fishing industry and are consequently vitally concerned with any decision which might dissuade tourists from visiting their state. These include such obvious businesses as bait and tackle shops, charter boat operators, and motels, but may also include less obvious occupations such as real estate developers in Florida who have a profound commitment to ensure that potential tourists and retirees continue to perceive Florida as a desirable sport fishing situs. It might also include, arguably, a lawyer whose clientele is composed of fishermen, and whose fees and continued employment are in part a function of how well he advocates his clients' interests. One might also contend that an employee of an organization advocating the interests of the seafood industry, or a portion of it, and an officer of a fishermen's association who receives a salary for such service, have personal financial interests which are distinct from the public interest.

As noted previously, each of the new appointees to the Rhode Island Council sought an advisory opinion from the Conflict Commission, realizing that their positions or roles in the industry might present a conflict. The general advisory which each received, that they could participate and vote so long as their respective organization had taken no "formal position" on the matter, seems less than satisfactory. It would seem unlikely that, on any substantive issue affecting a particular interest group, an employee, officer, or lawyer would not know what was in his group's financial best interest

whether or not it had taken a "formal position" on the matter. Even where a group's position might not be obvious or known, it is not unlikely that a mechanism for determining an "informal position" will develop, much like so-called "work sessions" became a popular phenomenon in response to open meetings laws applicable to "formal meetings" of public bodies.

It is inevitable that difficult issues, such as these, will continue to arise and that many years will be required for there to develop a body of case law sufficient to guide those involved. While a state conflict of interest agency may render numerous advisory opinions, the potential factual permutations are infinite, often making prior decisions and advisories less than determinative.

A conservative philosophy counsels that if a commission member is concerned that he or she may have a conflict, he or she ought to seek an advisory or refrain from participation and voting. The former approach is burdensome, and may not afford a timely guidance to members who are expected to manage resources in response to a variety of changing conditions. The latter approach may unnecessarily disenfranchise commission members and effectively deny the public the benefit of their expertise.

Moreover, the seeking of an advisory opinion may be a double edged sword. It might be argued that the lesson to be learned from the experience of Parascandola and Mendonsa is that if one seeks an advisory opinion, one had better be prepared to abide by the advice. Because Parascandola and Mendonsa seemingly acted in defiance of prior advisories, their votes were perceived to be willful violations of the law, justifying substantially harsher sanctions. Furthermore, there may be no method of challenging an advisory opinion, short of acting in defiance of it. The trap net fishermen had sought to appeal their original 1982 advisories to Superior Court, only to have those actions dismissed as nonjusticiable.[9]

Conclusion

It is inevitable that fisheries commission members will continue to be accused of acting in their own financial interest rather than in the public interest. To expect private citizens to share their expertise and knowledge of the fishing industry, and at the same time to be exposed to substantial fines and legal fees, is unreasonable. It is also essential to the continued vitality of fisheries commissions that they be perceived to be acting in the best interest of the public, in general.

It is important, therefore, that those involved in fisheries management recognize the inherent tension which exists between the two public policies sought to be served by the laws discussed herein. With such a recognition, and an understanding of the factors which may aggravate the tension, it is more likely that the potential for disruption and consequent impairment of the fisheries management function can be minimized, even if not avoided entirely.

Notes

1. For a more detailed history of the Rhode Island situation and a deeper analysis of the legal issue involved, see Bubier, Jill and Rieser, Alison, *Conflict of Interest and Fishery Management Councils,* Territorial Sea, Vol. IV, Number 2, June, 1984.

2. General Laws of Rhode Island §20-3-2.

3. General Laws of Rhode Island §20-3-1.

4. There are six fish trap companies which hold permits for a total of approximately fifty locations. Division of Fish and Wildlife, Rhode Island Department of Environmental Management.

5. Rhode Island Sportsman, Vol. 2, No. 4, April, 1941.

6. Rhode Island General Laws, Chapter 36-14.

7. *Matley and Sylvestre v. Parascondola,* Complaint Nos. 83-12, 83-13; *Barbeau, Matley, and Sylvestre v. Mendonsa,* Complaint Nos. 83-10, 83-13, 83-16, 83-17. The critical legal issue concerned whether the members' personal interests should be compared to those of the general Rhode Island citizenry, to those of all Rhode Island fishermen, to those of all commercial fishermen, or to those engaged in the commercial striped bass fishery. The Conflict Commission determined that the appropriate comparison subgroup was the general commercial fishing industry.

8. *Parascondola v. Rhode Island Conflict of Interest Commission, et al.,* Rhode Island Superior Court, P.C. No. 84-0644; *Mendonsa v. Rhode Island Conflict of Interest Commission, et al.,* Rhode Island Superior Court, P.C. No. 84-0395.

9. As alluded to earlier, many commercial fishermen vigorously dispute that striped bass are in decline, and point to the abundance of the species evident in the 1985 season.

10. In *Carney, et al. v. State of Alaska, et al.,* presently pending in the Alaska State Court system, the plaintiffs, who use a set net gear type, have challenged a decision by the Board of Fisheries alleging that some of its members who utilize a drift net gear type acted inappropriately by "obtaining personal financial gain."

11. 84-H9133, Introduced by Representatives Suttell, Willis, and Parella on March 2, 1984.

12. 2 California Administrative Code §18703.

13. See note #10, *supra.*

14. *Mendonsa, Parascondola and Manchester v. Marine Fisheries Council,* Rhode Island Superior Court, P.C. No. 84-2832. This action was unusual in several respects, one being the difficult position in which the lawyer for the Council was placed by having the three plaintiffs composing one third of the defendant. In addition, though no complaint was filed, it might be argued, that the filing of the suit against oneself was in conflict with one's public responsibility, particularly since the object of the suit was to restore the moratorium, the adoption of which had resulted from the improper votes of two of the plaintiffs.

15. Rhode Island Public Laws, Chapter 190, Section 1.

16. Boragine, Advisory Opinion No. 85-86; Nixon, Advisory Opinion No. 85-85; Palumbo, Advisory Opinion No. 85-88.

17. Rhode Island Conflict of Interest Regulation §1010. Refer to note Nos. 1, 7 and 8, *supra.*

18. *In the Matter of Martin Overstreet,* 6FPPC Opinion 12; *In the Matter of John Ferraro,* 4FPPC Opinion 62; *In the Matter of William L. Owen,* 2FPPC opinion 77; *In the Matter of Tom Thormer,* 1FPPC Opinion

19. *Mendonsa v. Rhode Island Conflict of Interest Commission,* Rhode Island Superior Court, P.C. No. 82-2240; *Parascondola v. Rhode Island Conflict of Interest Commission,* Rhode Island Superior P.C. No. 82-2284.

Independent State Fishery Commissions: The North Carolina Example

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Abstract

The structure, function and organization of state fisheries management in the United States differs considerably from state to state. One prominent feature in most states, however, is a board or commission that oversees fisheries policy and management. These boards and commissions differ widely in the scope of their responsibility and authority. This paper discusses the authority, responsibility, and organization of one of the so-called "independent" state fishery commissions — that of the Marine fisheries Commission in North Carolina. Drawing upon the author's experience as a member of that Commission, analysis is offered concerning the relationship between such boards and commissions and the other agents of the marine fisheries policy and management system.

Introduction

In 1985 James G. Martin, the newly-elected Governor of the State of North Carolina, appointed fourteen new members to the fifteen-member North Carolina Marine Fisheries Commission. The Marine Fisheries Commission is the only state commission whose members serve completely at the pleasure of the Governor, yet even given this circumstance such a complete house cleaning was unusual. Governor Martin's is only the second Republican administration in North Carolina in this century, and such a bold move reflected to some extent the exhilaration of political circumstance.

In the case of the Marine Fisheries Commission, however, the new appointments had some unique characteristics. The new Chairman of the Commission, Dr. John Costlow, the Director of the Dunk University Marine Laboratory, had taken the Chairmanship on the condition that he have a more or less free hand to select the new Commissioners. He was granted this, subject to the legislative constraints discussed below, and proceeded to put together a Commission somewhat different from those that had gone before. Where previous commissions had been dominated by fishing industry

interests — in many cases principally from the processing sector — the present Commission is a mixture of scientists, fishing industry representatives (both commercial and recreational), and experts in business, administration and extension.

In the pages that follow we will discuss the activities of this new Commission as examples of the structure and function of a so-called "independent" commission — that is, one whose legislative mandate gives it principal responsibility and authority over a particular policy domain, in this case marine fisheries. We will also discuss the role of such a commission with respect to the other agents in the marine fisheries policy and management system at both the state and federal levels.

The North Carolina Marine Fisheries Policy and Management System

The Formal Structure

The North Carolina marine fisheries policy and management system is, at its heart, a two component system: The Marine Fisheries Commission, a legislatively-created body whose members are appointed by and serve at the pleasure of the Governor; and the Division of Marine Fisheries, an office of the Department of Natural Resources and Community Development. The Commission is "authorized to authorize, license, regulate, prohibit, prescribe, or restrict [any activity related to] all forms of marine and estuarine resources in coastal fishing waters" (NCGS, S. 143B-286). "Marine and estuarine resources" are defined as, "All fish, except inland game fish, found in the Atlantic Ocean and in coastal fishing waters; all fisheries based on such fish; all uncultivated or undomesticated plant and animal life, other than wildlife resources, inhabiting or depending upon coastal fishing waters; and the entire ecology supporting such fish, fisheries, and plant and animal life." "Fish" is defined as "All marine mammals; all shellfish; all crustaceans; and all other fishes," and "coastal fishing waters" as "The Atlantic Ocean; the various sounds; and estuarine waters up to the dividing line between coastal fishing waters and inland fishing waters...." (NCGS, S. 113-129). The only authority the General Assembly reserved for itself with respect to marine fisheries policy and management was that of setting specific license fees for the harvest and sale of seafood (see Street, 1979 for more details on the management system).

In North Carolina, this authority extends over a coastal ecosystem with over 300 miles of ocean shoreline, 4,000 miles of estuarine shoreline, 2.2 million acres of sounds and estuaries, and a seafood industry with a dockside

value of $64.6 million in 1985. Because of North Carolina's unique position as an ecological 'swing state', poised on the border of the North/Mid and South Atlantic marine ecosystems, the diversity of fishery resources is greater than almost any other coastal state: clams, oysters, and scallops; shrimp; blue crab; flounder, spot, and croaker; menhaden; blue and white marlin, sailfish, dolphin, King and Spanish mackerel, striped bass, tuna, barracuda and wahoo; snapper and grouper. All these and many more contribute to the commercial and recreational fisheries of North Carolina.

This location and diversity, however, also means that the inter-jurisdictional problems faced by the Commission are complex. Many of the most significant fishery resources of North Carolina involve some form of multiple jurisdiction, either with other entities within the state or with supra-state organizations such as the Regional Fishery Management Councils or the Atlantic States Marine Fisheries Commission (ASMFC).

Within the state, the Commission is legislatively limited in several ways, particularly with respect to its responsibility for "the entire ecology supporting" the marine fisheries. For example, the Commission specifically does not have jurisdiction over "matters clearly within the jurisdiction vested in the Department of Agriculture, the North Carolina Pesticide Board, the Commission for Health Services, the Environmental Management Commission, or other divisions of the Department [of Natural Resources and Community Development] regulating air or water pollution" (NCGS, S. 113-132).

The Division of Marine Fisheries, which is organized into four regions within the state and operates with a total staff of 146 and an annual budget of $7 million, supports the activities of the Commission. A significant feature of the management system is that of the "proclamation authority" granted by the General Assembly to the Commission. This is the authority "to delegate to the Secretary of Natural Resources and Community Development [the authority is in practice further delegated to the Director of the Division of Marine Fisheries] the authority by proclamation to suspend or implement, in whole or in part, particular regulations of the Commission which may be affected by variable conditions as provided in [these statutes]" (NCGS, S. 143B-286). This proclamation authority is substantially and routinely used by the Division in such actions as the opening and closing of fishing seasons.

Outside of the state, North Carolina holds seats on the South Atlantic Fishery Management Council (SAFMC), a quasi-federal council whose activities are administered through the U.S. Department of Commerce, and is a member of the Atlantic States Marine Fisheries Commission.

Even though the above legislation enables us to characterize the Commission as "independent" with respect to other states, the authority of whose commissions is more limited — in many cases with principal policy authority being reserved by the state legislature — the North Carolina commission is in fact dependent on a variety of agencies, events, and relationships for the effective discharge of its responsibilities and achievement of its goals and objectives.

The Informal Structure Within the State

Within the state these agencies, events, and relationships fall into four categories: those which involve A) other commissions, B) the General Assembly, C) the various public and industry constituencies, and D) the Department of Natural Resources and Community Development (NRCD) and the Division of Marine Fisheries (DMF).

A) Other North Carolina Commissions

There are three other commissions in North Carolina whose authorities and responsibilities directly affect those of the Marine Fisheries Commission: the Coastal Resources Commission (CRC), the Environmental Management Commission (EMC), and the Wildlife Resources Commission (WRC). As examples, the CRC has authority over many of the planning processes that affect coastal industries in general, including fishing. The EMC has principal authority over water quality issues, whose relationship to fisheries are obvious if not well known or documented in their particulars. The WRC has authority over all inland gamefish, even in non-inland waters, and over all fish in inland waters. In North Carolina, many of the "marine fishes" such as striped bass and herring transverse the boundaries between the authorities of the WRC and the MFC.

In general, there has not been very much interaction among these commissions in the past. Although each is dependent in some sense on the others for some aspect of the discharge of its responsibilities, lack of time, bureaucratic inertia, political disputes, or just plain lack of energy, interest, or resources has kept the commissions from interacting in a vigorous way on a regular basis. This is a situation the present Chairman of the MFC is attempting to remedy through increased consultation and communication with these other groups, attendance by MFC Commissioners at meetings of the other commissions, and through direct initiatives such as an agreement reached in 1985 with the WRC concerning compliance by North Carolina with the ASMFC Striped Bass Management Plan (ASMFC, 1981a) under the mandates of the federal 1984 Striped Bass Act (P.L. 98-613).

B) and C) The General Assembly and Private Constituencies

A good example of the interaction between the Commission and the General Assembly and private sector constituencies is the controversy over the North Carolina menhaden fishery which occurred in 1985. Menhaden, which constitutes the largest volume fishery in the U.S. by weight, is a small pelagic fish which is harvested exclusively for production of fishmeal, oil and solubles, with a very minor portion of the catch being used for bait for both commercial and recreational fishing. The fishery for Atlantic menhaden occurs from Maine to Florida, but the vast majority of the Atlantic catch occurs in the waters of Virginia and North Carolina. The fishery takes place almost entirely in bays, sounds, and estuaries and in the ocean inside of three miles offshore. This means that the individual states have the principal management jurisdiction over the fishery (See Blomo et al., 1985 for a discussion of the fishery in North Carolina).

In the late 1960s, there was a dramatic decline in menhaden catches on the Atlantic coast. This decline is popularly ascribed to a combination of overfishing and perhaps environmental conditions which periodically affect small coastal pelagic species. In any event, because of concern over the fishery the Atlantic representatives of the National Marine Fisheries Service (NMFS), state fishery agencies, the ASMFC, and the menhaden industry began meetings which eventually led to ASMFC's adoption of an Atlantic Menhaden Management Plan in 1981 (ASMFC, 1981b). This plan called upon all of the Atlantic states to observe various management practices regarding the menhaden fishery, but the most prominent recommendation was the so-called "Option 7", a proposal for a shortened season coastwide on menhaden fishing. The major burden of this shortened season, however — which required formal adoption by the states, since the ASMFC has no formal authority to regulate menhaden — would have fallen on North Carolina. In the latter part of the historical fishing season — the "fall fishery" which occurs off North Carolina as the menhaden migrate southward — the majority of the fish taken were "peanuts" — small, 0-year class fish. It is the fall fishery which was the target of Option 7.

By 1985, all of the affected states had adopted some form of regulation of menhaden except North Carolina. This was principally because since the fall fishery occurred off North Carolina, there was little cost to the other states but a substantial cost to North Carolina of adopting such regulations. Those regulations that were adopted were prompted by a combination of factors that included commercial-recreational competition for ocean space, complaints by recreational fishermen that commercial menhaden fishing was having a detrimental effect on not only the menhaden population but also on forage fish such as King mackerel and bluefish as well, and state and federal agency concern for the menhaden population itself.

It was exactly this combination of factors — with a few more added — that came to the fore in North Carolina in 1985. Because of the history of the fishery in the 1960s the state and federal biologists in North Carolina had long been concerned about the menhaden stocks, although the stocks appeared to have been in a process of gradual increase for the last ten or fifteen years. The recreational fishermen in North Carolina have just gotten organized into a state-wide system of clubs in the last few years, and the menhaden issue was a coalescing event for them. In addition, menhaden is taken by seine net, often quite close to the beach and occasionally there is a "beach spill" where thousands of pounds of the small, oily fish wash up on the beach. Even though the menhaden companies have an excellent record or cleaning up such spills, with coastal tourism as one of the most rapidly growing industries in the state the thought — and sight and smell — of thousands of pounds of rotting fish on the tourist beaches is not a pleasant one to tourism interests. And finally, there is the general aesthetics of coastal development: With more and more coastal property converting from commercial and industrial use to leisure and tourism, even the sight of commercial fishing boats is anathema to some of the 'new coastal powerful.'

The result of this situation was a synthesis of conservation, recreational fisherman, and coastal leisure and tourism vectors that translated into bills introduced into the North Carolina General Assembly in the spring of 1985. The effect of the provisions of these bills would have made it virtually impossible for the menhaden industry to continue in North Carolina. Thus the Commission — all but one of whom had just been appointed a few months prior to the introduction of these bills — was put in a position between the menhaden industry, the General Assembly, the ASMFC, the MFS, and the recreational and coastal constituencies. At issue was not only the fate of menhaden fishery regulations, but also the "independent" role of the Commission. The two General Assembly bills, if passed, would clearly violate the traditional division of labor in the state with respect to fishery policy and regulation.

Through a careful process of collaboration, education, and negotiation among the Commission, the General Assembly members, and the private sector constituencies, a management package was adopted and the bills were withdrawn. What this example points out, however, is that even the "independent" Commissions are simply a part of a larger socio-political system within which relationships are subject to change at any time.

D) The Department of Natural Resources and Community Development

The new Commission members were appointed at about the same time as the new leadership in the administrative agency that provides staff to the

Commission — NRCD — was installed. In any appointed policy body-administrative staff relationship there are strong potentials for tension. In general the relationship between the present Commission and the Division of Marine Fisheries — the principal division of NRCD with which the Commission interacts — has been excellent, due largely to the careful selection of the Commissioners by the present Chairman. However, the potential for tension still exists. Two brief examples will illustrate these potentials.

In mid-1985 the new leadership of NRCD perceived the need for a reorganization of DMF, and began planning for such a reorganization. The process was somewhat accelerated in late 1985 when the then-Director of DMF left his position to take the Executive Directorship of the South Atlantic Fishery Management Council. By January of 1986, the reorganization plans were largely complete. The problem was that the senior NRCD staff planning the reorganization had even at that rather late date not formally briefed the Commission concerning the planned reorganization, nor had they informally consulted with any of the Commissioners — including the Chair — to any significant extent.

It is not clear whether this was an error of commission or omission, but the result was concern on the part of the Commission that their legitimate interests in the entity that provided their regulatory and staff support were not being addressed in the reorganization process. The senior NRCD staff person in charge of the reorganization was pointedly invited to the next Commission meeting to bring the Commission up to date on NRCD's plans, which he did in a thorough and professional manner. Still the Commission had the feeling — probably legitimate — that NRCD had proceeded in the way that they had at least to some extent because they felt it was their prerogative to reorganize their internal divisions as they saw fit, and that there was no formal requirement that the Commission be consulted. This is technically true, but it left the Commission with the feeling that the 'full partnership' in policy and management between the Commission and the department and division was somewhat less robust than one might like.

A second example concerns the Commission position on stormwater runoff regulations, which are presently being considered in North Carolina for the first time. Such regulations come most fully under the jurisdiction of the Environmental Management Commission, although the Coastal Resources Commission can claim some jurisdiction also because certain of the potential regulations concern land use planning adjacent to estuarine waters. At a meeting of the Commission early in 1986, the Deputy Secretary of NRCD produced a draft of a resolution — an item that had not been on the agenda — which he wanted the Commission to consider. The Commission hastily — and rather ill-advisedly, as it turned out — read the resolution and

passed it. The perception of the Commissioners at the time was that the effect of the resolution was to support in a general way the promulgation of stormwater runoff regulations.

The problem, however, lies in one particular phrase in the middle of the two-page resolution which stated that the CRC, which had been the more aggressive advocate of runoff regulation up until that time, should wait until the EMC, which many people perceived to have been dragging its feet on the issue, took action before taking action of its own. Regardless of the intent of the Commission with respect to this order of precedence between the two other commissions, the MFC Commissioners have not been fully cognizant of the effect of the phrase when they passed the resolution, largely because of the hurried presentation of the resolution at the meeting.

The morning after the MFC meeting the Chairman of the CRC called the MFC Chairman to discuss the resolution, and it became apparent that the MFC had not acted with a full awareness of the impact of its actions. This prompted the MFC Chair to contact the Deputy Secretary to inquire as to the genesis of the resolution, and the reason that the resolution had not been presented to the Commission with a fuller explanation of its provisions and potential ramifications. The Deputy Secretary's response was that the resolution had been drafted by staff with the intent of producing the smoothest and most effective interaction among the commissions — all of which are staffed by NRCD — and that there had been no intention to lead or mislead the MFC. Time pressure was cited as the reason for the hurried presentation due to the particular dates of the meetings of the three commissions with respect to regulatory deadlines.

All of this was plausible, and in fact the EMC subsequently took stormwater regulations to public hearings and is now in the process of final consideration of those regulations. The MFC was once again left, however, with a vague feeling of suspicion regarding the department's motives and intentions in the presentation and execution of the resolution.

These are two examples of the kinds of interaction between a policy-making and an administrative body that can create tension in the policy and regulatory process. We hasten to add that the relationship between the Commission and NRCD/DMF is in general a fine and productive one, and that the situations described above are exceptions to the general character of the interactions between the two bodies. It is true, however, that the management of such real and potential tensions is one of the arts of successful policy-making and policy implementation.

The Information Interactions Outside of the State

As we mentioned above, North Carolina is a formal participant on the Atlantic States Marine Fisheries Commission and the South Atlantic Fishery Management Council. We have already cited examples of North Carolina's interaction with the ASMFC, and the following example concerns the Commission's interaction with the SAFMC.

In 1986, an amendment to the Fishery Management Plan for Coastal Migratory Pelagics (SAFMC, 1986), a fishery management plan developed jointly by the South Atlantic and Gulf of Mexico councils, was approved by the Secretary of Commerce. One of the provisions of this amendment was a three-fish bag limit for recreational fishing for King mackerel on the Atlantic coast.

Because the jurisdiction of the councils under the Magnuson Fishery Conservation and Management Act (MFCMA) is from three to 200 miles offshore, this regulation applies only outside of the 0-3 state jurisdiction. Because a large percentage of the King mackerel catch occurs inside three miles, however, the effectiveness of this regulation is diminished unless the Atlantic states — in particular Florida, Georgia, South Carolina and North Carolina — adopt compatible regulations.

The SAFMC has put considerable informal pressure on the states to adopt the three-fish bag limit. For North Carolina, however, the situation is a difficult one. First, the data on the King mackerel fishery in the Atlantic is not as complete as it could be, and the conclusions to be drawn from it not very definitive. In the case of the recreational catch data — recreational catch comprises the bulk of the fishery — the data is extremely suspect due to the limitations of the data collection system itself. Second, the recreational fishery is quite economically important for coastal North Carolina, and the fishermen, both commercial and recreational, are still smarting from a season closure that occurred some years ago due to heavy fishing on the mackerel stocks in Florida and the Gulf of Mexico. The particular problem that led to that closure has since been remedied, but the perception that states further south derived economic benefit at the expense of North Carolina remains in the minds of North Carolina fishermen. Finally, there is the awareness of the fact that many of the provisions of the recent amendment had their genesis in the difficult relationship between the two councils on mackerel in general. In response to what is perceived by all as a genuine problem in the King mackerel fishery in the Gulf of Mexico, it is the impression that accommodations were made in the regulations on the Atlantic in order to produce a compromise that both councils could accept.

The artifact of all of this for North Carolina is that the Commission is under pressure to adopt compatible regulations in a situation where the data and analysis are not clearly in support of such regulation, and the economic impact on the North Carolina coastal economies is potentially substantial. In addition to all of this, neither the state nor the SAFMC — who in this case would rely on the NMFS, which has only one enforcement in North Carolina, for enforcement of its regulations — have the resources to enforce these bag limits. One final curious aspect of the relationship is that it is the recent ex-Director of North Carolina's DMF, who is now the Executive Director of the SAFMC, who is the agent for this 'friendly persuasion.'

At its first meeting in 1986, the Commission voted not to consider any King mackerel regulations in 1986 but to A) initiate a complete review of the present King mackerel data and analysis; and B) to begin research on the part of the state to better define the biological and socio-economic parameters of the King mackerel question in order that any decisions taken in the future will be well-informed ones. Other states to the south — in particular Florida — have already moved to consider or have adopted regulations compatible to those in the amendment. The fact that the Commission in North Carolina has taken the above action is indicative of two very significant properties of the state-suprastate relationship in fisheries policy and management: 1) A large part of the impetus for fisheries management is socio-economic, and socio-economic conditions vary among states requiring a regulatory regime not all of which can be defined within the parameters of a regional organization such as the SAFMC; and 2) Interpretations of data and analysis differ in the eyes of different beholders, especially when sufficient resources have not been forthcoming to adequately supply and analyze such data.

Conclusion

At the state level, even the so-called "independent" fishery commissions are inextricable involved in a web of relationships that affects their ability to discharge their responsibilities. At the suprastate level, these webs get even more extensive and complex, highlighting not only questions unique to natural resource management but larger questions of federalism as well.

In North Carolina, where the Commission is one of the most "independent" in the U.S., the system has been invigorated by the appointment of a diverse and energetic Commission membership. This diversity and energy has been challenged in the first 18 months of the new Commission by within-state and suprastate issues involving menhaden, striped bass, and King mackerel among others. The important 'bottom line' concerning the resolution of these challenges is that state fisheries management and policy legiti-

mately exists in legal, political and socio-economic contexts. The notion of making purely 'biological conservation' decisions is a misguided one, however nobly intentioned.

Even in the case of "independent" commissions, the state legislatures, the private sector, other commissions, state, federal and regional agencies, and even the courts all have legitimate places in the fisheries policy and management system. To expect all of these entities not to come into play in the fisheries management and policy process at some point is an unrealistic, and probably even an undesirable expectation. It is in the recognition, not the denial, of the legitimate role of all of these entities that the future of rational, comprehensive fishery policy and management lies.

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Integration of Economic Modeling in Fisheries Management: An Evaluation of Virginia Oyster Grounds Management

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Support for this research was provided through the Virginia Sea Grant program.

Abstract

To increase Virginia's production to a level 20% greater than the ten year average, the Virginia Marine Resources Commission is developing an oyster fishery management plan. An integrative analytical framework based on economic modeling is described that can be used to evaluate the effectiveness of alternative management strategies. The role of economic modeling and the adoption of the analytical framework for improved oyster grounds decision making is discussed.

Introduction

Throughout its history the oyster fishery has played an important role in Virginia's coastal economy. Accounting for fifteen to twenty percent of the total value of all commercial species landed in Virginia, the oyster fishery is a source of income and employment for thousands of tidewater residents (JLARC 1977). It is because of its importance to the tidewater region that the oyster industry has been a subject of law and public policy since colonial times.

Once the single largest producer of oysters in the United States, the Virginia oyster industry has been in a steady decline since the early 1960's. Public and private concern over the industry's decline prompted the State's legislature to review the condition of the oyster fishery and the State's role in its management. In response to its findings the 1984 legislature directed the Virginia Marine Resources Commission (VMRC) to develop and implement

an oyster fishery management plan (OFMP). The State set the plan's goal to maximize the biological, economic and social benefit from the harvest and utilization of market oysters. To achieve this end the VMRC can employ management alternatives that include harvest season, harvest gear and entry regulations in combination with alternative public investment strategies (shelling and oyster seed transplanting) to enhance harvestable populations. Any alternative strategy would have a different impact on the cost of producing and harvesting oysters in the State and upon the VMRC budget. The task before the VMRC is to select a mix of policies that (1) satisfies the production goals of the OFMP; (2) remains within the VMRC budget; and (3) is acceptable to the State's harvesters and processors. Balancing these three objectives is the management challenge.

The objective of this paper is two-fold. The first objective is to present an analytical framework, based on economic modeling, that is being used by VMRC to evaluate its management alternatives prior to OFMP implementation. The second objective of this paper is to focus on the utility of economic modeling and the importance of tailoring the model building process to be able to answer the questions that are of greatest interest to the politically important sectors of the industry. The paper is organized into five sections. First an overview of the oyster industry and oyster management policies will be presented. The second section will discuss the current state of the oyster industry and the development of the fishery management plan. Section three presents an analytical framework for evaluating the effectiveness of alternative management strategies. Section four will provide a sample policy simulation and implications for oyster grounds management. The final section will examine the role economic modeling has played in the development of the Oyster Fishery Management Plan.

Section 1:
Review of Virginia Oyster Grounds Law and Policy

The Virginia oyster, *Crassostria vircinica*, is a sessile mollusk attaching itself to any firm, clean substrate. Oysters may be found in intertidal zones and waters up to and sometimes exceeding 25 feet in depth. A filter feeder, the oyster subsists on nutrients extracted from the water column by passing water over its gills. The oyster's ability to select its food and extrude unwanted materials allows it to survive in waters carrying high silt and turbidity loads characteristic of estuarine environments. Reproduction is triggered by temperature (Kennedy and Breisch). In Virginia spawning begins in early July and continues into September as long as Bay temperatures do not fall below 20 degrees celsius (Merritt). Larval oysters spend

their first few weeks in a free-swimming state until they settle to the bottom and attach themselves, whereupon they are termed "spat." It is at this point that the availability of a hard surface is paramount. The productivity of a river system can be enhanced by placing oyster shells, the preferred material, on the growing bottom just prior to the spawning period.

The oyster survives best in estuarine conditions where salinities range between 5 and 35 parts per thousand (ppt), (Haven). Oyster growth is most rapid in salinities exceeding 15 ppt. Unfortunately, salinities of this level are favored by the oyster's principal enemies: the disease MSX and the oyster drill (a snail-like organism). Mortalities due to these two enemies are particularly high among spat and yearling (known as seed) oysters. In waters below 15 ppt. in salinity, survival of young oysters is greatly enhanced yet, growth rates are slowed and oyster growth is stunted due to overcrowding. When harvested and transported to a different river system, however, growth resumes and the oyster will reach the 3 inch legal size quickly. The interesting result is that the oyster grounds in Virginia can be divided into two distinct types, those that produce large amounts of seed and undersized oysters and those that are productive of market oysters. Moreover, the location of these grounds is well known and has changed little over time enabling oyster biologists to identify "best" management strategies for oyster production by river system (Haven).

By today's standards market oyster production in Virginia at the turn of this century was large, averaging over five million bushels per year over the period 1890-1925 (Haven). Although data is sketchy, there exists sufficient evidence to suggest that oyster production prior to this time was even greater. Due to such heavy exploitation of Virginia's oyster resources biologists noted as early as 1881, 1910, and 1912 that the natural oyster rocks were significantly depleted (Haven p. 187). By 1930 total oyster production had dipped to 1,686,914 bushels. From 1930 to 1960 harvests were relatively stable ranging between 1.5 and 3.5 million bushels but never approached production levels experienced prior to 1930. Over the last twenty-five years a dramatic decline in oyster production has occurred following the appearance of MSX disease in 1960. MSX, an oyster disease active in high salinity waters, had a devastating affect on privately leased growing bottoms. Additionally, worsening economic conditions throughout the 1970's forced the abandonment of Virginia's most productive private oyster beds. Public grounds harvests were also adversely affected by MSX and hurricane Agnes in 1972. The latter event devastated brood stock in many of the lower salinity portions of the Bay fundamentally altering the level and distribution of setting in the affected river systems.

As a matter of policy Virginia maintains a dual approach to oyster grounds management. Such an approach was initiated upon the completion, in 1896, of a survey of the State's natural oyster bottoms. The survey, known as the Baylor Survey, delineated naturally productive oyster rocks on the basis of the presence of live oysters or oyster shell. Bottoms identified as being naturally productive were designated as Public grounds and as stated in Article XI of the Constitution of Virginia:

> The natural oyster beds, rocks and shoals in the waters of this State shall not be leased, rented or sold, but shall be held in trust for the benefit of the people of this State.....

Bottoms not so designated were made available to private individuals for the express purpose of oyster culture. The practical importance of the Baylor Survey was to establish the limits of the natural oyster resources and the State's stewardship over them.

Prior to the Baylor Survey all harvesters were subject to several legal measures regulating the taking of oysters. These measures included gear, entry (residency, licensing and season restrictions), and harvestable size regulations; required the culling of live oysters from shell at the time of harvest; and restricted the removal of oyster shells for road paving and the manufacture of lime. It is important to note that by 1900 all of the above harvest restrictions were implemented and that the same regulations exist today in very much the same form. The harvest laws apply only to watermen, as the Chesapeake Bay harvesters are called, working the public grounds. The production and harvest of oysters on leased grounds is not subject to the above regulations.

An additional measure employed by the state is the Oyster Repletion Program (ORP). Through the application of aquacultural techniques the objective of the ORP is to influence the supply of seed and market oysters available for harvest. This objective is accomplished by planting shell on public seed beds and growing areas, or transplanting seed from the James River to areas better suited for growth. From its authorization in 1928 to 1960, however, it is doubtful that the ORP had any effect on harvestable populations as repletion effort varied greatly and little attention was paid to biologically optimal timing or placement of the shell. It was not until after the appearance of MSX that repletion effort was undertaken in earnest, and greater care was taken to ensure that shells were placed on bottoms most likely to receive a set of larval oysters.

Since 1960, the ORP has functioned as a disaster relief program and as an ongoing oyster bed replenishment program (Baker). In any given repletion

season both functions are served as some repletion effort may be targeted for river systems experiencing natural disaster (such as freshwater kill due to heavy rains), while the remainder of the ORP budget may be used in replenishment of oyster bed substrate depleted during normal harvesting. The Virginia Marine Resources Commission's (VMRC) success in administering the ORP to achieve its objectives is difficult to assess due to data deficiencies. Legislative audits in 1977 and 1983, however, concluded that the ORP's impact was positive. In spite of a positive assessment of the ORP's success, both audits pointed out deficiencies in the ORP and the state's management of public oyster grounds.

The 1977 report documented the decline of the oyster industry and cited the need to consider policy alternatives to enhance production. The authors concluded that production increases would be feasible, but that an expanded state role for mangement of the oyster grounds would be required. The 1983 study examined several alternative management strategies and found that unless current approaches to oyster grounds management were changed the industry would continue its current decline. They further concluded that even if existing harvest or leasing regulations were changed, only small increases in oyster production could be achieved unless current repletion strategies were also changed. This finding reveals the interdependence of legal and repletion strategies in oyster grounds management. The authors recommended that: 1) the state modify existing approaches to oyster grounds management; 2) the state should incorporate the use of economic modeling as a fisheries management tool to assess the impact of alternative strategies; and 3) the state should implement an OFMP that employs the most effective harvest and repletion strategies subject to technical, economic and political feasibility. In response to these recommendations the 1984 General Assembly mandated that VMRC develop and implement such a plan.

Section 2:
The Oyster Industry Today: Policy Alternatives

The State legislature mandate to VMRC was to develop and implement an OFMP and set as its goal to maximize the biological, economic and social benefit from the harvest and utilization of the State's oyster resources. The legislature declined, however, to make any recommendations or provisions as to how this was to be done. In meeting the State's requirement VMRC, in 1985, began to take steps toward development of an OFMP.

The development of the OFMP has taken place in four phases. In the first phase a Fisheries Management Advisory Council (FMAC) was formed with

members appointed by the commissioner of VMRC. The advisory committee is made up of private citizens active in and knowledgeable about the seafood industry. The Commissioner also appointed scientific advisors including economists, biologists and management specialists to assist the committee. While VMRC has the ultimate responsibility for the plan, the purpose of the FMAC is to provide recommendations and citizen expertise to VMRC with regard to OFMP provisions, goals and strategies.

The second phase in the plan's development was for the FMAC and VMRC to meet and discuss in a broad sense what the objectives of the plan should be. Following this, VMRC staff drafted a management plan with stated goals, objectives, and proposed management options to meet the plan's goals. The third phase in the OFMP development process took place over the next several months as FMAC and VMRC met, discussed and revised the proposed management plan. Currently the OFMP is in its fourth phase, that of evaluating the impact of alternative policies and choosing the mix of regulatory and repletion strategies that most effectively meets the OFMP goals and objectives. The final phase in the OFMP process will be the finalization and actual implementation of the plan. It is the prior phase, the evaluation phase, that is of interest here.

This paper will present an analytical framework for evaluating alternative policies, but it is first necessary to examine the goals and objectives of the OFMP as they have implications for the appropriate evaluation methods. The goal of the OFMP is to achieve and maintain a level of market oyster production that yields the greatest biological, economic, and social benefit. As stated, this goal is too broad to provide a basis for evaluating alternative management strategies. A useful partitioning of the OFMP goal is to examine its biological, economic, and social components.

The primary biological goal to be achieved is to attain and sustain a specific level of market oyster harvest. This goal, unlike others, is explicitly stated in the OFMP. The VMRC has set an annual 700,000 bushel harvest goal for both public and private grounds to be achieved by the years 1993 and 1995, respectively. It is not unreasonable to expect that many of the proposed management strategies would be capable of this meeting biological goal. It is equally likely, however, that some strategies would be less costly than others to both the public and private sectors.

There are several economic goals that may be pursued. That the goal should be attainable at least cost has already been mentioned. The view that the OFMP should be implemented without increasing State repletion requirements was expressed by the General Assembly. Coincidental to this view is the goal that through changes in ORP administration and taxes on harvest that

the repletion program could be made self-financing. Two other important, and perhaps conflicting, goals are income and employment goals. Legislation to permit more labor-efficient harvest gears has historically been opposed, successfully, by watermen on grounds that it would displace harvest labor (Santopietro). With respect to income, an important goal may be to insure that incomes to harvesters, processors and retailers not be lowered due to a change in management strategy.

The final component of the stated OFMP goal is to generate the greatest social benefit from the harvest of market oysters. Social goals are often hard to define but may include improving the distribution of wealth, assuring equal access to oyster beds and conserving oyster resources to insure the long- term viability of the industry. An additional social goal may be to preserve the cultural integrity of fishing communities.

The preceding discussion pointed out a number of more specific goals that are implied by the broadly stated OFMP goal. Of the many management options available to VMRC, it is unlikely that any single policy will be capable of satisfying all the management goals set for the OFMP. Rather, it is likely that a mix of regulatory and management strategies will be required to attain OFMP goals at levels considered satisfactory by VMRC managers and industry representatives alike.

The policy alternatives from which VMRC may choose are either regulatory in nature or involve direct public investment in the oyster fishery. VMRC's regulatory options fall into three broad categories: market oyster harvest, bottoms designation, and seed oyster harvest regulations. Market oyster harvest regulations include minimum size, open season, gear, quotas, and restricted entry. These proposed regulations are not in themselves a departure from traditional approaches to regulating the harvest of oysters in Virginia. The proposed means of administering these regulations, however, represents a significant change in oyster grounds management policy. In order to allow for increased management flexibility, the 1985 Legislature granted VMRC the regulatory authority to implement all harvest related restrictions as they deemed appropriate. Prior to this action all harvest regulations were legislatively set limiting VMRC's ability to respond quickly to changes in environmental considerations. Today, rather than representing limits or legal confines within which VMRC must work, the setting of harvest regulations is an important management tool to be molded and used as management circumstances dictate.

The purpose of bottoms designation policies is to increase the quantity of harvestable acreage for public hand-tongers or to increase the number of acres of growing bottom that are available for lease by private individuals.

OFMP provisions propose to increase harvestable acreage by opening formerly condemned public oyster beds. In the event of shellfish contamination the Bureau of Shellfish Sanitation will close the affected bottoms to all harvesting. VMRC proposals include reviews of condemned oyster grounds to assess the possibility of reopening condemned oyster grounds that are no longer contaminated. Policies aimed at increasing leasable acreage include the opening of nonproductive public grounds for lease and requiring proof of active cultivation on oyster grounds currently under lease. The former policy would represent a radical departure from traditional approaches to oyster grounds management and would face considerable opposition (Santopietro). Proposed proof of use policies would prohibit the nonproductive holding of leases, thereby forcing the choice between production or abandonment. The latter choice, it is believed, will increase the number of oyster grounds available to individuals who are willing to plant seed oysters.

Although, in principle and application, seed oyster harvest regulations are similar to market oyster harvest regulations, they serve at least one distinctly different purpose. The purpose of proposed seed harvest regulations is to reduce the cost of harvesting seed. The important consequence being that ORP costs would be reduced and lowered seed costs might attract increased investment in private oyster grounds production. The most important seed oyster harvest policy considered for the OFMP is permitting the use of a dredge on specifically designated seed beds. Currently, the only harvest gear permitted on public grounds seed beds is the hand-tong. Permitting the more labor-efficient dredge would substantially reduce seed harvest costs and seed prices.

In addition to regulatory policy measures, VMRC is also authorized to oversee direct public investment in the oyster fishery, i.e. the oyster repletion program. Although, management policy toward administration and the basic aquacultural techniques used in the program are unchanged, OFMP provisions represent significant changes in VMRC's approach to public grounds repletion. The important change in oyster grounds repletion policy called for in the OFMP is the evaluation of alternative repletion techniques to identify the most cost-effective mix of repletion activities. To make such an evaluation possible increased use of economic and biological analysis is called upon, and to support these efforts OFMP provisions emphasize the need for improved and expanded data collection. It is in these three provisions that the proposed management plan marks a dramatic change in ORP policy. Never before has such a level of program evaluation been called for by VMRC managers themselves. For the first time in the history of the repletion program the need for an improved basis for scientific management of the oyster fishery has been formally recognized and called for.

Section 3:
An Analytical Framework for Policy Evaluation

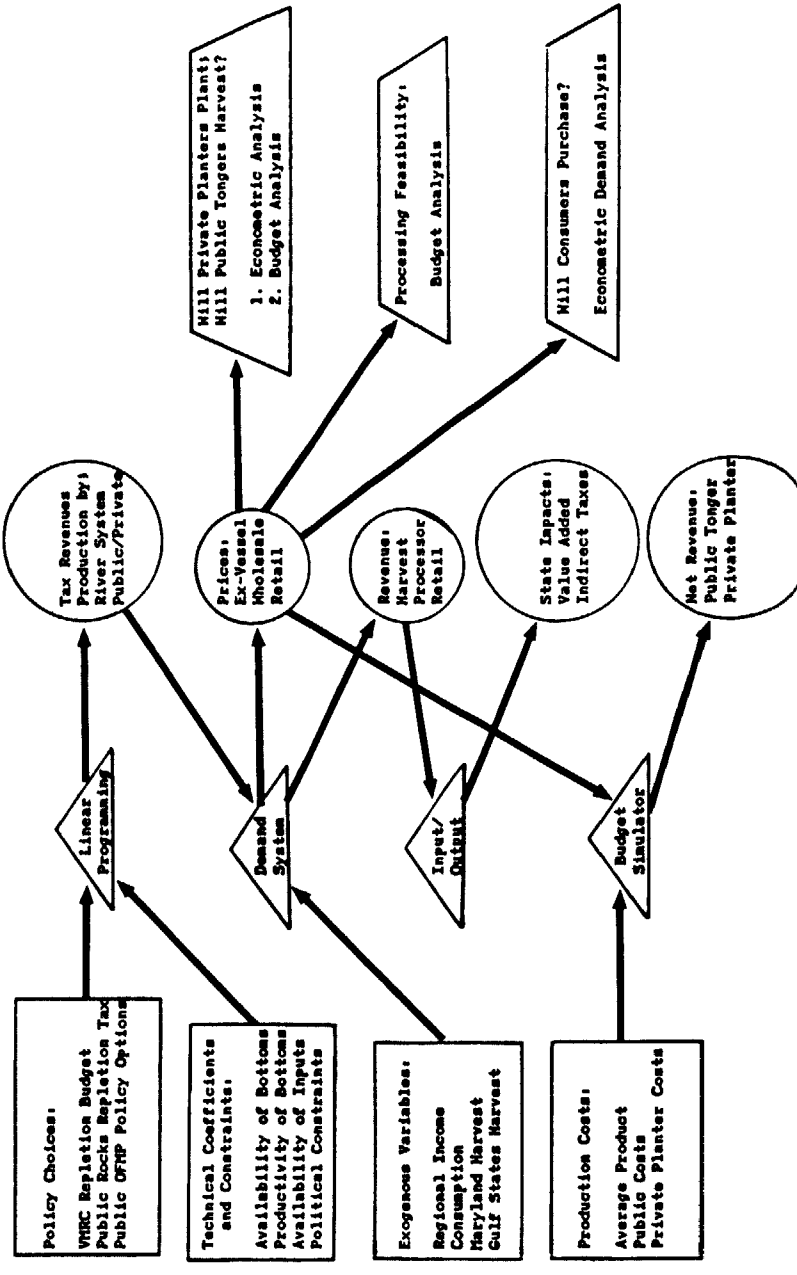
The goals and policy instruments contained within the OFMP were discussed in the previous section. Any single or mix of management alternatives would have a different impact on OFMP goals. Selection of specific policies and combinations of policies requires, therefore, that VMRC be able to quantify the degree to which proposed management strategies can satisfy the goals set for the OFMP. In addition, informed selection of policy alternatives requires that potential goal conflicts be identified. In this section, an integrative analytical framework based on economic modeling will be presented that is capable of accomplishing this task. First, however, what is meant by an integrative approach?

The analytical framework is integrative in two senses. First, economic modeling often incorporates biological and political information in addition to economic considerations. The economic models described in this section are integrative because they treat the oyster industry as a system in which limits to biological feasibility and political acceptability are built into the models' structure. Secondly, the analytical framework is itself integrative in that individual models interface with each other as output from one model is used as input to other models. The analytical framework is integrative, therefore, with respect to the technical information incorporated into the system and with respect to the economic models themselves.

The analytical framework employs four economic models to estimate the economic impact of a given management policy or mix of policies. The aim of the framework is to obtain quantitative estimates of changes in selected policy variables due to a change in management strategy. Given these, the ability of each policy or policy mix to meet the varied goals of the OFMP can be assessed and goal conflicts may be identified. Relative performance for different management strategies can be evaluated and compared, enabling VMRC to identify the most effective mix of management strategies for the OFMP. The specifics of each model will be discussed in this section. Prior to doing so, however, it is useful to examine the overall structure of the analytical framework depicted in Figure 1.

The policy variables that are being evaluated are shown within the circles of Figure 1. The models used to estimate the impact on the policy variables due to a policy change are represented by triangles. The policy analysis is initiated by specifying values for the choice variables listed in the rectangles of Figure 1. The selected values for the choice variables are incorporated into the technical information of each affected economic model. Solving the

Figure 1
Policy Evaluation Flow Diagram



models subject to the given choice variables yields the estimated effect on the policy variables of interest. The arrows of Figure 1 indicate the direction of flow between model inputs and outputs. Both aspects of the integrative nature of the analytical framework can readily be seen in Figure 1. Political considerations and biological realities are incorporated as choice variables that place restrictions on the linear programming model. The relationships, as indicated by the direction of the arrows, between the models of the system can be seen as output from the linear programming model imposed on the demand system. Likewise, the demand system output is imposed on the Input/Output model and the Budget model. A final dimension included in the analytical framework is the evaluation of specific components of the output to determine the technical feasibility of the production levels determined in the policy analysis. For example, prices may fall below that required for private planters or public harvesters to operate profitably. Similarly, production levels may exceed available processing capacity. In either case, the analytical framework permits readjusting the choice variables to accommodate a profit or processing constraint to reestimate the policy variables.

The first model used in policy evaluation is a Linear Programming (LP) model. LP models, a subset of all mathematical programming models, describe an economic system in terms of linear equations. The economic, biological, and political relationships contained within the model's technical structure are assumed to be linear. LP is a mathematical technique that optimizes an objective function subject to limits of resource availability and technical feasibility (Thunberg). Specifically, the LP model described here minimizes the public plus private cost of producing and harvesting a prespecified level of market oysters. In achieving the harvest goal, the model may choose from a number of different production and harvest technologies. The choice of production practices is, however, limited by legal constraints, availability of ORP funding, availability of growing bottoms, and political acceptability.

The technical information incorporated into the LP model is reflective of specified legal and repletion policies existing as of 1983. Proposed management strategies are evaluated by altering the models technical information to reflect the changed management environment. For example, a regulatory change permitting the use of a new harvest gear would alter the cost of harvesting oysters. To examine the economic impacts of such a management policy the analyst must identify the magnitude of the change in harvest cost and then adjust the model to reflect the new information. Solving the model yields an estimate of the cost and repletion funding savings or increases associated with the new gear regulation. In addition to repletion and cost information the model's output determines tax collections and production levels, by river system, on public and private grounds. The LP model,

therefore, provides quantitative estimates for production goals, cost minimizing goals, repletion funding, and self- financing goals. With regard to evaluating remaining policy goals, the LP model is inadequate because it is not suited to estimating changes in oyster prices.

Using the production levels determined by the LP model associated with a policy change, oyster ex-vessel, wholesale and retail prices can be forecast using a system of demand equations. The demand system, developed by researchers at Virginia Tech, expresses oyster prices at each level of the marketing chain as a function of Chesapeake Bay and Gulf State harvest, U. S. consumption of oysters, population, income, time trends, and an index of intermediated goods and services (Shabman and Capps). Price changes, therefore, can not only be forecast for changes in Virginia production but for changes in other factors affecting price as well.

The demand model is estimated using simultaneous equations econometric techniques. The resulting individual parameter estimates are interpreted as being the change in the dependent variable associated with a one unit change in any one independent variable holding all other independent variables constant. Since changes in Virginia's management policies have an impact only on Virginia's production, prices can be forecast by multiplying the Virginia's production regression coefficient by the new level of oyster harvest while maintaining all other independent variables at their specified levels. In this manner oyster ex-vessel, wholesale, and retail prices are estimated. The new price estimates can then be applied to the production levels determined in the LP solution to compute harvester, processor, and retailer total revenues. While most policy changes will likely have some effect on oyster prices and, therefore, on industry total revenues, in order to determine whether or not industry participants have been made better off by a policy change it is necessary to examine net revenue effects.

The third model used in the analytical framework, a budget simulator, is used to evaluate changes in net revenue due to a policy change. The budget simulator used in the analytical framework employs a spreadsheet format to generate changes in net revenues for individual harvesters and private planters given specified values or relationships for each budget item. Changes in net revenues are assessed by determining the impact of a proposed policy on particular budget items. For example, private planter net revenue changes associated with policies resulting in lowered seed prices would be attained by adjusting the seed price coefficient in the budget simulator. Lowered seed prices would likely result in increased production and lowered oyster prices. Adjusting the private planter's budget to account for the input and output price changes yields an estimate of net revenues for the private planter attributable to the proposed policy. Comparing the new level of net revenue

to net revenues that would have existed without the policy change provides the opportunity to determine whether or not industry participants are made worse off or better off because of the policy change.

The preceding effects, production, cost, repletion funding, price, total, and net revenue effects relates specifically to the oyster industry alone. Recognizing that linkages between the oyster industry and other sectors of the Virginia economy exist, it is important to consider how management changes within the oyster producing sector affect the Virginia economy as a whole. These state-wide effects can be evaluated through the use of multipliers generated with an Input/Output (I/0) model.

An I/0 model describes the interdependencies that exist between different sectors of an economy in terms of the purchases that are made by each industry from all other industries. Oyster harvesters purchase fuel and materials from several other economic sectors. These purchases in turn become income to the sellers of the materials which may be spent on purchases of seafood products or numerous other products produced in other sectors. The total amount of economic activity in an economy induced by an initial transaction in a single sector is termed a multiplier effect and can be computed for each economic sector. Multipliers for the seafood industry have been generated by Shabman and Johnson (1982). Using these multipliers it is possible to estimate changes in value-added and indirect tax revenues. Changes in value-added and indirect tax revenues indicate statewide net (gross sales less production costs) changes in economic activity due to a management change in the oyster industry alone. Indirect tax revenues are useful in assessing whether or not the repletion program can be made self-financing. For example, a change in management strategy may result in increased direct oyster taxes but may still not recover all costs of the repletion program. The collection of indirect tax revenues (tax revenues generated in sectors other than the seafood sector) may be sufficient to recover the remaining repletion budget deficit.

The analytical framework described in this section employs four different economic models to generate estimates of the impacts on various OFMP goals due to a change in management policy or policies. The analysis begins by adjusting the technical information contained within the LP model to reflect the policy change. The model results determine impacts on production, repletion program financing, and cost minimization goals. Impacts on oyster prices at the ex-vessel, wholesale, and retail level are forecasted by imputing the production levels determined in the LP model into a system of demand equations. The resulting prices are used to determine changes in industry total revenues. The prices generated with the demand system are also used as input to the budget simulator to assess changes in net revenue

associated with a given policy. Net revenues associated with each policy can be compared to determine whether or not individuals are made better off with a policy change than without a policy change. The final step in the analytical framework is to assess the state-wide effects of proposed management strategies. These impacts are estimated using multipliers generated from an 1/0 model of the Virginia economy. The multiplier analysis provides information with regard to state.wide gross income and the potential for the repletion program to be self-financing. The following section will provide a sample policy analysis to illustrate the use of the analytical framework.

Section 4:
Sample Policy Simulation: A Seed Dredging Policy

In this section a single proposed management policy will be evaluated and compared with a baseline condition. Both will be evaluated using the analytical framework described above. The models used for the analysis are currently being updated by the VMRC. For this reason, the analysis presented in this section is meant to be illustrative in nature. The baseline condition is representative of the set of legal and repletion practices maintained prior to OFMP development. The year 1983 is selected as a representative year for this purpose. The policy to be evaluated is a policy permitting the use of a dredge for the harvest of seed oysters. Of the regulatory alternatives available to the VMRC, seed dredging policies have traditionally been met with stiff opposition from the watermen. That such a policy is being considered is testament to increased public awareness of the need for change in traditional approaches to oyster grounds management. For the baseline condition, the only legal harvest gear for seed oysters is the hand-tong. The use of a dredge would increase the productivity of labor and would reduce the cost of seed oysters to private planters. For both scenarios a minimum harvest goal is set at not less than 700,000 bushels per year on both public and private grounds, and the repletion program is allowed a budget of $1,000,000 per year. Given this information, the LP model solves for the mix of repletion and production activities required to attain a level of market oyster harvest that is sustainable, does not exceed the ORP budget and can be maintained at least cost.

Table 1 summarizes the results of the scenario described above. The figures of Table 1 are presented on an annual basis with the exception of the total cost of meeting the harvest goal. Under a policy that permits the dredging of seed, the average annual total state market oyster harvest is 1,320,386 bushels, an increase of 14.04% over the baseline condition. In both cases the repletion budget is predetermined and cannot be exceeded.

Table 1
Estimated Impacts for Selected Policy Variables for A Seed Dredging Policy

	Baseline	Seed Dreding
Total Harvest (Bushels)	1,157,805.0	1,320,386.0
Public Harvest	667,805.0	830,389.0
Private Harvest	490,000.0	489,997.0
Total Cost ($)	34,589,845.0	37,320,649.0
Repletion Budget ($)	993,356.0	999,117.0
Tax Collections ($)	382,537.0	475,166.0
Budget Deficit ($)	610,819.0	523,951.0
Prices ($/Pound)		
Ex-vessel	0.830	0.8084
Wolesale	1.220	1.1949
Retail	2.094	2.0807
Total Revenues ($/Year)		
Harvester	6,419,334.0	7,130,232.0
Processor	9,435,648.0	10,539,231.0
Retailer	16,195,284.0	18,352,145.0
Net Revenues ($/Year)		
Private Planter		
750 (bushels/Acre)	-435.75	833.62
1125	1,042.65	2,257.90
1500	2,521,05	3,686.20
Hand-Tonger	314.16	2,569.67
Value Added ($)	10,170,654.0	10,661,001.0
Indirect Tax Revenues ($)	1,017,065.4*	1,066,100.1

* Estimated to be 10% of value-added.

Average annual repletion outlays are, therefore, roughly equivalent. Due to the lower production levels attainable when the dredging of seed is not permitted, the average annual repletion outlays are 16.58% higher than when seed dredging is considered.

The next step in the policy simulation is the estimation of oyster prices at the ex-vessel, wholesale, and retail levels. Assuming all other variables (Maryland harvest, disposable income, etc.) defined in the demand system remain unchanged, price forecasts are determined by adjusting for the total production level determined in the LP solution and multiplying by the appropriate regression coefficient. The resulting price forecasts are listed in

rows 8, 9 and 10 of Table 1. At an annual production level of 1,320,386 bushels, oyster ex-vessel, wholesale, and retail prices are predicted to be $0.8084/lb, $1.1949/lb, and $2.0807/lb, respectively, for the seed dredging policy. Under the baseline condition predicted prices are slightly higher at $0.83/lb, $1.22/lb, and $2.094/lb for ex-vessel, wholesale and retail, respectively. Total revenues to each sector of the industry are computed by multiplying each predicted price by total harvest. These revenue estimates are also listed in Table 1. In spite of lowered prices associated with the seed dredging policy, industry revenues increase under this policy because of the greater production potential.

The third step in the policy analysis is to determine harvester and private planter net revenues. Recognizing that all private planters do not face the same yields on their growing beds, annual net returns per acre for different production levels are computed and reported in Table 1. The budgets used to compute net returns under a seed dredging policy were adjusted to account for the lowered seed price and for the ex-vessel price determined with the demand system. The resulting estimates show that for all levels of yields per acre considered, when seed dredging is allowed, net returns are positive and increasing with productivity. Conversely, when seed dredging is not permitted, net returns per acre are negative for low productivity grounds. Additionally, higher seed costs offset the higher price received under the baseline condition causing net returns on all grounds to be lower than under a seed dredging policy. Net returns to harvesters working the public grounds are computed using the budget simulator after adjusting for price. The increased economic activity stimulated by greater harvest levels when the dredging of seed is permitted results in a greater multiplier effect at the state-wide level in terms of value-added. Under both scenarios indirect tax revenues are sufficient to recover all repletion program costs.

Examining the estimated values for the policy variables listed in Table 1 and comparing the baseline to the seed dredging scenario favors the adoption of such a policy. Reduced seed costs allow VMRC to get more repletion effort per dollar spent than the baseline condition. Additionally, lowered seed prices may make private oyster production profitable on grounds that otherwise would not be. Average annual repletion budget deficits are lower with the higher market oyster harvest levels associated with the seed dredging policy. The important implication of this result is that if a self-financing repletion program goal is pursued, taxes on harvested seed and market oysters would have to be increased relatively less than they would under the baseline condition. Since the majority of tax collections come from watermen harvesting market oysters on public grounds, the possibility of relatively lower tax rates under a seed dredging policy would enhance political acceptability. Indeed, albeit probably for entirely different reasons, in a recent

survey of Virginia's oyster harvesters, over 60% favored the dredging of seed as a means of improving oyster grounds management, a remarkable turn around in opinion considering the historical record (Santopietro). As a means for lowering seed prices, modifications to seed harvesting policy are also supported by private planters. However, VMRC officials are skeptical about such policies, citing increased management demands, uncertainties with respect to the extent of damage to seed beds associated with dredging, and the possibility that increased culling costs may outweigh the harvest cost savings. All these concerns must be addressed prior to adoption of a seed dredging policy.

This section provided an illustrative example of how the analytical framework is used to estimate the impacts of a proposed mangement policy on several important variables. The effects of any proposed policy or mix of policies can be similarly evaluated. In choosing the most effective overall management strategy for the OFMP, VMRC managers can simulate the impacts of many different policy alternatives and choose those policies that have the most favorable impact on the biological, economic, and social goals of the OFMP.

Section 5:
The Use of Economic Models in OFMP Development

The previous sections described in detail an analytical framework employing four different economic models to estimate the impacts of alternative oyster grounds management strategies. Although the models were all developed separately for different purposes their use in the integrative capacity described in this paper was developed specifically for the use by VMRC managers in the development of the OFMP. This section will discuss the current state of the OFMP and the role that economic modeling has played in its development.

The OFMP is currently in a review process. Goals and specific objectives have been stated and well-defined management strategies have been identified to achieve the plan's objectives. Although economic modeling played no role in specifying OFMP goals or objectives, VMRC managers plan to make extensive use of economic modeling in evaluating specific management strategies to identify the most effective overall oyster grounds management plan. The importance of such a step can only be realized when put into historical perspective.

With regard to regulatory policy, all harvest regulations had formerly been legislatively set. The VMRC's traditional role in the oyster fishery, there-

fore, has been one of enforcing harvest laws and administering the repletion program. In administering the repletion program over the past twenty-five years, VMRC has almost exclusively relied upon the expertise of a few repletion officers in determining the location and level of repletion effort in each river system. It is not suggested that repletion decisions made in the past were arbitrary or flawed in any manner. Rather, the VMRC, over this period, had neither the staff with the necessary expertise nor the data in a usable form, required to conduct the quantitative analysis (economic or otherwise) needed for a scientific basis for management of the oyster fishery. It is only within the past two years that VMRC has acquired an expanded management staff with the expertise and capacity to make use of the economic models discussed in this paper.

The management demands placed on VMRC are greater today than they ever have been. The use of economic models can provide an important analytical tool to aid VMRC decision makers. The fact that steps are being taken toward the adoption of economic modeling in oyster fishery policy analysis is truly remarkable in the context of historical approaches to oyster grounds management.

Prior to full implementation of the analytical framework described here, VMRC managers are updating and reviewing the assumptions and technical information incorporated into the models contained therein. In addition to this effort, ongoing research will contribute toward more informed policy decisions. Current research at Virginia Tech and the Virginia Institute of Marine Sciences are focusing on the cost structure of the harvesting sector of the oyster industry. These two research efforts will provide valuable information with regard to the feasibility of production goals set for the OFMP. It is not at all clear, for example, that even if production increases were technically feasible there would be sufficient labor to harvest the oysters or that sufficient processing capacity would exist. Similarly, while many good privately held growing bottoms exist in the State, the relationships between costs, output price variance of production, and attitudes toward risk are little understood (Thunberg). In addition to economic considerations, important biological questions remain unresolved. For example, the environmental factors that enhance the possibility that VMRC's shelling or seed-transplanting efforts will be successful need to be further investigated. The possibilities for genetically altered seed that is resistant to MSX or is suitable for transplanting in low salinity waters are but a few areas for biological research that could have important implications for oyster grounds policy. Incorporation of improved biological information into the economic model building process can greatly enhance the reliability and utility of economic modeling in oyster grounds policy decision making.

Conclusion

The management problem posed by the declining oyster industry has greatly increased the role for State management of the fishery. Recognizing that continued reliance on traditional approaches to oyster grounds management would have little effect in increasing oyster production, VMRC managers are currently developing an oyster fishery management plan. Man plan provisions represent marked departures from past management strategies. The most important management change is the adoption of biological and economic modeling approaches. For the first time in the history of the State's management of the oyster fishery, VMRC managers have the necessary expertise and commitment to make use of economic models to assess their policy alternatives.

The management challenge of the future is likely to become increasingly difficult. Implementation of the OFMP will place management demands on the VMRC never before experienced. The increased flexibility accorded to the VMRC's regulatory power by the Legislature will make oyster grounds management strategies more complex. The complexity and information demands of the decision making environment will create demand for analytical models. It is likely that economic modeling approaches will play a greater role as increasingly difficult policy choices must be made. Continue research efforts will improve the biological and economic information base upon which management decisions are based. Such research will improve the reliability of economic modeling, increasing the ability of oyster ground managers to make well-informed policy decisions.

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Chapter 9
Industry Views of Regulation and Management

"Biting the Bullet" and Other Fisheries Management Fallacies

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Most fishermen will tell you that the hardest part of any trip is throwing the lines off the dock. If that analogy can be carried over into my journalism career, I would have to say that throwing the lines off and jumping right into an article has never been a big problem for me — until I tried to write this paper.

When the first call for papers for this conference went out, I dashed off a quick page on "Quota Management — The Root of All Evil?" At about the same time I was turning out pages of arguments against limited entry, an analysis of where the fishery management council system stands as it approaches its tenth anniversary, and a series of articles explaining what I c the fishing pressure ratchet.

During the same time that all this prose was rolling off my word process with such ease, the Atlantic Demersal Finfish Plan was being rejected and r submitted, the scallop plan was being sidetracked through a political end-ru around the Council, and reports of large year classes of cod, haddock, and scallops were coming out of the Northeast Fisheries Center. Maine lobster men were astounding the fishery management world by supporting an increase in the minimum size of lobsters in return for protection of their V-notched brood stock.

The surf clam fishery in the Mid-Atlantic region of the fishery conserva tion zone was operating on a six hours every two weeks basis while a newl productive bed of surf clams in Long Island Sound was flooding the marke New surf clam boats were being rigged out to harvest the large and relative unregulated Georges Bank stocks, while other U.S. surf clammers were helping the Canadians explore the Canadian portion of Georges.

The butterfish that has fueled much of Point Judith's recent prosperity were failing to show up in quantity for the second year in a row. Point Judith boats took to fishing Georges Bank and the Gulf of Maine in unprecedented numbers. New freezer trawlers were coming on line and immediately leaving New England for southern waters.

Massachusetts lobstermen were calling for a total prohibition on the taking, landing, or possessing of lobsters by mobile gear vessels. Maine lobstermen proposed to the New England Fishery Management Council that a nine mile strip of the FCZ be closed to scallop dragging for seven months out of the year and the proposal was referred to the Scallop Committee.

Through all these developments an article in the November, 1985 issue of "Maritimes", the University of Rhode Island Graduate School of Oceanography publication, kept popping into my mind. The title of the article, written by Professor Perry Jeffries, is "Surprising and Unexplained Events in Narragansett Bay." In this article, Jeffries points out "huge changes in abundance" of several well-known species that became apparent during the analysis of weekly bottom tows taken in Narragansett Bay and in Rhode Island Sound by URI laboratory vessels over the past 20 years. "Scientific minds are baffled as to causes for these dramatic swings in abundance of such common species as winter flounder, scup, and starfish," Jeffries writes.

"Starfish?" I keep asking myself. There is no fishery for starfish. No minimum size requirement, no mesh size, no spawning ground closure, no catch quota, and no limit on the number of fishermen could have prevented the starfish population from falling from a position as the most numerous invertebrate in bottom tows in Narragansett Bay in the early 1970's to zero in 1979.

Suppose there had been a fishery for starfish. Think about the flurry of management activity and the severity of conservation regulations that would have been sought and fought as the fishery declined from prominence to non-existence. Imagine, the complete disappearance of a major species, something I'm not aware of happening in any commercial fishery in modern times.

Imagine the fishery management council meetings, as the continuing decline in starfish landings and the dismal results of the weekly bottom samplings provided graphic evidence of the "overfishing" of the starfish stock. Do you doubt that overfishing would be labeled the primary culprit?

Starfish fishermen, struggling to make their payments and support their families on declining catches, would be protesting regulations that would hasten their default on their mortgages and their departure from the fishery.

Bureaucratic ears would be sympathetic, but the hard fact would remain — you have to bite the bullet.

It all sounds like a joke, the rise and fall of the Narragansett Bay starfish fishery. But it is as real as the Atlantic Demersal Finfish Plan, the American Lobster Fishery Management Plan, or the Atlantic Sea Scallop Fishery Management Plan. As much as we tell ourselves that environmental conditions beyond our control may be as important or more important than fishing pressure, our inability to influence the environmental factors forces us to concentrate on fishing pressure as if it were the only cause of fluctuations in fish stock abundance.

I do not mean to tell you that we do not need fisheries management because nature controls the stocks and they will come and go regardless of what we do. This is the very heart of the uncommon problem that I had in not being able to sit down and write this paper and submit it before the established deadline. This is the essence of the fishery management dilemma that I see us facing today.

We must learn, to paraphrase the popular wall hanging, to recognize the difference between the things we can control and the things we cannot.

This learning process, however, has no end that anyone can foresee, and we cannot do nothing while we wait. What can we do, then?

We all know the various conservation techniques available to fishery managers. Although I don't believe the pros and cons of each of these measures as they apply to each fishery have been discussed and debated widely enough, I didn't come here today to prescribe the cure for our many specific fisheries management crises.

Rather than that, I would like to try to contribute to an overall view of fisheries management that I believe may help to move us along on the road to responsible conservation. Vaughn Anthony and S.A. Hurawski opened the door, at least, to the issue that I see as critical to the success of fisheries management in the concluding sentence of their 1985 presentation to the International Council in the Exploration of the Sea. They state that "it is the continuing challenge of managers and scientists to design and evaluate regulatory schemes that take into account the 'real world' responses of those being regulated."

While I agree with Anthony and Hurawski, I believe they left out part of the challenge as I see it. The "real world" responses of those being regulated

depends in large measure on their attitude toward, and their understanding of, the conservation issue at stake.

If one stops to think about it, there is no question that society as a whole embraces a conservation ethic to a much greater degree than, say, twenty years ago. The fishing community is certainly as aware as society as a whole of the importance of pollution control, wetlands preservation, and other conservation issues. The question of conserving fish stocks is closely related to these other issues, and fishermen thus have a basic attitude toward them.

Just as society has struggled with finding an acceptable balance between the costs and benefits of moving forward with the host of environmental concerns that confront us, fishermen as a group are struggling with the acceptable costs associated with achieving the benefits of conservation. Just as it is with other restraints required for environmental reasons, fishermen can be expected to resist the restraint if it threatens them too severely. Fishermen have the added justification for their resistance that the harm that they do, if it is actually they that are causing the harm, is only temporary since the resources are renewable.

Fishermen, then, are in a position to see both the benefits of conservation and the costs. The costs are often much more obvious and immediate, and their response to management proposals is likely to have more to do with reducing the cost than achieving the benefit.

Managers, on the other hand, tend to concentrate on the benefits of conservation without giving as much attention to the costs as a fisherman might.

Is there a right and a wrong here? I would suggest that there is rather an acceptable balance, and that the recognition of the acceptable balance is the key to productive fisheries management. I would also suggest that fisheries managers who insist on biting the bullet and imposing severe hardships on fishermen in the name of conservation are acting just as irresponsibly as fishermen who oppose any kind of conservation. My accusation of irresponsibility on the part of the fisheries managers does not stem from the likelihood that fishermen will be harmed by the actions of the managers, but from the likelihood that the conservation they seek will not be achieved because of their stubbornness.

The management of our marine fisheries is, in the final analysis, a political process. The most significant political force concerned with most of our major commercial marine fisheries is the commercial fishing industry. Fishery managers who attempt to impose measures beyond what the industry can accept are likely to find that the measures are either not implemented for

political reasons, or not obeyed. In either case, the goal of improved conservation is not achieved. By stubbornly insisting that it is time to "bite the bullet," therefore, managers can be counterproductive.

Is it possible, then, to make more progress toward conserving our stocks, towards achieving the "optimum yield," than we seem to have been making in recent years? I believe that it is.

To do this, however, I believe that we must change our approach from one that focuses primarily on active management efforts to one that focuses primarily on understanding our resources and educating ourselves to the conservation requirements of those resources. As we learn and understand what we can do to improve our resources, I believe we will find acceptable ways, one step at a time, to accomplish this goal.

I expect there will be many who will respond to this assertion by saying, "Oh, sure. That all sounds good, but why should we accept that fishermen will be more amenable to regulation just because they have a better understanding of the resource?"

I'd like to offer one example that may lend some credibility to my argument. I have often wondered why lobsters seem to be subject to a more active conservation ethic than other kinds of fish. I don't believe this ethic has anything to do with lobstermen directly, but it is connected to the lobster itself. I would even go so far as to say that many dragger fishermen have a higher conservation regard for lobsters than they do for the primary species that they harvest. And that doesn't even make economic sense.

It is also interesting to me that this regard for lobsters is a relatively new phenomenon, and that it is still not universal. There are people in the lobster business who wouldn't think of selling a short lobster today, but who carried on a wholesale business in shorts not very many years ago. They didn't just get religion, and they weren't beaten into submission by stringent enforcement. Why has the attitude of fishermen towards lobsters changed to the extent that the majority of lobstermen now support an increase in the minimum legal size, for example?

Think about this. Compare the general level of knowledge about the yellowtail flounder resource with the general level of knowledge of the lobster resource. How many years does it take a yellowtail to reach legal size? What percentage of yellowtails are sexually mature at the legal size? What percentage of yellowtail flounders are caught at the minimum size? How do you recognize a yellowtail flounder ready to spawn?

Ask the same questions about lobsters and I'm sure you'll find a much higher general level of knowledge, not only among lobstermen, but also among fishermen in general.

I would submit that the willingness of lobstermen to submit to regulations and to increasing regulation, is due in large measure to their greater understanding of the resource. I would qualify that statement, however, by pointing out that this willingness of lobstermen to accept regulation does not mean that they would accept the 3 1/2 inch minimum size that fishery managers were pushing. There was still a need to find a balance between the theoretical biological optimum and the optimum as defined in the Magnuson Act.

Having said that conservation requires an understanding of the resource, and that the lobster fishery has benefited from such an understanding, it seems to me we should ask why the lobster fishery has been different in that regard. And this is where I feel the hopelessness start to set in, because the answer that I see makes it clear that the process is a long and frustrating one that will not generate enthusiasm on the part of the fishery management system.

To my knowledge, the lobster fishery has supported the most comprehensive, broad-based, and active organizational structure of any major fishery in the Northeast Region. Through this organizational structure, lobstermen have come together, with each other and with biologists and other fishery managers to discuss and debate on a continuing basis the issues of lobster management. These meetings have ranged from monthly meetings of relatively small groups to annual meetings of growing numbers and expanding geographical coverage. I'm not aware that any similar activity involving any of our other major commercial fisheries has taken place, particularly focused, as many lobstermen's meetings are, on fishery management issues.

If it is true that the organizational structure of the lobster fishery has brought about a greater conservation ethic, it is not so easy to propose that we just emulate this situation in other fisheries. The major portion of the lobster fishery is carried out by fishermen who go out for the day and return at night. The fishery is quite seasonal, with periods during the year when fishing activity is slow or non-existent. Lobstermen have a degree of flexibility in planning their schedules. Their participation in organizational activities, therefore, does not necessarily interfere with their business to the same extent that the same degree of participation would interfere with the business of an offshore trip fisherman.

Many of the major fisheries of conservation concern at the present time can be contrasted with the lobster fishery by the fact that they are predomi-

nately trip boat fisheries. All the boats operate on their own individual schedules, and a change in schedule to accommodate attendance at a meeting, or regular meetings, is too costly to be acceptable. On a local, or port, basis, particularly in the larger ports, it might be possible to get enough people together to accomplish something, but it would be difficult to justify bringing in scientists and fishery managers, and the broad-based cross fertilization that is necessary for consensus would be difficult to achieve.

Many of our major offshore fisheries are also year-round fisheries with no universally accepted slow season, at least not to the extent that a whole fishery pretty much comes to a halt as does the lobster fishery. Complicating this further is the fact that many offshore vessels are multi-purpose, or at least multi-fishery operations, switching from one fishery to another as their seasonal productivity dictates.

This is the challenge facing the Atlantic Offshore Fishermen's Association: to find the solution to the many obstructions that stand in the way of establishing a broad-based, comprehensive organization of fishing vessel owners involved in all the major commercial offshore fisheries on the Atlantic coast.

We recognize the difficulty in doing this — we've been trying to do it for fourteen years now, with limited success. We view a major part of this challenge to be the development of a communication system that does not require individuals to be present at regular meetings in order for him to interact with his association.

I am not going to tell you that Atlantic Offshore is trying to bring about this regional organization for the sole purpose of creating a greater conservation ethic in the fishing industry, but I will tell you that a recent pole of our membership placed fisheries conservation as the number one priority out of twenty major issues. If we are successful in serving our members, therefore, we will be working toward the improved conservation of our resources.

As people who are interested and involved in East Coast fisheries law and policy, therefore, I would like you to consider seriously the following points:

1. We have a wide variety of fisheries with an equally wide variety of conservation requirements;

2. We have a complex mix of fisheries that combine to create what we call our fishing industry;

3. Each fishery is a combination of the resource, the market, and the capital and labor that brings that resource to the market;

4. Conservation is not appropriate, and will not succeed, if it does not consider all aspects of the fishery;

5. An emphasis on understanding our resources, and disseminating that knowledge, will bring about greater conservation than attempting to force unacceptable restrictions on an unwilling industry; and

6. An understanding of the conservation requirements of a fishery can be hastened through strong and active fishermen's organizations.

Fishery managers and others who are interested in bringing about better conservation should therefore support and become involved with the establishment of strong fishermen's organizations and use these organizations for the two-way flow of information between managers and fishermen that will be necessary to arrive at responsible and acceptable fishery management plans.

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The Commercial Fishing Industry's Involvement in Data Acquisition and Marine Biological Research

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Abstract

The purpose of this paper is to present an historical account of the commercial fishing industry's involvement in marine-related biological research. In addition, it will highlight and successfully argue the advantages of the commercial fishing industry's direct involvement in research and data acquisition and its impact on certain aspects of fisheries management.

Introduction

The commercial fishing industry is presently and has in the past been the scientific community's main source of information on marine ecology. Historically, providing relevant information either to biological or technical researchers has been a self-serving process for fishermen. For the commercial fishermen, knowledge of their occupation not only increases the chances for success, but also promotes pride in achievement through a broader understanding of their work environment. In the commercial fishing industry, the need for updated information is essential because of its highly competitive nature. An interchange of ideas with scientists provides a broader comprehension and usage of materials and methods involved in the fishing activities. Also, while working on the ocean, fishermen are presented with a great deal of unforeseen circumstances that not only affect their success but their safety as well. This information is essential for them to be able to anticipate future situations and make decisions that will enhance a safe and successful operation.

Through technical innovation science has provided fishermen with the ability to conduct their operations as safely and as efficiently as possible. Basic changes, from the use of lead weights and compasses to that of color sounders and automatic course plotters, have been a rather recent development, with more advances still anticipated in everything from electronics to

increasing gear efficiency. Although most fishermen hardly consider themselves computer programmers, comprehending this new technology has not presented any real problems. With the listing of new products in technological sections of fishery-related publications, fishermen have the opportunity to scrutinize the efficiency and utilization of new technological equipment and do so readily.

However, as scientific technology advances in the mechanical aspects of the fishing industry, advancements in the understanding and maximum utilization of its biological components has not progressed in equal measure. In addition to the inherent problems, such as the accessibility of raw data and the absence of well-tested scientific methods for accurately predicting ecological changes in the ocean, a current advancement in biological research is further hampered by a resentment on the part of the fishing community toward some past and current management practices. As a result, it now appears that access for researchers to biological information provided by fishermen may become more difficult to obtain when it is most needed. An obstacle such as this, the acquisition of information from the fishing community concerning marine ecology, has not always been present and can be attributed to a recent lack of communication between fishery scientists and commercial fishermen.

Historically, fishermen have been the main source of information to marine biologists. By providing specimens for analysis, exhibits, and sightings which aid in behavioral studies, the commercial fisherman has been a steady and reliable source of valued information that could not otherwise be obtained. Although fishermen still provide scientific information on a broad range of topics and are actively involved in ongoing research there now appears to be a reluctance to provide the scientific community with the necessary information for developing certain resource management plans. The main theme of this paper directly addresses this problem.

This paper will also explore some of the reasons for this communication breakdown and its implications; and will investigate areas where the commercial fishing industry could be and has been of great assistance to researchers in developing a detailed understanding of the marine environment. Lastly, this paper suggests that more active assistance by the fishing industry would aid in creating a more comprehensive management plan that would significantly protect the resources while assuring fishermen of a future environment with which to make a living.

Historically Speaking

Recorded fish abundance reports can be traced back to the early American settlers. Comments on fish availability have been found in the writings of such notable early explorers as Captain John Smith. However, it wasn't until the 19th century that any real scientific effort was put forth to identify and list marine organisms here in the Northeast. As early as the 1800's the topics of fish and fisheries of the North Atlantic appeared in publications in both the U.S. and Canada. A detailed investigation of the marine environment was initiated in 1912 by the U.S. Bureau of Fisheries and the Museum of Comparative Zoology of Harvard University. This was one of the first of its kind. It lead to subsequent research efforts culminating in published reports in 1925 on fishes encountered during this investigation. In 1926-27 a subsequent part of this investigation which dealt with the plankton and physical characteristics of the marine environment sampled was also published.[1]

The next notable research effort and publication pertaining to the New England area was *The Fishing Grounds of the Gulf of Maine*, by Walter H. Rich which appeared in the U.S. Department of Commerce, Bureau of Fisheries, Report of the U.S. Commission of Fisheries.[2] This report along with Bigelow and Schroeder's *Fishes of the Gulf of Maine*[3] published twenty years later have become two of the most widely used and informative references available to both fishermen and researchers today. Their thoroughness is exemplified by their current use and lack of any major revision even though technological advances and improved knowledge of the marine environment would seem to warrant it. The accuracy of these two publications has been attributed not only to hard work and good techniques exhibited by the scientists involved but also a great deal of the credit has been given to the commercial fishing community. The commercial fishermen's role in most early marine related research can be best exemplified in a quote from Bigelow and Schroeder:

> "We wish to express our hearty thanks to the many commercial fishermen and to the many salt water anglers of our acquaintance who have met our inquiries in the most cordial way and who have supplied us with a vast amount of information on the habits, distribution and abundance of the commercial and game fishes, which could be had from no other source. The preparation of this book would have been out of the question without their help."[4]

Current Areas of Assistance by Fishermen:

A. Research Institutions

In a number of areas this spirit of cooperation between scientist and fishermen is still very much evident today. For example, the National Museum of Natural History at the Smithsonian Institution in Washington, D.C. has relied on fishermen to provide necessary marine biological material over the years. A large number of cephalopods (squid and octopus) are in the Museum because of the contributions of commercial fishermen. Also included there are records of specimens captured and sightings of the rare giant squid (Architeuthis). A new species of crab and a huge octopus were caught by Bermuda fishermen who were experimenting with a new fishery. As a result, information and specimens were forwarded to the Museum on these discoveries and those of other crabs and shrimp.[5] A New Hampshire fisherman has also assisted in the acquisition of invertebrates. He has personally provided many specimens when needed which have been used by researchers working at the Museum.[6] The Smithsonian and other research institutions and aquariums are also actively using the foreign fishing fleet operating in the FCZ (Fishery Conservation Zone) to obtain information on sightings and biological samples of marine mammals. On the West Coast, fishermen have provided information to NMFS (National Marine Fisheries Service) researchers on the feeding habits of marine mammals and samples of their diet.[7] Expanding fisheries into different areas has provided the opportunity to discover previously unreported species. For example, this has happened with the discovery of new species of squid in Australia and New Zealand and a new species of octopus in Mexico.[8] Blue sharks which at one time were thought to be extremely rare in the Caribbean sea and in the Straits of Florida have been shown to appear regularly because of the development of deep water longline fishing gear on which they are caught.[9] And the new species of crab caught off Bermuda is another example.[10]

Commercial fishermen have been called upon to provide specimens for research in areas such as physiological and biomedical research. Examples of this are in the use of the squid giant axion and octopus' circulatory and nervous systems in many forms of biomedical research.[11] And just recently the goosefish (*Lyphius piscatorus*) is being used in the study of insulin secretions for use in treating diabetes.[12]

Assistance to researchers has been forthcoming from the fishing community even if positive results are not always achieved. For example, the discovery of the spawning grounds of summer squid has been unsuccessful (*Illex illecebrosus*) so far. The Canadians have spent millions on research

cruises to try and find any indication of their whereabouts. When U.S. fishermen were asked to help in this search there were many responses. And although the search met with little success, the interest was expressed.[13]

Developing fisheries for underutilized species has also been a strong point of cooperation between the commercial fishing industry and research scientists. In the Northeast this could be exemplified by the New England Fisheries Development Program. To date there have been many successful joint research efforts. The development of a red crab fishery on Georges Bank is an example of this. Fishermen from Gloucester and New Bedford, Massachusetts and Galilee, Rhode Island aided in measuring the density, size, and sex composition of the red crab population, while also helping in a tagging program. The information obtained from this effort was helpful in understanding the biological aspect of the fishery. Not only was this necessary to develop a fishing strategy but also to develop an economic forecast needed for marketing this new product.[14]

Fishermen who are asked to assist in scientific research traditionally meet this request with a mixture of curiosity and reservation. How successful any project is will depend on how the fishermen perceive it. If it does not present any unnecessary burden or infringement on valuable fishing time and appears to have a practical application it probably will receive a favorable response. In Southern New England, for example, fishermen have worked with the University of Rhode Island in projects including fish quality and handling methods, evaluation of trawl deck instruments, and fish harvesting gear research. They have also notified scientists at the University of Rhode Island of unusual or unknown species that they have caught. Their future assistance is also anticipated in a project that will try and determine if immature halibut can be excluded or expelled from a ground trawl.[15] Elsewhere, fishermen have assisted NMFS in the development of the Turtle Excluder Device for trawl nets in the Southeast. In Maine, fishermen have assisted the Department of Marine Resources in the development of a by-catch eliminator for the shrimp fishery. And a Portland area fisherman has worked with a private research organization and the New York Power Authority assisting in the study of striped bass in the Hudson River and Long Island Sound.[16]

B. Shark Research

There are many other examples of this cooperative research between fishermen and scientists. As in a number of those cases previously cited, fishermen's services are provided with anticipation of some form of future gains. However, there are areas where curiosity concerning a research topic, or the desire to become involved in one, may be the only incentive needed to participate. This type of assistance, provided with little more than a "thank

you" anticipated in return, could be exemplified by the NMFS shark tagging program. For this, American and foreign fishermen have provided necessary information for migratory behavior, age, and growth studies on sharks. This program was initiated in the early 1960's. Although geographically limited in its initial stages, tagging developed over a broader area with the assistance of commercial fishermen who fished for swordfish. The program was/is based almost entirely on the fishermen's cooperation. Independent fishermen, both sport and commercial, provide better than 50% of fish tagged and tags returned. And in remote areas such as the Grand Banks, commercial fishermen are credited with providing all of the information that is now available.

The amount of assistance provided and the degree of reliability of information received from fishermen indicate that a considerable amount of time and effort go into providing accurate data. In addition, fishermen who are not directly involved in the program have provided information on the sightings of uncommon species and areas of fish concentration. This information saves researchers time and money in their efforts to locate and record such findings. Fishermen have also provided direct assistance to researchers by lending or contributing the use of their vessels and the manpower to conduct investigations.

Interest in the shark tagging program has continued to grow over the years and in 1985, for example, there were 7,194 fish tagged and 256 recaptured. This amount was equal to the amount tagged in the first seven years of the program; also, more tags were returned in 1985 than the total amount returned for the first nine years."

C. Swordfish Research

There have also been cooperative research efforts between fishermen and scientists concerning other species of pelagic fish. Swordfish research, for example, although not having enjoyed the success of the shark tagging program, still relies heavily on commercial fishermen for obtaining ecological information and assistance in conducting research projects.

Over the past twenty years (1965-1985), swordfish research projects to which commercial fishermen have made a major contribution have included the tagging of 1,625 fish and the return of 75 tags from recaptured fish." Along with this tagging effort commercial fishermen have helped in providing stomachs of swordfish for scientists studying the feeding habits of the fish. They have also assisted researchers in obtaining hard parts (vertebrae, spines, otoliths) from fish needed for age and growth studies. Fishermen have also provided time in addition to their fishing activities and equipment

to help researchers locate fish at sea for study. In one such instance a fish located by a swordfish spotter plane working with a commercial fishing vessel was tracked and tagged with a depth and temperature transmitter. The fish was then tracked by a research vessel picking up information from the transmitter."

Much more ecological information is needed before any accurate life history model can be developed for swordfish or any other pelagic species (e.g., tuna, shark, etc.). For that matter, the information provided by the commercial fishing industry will be a major factor in determining how successful any future investigation of these apex predators and their environment will be. And because of the highly migratory nature of these pelagic fishes, capable of moving from one country's fisheries conservation zone to another, the information provided to scientists for management purposes is significant on a national as well as international level. The problems encountered by researchers studying pelagic fish species are numerous, and any success achieved in understanding the ecological components of these fish depends significantly on the assistance provided by those fishermen who actively pursue them.

D. Mackerel Research

Although future prospects of any major development in most pelagic fish research are not very encouraging, there has been some development in Atlantic mackerel research. Along with the information coming directly from U.S. boats catching Atlantic mackerel, numerous joint ventures between U.S. and foreign vessels have been another source of information. There has also been a directed foreign fishery for Atlantic mackerel as well as a directed squid fishery that have both provided biological information on Atlantic mackerel. A joint research effort between fishermen on two factory trawlers has provided space for scientists while at sea to obtain data on Atlantic mackerel.

The mackerel fishery has provided scientists with a vast amount of data on which to draw from for future research projects. The amount of biological information on Atlantic mackerel provided to scientists by foreign fishermen has little chance of being duplicated in other fisheries. A significant amount of knowledge has been gained in fish mortality rates, age and growth, population structures, parasite infections, and other related areas. With continued assistance from the U.S. fishermen in updating this data after the foreign effort declines a thorough knowledge of the Atlantic mackerel and its ecology could be gained.

E. Lobster Research

Another fishery where scientific knowledge is currently influenced by a considerable amount of input by fishermen is the lobster fishery. In Maine for example, lobstermen have been instrumental in providing information concerning the lobster's ecology and the fishery itself. Currently, and in the future, there are/will be four distinct lobster tagging studies in the Gulf of Maine which rely heavily on lobstermen and fishermen to assist in the recapture and return of tagged lobsters. They involve the Maine Department of Marine Resources, the federal government (NMFS), the University of Maine Sea Grant Program, the Maine Lobstermen's Associations, and a Canadian study. There has also been lobster tagging research done in the past and, although not nearly as extensive as the present studies, the information and assistance provided by lobstermen were the keys to their successful completion. Although the results of this earlier research was not conclusive and produced more questions than answers concerning lobster migratory behavior, it did provide a format for some of the current research.

Initially, with lobster tagging studies, incentives were used to gain co-operation from those fishermen finding tags and returning them to researchers. Cash rewards have been offered for tags returned as compensation to fishermen for their investment of time and effort. In Maine, the Department of Marine Resources has even held a trap lottery with returned tags, giving away new lobster traps.[20]

Currently, however, some of the new research has not only been initiated by lobstermen but they have also provided extensive manpower to set up the studies and to collect data. In the future they may also assist in providing funding for some of these programs. One such program currently underway which was initiated by lobstermen and relies heavily on their participation is the University of Maine, Maine Department of Marine Resources, and the Maine Lobstermen's Association tagging program. This program was initiated in 1983 when industry members contended that a minimum size regulation on captured lobsters might result in significant numbers of larger legal-sized lobsters leaving near shore waters and eventually becoming unavailable to Maine inshore fishermen. The objectives of this research are to determine (1) movements and/or migration patterns; and (2) holding capabilities of two tag types designed to remain attached after the molting season. During 1983 and 1984, a Maine Department of Marine Resources research team assisted by members of the Maine Lobstermen's Association and the University of Maine Orono tagged and released about 2000 lobsters in both the Stonington and the Boothbay Harbor regions.[21]

In other areas, Maine lobstermen have provided assistance to researchers in the design and testing of escape vents for traps which would allow for undersized lobsters to escape. Lobstermen have been a reliable source of information concerning environmental changes.

In the past, lobstermen have provided to scientists information on changes in population levels and areas of abundance, as well as specific biological information for both crab and lobster. Due to the lack of resources available to investigate the biology and ecology of such species as the Jonah and rock crabs, what information that is available comes almost exclusively from the observations of lobstermen. Reports from lobstermen on the relationship between sea urchins and the availability of kelp (which provides protection for lobsters) in shore areas, has prompted an investigation into the effect sea urchins may have on the coastal ecology.

The Maine lobstermen's concern for a healthy environment and a strong lobster resource has gone beyond their active participation in research efforts and keeping scientists informed of ecological change through reported observations. They have also been involved for years in an industry sponsored conservation measure to "V-Notch" egg-bearing female lobsters' tails. Its supporters claim that sexually mature female lobsters are protected by making it illegal to sell or possess such "V-notched" lobsters. In addition, there is a program developed (the seed lobster fund) to provide money, which comes from the industry, to purchase sexually mature and protected lobsters and place them in depleted areas in order to replenish the stocks. Recently, there has been an interest in taking this a step further by using some of this funding to raise lobsters in hatcheries and then to release them in the ocean to supplement natural populations.[23] Maine has not been the only state utilizing its lobstermen in research or conservation efforts. The coastal states of New England and the mid-Atlantic region, and the National Marine Fisheries Service, as well as private organizations, have used lobstermen to assist in obtaining information on ocean ecology. Studies have been done to determine the effect of oceanographic effects such as tides and currents on lobster behavior.[24] Offshore lobstermen's catch records have been analyzed to define areas of concentrations and movement of lobsters on Georges Bank, and they have been used to confirm results of tagging experiments in addition to contrasting differences between offshore and inshore lobster populations.[25]

The Industry's Opposition to Fisheries Management

As in those examples this paper has previously cited and in many more instances not covered, there has been a strong willingness on the part of the fishing industry to actively participate in research conducted in the marine

environment. Whether the motive is one of personal gratification or of financial gain there does exist this desire to become involved in some forms of research.

Recently, however, in areas that require the enactment of regulatory management programs to preserve fishery resources, fishermen and scientists have more often than not taken different views on certain measures. This in itself is not something that is totally unexpected. In the management of any harvestable resource there are regulatory measures that have to be enacted which may and often do cause some initial loss of availability to those using it. This sacrifice can sometimes be a hard pill to swallow when it comes down to dollars and cents, but in most cases if a management program is sound and future improvements can be anticipated by those affected it will for the most part eventually be accepted. With those fishermen that cannot deal with certain programs initially, there is the option to make adjustments to better utilize the resource, once successfully managed, in the future and be assured that there will be something available after the commitment has been made. In theory this is the effect management of our harvestable resources should produce. However, this is not the case, as evidenced by the number of problems plaguing managers today and the recent resentment by fishermen of many of the conservation measures that have been enacted since the FCMA (Fishery Conservation and Management Act) came into effect in 1976.[25] Most of these problems can be directly attributed to the lack of information about the resource available to scientists, who in turn provide managers with the stock assessments needed to develop conservation measures. In New England, there have been some successful areas of cooperation between fishermen and fisheries scientists. Tag returns from cod and haddock tagged in the Sheepscot Estuary in Maine and yellow tail flounder in Southern New England are such examples. However, they appear to be the exception and not the rule where cooperation between fishermen and scientists is concerned.

The Quota System

With the enactment of the FCZ came the need to manage a resource depleted by heavy foreign fishing. Some of the earlier management strategies were rather reactionary due to the limited amount of stock information available to managers; the fear that the past foreign fishing effort had placed stocks in a dangerously low level; and the immediate need for the enactment of conservation measures mandated by the FCMA. In 1977 the FMP (Fishery Management Plan) went into effect for cod, haddock, and yellowtail flounder. It required a minimum mesh size for nets, seasonal spawning area closures, and optimum yield, better known as quotas. Attempts to restrict harvests under this quota system led to more restrictive measures such as

allocations by vessel class, quarterly quotas, and vessel trip limits. These quotas led to considerably more management problems than they have helped to solve. The restrictive nature of these programs set off a storm of protests from fishermen throughout New England, and they presented a united front for probably the first time. Fishermen managed to have the quotas lifted. However, the damage had been done. Fishermen's negative interpretation of the wording on the restrictions and their reason for enactment left a strong resentment toward fishery management people and others involved in this process. There were also other problems caused by some of these measures. These quotas had detrimental effect on reliability of the commercial fishing data base which declined considerably because of misreporting or underreporting and discarding catches. Previous data compiled for years on landings and catch efforts for these stocks was biased by these new figures.

Mandatory Logbook System

Fishermen were hit with another shock right on the heels of the quota system, and that was with the mandatory logbook system. The new logbook system, established in January 1979 by National Marine Fisheries Service, was developed to provide information to NMFS on catch data in order to monitor how fast quotas were being caught. And of greater importance for the future, the logs would provide a more extensive data base from the industry to be used in stock assessments. After the requirement went into effect, fishermen and fish dealers were required to complete the log and send it to NMFS on a weekly basis or face legal consequences. As fishermen became aware of the program, there were many questions pertaining to the issue of what exactly they would be held responsible for. For example, they wanted to know what would happen if their estimated weights did not match exactly with their weigh outs. Also, there was the question as to whether the I.R.S. would be allowed to inspect their catch reports. Most importantly, they wanted to know if their fishing areas would become public knowledge. Information pertaining to these questions was not readily available and whatever published responses there were became overshadowed by the strong negative sentiment voiced by the industry. For example, an article in *Maine Commercial Fisheries News* in 1979, New England Fisheries Management Council and Maine's Commissioner of Marine Resources, Spencer Apollonio stated quite bluntly that:

> NMFS has done a disservice to the fishing industry and to the cause of fishery management under the council system by not realizing the importance and sensitivity of the logbooks issue and devoting the appropriate amount of thought, care and expertise to the design of the program. The system as they have designed it imposes paper work on the industry for no purpose.[36]

For the most part though, fishermen were not opposed to the entire concept of the logbooks, but to the particular circumstances surrounding their development and implementation. This opposition took on a serious note when in June 1979, the Massachusetts Inshore Draggermen's Association took the issue to court. This made it very difficult to focus attention on the real issue, the need of scientists on the New England Fishery Management Council and at NMFS for information from fishermen on the current status of the fish stocks. There also developed a detrimental effect on the data collection system currently in place. By wide-spread misreporting of the amount and locations of fish catches to evade restrictive trip limits the effectiveness of the whole system deteriorated. There was also a noticeable breakdown in the cooperation between vessel captains and NMFS port agents as a result of the mandatory logbooks.

After its stormy reception and legal battles the mandatory logbook program was eliminated. Managers were then faced with the problem of not only developing an alternate system to acquire much needed updated catch statistics from the groundfish industry but they were also faced with improving severely strained relationships with the commercial fishing industry. Hoping to solve these problems the New England Fisheries Management Council developed the three tier data collection system.

The Three Tier System

The plan of the three tier system was to utilize fishery statistics and the data collection system that had been in effect for the past decade. The use of port samples and the New England Fisheries Center's Trawl Survey in acquiring information were its primary sources. The intent was that the three tier system would resolve enforcement problems, develop better and more reasonable fishery regulations, and change National Oceanographic and Atmospheric Administration and National Marine Fishery Service's implementation procedures, (separating data collection from enforcement procedures, such as the mandatory logbook system) rather than alter (negatively) a good general fishery data base. This would have been accomplished by eliminating individual vessel identification. The advantage of this action was that it would have increased industry participation in the program but its disadvantages were that individual vessel participation in a fishery could not be determined by its performance.

The system consisted of a first tier which was data collected from dealers. It corresponded to the weighout data already being provided to port agents by dealers. The second tier was collected from vessel captains, corresponding to the interview system also being used by port agents. And the third tier would

be collected from the vessel's captain and be in some way similar to the logbook system. The exceptions were that it would be based on voluntary industry cooperation; it would apply to a subsample of the fishing trips; and records kept by fishermen would be augmented by NMFS or sea observers and samplers on cooperating vessels. The intent of this system was to provide data on a continuous basis to be used in a wide range of industry oriented management analysis. To realize this goal the needs of fishermen (protection of financial privacy, local fishing operations from domestic competition and general knowledge of fishing grounds) had to be met. Results and how they were to be used in management strategies were to be provided to the individuals that had participated. This was anticipated to satisfy the fishermen's long held belief that the scientific data being used to develop management plans was outdated and not really what was taking place in the fishery.

However, since its enactment the system has encountered a number of problems that have limited its ability to function at an effective level. Although the first two tiers of the system were already in operation prior to the plan and have continued providing information in that capacity, the third tier system has met with a number of obstacles. For example, funding, the availability of trained personnel, and liability problems have limited its operation considerably. In addition to these technical problems there was also interference coming from a different source. In one instance, a debate ensued between NMFS and NEFMC concerning the data produced by the system. The Council maintained that they needed access to the data to enable them to adequately address scientific aspects of management policies. There was also expressed an interest by the Council to have the data collection system provide some sort of direct association between catch effort and individual vessels so an economic forecast could be made. NMFS contended that it was unlawful to release this information to the public and that use by fishermen and other related industry members on the Council of the information would create a conflict of interest. NMFS maintained that they had made various commitments to the industry (and Council) representatives to eliminate information which permits the association of individual vessels with performance data. This exchange was made in the expectation that the industry's support would be given in the collection of improved fishery data for resource assessment. However, both NMFS and the Council agreed that the loss of the information in question significantly diminished the utility of the data base for other types of management analysis which would be of potential interest. The Council negatively viewed NMFS's contention that preventing the appearance of a conflict of interest was more important than allowing the Council access to raw data. The Council's view was voiced by one of its members:

> This data was used by the Council for biological impact analysis and was also necessary, even though the stock assessments per se are the responsibility of the Northeast Fishery Center, the analysis by the Council must directly utilize the raw data in order to determine exactly what stocks are measured and to correctly and critically interpret the research results.[27]

This control of raw data limited the Council's ability to contract fisheries research and meant that NMFS by controlling the data would determine the extent and level to which the research could be applied. Also, not allowed access to individual records, the Council would not be able to fulfill its responsibilities for analysis in support of (1) Council policy decisions; (2) defining management units and objectives; (3) management strategy identification; and (4) evaluating biological, economic, and social impacts on various management alternatives.

As a result of this political maneuvering by the NEFMC and NMFS any real solution pertaining to the immediate problem of providing updated data to research scientists so as to adequately assess current fish stocks was not forthcoming. The fishermen were another casualty of this inability of fishery resource managers to extract updated data from the groundfish industry. It would appear that they had not only lost the protection of a workable management plan for the industry (at this time) that updated scientific information would provide, but had also lost a good deal of faith in those people (resource management) that in essence would be providing for their security.

Current Research on Groundfish

Prior to recent management setbacks, fishermen have complained that since the Fishery Conservation Management Act was established and fishery management became a fact of life, the regulations have no relation to reality because the scientists responsible for providing the Council and NMFS with the data on which to base their management decisions do not have accurate and updated information. Fishermen have readily acknowledged that the catch effort reporting required by fishery management plans is a way for them to provide the scientists and managers with better information than they presently have available and have urged greater use of their own information in establishing management measures. However, since the early 80's, the opportunity to extract and utilize this information from the commercial fishing industry has never really developed. This has not been because the willingness to help provide information on the part of fishermen was not evident, nor because the need of it by scientists was not crucial, but because other outside factors have served to delay implementation of any useful program which would get the two together.

From a scientific perspective the information being provided to researchers responsible for developing biological assessments of current stocks under management consideration is minimal at best, although many of the programs currently in use today have been ongoing for some time. In the New England groundfish industry this information comes from a number of sources, of which a majority are directly related to commercial fishing activities. To obtain the "M.S.Y."(maximum sustainable yield) of certain stocks, resource managers need to develop fishing catch and effort policies. For this, scientists need to know past and present length and age composition of fish removed from the stock, the number of young fish which eventually enter a fishery (recruitment), growth rates, amount of fishery effort, time and location of fishing effort, and removal of a targeted species by means other than fishing. The basic types of data considered necessary to provide for this are fish landings, fishing effort, biological samples (length frequencies, age and sex). The current system for acquiring this information through the sampling of commercial catches originated from the haddock sampling program of the 1930's. It was expanded in the 1940's and 50's to include other species and at this time port samplers were assigned to the major ports. These agents were responsible for the collection of landing data, fishing effort, and position of fishing areas, for all species landed in their ports. And to cover the vast area and amount of data involved, the program was also at times augmented under contract sampling by state agencies and educational institutions. Currently this program exists in 10 states from Maine to Virginia with 19 port offices covering 21 major port areas. Information is also provided for stock assessments by scientific research cruises. Of primary interest to groundfish management is the Northeast Fisheries Center bottom trawl survey conducted in the spring and fall of the year. This, along with similar research conducted by state agencies, has provided information to researchers to form a basis for evaluating trends in abundance for individual species, and calculating total bio-mass and food habits.

It has been maintained by NMFS resource managers and some scientists that the general consistency between the fishery and survey data base in depicting trends in abundance, population, size, and age composition supports the general validity of these techniques. There is, however, an obvious potential for bias associated with anomalous survey data both in the trawl survey and commercial catch information.

In biological sampling of commercial catch data it is essential to obtain unbiased representative samples which have to accurately monitor landings by stock, area, season, and gear in order to adjust sampling to reflect changes in landing patterns. Also, estimates of fishing mortality need to take into account gear type and effort. The need for this information to be accurate and consistent is to provide scientists with the necessary material for an

accurate assessment of the fish stocks. The need for information of this kind requires a great deal of effort from those charged with its acquisition. In the groundfish industry, port agents are responsible for this information. They have to consistently monitor changes in techniques to account for them. The seasonability of a fishery also presents a problem to samplers engaged in constantly monitoring a fish stock. Even when samples are from available market categories, culling and the sale of fish in the round will determine what it is to be used. Also, any sampling done has to be accomplished at the discretion of the fish dealers. While information on effort has to be obtained from the captains of the vessels, it only takes place at their convenience.

Trawl survey data used in stock assessment has a potential for bias as well. This survey data has been necessary for scientists in solving particular fishery research problems. In most cases, however, characteristics of these methods have not been fully evaluated. Scientific trawl surveys, though extensive, are limited in their detailed coverage and severely limited in time. They are highly desirable in that they can be rigidly controlled in terms of statistical design, comparability, and ability to be duplicated. However, in terms such as catch per tow values, the effectiveness of the fishing gear, vessel speed, day/night differences, and other factors involved in direct fishing activities, there is a chance that the information may be limited to a point where its usefulness could be questioned.

Summary

Until now this paper has given a number of examples where the commercial fishing industry has been of assistance to scientists in providing material and information necessary to conduct their research. Also presented are examples where fishermen have taken an active part in some of these experiments, provided manpower, vessel time, equipment and, in some instances, initiated the research themselves. It has also shown where certain programs designed by fishery resource managers, with the intent to extrapolate necessary information from the commercial fishing industry have until now proved ineffective. In addition, it has been stated that in some instances there has been an adverse effect on any future involvement by fishermen in programs of this nature. Lastly, the paper goes into some detail as to how information being used for current stock assessments is derived from the commercial fishing industry and related research programs.

The intent of the research so far has been to identify these areas involving a cooperative effort between fishermen and research scientists. This last section will deal with the current situation and the future outlook in the commercial fishery assistance in data acquisition and management. In order

to develop a program that statistically represents a fishery resource correctly and properly propose an effective management plan a number of things are needed. Adequate sampling, a good program design and a feasible implementation strategy should all be structured in such a way that the quality and quantity of data actually will meet its requirements. Any attempt to define scientifically a conservation measure in terms of adequacy, accuracy, and precision with respect to determining the effects of fishing and the environment on fish populations needs a vast amount of information compiled over substantial periods of time. Currently this information is supplied for most fisheries through landing statistics augmented by direct research. In the New England groundfish fishery, for example, resource managers rely heavily on NMFS port agents for most of their information. However, the information these agents are able to provide is limited at best. They are restricted by manpower shortages. Maine, with its extensive coastline and the expanding number of harbors being used by fishermen, has only two ports, Portland and Rockland, with agents available to directly monitor landings. Faced with an increased number of landings and limited resources it has proven difficult to provide scientists with the information required for their research. Attempts to supplement the lack of manpower by contracting outside institutions to assist has also proved of little use. Port agents not only have to face difficult logistic arrangements but the irregular hours of fishermen and fish packers have also restricted some information. There have been difficulties arising from management measures. The ability to extract information from groundfish fishermen in the early '80's was hampered by their negative reaction to stiff vessel quotas for certain species. In the scallop fishery the current size restrictions on scallops have biased samples by limiting scallop samples to a non-representative group.

The limited amount of up-to-date accurate fishery statistics for groundfish provided from commercial catch sampling has forced more and more dependence on Northeast Research Center trawl surveys. These surveys can provide essential fishery independent data on changes in recruitment and stock magnitude, but they are not designed to provide data on short term variations in the fishery which are currently needed. Also, whatever information provided by them in the future may be dependent on National Oceanographic and Atmospheric Administration's financial situation. Another form of data acquisition performed by New England Fishery Council and port agents is sea sampling, going out on commercial vessels and sampling the catch. This is also limited in its ability to provide much information, because of availability of personnel, as well as vessel conditions and accessibility. For example, in 1984, NEFMC researchers made 31 trips, which averaged 5 to 6 trips for each port covered in the New England area over one full year.

The information provided to scientists involved in stock assessments and management is currently limited. Although the basic set of statistics may in some ways be adequate in meeting the needs of primary conservation and management, it is still limited and will have to be augmented to meet the extended objectives of management programs in the future. This information will have to come out of the fishing industry in one form or another. It should be easily recognized that the voluntary cooperation by those providing this information represents the least expensive and most effective method of carrying out this program. So the elimination of impasses between fishermen and regulatory authorities with regard to reporting catch data is needed in order to create a more cooperative relationship. If this relationship could be incorporated into current scientific effort directly by fishermen, in contrast to what is now available, they could cover the fishing grounds frequently throughout the course of the year and their aggregated effort could provide much more detailed coverage in both space and time. Fishermen in this instance would become a barometer for environmental changes due to fishing as well as natural causes.

Conclusion

The current state of fishery science is at a point where any advancement without the assistance of fishermen in providing necessary information from the ocean will be next to impossible. The simple economics make this quite clear. The costs of vessel, time, and sea and shore personnel could rapidly eat away limited budgets without any guarantee that the information provided will be an accurate picture of what is being investigated. Yet any collective effort to get this information from the commercial industry has thus far proved ineffective. The scientific community and resource managers have chosen instead to get data on the fishery resource from existing government programs which, even if they ran at full capacity, cannot supply the amount of information needed to accurately address fishery conservation and develop a management plan that will assure the continued availability of the resource. In this respect the current state of fishery management exhibits a high degree of protectionism, being more intent on placing controls on fishermen in order to protect the resource; whereas, through a stronger scientific understanding of the ocean's natural ecology and its harvested resources, the emphasis could shift from that of protecting the resource to one of propagating it. This scientific assessment can come only when scientists refine their techniques and analysis to a point where they present a strong correlation between models and the natural environment. Through testing and the development of new techniques, science can and will come up with more reliable means to determine ecological interactions. But the only way to refine and utilize these methods will be testing them in a natural environment. Here fisher-

men's voluntary participation is paramount. Not only are they a constant indicator of environmental changes as a result of their everyday fishing activity but they are for the most part concerned with their resource and want it to be protected. Any interest generated by an active participation of fishermen in research will be a good monitor as to what effect management plans will have in the future. Conservation measures will only work when they are perceived as being adequate and necessary by those individuals directly involved. Without the industry's support management will not work, and not only the resource but the whole ocean ecology and shoreside economy will suffer.

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Chapter 10
Interjurisdictional Aspects of Fisheries Management

Bluefish:
A New Approach to Interjurisdictional Management

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Because this year marks the tenth anniversary of the signing into law of the Magnuson Fishery Conservation and Management Act[1] (Magnuson Act), it comes as no surprise to find that within the various sectors affiliated with marine fisheries, the buzzwords have been evaluate, assess, and rethink. For the next hour, this panel will take its turn evaluating and assessing, perhaps even rethinking, the interjurisdictional aspects of marine fisheries management. I contend, however, that this exercise is more than ceremonial. Recent developments have brought state-federal relations to the forefront of fisheries management concerns.

In August 1984, the leaders of the House Subcommittee on Fisheries and Wildlife Conservation and the Environment requested that the Congressional Research Service (CRS) conduct a study to provide "a better information base than now exists to ensure that decisions [involving interjurisdictional fisheries issues] are rational and consistent with real needs."[2] The request was prompted by disagreement within Congress over the appropriate balance between the states and the federal government, and the necessary degree of cooperation between the states themselves, in the management of marine fisheries.[3]

The CRS Study,[4] released in March 1985, identified the major interjurisdictional problems affecting fisheries management and pointed to several possible avenues of redress. One such avenue is that provided by the National Marine Fisheries Service's Policy on Interjurisdictional Fisheries[5] (NMFS Policy), a document which has been under development since 1983 and remains in draft form today. Although it is conceivable that this policy document will never be formally adopted, it clearly is an expression of the

current federal perspective vis-a-vis the management of interjurisdictional fisheries, and thus is worthy of consideration.

The elements of the NMFS Policy include: 1) a transfer of more management responsibility to the states, 2) a comprehensive management planning program for all U.S. fisheries, and 3) a mechanism for resolving differences between jurisdictions. Basic to the policy is the belief that effective interjurisdictional fisheries management can be accomplished by existing authorities without recourse to any new legislation or major change in state or federal jurisdiction regarding marine fisheries.

The question which I offer is this: Given the management structure established by the Magnuson Act, how valid is the contention that effective interjurisdictional fisheries management can be achieved solely through new administrative policy? To address this question, I will focus on a specific problem — the problem of managing a fishery that is prosecuted predominately in the territorial sea but overlaps the FCZ, and a specific fishery — the fishery for bluefish.

State-Federal Structure Under the Magnuson Act

The Submerged Lands Act of 1953[6] granted coastal states exclusive jurisdiction over all marine resources out to the seaward boundary of the territorial sea, a distance of generally three miles. The Magnuson Act established a zone of federal jurisdiction, the fishery conservation zone (FCZ), extending from the edge of the territorial sea to a distance of two hundred miles from the shoreline. In establishing the FCZ, the Magnuson Act largely preserved state jurisdiction in the territorial sea.[7] Clearly, this multijurisdictional arrangement is ill-suited to the management of migratory fishery resources which, by nature, rarely remain in the waters of any single jurisdiction.

To address the obvious potential for inconsistency contained within the jurisdictional structure of the Magnuson Act, Congress created a framework through which a policy of state-federal coordination could be pursued. One foundation for such a unified approach to management was the inclusion of state officials in the voting membership of the regional management councils.[8] It was hoped that state participation in managing FCZ fisheries would lead to consistency in the measures applied by states for any portion of an FCZ fishery that extended into the territorial sea.

A second foundation for state-federal consistency is given by the incorporation of National Standard number three into the Act. The Standard requires

each fishery management plan (FMP), to the extent practicable, to manage an individual stock as a unit throughout its range.[9]

In accordance with the Act's recognition of state authority in the territorial sea, conservation and management measures specified by an FMP can only be implemented within the FCZ. However, where state action or inaction "substantially and adversely" affects the carrying out of an FMP for a fishery that exists predominately in the FCZ, the Act authorizes the Secretary of Commerce to preempt state law and impose federal regulations within the territorial sea.[10]

The preemption provision gives teeth to National Standard number three. The capacity of an FMP to ensure that a stock will be managed as a unit throughout its range is dependent on the preemption provision, which can be used, if necessary, to compel recalcitrant states to adopt management measures compatible with those of an FMP. This provision, however, applies only to predominately FCZ fisheries. For fisheries that occur predominately in the territorial sea, but overlap the FCZ, no such mechanism is available. This limitation has adversely affected the development and implementation of a number of FMPs, including those for Atlantic herring,[11] American lobster,[12] and bluefish.

Bluefish FMP

The ill-fated bluefish plan continues to be a timely issue due to the on-going efforts of the states and the councils to devise an acceptable management regime for the fishery. The original bluefish FMP was developed over a six-year period by the Mid-Atlantic Council and submitted to NMFS for review in June 1984. In September 1984, NMFS disapproved the plan, a decision stemming, in part,[13] from the contention that the plan suffered from jurisdictional limitations.

The Council undertook development of the bluefish plan with a keen awareness of the potential problems posed by the interjurisdictional nature of the fishery. At the time of plan development, statistics indicated that some 53 percent of the total bluefish catch came from state waters, with the remaining 47 percent coming from the FCZ.[14] Accordingly, the plan was designed "to improve cooperation with the States to enhance to the management of bluefish throughout its range."[15]

One of the first issues facing the Council was whether the plan should cover just the FCZ or the total range of the fishery, including territorial waters. The Council recognized that its authority was limited to the FCZ.

The Council also recognized, however, that a plan which pertained only to the FCZ would neglect the region which accounted for the major portion of the fishery. Hence, the Council decided to define the management unit of the plan as "the bluefish fishery of the western Atlantic Ocean, excluding the Gulf of Mexico,"[16] and Optimum Yield as all bluefish harvested in this area.[17] Since the NOAA Guidelines for Fishery Management Plans specify that "[t]he geographic scope of the fishery, for planning purposes, should cover the entire range of the stock(s) of fish, and not be overly constrained by political boundaries,"[18] the decision taken by the Council certainly seemed appropriate.

Having selected a sufficiently broad scope, the Council was then obligated to consider the territorial sea component of the fishery. One of the more pressing concerns was the potential ineffectiveness of measures which were intended to control overfishing of the entire stock, but applied only to the FCZ portion of the fishery. The Council addressed this by including a provision in the plan stipulating that

> [a]ll persons applying for a permit [to fish in the FCZ] must agree that their fishing activity will be bound by the prevailing federal management measures regardless of where fishing operations take place.[19]

The provision was designed to facilitate the dockside enforcement of management measures so as to render inadmissible any claims that permitted vessels were not subject to the plan's regulations because they took their catches in state waters.[20] The provision is nearly identical to, and clearly modelled after, the permitting provision contained in the rules implementing the New England Council's FMP for American Lobster.[21] Notwithstanding the questionable legal basis of the provision,[22] it still fails to ensure consistent and enforceable regulations throughout the range of the fishery. Under both FMPs, persons fishing exclusively in state waters are not required to obtain permits; their activities are bound only by applicable state laws. Hence, there still exists the potential for disparity in the separate regulatory regimes governing permitted and nonpermitted persons or vessels. Moreover, the permitting provision makes at-sea enforcement necessary to ensure that nonpermitted vessels refrain from fishing in the FCZ. Citing the unreasonably high costs associated with at-sea enforcement, NMFS and the Office of Management and Budget found the Bluefish FMP to be inconsistent with National Standard number seven,[23] which calls for measures that minimize costs and avoid duplication.[24]

The Council recognized that effective management of the bluefish resource would require compatible management by the federal government in the FCZ and by the states in the territorial sea and internal waters. To

achieve this compatibility, the Council, during plan development, asked the Atlantic States Marine Fisheries Commission (ASMFC) to prepare an interstate bluefish plan. The ASMFC agreed, but opted to await adoption of a final FMP by the Council before developing a complementary interstate plan.[25] It was the opinion of the Council that since those voting under the ASMFC were, in many cases, also members of the Council, it could reasonably be expected that the Commission would build upon the groundwork laid by the FMP.[26]

In finding the Bluefish FMP to be inconsistent with National Standard number one,[27] NMFS held that

> [a] considerable expansion of the present level of fishing could lead to overfishing that would not be prevented by the measures in the FMP since they ... [make] no provision ... for obtaining complementary state action.[28]

NMFS made no reference to the Council's initiative vis-a-vis the ASMFC. Thus, the contention that the FMP failed to provide for complementary state action is inaccurate.

Noting that "present states' regulations [are neither] consistent with each other [nor] with the proposed regulations for the FCZ,"[29] NMFS further dismissed the bluefish plan on the grounds that it failed to meet National Standard number three.[30]

The question concerning state regulation of bluefish is not whether there is variation — for clearly there is — but whether there is variation to a degree that would negate the effectiveness of the federal plan. In a letter written just prior to the formal disapproval of the plan by the Secretary, the NMFS Northeast Regional Office downplayed the significance of the variance in state regulation. Noting that the thrust of the plan was to prevent the development of a new commercial fishery for bluefish in the FCZ, the Regional Office pointed out that "most coastal states presently have regulations which would preclude this development in their own waters."[31] This finding, among others, led the Regional Office to conclude that the FMP met the National Standards and was therefore "an approvable document."[32]

The finding that the Bluefish FMP failed to conform with National Standard number three illuminates a flaw within the federal system, not a flaw with the Council's plan. This assertion is borne out by a recommendation from NMFS to the Council. NMFS advised that a resubmitted plan should include, *inter alia*,

> a mechanism to control total fishing effort if [optimum yield] is exceeded, including those measures that each State could be expected to implement [in its waters] to ensure effective management throughout the range of the fishery.[33]

Within the legal framework established by the Magnuson Act, no such mechanism is available to the Council. The nature of the bluefish fishery, i.e., its status as a predominately territorial sea fishery, precludes the opportunity to compel state action. Thus, it is fair to say that the Council did what it could to address the interjurisdictional issue.

A New Approach?

In October 1984, immediately following the rejection of the Bluefish FMP, the Mid-Atlantic Council asked the ASMFC to proceed jointly with the development of a new bluefish plan. The Commission agreed and the new planning process is now underway.

This new initiative may lead to one of two possible outcomes. The first would be a new FMP supported by a complementary interstate plan or, depending on the developmental sequence, an interstate plan supported by a complementary FMP. Since states would still be under no obligation to adhere to any interstate plan, however, it is not clear how such a situation would appease the jurisdictional concerns raised by NMFS in its rejection of the original Bluefish FMP. Indeed, within a strictly jurisdictional context, the only fundamental difference between the rejected FMP and any new plan adopted by the Council is that the development of management measures for federal waters and state waters will be taking place either simultaneously or in reverse order.

There is a second possible outcome of the new bluefish initiative: participants in the process have indicated that the Council-ASMFC collaboration may result in a single state-federal plan covering the entire fishery throughout its range, both within the FCZ as well as the territorial sea.[34] A result such as this would comport, by and large, with the comprehensive FMP program espoused by NMFS.[35] Herein lies the potential for a new approach to interjurisdictional management. A single state-federal plan has already been implemented successfully for the Alaskan king crab fishery.[36] Yet the king crab fishery occurs predominately in the FCZ. This status provides the opportunity for a federal override of any state rules that are not consistent with the FMP. No such opportunity exists in the case of bluefish management.

Clearly, if the states and the federal government are to establish a coordinated regime for bluefish, some mechanism must be made available to ensure that differences between jurisdictions will not hinder the effectiveness of the regime. In this regard, the NMFS Policy proposes to establish some means of dispute resolution. This is likely to consist of a board of conciliation, a mediation process, or professional arbitration.[7] An effective mechanism would fill the gap left by the federal government's inability to exercise its preemption authority over predominately territorial sea fisheries. Yet the feasibility of such a mechanism is doubtful. First, given the states' continuing emphasis on voluntary cooperation in interstate management,[8] it is unlikely that they would submit to a process of mediation or conciliation — especially one conducted under federal auspices. Second, the inevitability of interjurisdictional conflict would call for frequent use of the mechanism during FMP development. This would delay implementation of management measures, a situation which is especially problematic in fisheries management.

A perhaps more viable option is the possibility of expanding the use of Amendment One to the ASMFC Compact.[9] This amendment permits states to designate the ASMFC as a regional fisheries agency, thereby granting state representatives to the Commission the authority to act on behalf of their states in promulgating joint management regulations. The northern shrimp fishery has been the only interstate fishery managed under this framework.[10]

If the states fail to strengthen the basis for interstate cooperation, it seems likely that any new bluefish management regime which involves the federal government will suffer from the very same legal constraints that blocked approval of the original FMP. While I applaud the intent of the new policies developed by NMFS, it is my perception that the problem will ultimately require a legislative solution.

Notes

1. Pub. L. 94-265, 90 Stat. 331 (1976) (codified at 16 U.S.C. §§ 1801-1882 (1982 & Supp. 1983)) [hereinafter cited as Magnuson Act].

2. *Marine Fish Management* 10:8/9, at 4 (1984).

3. *Id.*

4. Buck, E.H., and D.M. Sale. 1985. Interjurisdictional Fisheries Management: Issues and Options. Report by the Congressional Research Service, Library of Congress, for the House Committee on Merchant Marine and Fisheries, Subcommittee on Fisheries and Wildlife Conservation and the Environment, 25 March 1985.

5. NMFS Policies for the Management of Interjurisdictional Fisheries, Draft Report, 27 February 1985 [hereinafter cited as NMFS Policy].

6. Pub. L. 83-31, 67 Stat. 29 (1953) (codified at 43 U.S.C. §§ 1301-1315 (1976)).

7. Magnuson Act, *supra* note 1, at § 1856(a).

8. *Id.* at § 1852(b)(1).

9. *Id.* at § 1851(a)(3).

10. *Id.* at § 1856(b).

11. In 1982 NMFS withdrew its approval of the Atlantic Herring FMP [46 *Fed. Reg.* 42596 (1982)] and repealed the plan's implementing regulations [50 C.F.R. Part 653] in response to an insufficient level of state cooperation. *See* Marine Law Institute. 1982. Withdrawal of herring plan due to lack of state cooperation. *Territorial Sea* II:2, at 7.

12. The American lobster FMP includes a prohibition against landing lobster parts [50 C.F.R. 6497(a)(2), 649.20(c) (1982); 48 *Fed. Reg.* 36268 (1983)]. The New England Council adopted this prohibition in an effort to ensure compliance with the minimum size limit, which is the core of the lobster management program. The States of New Jersey, Maryland, and Virginia allow vessels to land lobster tails and claws and have been reluctant to ban this activity. Thus, the situation effectively prevents any enforcement of the minimum size. *See* Rieser, A. Intergovernmental Relations in Marine Fisheries Management (in press) at 10.

13. There were basically five reasons given for disapproving the plan:

1. The regulatory actions in the FMP were not based upon adequate information concerning the need for and the consequences of proposed action. As such, the regulatory impacts were not quantified as to benefits compared to costs.

2. There was no immediate urgency for management at the time.

3. The measures in the plan would not prevent overfishing since they apply only to commercial fishing in federal waters.

4. The allocation system of the plan was too rigidly fixed and complex and did not allow for changes in various areas over time.

5. There was a question of fairness in the plan with regard to treatment of different areas and between traditional and nontraditional fishing gear.

See Action Memorandum from William G. Gordon to John V. Byrne, 31 August 1984 and acknowledged by Anthony J. Calio on 7 September 1984 [hereinafter cited as Bluefish FMP Disapproval by NMFS Washington Office]; letter from Richard H. Schaefer to Robert L. Martin, 7 September 1984 [hereinafter cited as Bluefish FMP Disapproval by NMFS Regional Office]; and letter from Robert P. Bedell to H.

Stephen Halloway, 14 September 1984 [hereinafter cited as Bluefish FMP Disapproval by OMB].

14. Mid-Atlantic Fishery Management Council, Bluefish Fishery Management Plan, 12 January 1984, Section XVIII, Tables 9 and 38 [hereinafter cited as Bluefish FMP].

15. *Id.* at Section IV.C.

16. *Id.* at Section XII.A.

17. *Id.* at Section XII.B.

18. 50 C.F.R. § 602-13(b) (1985).

19. Bluefish FMP, *supra* note 14, at Section XII.B.

20. *Id.* at Section XII.C.5.

21. 48 *Fed. Reg.* 36267 (1983).

22. *See* Marine Law Institute. 1984. New England's American Lobster Licensing Scheme. *Territorial Sea* IV:1, at 10. Ironically, the New England Council is on record opposing the permit requirement of the bluefish plan on the grounds that it "inappropriately preempts state authority within the territorial sea." Letter from Douglas Marshall, Executive Director of the New England Fishery Management Council, to the Honorable Malcolm Baldrige, 27 March 1984. While it does seem clear that, pursuant to the Magnuson Act, the federal government has no authority to regulate a predominately territorial sea fishery in the territorial sea, an opposing point of view has been set forth by Robert J. McManus, General Counsel for NOAA, in a letter to Alex Jernigan, Chairman of the Gulf of Mexico Fishery Management Council (18 October 1983). *Marine Fisheries Management Reporter* 2: 1-6821 through 1-6826.

23. Bluefish FMP Disapprovals by NMFS Washington Office and OMB, *supra* note 13.

24. Magnuson Act, *supra* note 1, at § 1851(a)(7).

25. Bluefish FMP, *supra* note 14, at Section IV.B.

26. *See* Minutes of the November 1983 Meeting of the Mid-Atlantic Council. Bluefish Committee Report, Sec. III, at 25, comments of Mr. Bryson.

27. National Standard number one requires that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield for each fishery for the United States industry. Magnuson Act, *supra* note 1, at § 1851(a)(1).

28. Bluefish FMP Disapproval by NMFS Washington Office, *supra* note 13. It should also be noted that in finding that the plan failed to meet National Standard number one, another important consideration was that the plan made no provision for

limiting the growth of the recreational fishery, which comprises over 90 percent of the fishery. *Id.*

29.Bluefish FMP Disapproval by NMFS Washington Office and OMB, *supra* note 13. The letter of disapproval from the NMFS Regional Office alluded to, but did not actually cite, inconsistency of the plan with National Standard number three.

30.*See* text accompanying *supra* note 9.

31.Information Memorandum from Richard H. Schaefer to Roland Finch, 20 August 1984.

32.*Id.* Actually, the NMFS Regional Office recommended approval of the plan on a conditional basis.

33.Bluefish FMP Disapproval by NMFS Washington Office, *supra* note 13.

34.Personal communication, John Bryson, Executive Director, Mid-Atlantic Fishery Management Council (28 April 1986). Personal communication, Peter Colosi, Northeast Regional Office, National Marine Fisheries Service (28 April 1986). Personal communication, Paul Perra, Atlantic States Marine Fisheries Commission (24 April 1986).

35.NMFS Policy, *supra* note 5.

36.*See* Bubier, J. 1985. Alaska King Crab: State Assumes Larger Role in Federal Management. *Territorial Sea* V:1, 1-9.

37.NMFS Policy, *supra* note 5, at 31.

38.*See, e.g.*, McCallum, J. 1985. Comments of the Atlantic States Marine Fisheries Commission on NMFS Draft Policy on Interjurisdictional Fisheries.

39.Act of May 4, 1942, ch. 283 §§ 1-4, 56 Stat. 267 (codified at 16 U.S.C. § 667(a) (1974)). Amended in Act of Aug. 19, 1950, ch. 763 §§ 1-4, 64 Stat. 467.

40.*See* Rieser, A., and N. Ziegler. 1982. Regional Fisheries Regulation Under the Atlantic States Marine Fisheries Compact: Promising Model or Unworkable Scheme? *Territorial Sea* II:1.

Interjurisdictional Aspects of Fisheries Management

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The views expressed in this paper do not necessarily reflect those of any government agency.

Abstract

The paper describes the marine fishery management authorities of state, federal, regional and international institutions. These multiple jurisdictions have overlapping responsibilities, but different regulatory powers and procedures. These differences create special problems for management of migratory fishery resources.

Preface

> You cannot draw a political line in the water and hope that these fish are going to obey it or hope that people who make their livelihood there will have a unanimity of attitude at all times as to what conservation should be.
>
> If it means my making a lot of money this year as opposed to your making a lot of money this year, I am more for my conservation approach than for your conservation approach, because my conservation approach is going to have the merit and the virtue of making me a lot of money as I conserve.[1]

For an audience of lawyers, public officials, and perhaps even some fishermen, this panel's topic should have something for everyone. *For lawyers*, jurisdictional squabbles mean lawsuits — the more of one, the more of the other. *For bureaucrats*, jurisdiction is "turf" — without it, one cannot "govern". *For fishermen*, jurisdictional divisions can be a blessing or a curse — sometimes the artificial lines in the water will protect them from competition — more often they will simply confuse and confound them, adding legal uncertainty and ever changing rules to the inherent problems of coping with weather, locating fish and finding the best market.

Our setting is also particularly appropriate. Because of the number of states in New England and the closeness of Canada, there is a greater potential for interjurisdictional problems in New England than almost anywhere else in the world, with the notable exception of Pacific salmon.[2] Finally, our timing is also right, since a number of studies are now in progress that could recommend changes in jurisdictional arrangements.

I have only three points to make:

1. The artificial lines between management jurisdictions are not distinct. There is considerable overlap between the fishery management powers of state, federal, regional, and international institutions.

2. Because these institutions respond to different political constituencies, they may have different objectives. If common objectives cannot be developed, management programs for migratory species will be less effective.

3. Fishermen, not bureaucrats, bear the consequences of ineffective management.

There are four levels of government that claim significant fishery management authority over migratory marine species — states, interstate compacts, federal agencies, and international commissions. Legislation and judicial decisions have placed different limits on the exercise of that authority at each level.

States

Twenty-four states of the Union and five territories have jurisdiction over marine fish. Actions of four more states and the District of Columbia must be considered for anadromous fish like salmon, shad, or striped bass. The states have tried a wide variety of management institutions — legislative, collegial, and even autocratic. Some have limited the application of their laws and regulations to state territory. Others have made jurisdictional claims well beyond their borders.

An early legal theory for regulation of fisheries was based on a supposed sovereign ownership of natural resources as "common property" held in trust "for the benefit of the people." See *Geer v. Connecticut*, 161 U.S. 519, (1896). Naturally, state laws based on this theory were applicable only within state borders. Even today, a great many state fisheries laws are so limited. A recent example, was the Florida Supreme Court's rejection of

extraterritorial application of a law prohibiting possession of fish traps, in *Southeastern Fisheries Assn. v. DNR*, 453 So. 2d 1351 (Fla. 1984).

Modern state fishery management programs are more likely to be based on a state's inherent police powers, which can extend well beyond state borders in some instances. When not in conflict with federal law, state extraterritorial control of fisheries has been generally upheld by the courts. See *Bayside Fish Flour Co. v. Gentry*, 297 U.S. 422 (1936); *Skiriotes v. Florida*, 313 U.S. 69 (1941). Perhaps the most aggressive use of state extraterritorial authority has occurred in Alaska, where vessels fishing on the high seas have been subjected to state law based on "daily use of Alaska territorial waters and facilities". *State v. Bundrant*, 546 P. 2d 530, *appeal dismissed sub. nom. Uri v. Alaska*, 429 U.S. 806 (1976).

State fishery management powers are not without limit, however, either within or beyond state borders, particularly when "conservation" regulations are found to favor local economic interest at the expense of "outsiders." The more obvious limitations are constitutional. In *Toomer v. Witsell*, 334 U.S. 385 (1948), a South Carolina law requiring non-residents to pay 100 times more than residents to shrimp in state waters was found to violate the privileges and immunities clause. In *Takahashi v. Fish and Game Commission*, 334 U.S. 410 (1948), a California law which denied resident aliens the right to fish in state waters was found to violate the equal protection clause. The rights of citizens from one state to take fish within another state's boundaries were similarly upheld in *Tangier Sound Watermen's Assn. v. Douglas*, 541 F.Supp 1287 (E.D. Va., 1982). In *Hughes v. Oklahoma*, 441 U.S. 322 (1979), a law that banned shipment of minnows to another state was found to unnecessarily burden interstate commerce. In *Bristol Bay Herring Marketing Cooperatives v. Skoog*, an unreported federal district court decision, a ban on export of unprocessed fish was found to improperly burden foreign commerce. And, in *Douglas v. Seacoast Products*, 431 U.S. 265 (1977), Virginia's attempt to exclude out-of-state vessels was found to conflict with, and thus superseded by, the federal vessel documentation laws.

In addition to these constitutional limits, and any geographic limits imposed by the state legislatures, there may also be procedural challenges available under state administrative requirements, if, for example, the legislature has delegated rulemaking authority to a fish and game commission or a department of natural resources.

Interstate Compacts

There are three interstate compacts that created the Atlantic, Pacific, and Gulf States Marine Fisheries Commissions. There are other compacts that deal with fish in the Connecticut, Potomac, and Columbia Rivers. Each of the participating states and the U.S. Congress have placed limits on the authority of the compact commissions. Some compact commissions have direct regulatory authority; others only propose regulations that will later be adopted as state law, thus subjecting these bodies to many of the same potential legal challenges listed above.

Most recently, the Federal Government has used the Atlantic States Marine Fisheries Commission's striped bass plan as a basis for federal action if the states do not adopt the plan's recommendations. See 16 U.S.C. § 1851 note. While undoubtedly necessary in view of the present condition of Atlantic stripers, this legislation illustrates many of the problems of interjurisdictional management.

First, the member states have not ceded sufficient authority over striped bass to the ASMFC to permit the Commission to enact direct harvest controls. Thus, each measure that the Commission adopts requires follow-up at the state level, either the adoption of regulations or the enactment of legislation. Second, because the striped bass is predominately a near-coastal species, the federal Regional Fishery Management Councils can regulate only a small part of the fishery. Third, because the ASMFC is not a federal agency, the Congress cannot delegate direct rulemaking authority to it. Finally, because of limits in the Atlantic Striped Bass Conservation Act itself, the Secretary of Commerce has only one power — to declare a moratorium on fishing in any state that fails to adopt and enforce the striped bass plan; the Secretary cannot simply supplement inadequate state action with additional federal regulations.

Federal Agencies

Most of the Federal Government's marine fisheries management authority is the shared responsibility of the Secretary of Commerce and the eight Regional Fishery Management Councils established by the Magnuson Act, 16 U.S.C. §§ 1801-1882. Other Federal laws that may affect marine fishing are the Endangered Species Act, 16 U.S.C. §§ 1531-1543, the Marine Mammal Protection Act, 16 U.S.C. §§ 1361-1407, and the Marine Protection Research and Sanctuaries Act, 16 U.S.C. §§ 1431-1434. Each of these statutes provides different procedures for state participation and varying degrees of federal preemption, but the focus of my attention will be on the Magnuson Act.

The Magnuson Act purports to encourage management throughout the range of fishery resources. First, the Act recognized that coordinated management of highly migratory species of tuna could only be achieved by international agreement. Second, the regional councils are composed mainly of state officials and members of the public. It was hoped that interstate and state-federal conflicts would be minimized during the planning process. Third, the Act directs that "To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination." 16 U.S.C. § 1851(3). Finally, for fisheries predominately located in the fishery conservation zone (FCZ), the Secretary of Commerce is authorized, after formal hearings, to set aside or modify state laws that would impair the effectiveness of the federal management program.

The Magnuson Act reduced, but did not eliminate, the potential for interjurisdictional conflicts. Unlike several other natural resource management statutes, the assertion of federal jurisdiction was confined to fisheries located in the FCZ. State jurisdiction was preserved in three important ways — (1) by defining the FCZ as adjacent to and seaward of state boundaries [generally the three-mile limit of the U.S. territorial sea]; (2) by preserving state jurisdiction within state borders; and (3) by allowing states to continue to assert extraterritorial fisheries management authority as to vessels registered under state law.

For a time, many presumed that Congress had clearly delineated the jurisdictional lines in the Magnuson Act. Some fishermen, and some lawyers, believed that state rules could never apply to actions in the 197-mile FCZ and that only with great difficulty could federal regulations be applied to fishermen within the three-mile limit. After much litigation, these simplistic assumptions were proved wrong.

First, the concept of state vessel registration appears to be broader than Congress may have anticipated. In *People v. Weeren*, 26 Cal. 3d 654 (1980), a federally-documented swordfish vessel operating in the FCZ was found subject to California laws, prior to any federal swordfish regulations, based on other state-issued documents. Courts in Florida, Washington, and Alaska have agreed. See *Anderson Seafoods, Inc. v. Graham*, 529 F. Supp. 512 (N.D. Fla., 1982); *State v. Nelson*, No. C-2093 (Pacific Co. Super. Ct., Wash., Apr. 29, 1980); *F/V American Eagle v. State*, 620 P. 2d 617 (Alas. 1980), appeal dismissed 454 U.S. 1130 (1981).

Second, it has now been established that federal fishery management regulations will supersede conflicting state laws, without formal preemption, and even as to state registered vessels. *State v. Sterling*, 448 A 2d 785 (R.I.

1982); *North Pacific Fishing Vessel Owner's Assn. v. Sheffield*, unreported, No. A84-054, (D. Alas. 1984).

Finally, the regional councils and the Department of Commerce are extending the geographic scope of federal regulations into state waters without invoking the formal preemption procedures. Examples of federal fishery regulations that now apply within state boundaries are reporting requirements, possession limits, minimum sizes, and restrictions on sale. At present, one of these regulations is being challenged in court. *Rockport Shrimp Co-op v. Baldrige*, (No. C84-139, S.D. Tex.). Under the challenged rules shrimpers must report landings from state waters; the federal authorities contend such data are necessary to properly manage the resources in the FCZ. No formal preemption hearing was convened because the Secretary did not intend to set aside or change any state law. We expect to prevail. The real barriers to aggressive federal fishery management actions within state boundaries are political, not legal, and different regions of the country have different perceptions of states' rights. As an example, a federal effort to impose a nationwide minimum size for red snapper, 99% of which are harvested in the FCZ, was rejected by the Gulf of Mexico Council. In contrast, here in New England, both the scallop and the groundfish minimum sizes apply nationwide.

One federal management program, that Maine lobstermen are now subject to, takes a slightly different approach in that it adopts the best of both state and federal measures. Under the American lobster regulations, anyone fishing in the FCZ must have a federal permit. Anyone holding such a permit is subject, at a minimum, to all the federal requirements, even for lobster taken in state waters. But, in addition, where Maine, for example, imposes more stringent management measures on its own fishermen, those more stringent measures also apply to lobsters taken from the FCZ by Maine registered vessels. Thus, we have an instance where the adoption of a federal regulation does not invalidate state extraterritorial regulations at the same time as the federal regulations apply within state boundaries. This approach might be suitable for other interjurisdictional management programs.

There are a number of other limitations on the federal fishery management powers. Many of the cases cited earlier with reference to constitutional limits on state fishery management actions have equal application in the federal context, except for those involving the supremacy or commerce clauses. The Magnuson Act also contains a set of national standards against which the regional councils' management programs are tested. While these are somewhat vague, the procedural process by which management plans are approved and implemented is quite specific, involving two levels of public comment, specific time-limits for Secretarial action, and adherence to "other applicable law."

Perhaps the most important of the other applicable laws is the Administrative Procedure Act (APA), 5 U.S.C. §§ 551 *et seq.*, which requires a sound administrative record for federal rules. Other statutory requirements are the National Environmental Policy Act, the Regulatory Flexibility Act, and the Paperwork Reduction Act. Finally, all federal regulations must meet strict analytical requirements of the President's regulatory reform program expressed in Executive Order 12291. This bewildering assortment of procedural requirements is a fertile field to be plowed by lawyers. As with state management efforts, the possibility of litigation will affect management decisions.

International Agencies

The United States and Canada are parties to several treaties that assign fishery management jurisdiction to international commissions. Pacific and Atlantic salmon, Atlantic tunas, and Pacific halibut are managed by such commissions. Each of these treaties are implemented in the United States by specific legislation that divides fishery management responsibility between the State Department and the Commerce Department. In the case of Pacific salmon, the legislation also provides for extensive participation by state and Indian tribal fishery managers.

As a general rule, far less in the way of legal due process is involved in giving effect to the decisions of international commissions. Because of the foreign affairs exception in the APA, the management decisions are usually published as federal regulations without public comment; frequently these rules are effective upon filing with the *Federal Register*. Given the deference courts provide to the conduct of foreign affairs, litigation is not likely to be successful.

The Fishermen's Plight

In our federal system, we take most jurisdictional divisions for granted. We don't expect the state government to specify the size of trash cans, or the Federal Government to decide where our children will attend school. Certain other functions, such as air traffic control, are plainly national responsibilities, though broader problems of aviation safety may be resolved by international organizations. But with fisheries the management responsibilities are not clearly delineated. As a result, fishermen will frequently be subject to overlapping regulations issued by several levels of government, each with somewhat different processes and powers.

For example, here in New England, fishermen will be subject to groundfish, scallop and lobster rules proposed by the New England Fishery Management Council; surf clam, squid, mackerel and butterfish rules proposed by the Mid-Atlantic Council; swordfish rules proposed by the South-Atlantic Council; striped bass rules recommended by the Atlantic States Marine Fisheries Commission; and Atlantic tuna and salmon rules set by international commissions.

In some fisheries there will be one set of rules for state waters and another for the FCZ. For lobster, both sets of rules will apply. In other fisheries, some state rules may have been superseded by federal rules, but both are still "on the books". In others, the federal rules have not displaced the state rules. Adding to the regulatory uncertainty is the possibility that some state rules, if challenged, might violate the Constitution and that some federal rules might violate the Administrative Procedure Act or some other law.

Adding still further uncertainty is the fact that all of the above are subject to change, sometimes on very short notice, by the relevant authorities based on the most recent biologic and economic data or changed circumstances.

Implications for Management Effectiveness

Fisheries management programs are undertaken for a variety of reasons: protection of stocks, increased economic or biologic yield, community stabilization, enhanced recreational opportunities, etc. But all of these objectives cannot be achieved simultaneously, and some are directly contradictory. What happens when the public officials in one jurisdiction disagree with the public officials in another jurisdiction over the objectives to be sought?

This brings me back to the second part of Senator Gravel's statement that fishermen will rarely agree on the type of management program, but that each will favor the approach that benefits themselves most. Since many fish stocks cannot be maintained at productive levels or rebuilt without sacrifice, each fisherman will try to influence the managers to make someone else sacrifice. The litanies employed in the public dialogue are almost endless: trawlers catch too many small fish, lost gillnets ghostfish, longlines foul fixed gear, fishtraps preempt fishing grounds, small boats preserve local communities, large boats are more efficient — I could go on; but I won't.

My point is that because state, federal, regional, and even international institutions have different constituencies they are each likely to select a different "conservation objective." For example, when faced with declining

stocks, a state may prefer to impose vessel quotas to help stabilize local communities. Higher levels of government will be less concerned about local effects and thus may select different management controls intended to favor a larger constituency.

If agreement on objectives cannot be achieved, it is likely that the management institutions will impose different, overlapping, and sometimes conflicting rules. A consequence is that none of the management institutions may fully achieve its objectives. Regulations in this scenario are likely to be viewed by the fishermen as punishment without purpose.

In an ideal world the various management authorities would develop common management objectives through compromise. With coordinated efforts, the regulatory burden placed on the fishermen could be limited to that necessary to achieve the shared objective. But compromise can also cause problems, particularly when dealing an inexact science.

For example, assume that scientists at one level of government believe a 20% harvest reduction is needed to achieve a share objective, but scientists at another level believe a 40% reduction is required. Politically, and even legally, it will be very difficult for the manager at the first level to impose more than a 20% reduction. But the manager at the second level doesn't have the same problem. He can justify imposing only a 20% harvest reduction because (a) it is a step in the "right" direction, and (b) a greater reduction will not do much good if the first level manager can't cooperate. The compromise then becomes the lowest level of harvest reduction that all levels agree is at least a step in the right direction.

I suggest, however, that there is a serious flaw in this kind of compromise. What if 40%, or even 30%, is really the correct answer? The 20% harvest reduction will be ineffective and the fishermen's conservation sacrifices will be wasted.

This then is my final point. Fishery managers at all levels must realize that their jurisdictional struggles — their turf contests — are waged on the backs of the fishermen. Both disagreements and some agreements between the various management jurisdictions can lead to ineffective, but still burdensome, regulations. With this in mind, I ask the fishery managers here to reflect on the "tragedy of the commons" from a different perspective.

In this classic justification for fishery management, new fishermen continue to enter a fishery and existing fishermen continue to increase their efforts until the common property of all — the natural resource base — collapses from over-harvest.

But, as we all know, fishery managers don't catch fish; they regulate fishermen. If the various fishery management institutions continue to adopt conflicting or ineffective regulations, they will have to adopt increasingly severe regulations to achieve even modest objectives. Eventually, the fishermen could collapse from overregulation.

Notes

1 January 19, 1976, floor statement of Alaska's Senator Mike Gravel during debate on the Fishery Conservation and Management Act, Public Law 94-265, 16 U.S.C. §§1801-1882.

2 Actions affecting Pacific salmon are taken by five states, three interstate compacts, two Regional Fishery Management Councils, at least ten federal agencies, two international commissions, Canada, Japan and the Soviet Union. New England fishermen are slightly better off; they usually will have to contend with only two or three states, one interstate compact, two regional councils, four federal agencies, two international commissions, and Canada.

Who Owns William Penn's Circle?

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Abstract

Boundary and interjurisdictional resource management disputes between the States of Delaware and New Jersey have existed since the earliest days of statehood. The Delaware River and Bay boundary between the two states was finally fixed by a 1934 U.S. Supreme Court decision[1] which arguably makes part of waters bordering Salem County, New Jersey subject to Delaware regulatory authority.

Earlier efforts to develop a coordinated management scheme resulted in a 1905 Compact[2] ratified by both states and the U.S. Congress. Among other things, the compact would have ensured reciprocal fishing privileges but for the fact that the states have never passed compatible fisheries legislation.

Delaware today unilaterally enforces its fishing laws up to the low water mark along the affected New Jersey shore and treats New Jersey fishermen as non-residents. Other commercial and recreational activities on the New Jersey side have been halted by Delaware officials citing the 1934 decision. Over a hundred years, an Act of Congress and a Supreme Court decision have not settled the issues.

This paper examines the Supreme Court decision, the 1905 Compact, and the persistent related problems.

Background

Relations between the neighboring States of Delaware and New Jersey have generally been amicable over the years, but persistent boundary and resource management disputes have slowly simmered for over two centuries. Never reaching the degree of violence of the oyster and crab wars of the Chesapeake, fishery management disputes in Delaware River and Bay have involved the U.S. Supreme Court, the U.S. Congress and several dozen fishermen, but the controversy nevertheless has been a quiet one.

The source of controversy can be traced to a series of pre-Revolutionary War grants and letters patent. After examination of these documents the U.S. Supreme Court in 1934 held that the boundary in the Delaware River and Bay is approximately the mid-channel (Thalweg Line) of the River and Bay from the mouth of the Bay to the southern edge of a circle drawn twelve miles around the city of New Castle, Delaware. North of that point to the Delaware northern boundary, it is the low water mark on the New Jersey side of the river.

Over the years, Delaware authorities have from time to time chosen to enforce Delaware regulations within the area of the circle, a matter of some consternation to New Jersey fishermen. A Supreme Court injunction issued in 1878 enjoined enforcement of restrictive regulations until 1907, when, with Congressional approval of a compact between the states, the case was discontinued without prejudice.

Following the 1934 decision, which gave Delaware title to the river, islands and subaqueous soil within the circle — subject to the Compact of 1905, the situation remained static, although claims to regulatory authority over development on the New Jersey side of the river have been made by Delaware authorities.

More recently, because of improved water quality, increasing numbers of shad have returned to the Delaware estuary in sufficient numbers to sustain a small commercial fishery. The State of Delaware has assumed the position that the compact never took effect, and that the Supreme Court decision of 1934 gave Delaware unilateral fisheries management authority within the circle.

Compact of 1905

In 1878, the State of New Jersey filed for an injunction in the U.S. Supreme Court against the State of Delaware to prevent Delaware from enforcing its fishing laws that restricted New Jersey residents from fishing in Delaware's portion of the estuary. An injunction was issued restraining execution of the challenged Delaware statutes.[3]

Twenty-seven years later the legislatures of the two states each appointed three commissioners to a bi-state commission charged with framing a "Compact between the State of New Jersey and the State of Delaware relating to the boundary controversy between the States."[4] The stated purpose of the Compact was "the amicable termination of the suit between said two

States, and the final adjustment of all controversies relating to the boundary line between said states and to their respective rights in the Delaware River and Bay...."

Although the historic location of the actual boundary between the States was still a matter for future determination by the U.S. Supreme Court, the Compact determined jurisdiction and the respective rights of the two States in the Delaware River and Bay.

Articles I and II provided that each State has authority to serve criminal or civil process on any portion of the river between the two states, and determined that Delaware has jurisdiction over crimes committed on the western half of the river and that New Jersey has jurisdiction over crimes committed on the eastern half.

Article III provided a common right of fishery within the entire river "in and over the waters of said river between low-water marks on each side...."

Article IV established a commission to determine the dividing line between the river and the bay, and provided for passage of concurrent fisheries legislation.

Article V saved all State fisheries laws not inconsistent with the concurrent legislation called for in Article IV.

Article VI stated that nothing in the Compact would affect the oyster industry carried on under the laws of either state.

Article VII determined that "(e)ach State may, on its own side of the river, continue to exercise riparian jurisdiction of every kind and nature, and to make grants, leases and conveyances of riparian lands and rights under the laws of the respective states."

Article VIII provided that "Nothing herein contained shall affect the territorial limits, rights or jurisdiction of either state of, in or over the Delaware River, or the ownership of subaqueous soil thereof, except as herein expressly set forth."

Article IX made provisions for execution and ratification of the Compact, maintaining that with Congressional ratification the agreement becomes binding in perpetuity, upon both States. Also with ratification the suit pending in the Supreme Court would be discontinued without prejudice.

Ratified by the parties in 1905, the Compact took effect when it was approved by Congress in January of 1907.

Part of the present day controversy revolved around the issue of whether or not the Compact remains viable after all these years and even whether the respective legislatures have *ever* been bound by *any* of the provisions of the Compact. One Superior Court of the State of Delaware held in 1984 that "because no uniform (fisheries) laws ever existed in 1907, nor since, the Delaware General Assembly has never been bound by any of the provisions of the Compact."[5]

However, thirty years after the agreement was ratified by the States, the U.S. Supreme Court Justice Cardozo indicated that he considered the Compact to be viable. Curiously, that same decision has been cited by Delaware officials as authority for restricting the fishing rights of New Jersey residents in the Delaware River — the precise subject of controversy which prompted the U.S. Supreme Court to issue an injunction against the State of Delaware in 1878, and which led ultimately to ratification of the Compact of 1905.

New Jersey v. Delaware

The U.S. Supreme Court actually decided two boundary issues in the case of New Jersey v. Delaware. One issue, "won" by New Jersey, set the boundary line from the mouth of the Bay to the southernmost point of the New Castle circle as the Talweg Line, the main line of navigation, rather than the geographical center line proposed by Delaware. The second issue involved title to the river, islands and subaqueous soil within the circle.

Delaware traces title to the area within the circle through deeds going back to at least 1682. In that year the Duke of York delivered to William Penn a deed of feoffment to the twelve mile circle. On October 28, 1682, attorneys John Moll and Epbraim Herman gave possession and seisin to William Penn "by the delivery of turf and twig and water and Soyle of the River of Delaware."[6]

Letters patent from Charles II dated May 12, 1664 granted to the Duke of York all the land from the west side of the Connecticut River to the east side of the Delaware River. English victories over the Dutch in 1664 had transferred what is now the State of Delaware to the *de facto* control of the Duke — title later rectified by letters patent from the Crown in 1683.

When the Treaty of Paris was signed in 1783, the land within the circle was part of the territory of Delaware, and the title was in the Penns or in

persons claiming under them. The Declaration of Independence made Delaware a state with boundaries fixed as of that time. Nothing done since then, according to the Court, has had the effect of reducing Delaware's territorial limits nor of increasing territory belonging to New Jersey.

New Jersey claimed that through the exercise of dominion by riparian proprietors and by government officers, title to the subaqueous soil up to the center of the channel was developed through prescription. The Special Master appointed by the Supreme Court disagreed and the Court concurred.

The Master also concluded that "at no time has the State of Delaware ever abandoned its claim, dominion or jurisdiction over the Delaware River within the said twelve mile circle, nor has it at any time acquiesced in the claim of the State of New Jersey, thereto, except as modified by the Compact of 1905."[7]

For these reasons, the Court found that within the twelve mile circle, "the river and the subaqueous soil thereof up to low water mark on the easterly, or New Jersey side, will be adjudged to belong to the State of Delaware, subject to the Compact of 1905."[8] The Court also noted that the Compact of 1905 provides for enjoyment of riparian rights, for concurrent jurisdiction in respect to civil and criminal process, and for concurrent rights of fishery.

New Jersey v. Delaware was decided on February 5, 1934, and a decree was entered on June 3, 1935 in which it was ordered, adjudged and decreed that the decision was made "without prejudice to the rights of either state, or the rights of those claiming under either of said states, by virtue of the compact of 1905 between the states."[9]

With the Supreme Court confirmation of its title to the area of the circle, the State of Delaware "won" the second boundary issue. However, it is also clear that the Court considered the respective rights of the parties to be subject to the Compact. At that point, thirty years had gone by without passage of concurrent fisheries legislation. Since then, another half century has gone by without passage of concurrent fisheries legislation.

Recent History

On the first day of shad season, April 4, 1985, Nelson Emmons of Alloway Township, New Jersey, was arrested in the circle by the Delaware Marine Police for fishing near Pea Patch Island without an out-of-state Delaware commercial fishing license. He had a license from New Jersey.

Mr. Emmons was fined $500 and court costs, which he paid. No commercial shad fishing by New Jersey fishermen has taken place in the circle since then.

Both states require non-resident licenses below the line; each charges non-residents ten times as much as residents. However, Delaware resident licenses are $150 compared to New Jersey's $20. Non-residents may also purchase Delaware blue crab or eel licenses for $1000.

The decision to enforce Delaware fishing laws within the circle was made by Division of Fish and Wildlife officials based on a 1977 Delaware Attorney General's Opinion[10] to the effect that the 1905 Compact is legally invalid because each state had since enacted separate fishing regulations. Among differences identified by the Attorney General were regulations requiring nets to be set differently and the fact that New Jersey permits shad fishing on Sunday while Delaware does not. It is true that the Commission appointed to develop concurrent fisheries laws was not successful; indeed, it last met in 1923, the same year that the Delaware General Assembly adopted a new law with the stipulation that it would not become effective until a similar law was enacted by New Jersey.

In 1979, New Jersey adopted a comprehensive fisheries management act,[11] but there was no reference made to the old Compact. However, the Act does allow the Marine Fishery Commission established by the act to make agreements with Delaware regarding fishing rights on Delaware River and Bay. Delaware likewise recently revised its fisheries law in Title 7 of the Delaware Code.[12]

According to Bruce Freeman, New Jersey Administrator of Marine Fisheries, between 20 and 50 New Jersey fishermen have been displaced, along with a loss of income to them of about $100,000. Although economic protectionism is not a legal issue in this controversy, Charles Lesser, Manager of the Delaware State Fisheries Section, has pointed out that Delaware is now enforcing its license laws to help protect its own fishermen.

The New Jersey Legislature passed an Assembly Resolution in January 1986 calling on the Governors of the two states to settle the matter.[13]

Remaining Questions

In his letter opinion Judge Claud L. Tease of the Superior Court of the State of Delaware, points out that there is no dispute that the two states entered into an interstate compact relating to disputes over territory, jurisdic-

tion, and fishing in the Delaware River and Bay, but found that "(b)ecause no uniform laws ever existed in 1907, nor since, the Delaware General Assembly has never been bound by any of the provisions of the compact."[14]

Why then did Justice Cardozo make repeated references to the Compact in his decision in New Jersey v. Delaware?

Will New Jersey fishermen transiting the circle be presumed to be in violation of Delaware laws? Are developers on the New Jersey side subject to provisions of the Delaware Coastal Zone Act? Do muskrat trappers working in New Jersey wetlands require a Delaware hunting license?

Have the bureaucrats turned the calendar back two hundred years?

Notes

1. *New Jersey v. Delaware*, 291 U.S. 361 (1934)

2. 34 Stat. 858 (1907)

3. 205 U.S. 550 (1878)

4. n.2 *supra*

5. *State v Mick, Parsons, Crow & Willey*. No. 83-05-0092-93 (Dela. Sup. Ct., May 2, 1984) (letter opinion, Claud L. Tease, J.)

6. *New Jersey v. Delaware*, 291 U.S. at 365

7. *Id.* at 376

8. *Id.* at 385

9. *New Jersey v. Delaware*, 295 U.S. 694 (1935)

10. State of Delaware, opinions of Attorney General, 77-033 (1977)

11. N.J.S.A. 23:2B-6 *et seq*

12. Title 7 Delaware Code Chap. 9

13. New Jersey AR50, 1986

14. n.5 *supra*

Part Three

Fisheries Development

Chapter 11
Cooperatives, Antitrust, and Tax

Fisheries Cooperatives: An Antitrust Perspective

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Abstract

The Magna Charta of cooperative activity in the fisheries industry is the Fishermen's Collective Marketing Act of 1934 (FCMA). It limits the antitrust exposure of persons who collectively catch, raise, process, and/or market aquatic products.

This paper explains the development of the FCMA, outlines the legislative language, and discusses the scope of the antitrust protection provided. It includes an overview of fisheries cooperatives in the United States and New England, antitrust protection for export marketing of fish and fish products in the Export Trading Company Act of 1982, and pending legislation to authorize collective fisheries product promotion through Seafood Marketing Councils.

Cooperatives and Early Federal Antitrust Law

The proper treatment for cooperatives has always been an enigma for policymakers dealing with antitrust issues. While most early problems concerned agricultural cooperatives, their resolution set the stage for the enactment of similar legislation for fishery interests.

The story of the FCMA begins with the enactment of the Sherman Antitrust Act of 1890.[1] That law, championed by farming interests, was intended to control the "trusts" that were becoming the dominant factor in the United States economy. It provides:

> "Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal...."[2]

When the Sherman Act became law, the development of cooperative marketing associations was in its infancy. A few alert legislators foresaw the language could cripple efforts of farmers to create organizations strong enough to protect their interests in the marketplace.[3]

Senator Sherman proposed an amendment providing the Act "... shall not be construed to apply to ... any arrangements, agreements, associations, or combinations among persons engaged in horticulture or agriculture made with the view of enhancing the price of their own agricultural or horticultural products."[4]

The amendment was not adopted. Many legislators felt it was important not to limit the applicability of the new law in any way. In view of the embryonic state of cooperative marketing at the time, it is more remarkable that their status was considered at all than that Congress rejected the Sherman amendment along with all other requests for special treatment.

Three developments in the early 1900's changed congressional attitudes toward antitrust law and cooperatives. First, the United States Supreme Court construed the Sherman Act narrowly, holding that only unreasonable restraints of trade violated the statute.[5] Thus, it did not effectively mitigate the power of industrial trusts that were of such great concern to farm interests.

Second, this was a period of great growth for voluntary cooperative marketing associations. Farmer cooperatives increased both their economic and political strength.

Third, the Sherman Act and similar statutes adopted by the states were used to attack farmer associations as unreasonable restraints of trade.[6] Thus, the antitrust law farmers had fought for was turning out to be a burden rather than an asset.

Enactment of the Clayton Act, in 1914, tightened the Sherman Act prohibitions to provide a more effective restraint on anticompetitive conduct of powerful non-cooperative businesses.[7] Also, section 6 of the Clayton Act contains an affirmative statement that:

> "Nothing contained in the antitrust laws shall be construed to forbid the existence and operation of labor, agricultural, or horticultural organizations, instituted for the purposes of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individual members of such organizations from lawfully carrying out the legitimate objectives thereof; nor shall such organizations, or the members thereof, be held or construed to be illegal combinations or conspiracies in restraint of trade, under the antitrust laws."[8]

While this language was a clear expression by Congress that forming a cooperative was not a per se violation of the antitrust laws, it did not protect any meaningful actions by such associations. Also, its benefit was limited by the fact that it only applied to non-stock organizations.

Agricultural interests recognized the shortcomings of Clayton 6 and, after several years of intense Congressional consideration, secured enactment of the Capper-Volstead Act in 1922.[9]

Capper-Volstead was not drafted as an amendment to earlier statutes. It stands alone as an affirmative statement of the right of agricultural producers to collectively market their products, provided certain specific organizational and operational tests are met. The public interest is protected by language stating that if cooperatives demand excessive prices corrective action shall be initiated by the Secretary of Agriculture.

The decade following enactment of the Capper-Volstead Act was one of severe depression for agriculture. No significant cases are reported involving the Act, probably because the farm economy was too weak to support any meaningful market action by farmers even on a collective basis.

Fisheries Cooperative Marketing Act

As the depression spread in the 1930's, market conditions for fisheries producers became quite difficult as well.

A bill providing limited antitrust immunity for associations of producers of aquatic products was introduced in the House of Representatives on April 19, 1934. The sponsor was Representative Schuyler Bland of Newport News, Virginia. Congressman Bland was in an excellent position to champion the bill, as he was Chairman of the Committee on Merchant Marine. The bill was reported by the Merchant Marine Committee to the full House for consideration on May 7th.[10]

Substantive debate over the bill fills little more than a column in the *Congressional Record*. It took place on the floor of the House on May 21st. Although brief, that discussion reveals several important points about the FCMA's origin.

The Capper-Volstead Act was clearly the model for the bill. Chairman Bland stated "... this bill provides for the same relief for the fishermen that has already been given to the farmers. There is no change in the law except it is made applicable to fishermen."[11]

Chairman Bland considered himself the father of the bill, with input from the Bureau of Fisheries.

A statement by Congressman Francis Maloney of Connecticut indicates that fishermen along the New England Coast, including oyster growers and people engaged in all branches of deep sea fishing, supported passage.

The only negative comments were from Congressman Charles Truax of Ohio. He felt cooperatives had done nothing to boost prices for Ohio farmers and it would be foolish to encourage fishermen to form similar associations.

The bill passed the House by a voice vote on June 7th.

Similar legislation had been introduced in the Senate on May 11th by Senator Hubert Stevens of Mississippi. It was reported favorably by the Committee on Commerce on May 17th, and passed by the full Senate without debate June 13th. The Senate agreed to the House language June 18th and sent the bill to the White House. It was signed into law by President Roosevelt on June 24th. Thus, while it took years to establish a limited antitrust exemption for farmers, a similar statute for fisheries cooperatives was enacted in 2 months.

The FCMA has two provisions.[11] Section 1 sets forth who is covered by the Act, how they must operate to receive the benefits, and what actions are protected from antitrust liability. Section 2 empowers the Secretary of Commerce to prevent abuses by cooperatives.

Phrasing of the FCMA is virtually identical to that of the Capper-Volstead Act, except references to components of the fisheries industry are substituted for corresponding entities in agriculture. As FCMA provisions are analyzed, cases interpreting Capper-Volstead will be included where they shed light on how courts are likely to construe the FCMA.

Section 2. A Non-exclusive Exemption

Most antitrust litigation against cooperatives involves the organizational and operational standards in section 1 of FCMA. Before discussing that section, it is important to emphasize one issue with regard to section 2, the relationship between the Secretary of Commerce's enforcement powers and general antitrust law.

Section 2 of FCMA provides, in part:

> "If the Secretary of Commerce shall have reason to believe that any such association monopolizes or restrains trade in interstate or foreign commerce to such an extent that the price of any aquatic product is unduly enhanced by reason thereof ... (he shall issue a complaint, hold a hearing, and, if he finds monopolization or restraint of trade has caused undue price enhancement) ... issue ... an order ... directing such association to cease and desist from monopolization or restraint of trade."

In the first landmark decision interpreting the Capper-Volstead Act, *United States v. Borden Co.*, farmer cooperatives urged the Supreme Court to affirm a lower court decision holding administrative action by the Secretary of Agriculture under section 2 of Capper-Volstead (similar to section 2 of the FCMA) was an essential prerequisite to the judicial power to entertain a prosecution under the Sherman Act.

The Supreme Court reversed, stating:

> "We find no ground for saying that this limited procedure is a substitute for the provisions of the Sherman Act, or has the result of permitting the sort of combinations and conspiracies here charged unless or until the Secretary of Agriculture takes action. That this provision of the Capper-Volstead Act does not cover the entire field of the Sherman Act is sufficiently clear.... We think that the procedure under sec. 2 of the Capper-Volstead Act is auxiliary and was intended merely as a qualification of the authorization given to cooperative agricultural producers by sec. 1."[13]

Similar claims that the FCMA confers exclusive jurisdiction in the Secretary of Interior over monopolization or restraint of trade by fisheries cooperatives were rejected by the courts and the Federal Trade Commission, on the basis of the *Borden* opinion.[14]

Section 1. Extent of the exemption

Section 1 of FCMA defines the "persons" and "associations" entitled to claim the limited antitrust exemptions granted, and describes the elements and scope of the exemption.

The exemption applies to:

(a) "persons engaged in the fishery industry ...

(b) "as fishermen, catching, collecting, or cultivating aquatic products, or as planters of aquatic products on public or private beds ..."

and permits them to:

> (c) "act together in associations corporate or otherwise, with or without capital stock
>
> (d) "in collectively catching, producing, preparing for market, processing, handling, and marketing in interstate and foreign commerce, such products of said persons so engaged."

Such associations:

> (e) "may have marketing agencies in common," and
>
> (f) "may make the necessary contracts and agreements to effect such purposes."

but such an association is entitled to claim the exemption only if it is:

> (g) "operated for the mutual benefit of the members ...," and
>
> (h) meets the following requirements:
>
> > (i) each member is allowed only one vote without regard to the amount of stock or membership capital he may own; or
> >
> > (ii) it pays no more than 8 percent per year in the form of dividends on stock or membership capital; and, in any case,
> >
> > (iii) it does not deal in the products of nonmembers "to an amount greater in value than such as are handled by it for members."

This provision gives fishermen significant marketing alternatives that might otherwise be unavailable:

- Fishermen who are members of a cooperative can agree among themselves on the prices they will receive for their aquatic products and all reasonable terms of sale.[11]
- Fishermen who are members of one cooperative can agree on marketing practices with fishermen who are members of another cooperative by having their associations use a common marketing agent,[12] form a federation,[13] or simply work together to accomplish their legitimate marketing objectives.[14]
- Fishermen can use their cooperative to do as little as establish a floor price below which no member will sell his products,[15] or they can

integrate forward throughout the marketing chain. Ocean Spray and Welch's are examples of East Coast agricultural marketing cooperatives that put their members' product right on the grocery store shelf.

- Fishermen may, through a single cooperative "or in combination with other exempt cooperatives, obtain monopoly power in a given market so long as it is achieved through natural growth, voluntary confederation and without resort to predatory or anticompetitive practices."[20]

While the FCMA gives fishermen the opportunity to enhance their marketing power, it does not entirely supersede the Sherman and Clayton Acts.[21] Reasonable restraints are placed on that power:

- The exemption is available only to cooperatives composed entirely of producers and associations of producers. For example, if non-cooperative packers or processors are admitted as members, the exemption is lost.[22]

- Collective action must be restricted to producers and associations of producers. Anticompetitive agreements and concerted action between a cooperative and a non-cooperative have been held to violate the Sherman Act[23] and section 7 of the Clayton Act.[24]

- Even a single, properly structured cooperative receives no protection if its actions are predatory and would constitute an attempt to monopolize or a monopolization under section 2 of the Sherman Act. Predatory conduct is activity that is anti-competitive and has no business justification. Conduct on the part of fisheries associations that the courts have deemed predatory includes picketing, boycotting, and thinly veiled threats of violence to exclude nonmembers from the market.[25]

In recent years, a split has developed between the Circuit Courts of Appeal over the test to be applied in determining if certain conduct is outside the scope of permissible cooperative activity.

The Second Circuit, which encompasses Connecticut, New York, and Vermont, and the Ninth Circuit have held that conduct, to be unlawful, must be predatory on its face, i.e., anticompetitive and without business justification.[26]

The Sixth and Eighth Circuits have said otherwise lawful conduct may become unlawful if the cooperative acts with an unlawful, i.e., predatory, intent.[27] Neither circuit has established guidelines for determining unlawful intent of a cooperative when it undertakes otherwise permissible activity.

Washington Crab Association

The leading opinion interpreting the FCMA is a Federal Trade Commission decision, *In re Washington Crab Association*. The complaint, examiner's initial decision, and Opinion of the Commission are all published at 66 Federal Trade Commission Decisions 45 (1964). The Opinion, by Chairman Paul Rand Dixon, is very well written. I recommend all professional advisers and policymakers in the fisheries industry read it.

The opinion states the facts in the case as follows. Washington Crab Association was organized in 1958 to increase the market power of crab fishermen in Washington and Oregon, particularly the Westport, Washington, area. While the price of crabs had been as high as $.20 a pound in the past, in the three years before the association was founded the price had been only $.08 a pound.

Fishermen contended that prior to the organization of the cooperative they were at the mercy of the processors. Most owed the processors a great deal of money, borrowed to finance their boat and equipment. As crabs spoil in a few days, fishermen had to take whatever price was offered. Often the price "fell" during the day while they were at sea, so when they returned with their catch they were offered less than promised when they left port. Also, processors often made "deductions" in price for "defective" crabs after the catch in question had been commingled with others, making it impossible for the fishermen to challenge the deduction.

The bylaws authorized the association to be the sole and exclusive marketing agent for the members and to decide which processor each member would deliver to.

The association developed a purchase contract between the association, as seller, and a processor, as buyer. It was sent to each processor in the area for signature. Key provisions of the contract —

(1) obligated the processor to pay the price demanded by the association for crabs of its members;

(2) barred either party from canceling the contract on less than 24 hours notice; and

(3) provided "defective" crabs delivered by a member had to be rejected at time of delivery, and the association had to have the opportunity to inspect the crabs claimed to be defective.

Thus, the opinion notes, the contract was a direct response to the alleged problems of the fishermen. Prices were protected during a day at sea, and a mechanism to prevent abuses in declaring "defects" was established.

After it was formed the association asked for, and secured, an immediate 50 percent increase in the price of crabs, from $.08 to $.12 a pound. Early in the next 5-month season the price was successfully increased to $.14 a pound

Mid-way through that season the association tried to increase the price again to $.16 a pound. The processors refused to accept that price and a stalemate developed. The fishermen "sat on the beach" for nearly a month. Then, in their most dramatic move, many of the fishermen formed a second cooperative and purchased their own processing plant. The day it began accepting crabs the other processors agreed to pay $.16 a pound.

At this point Chairman Dixon makes a crucial observation. He states, "If this were the whole story, there would be nothing here to concern the Federal Trade Commission."[28]

In other words, these fishermen, through their cooperative, legally took several steps together to improve their income. First, as Chairman Hand notes, "The members of the association have fixed prices, of course, but this they are expressly permitted to do under Section 1 of the (FCMA)."[29]

Second, Chairman Hand saw nothing wrong with the members limiting production, either by "sitting on the beach" or by "rotating the boats" to equally divide among the members the business of supplying the first few processors to accept a price increase. He states:

> "To be sure, this is a 'limitation on production' and, except for the exemption afforded ... by the (FCMA) ... would be a *per se* violation of the Sherman Act and the Federal Trade Commission Act. ... Thus, so long as the members of a cooperative are acting pursuant to an agreement *voluntarily* entered into among themselves, they are to be considered as a single entity for antitrust purposes, the same as an ordinary business corporation with a number of 'divisions.' There is no obligation on the single corporation to produce at capacity; it may produce in any volume that it likes and allocate production among its several 'divisions' in such proportions as it sees fit. ... We see nothing unlawful in their limiting production by agreement among themselves, or in their 'boat rotation.'"[30]

Limiting production is not included in the list of marketing tools availabl to fishermen under the FCMA earlier in this report because there is doubt among antitrust experts that this finding would be applied in every circumstance. But research has not uncovered any decisions specifically rejecting this conclusion.

Third, when the cooperative was unable to convince the processors to meet its price, it was free to buy a plant and go into direct competition with the processors. Cooperatives do not have unlimited rights to purchase non-cooperative businesses. The court will look at the economic effect of the purchase. If it increases competition in the industry, the purchase will probably be approved; if it stiffles competition, the purchase is likely to be found to violate antitrust law.

Unfortunately, the first quotation from Chairman Hand began "If this were the whole story...." In an attempt to hold and increase its market power, the association engaged in a number of clearly predatory practices that need not be detailed here.

These predatory practices led to an FTC complaint charging the association with violating section 5 of the Federal Trade Commission Act, which reads:

> "Unfair methods of competition in commerce, and unfair or deceptive acts or practices in commerce, are hereby declared unlawful."[31]

The association raised three defenses. First, it claimed the FCMA gave it an absolute exemption from antitrust prosecution.

Second, it argued FTC actions was barred by a prior decision of the Secretary of the Interior not to take action against it under section 2 of the FCMA.

Third, it asserted it was immune from antitrust liability unless the government could show it had conspired with persons or organizations not protected by the FCMA.

The FTC, relying on cases cited earlier in this paper, rejected each of these defenses. As the only penalty inflicted was an order that the association stop using coercion, threats or intimidation to accomplish its legitimate objectives, no further legal action was pursued by the cooperative.

Department of Justice Initiative of 1982

In 1982, the Department of Justice filed lawsuits against three fisheries cooperatives on the West coast, charging each association with violations of section 1 of the Sherman Act. The cases were settled by consent judgment. These disputes indicate issues involving fisheries cooperatives of concern to antitrust enforcement officials today, their positions on these issues, and their views of the protection available under section 1 of FCMA.

Two of the cases focused on a common issue, the relationship between cooperative associations and non-member producers.

The first of these cases to be settled involved All Coast Fishermen's Marketing Association. Membership consisted of commercial fishermen, the majority of whom operated out of the Port of Charleston, Oregon.

On February 19, 1982, Justice filed its complaint alleging several practices of the association amounted to a conspiracy to restrain competition in the sale of seafood:

- For several years non-members attended meetings of All Coast at which the price per pound of seafood to be offered processors was discussed. The nonmembers were allowed to participate in these meetings and to vote along with members on what the ex-vessel price should be.

- When members were refusing to fish because the association did not have an agreement with processors, employees of the association convinced non-members not to fish until an agreement was reached.

- Threats and harassment were used to enforce agreements not to fish, and to ensure non-members honored the price agreements between All Coast and processors.

- Association contracts with processors required them to collect marketing fees, payable to the cooperative, on all seafood delivered, including seafood from non-members.

The position of the United States, set forth in section II of the competitive impact statement attached to a proposed consent decree filed with the court on July 13, 1982, was that joint activities permitted commercial fishermen under the FCMA:

> "... are exempt from the antitrust laws as long as only members participate in such activities. The exemption does not apply where non-members engage in joint marketing and pricing activities with members. In addition, immunity does not and has never extended to joint acts to coerce non-members to comply with the defendant's prices or its policies."[8]

Mr. Sydney Berde, an attorney experienced in representing farmer cooperatives in antitrust cases, commented on the proposed final judgment and competitive impact statement. He challenged the position of Justice tha permitting non-member producers to participate in cooperative affairs

nullified the exemption for collective marketing. He argued that protection is only forfeited when fishermen combine with non-producer entities such as processors or labor unions.[33]

Mr. Anthony Desmond, Chief, San Francisco Office of the Antitrust Division, responded to Mr. Berde's comments. Mr. Desmond politely rejected Mr. Berde's arguments, relying on the literal language of the statute which, he contended, "plainly states that the exemption is granted only to those fishermen who have formed associations and that joint marketing activities are immunized from the antitrust laws only when engaged in by members of the association."[34]

Toward the end of his reply Mr. Desmond, inadvertently I am sure, made the strongest possible argument for effective fisheries cooperatives when he wrote:

> "Nonassociation fishermen represent a procompetitive influence in the marketplace. This competition benefits the public because it tends to keep prices down."[35]

This is as plain a statement as one can make that cooperatives with market power are good for fishermen because they increase prices received by fishermen.

In the final judgment entered October 25, 1982, All Coast agreed to refrain from:

> (A) discussing ex-vessel prices, terms of sale, or tieups with non-member fishermen;
>
> (B) requesting or coercing non-member fishermen to tieup or sell fish only at association prices and terms of sale, and
>
> (C) requesting or coercing processors to collect or remit fees from non-members or limit in any way purchases from non-member fishermen.[36]

A similar complaint was filed against Del Norte Fisherman's Marketing Association, Inc., on July 6, 1982, only one week before the proposed consent judgment with All Coast was filed with the court. Del Norte is an association of commercial fishermen operating out of the Port of Crescent City, California.

Like the All Coast case, Justice alleged violations of Sherman 1 because Del Norte met with non-member fishermen to discuss prices, non-members agreed not to fish unless the association had a contract with processors, and

because, it claimed, Del Norte used threats, harassment, and vandalism to insure non-members complied with these agreements.[27]

Although Del Norte negotiated for over two years with Justice, it eventually accepted a consent judgment on December 21, 1984. The judgment was very similar to the one All Coast signed. Like All Coast, Del Norte agreed to cease all discussions with non-member fishermen and free processors from any limitations on purchases from non-members.[28]

These cases were particularly attractive to Justice because of the undercurrents of predatory conduct, i.e., threats and intimidations of non-members. These undercurrents may have permitted the government to attain a decree on a position that may not stand up in a trial, that the scope of the exemption in section 1 of FCMA turns on the formality of membership or the presence or absence of a formally designated marketing agency in common.

The third case involved a different issue, the relationship of a bargaining association to processors.

The complaint herein alleged that four crab processors and a fishermen's cooperative marketing association engaged in a combination and conspiracy to fix prices of live Bering Sea crab.

The processors were Seattle-based firms with processing facilities in the Dutch Harbor area of Alaska. The cooperative, Alaska Marketing Association, was comprised of fishing boat operators who harvest crab and sell it to the Dutch Harbor processors. The primary function of the cooperative is to represent its members in bargaining with the processors concerning the price to be paid for the crab.

Justice claimed two or more of the processors met regularly with cooperative representatives to reach agreement on the price to be paid for crab. Other processors in the area and independent fishermen usually followed the price agreed to at these meetings.

The complaint sought to enjoin Alaska Marketing Association from engaging in price negotiations with more than one processor participating, and from facilitating any agreement among processors to fix live crab prices.[29]

The consent decree, entered October 29, 1982, prohibits the cooperative from undertaking the actions which Justice found objectionable.[30]

The lesson of this case is that a bargaining association can negotiate identical contracts with processors as long as it does so on an individual basis

with each processor and without facilitating an agreement among the processors to achieve such a result.

Department of Commerce Enforcement Regulations

Regulations spelling out the procedures to be followed in conducting an investigation under section 2 of the FCMA are published at 50 CFR, part 290.

The regulations follow generally accepted administrative law principles. They are confusing in one regard. They were originally published in 1966 when enforcement authority was in the Department of Interior. Although that responsibility was transferred to the Commerce Department in 1970, the regulations have not been amended to substitute "Secretary of Commerce" for "Secretary of the Interior."

In brief, any one can ask the Secretary to investigate a fisheries cooperative, but only the Secretary can institute a proceeding. If an administrative complaint is issued, the cooperative is entitled to a hearing conducted by a hearing official appointed by the Secretary. Interested parties may intervene at the discretion of the hearing official.

After the hearing the hearing official will issue a decision embodying his findings of fact and conclusions of law. Any party can file exceptions, and then the entire record is forwarded to the Secretary. The Secretary, at his discretion, may call for additional proceedings. If the Secretary finds monopolization or restraint of trade which unduly enhanced price, he shall order the association to cease and desist from such conduct. If the order is ignored, the Secretary requests the Attorney General to seek court ordered compliance.

Overview of United States and New England Fisheries Cooperatives

While cooperatives are a major force in farming (7 of every 10 commercial farmers patronize at least one of the more than 5,500 agricultural marketing, supply and service cooperatives),[a] cooperatives have not been used nearly as much by fishermen.

A recently published study of U.S. fishery cooperatives indicates there were 102 such associations in 1980. Seventy were active and participated in the survey. These associations reported 10,425 members, 5.3 percent of known U.S. fishers. Members operated 8,275 fishing craft, 7.3 percent of the U.S. fleet.[a]

Cooperatives marketed 555 million pounds of seafood for human food and industrial use, 8.6 percent of the 1980 U. S. fish landings. Some bargaining associations negotiated price and other factors for an additional, but unknown, portion of the U. S. landings.

Fifty-five of the associations (78 percent) had a hired manager. The remaining 15 relied primarily on the associations' officers to manage the business affairs, contracting with individuals to handle specific tasks such as legal, accounting, warehousing, and fish handling duties.

Maine had the largest number of fishery cooperatives of any state, 15 associations. A total of 23 fisheries cooperatives were headquartered in New England. The Maine cooperatives averaged only 60 members, compared to an average of 200 members for other New England associations. This reflects the predominance of lobster cooperatives in Maine, which average only about 40 members each.

Twenty-one of the New England cooperatives were primarily engaged in marketing, 2 offered only supplies and services.

Most fishery marketing cooperatives are along the Pacific coast and in New England. Each region has a distinct type of cooperative. Twenty-one of 23 Pacific coast marketing cooperatives are bargaining associations. Their only function is to negotiate price and terms of sale with processors on behalf of their members.

All 21 New England marketing associations perform handling functions. They list 2,137 memberships in 1980, 1,396 of which were active. New England cooperatives marketed 15 percent of the region's total landings. While not a large proportion, it is substantially more than in other coastal regions.

Eighty-one percent of the product sold by New England cooperatives was fresh, the remainder was processed. Wholesalers purchased 73.4 percent of the product, processors 17.2 percent, with the remainder divided among chain stores, local dealers, export, and retailers.

The 10 lobster cooperatives in Maine (included in the 21 New England marketing associations) marketed a $7.4 million catch and paid members 85 percent of that amount upon delivery and an additional 4.7 percent as a patronage refund. They also sold $1.3 million in supplies and services to their members, primarily fuel.

While cooperatives are a factor in the fisheries industry, particularly in New England, they are far from a dominant factor in the market. In view of

the economic power an effective cooperative can wield in the marketplace, fishermen and their professional advisers ought to consider more collective marketing initiatives in the fisheries industry.

The Export Trading Company Act of 1982

The FCMA was enacted to provide antitrust protection for non-predatory collective efforts by fishermen developing more effective domestic marketing programs. Now that many markets are international, the Export Trading Company Act of 1982 has been enacted to provide antitrust protection for legitimate foreign market development activities.[43]

The ETC Act is divided into four titles:

Title I contains definitions and procedural matters.

Title II provides exporters with improved access to export financing.

Title III establishes a procedure within the Departments of Commerce and Justice whereby exporters can receive a determination in advance of exporting that their proposed export conduct is immune from U.S. antitrust laws.

Title IV amends the Sherman and Federal Trade Commission Acts to clarify the application of these statutes to export trade.

Only Titles III and IV will be summarized.[44]

Title III authorizes the Department of Commerce to issue export trade certificates of review. The certificate provides two advantages to companies wishing to collectively seek export sales.

First, as long as the holder stays within the guidelines of the certificate, immunity from state and federal government civil and criminal antitrust action is virtually absolute. Activities outside the scope of the certificate are subject to the antitrust laws. The only exception to immunity is that Justice may seek to enjoin conduct threatening clear and irreparable harm to national interests.

Second, private parties cannot collect damages for properly certified conduct. They must show the certificate should not have been issued, or that the injurious conduct was outside the scope of the certificate. Access to

treble damages is severely limited, and successful defendants are entitled to reasonable attorneys' fees and costs.

Title IV amended the Sherman and FTC Acts to make it clear they apply to export conduct only if it has a "direct, substantial, and reasonably foreseeable" anticompetitive effect on domestic or import commerce in the United States.[45] Thus, if export activity has an anticompetitive effect only on foreign markets, it is immune from U.S. antitrust laws.

The main advantage of the ETC for fisheries interested in export marketing is the flexibility it gives them to combine assets with other businesses, including competitors, to become big enough to be a factor in the international arena. Arrangements can involve vertical integration up and down the chain of distribution, and horizontal combinations among firms with similar or complimentary product lines.

Fishermen can use the FCMA to gain antitrust protection for collective marketing with other fishermen in domestic markets. Then individually, or together as cooperatives, they can unite with non-cooperative processors and merchandisers under the ETC Act to become effective export marketers.

Government officials, in reviewing applications for certificates under Title III and interpreting the general antitrust protections of Title IV, are most concerned with potential use of an ETC as a vehicle for reducing or eliminating competition in domestic markets. They are particularly sensitive to exchanges of information that could be used to influence domestic price and production levels.

At least two export trade certificates of review have been issued to fisheries interests:

> U.S. Farm-Raised Fish Trading Co. of Jackson, Mississippi, and its processor-stockholders (Catfish Farmers of America, Delta Catfish Processors, Fishland, Farm Fresh Catfish Company, and ConAgra). The ETC is authorized to purchase live or processed catfish for export from its members, set purchase prices, allocate export orders among its members on a sealed-bid or rotating bid basis, and sign exclusive export contracts with its members.[46]
>
> Pacific Northwest Fish Export Association, Seattle, Washington, and its members (Icicle Seafoods, Peter Pan Seafoods, Sea-Alaska Products, and Ocean Beauty Seafoods). This ETC may compile and disseminate to its members information on sales and marketing opportunities in the export market for fish and fish products including data on prices, projected demand, insurance, transportation, foreign competition, customer specifications, and U.S. and foreign legislation, regulations, and policies affecting export sales.[47]

East Coast cooperatives have traditionally ignored the export markets, selling primarily to domestic processors. The ETC Act opens new opportunities for creative planning in the export market. These two ETC's provide quite different services to their members. Perhaps one or more ETC's would open new outlets for East Coast fish and fish products.

Persons interested in exploring this option can view and copy existing certificates at the Department of Commerce, or review notices summarizing certificates published in the *Federal Register*.

Seafood Marketing Councils

Congress is presently deciding whether to approve another collective marketing opportunity for fisheries interests. Pending legislation would authorize the United States fishing industry to establish a coordinated program of research, education, and promotion to expand markets for fisheries products. Although not drafted as an amendment to the antitrust laws, a Seafood Marketing Council Act would augment group efforts undertaken pursuant to the FCMA or the ETC Act.

The overall objective of the legislation is to duplicate the success of certain agricultural producers, notably cotton, egg and dairy farmers, in increasing public awareness of the positive attributes of their products. While there is general agreement among interested parties about the need for such an initiative, there is wide disagreement on how it should be achieved. In a reversal of their usual positions, Senate leaders are calling for a sweeping national program with direct government involvement, and House sponsors are calling for limited programs funded entirely by the fishing industry.

The legislative process was initiated in 1983 by Senator Ted Stevens (R-Alaska), Chairman of the Merchant Marine Subcommittee of the Senate Committee on Commerce, Science, and Transportation. His bill called for a national seafood marketing council supported by federal funds for at least 4 years. The Senate passed the bill in the last days of the 98th Congress, which adjourned before the House had time to consider it.[*]

In 1985 all of the action was in the House of Representatives. Four senior members of the House Merchant Marine and Fisheries Committee introduced their seafood marketing councils bill, H.R. 2935, in July.[*] After hearings and subcommittee approval, the bill was reported favorably by the Merchant Marine and Fisheries Committee on December 5th.[*] The House passed the bill by voice vote, under a suspension of the rules, on December 9th.[*]

Under H.R. 2935 fishermen and/or fish processors may petition the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to issue a charter creating a seafood marketing council. The charter proposal must include, among other things:

- a description of the species of fish and the fish products for which the council will implement marketing and promotion plans,
- the plan for assigning seats on the council to different sectors of the industry affected by the proposal, and
- the procedures for determining assessments to be levied on those sectors to finance council programs.

Once NOAA is satisfied the proposal meets various procedural requirements, it shall conduct a referendum among the sectors affected. Approval requires the affirmative votes of a majority of the eligible voting participants in each sector, and those voting for the council must have accounted for at least 66 percent of the handling of species covered during the 12 months before the vote.

Once established, the councils would be permitted to impose and collect assessments on participants in the designated industry sectors to be used for research, promotion and consumer information activities regarding the quality and marketing of fish and fish products. The council could also establish voluntary quality standards and, if approved by NOAA, authorize the placement of a seal or other identifying mark on packages containing fish and fish products meeting the quality standards.

To make sure participation is voluntary, any person who pays an assessment shall have the right to demand and promptly receive a refund of the money from the council.

In summary, H.R. 2935 permits species-specific and product-specific councils funded entirely from assessments on the fisheries industry. The intent of the sponsors is that these councils will be organized on a regional basis, and similar councils in different geographic areas will cooperate to achieve the greatest impact.

Senator Stevens reintroduced legislation to create a National Seafood Marketing Council in March of this year.[8] That bill, S. 2138, differs from th House bill in several important respects.

The Stevens bill establishes a single nationwide seafood marketing council. The council would promote seafood in the generic sense.

NOAA would have a non-voting seat on the council, and would appoint the 15 voting members of the council. Geographic and sector interests would all be represented. The East Coast (Maine to Virginia) would be entitled to a minimum of three representatives, one each from the harvesting, processing, and marketing sectors.

Funding for at least the first four years would come from the Fisheries Loan Fund established by the Fish and Wildlife Act of 1956.[9] Federal funding is set at $10 million for fiscal 1986 and $5 million for each of the next three years. Funds not used in the designated years, and investment income earned on those funds, could be carried over by the council to be spent in future years. While the bill doesn't appear to specifically authorize it, the intent of the sponsors is that assessments would supplement the specified federal funds.

On April 17th the Senate Commerce Committee held a hearing on both Senator Stevens' bill and the House bill. A conversation with attendees at the hearing indicates Mr. Carmen Blondin of NOAA testified that, although the Administration supports the concept of industry organized and funded research and promotion efforts, it opposes any federal government involvement or expenditure.

Mr. Ken Coons, Executive Director of the New England Fisheries Development Foundation, reportedly endorsed use of Fisheries Loan Fund assets for a national marketing program but expressed reservations about Northeastern representation on the council under the Stevens bill.

Senate staff professionals are working on a draft bill combining both proposals, a federally funded generic promotion program and species-specific programs financed by affected fisheries interests. Assuming Senator Stevens is pleased with the results, his subcommittee will probably meet later this summer to markup a bill for full committee consideration.

In telephone conversations Senate staff has expressed optimism an agreement can be reached with the House. The greatest obstacle they foresee is convincing other Senators, in this time of budget austerity, of the need for federal seed money to get any councils that might be formed off to a strong start.

The Committee Report accompanying H.R. 2935 states that from 1980 to 1984 investments in seafood advertising fell 10 percent while there were

"tremendous increases by competing food groups."[9] Seafood marketing councils, if authorized by law and supported by the industry, would provide a mechanism to collect sufficient funds to produce and distribute professional advertising.

Such collective activity would be exempt from antitrust suits. However, attempts to use a marketing council for anti-competitive conduct, such as price fixing, would not be protected. While seafood marketing councils could not be used for collective marketing, they might provide a foundation of mutual trust upon which other collective marketing programs might be built.

Conclusion

No one has made a stronger statement in justification of group action than native New Englander Benjamin Franklin, who proclaimed at the signing of the Declaration of Independence, "We must all hang together, or assuredly we shall all hang separately."

What was once inflamatory political rhetoric may now be simple economic truth. Fishermen, like farmers, are trying to compete in markets that are becoming increasingly international in scope. Foreign competitors are aggressively seeking our domestic and overseas markets. Multi-national firms and conglomerates are becoming more dominant in processing and consumer marketing.

While the fiercely independent producer can still survive, the task is becoming more difficult all the time. Group action, through such vehicles as cooperatives, export trading companies, and marketing councils, offers fishermen the economic power to compete in today's market environment. Fisheries interests should be active proponents of laws and policies facilitating group action, and more effective users of collective power available to them. There are simply few other avenues available today as ways to long-term prosperity for the industry and the people who depend on it.

Notes

1. 26 Stat. 209 (1890), 15 U.S.C. §1 *et seq.*

2. 15 U.S.C. §1.

3. 21 Cong. Rec. 2561, 2562, 2606 (1890).

4. 21 Cong. Rec. 2726 (1890).

5. *Standard Oil Co. of New Jersey v. United States*, 221 U.S. 1 (1911); *United States v. United States Steel*, 251 U.S. 417 (1920).

6. *Ford v. Chicago Milk Shippers' Ass'n*, 39 N.E. 651 (Ill. 1895); *Reeves v. Decorah Farmers' Co-operative Society*, 140 N.W. 844 (Ia. 1913).

7. 38 Stat. 730 (1914), 15 U.S.C. §12, *et seq.*

8. 15 U.S.C. §17.

9. 42 Stat. 388 (1922), 7 U.S.C. §§291-292.

10. Various steps in the legislative process are reported at 78 Cong. Rec. 6974, 8261, 8562, 8982, 9175, 10,745, 11,322, and 12,421 (1934).

11. 78 Cong. Rec. 9175 (1934).

12. 48 Stat. 1213 (1934), 15 U.S.C. §§521-522.

13. 308 U.S. 188, 206 (1939), reversing 28 F.Supp. 177 (N.D.Ill. 1939). A subsequent attempt to have the Supreme Court reverse itself was unsuccessful. *Maryland & Virginia Milk Producers Ass'n v. United States*, 362 U.S. 458 (1960).

14. *Manaka v. Monterey Sardine Industries*, 41 F.Supp. 531 (N.D. Cal. 1941); *In re Washington Crab Association*, 66 F.T.C. 45 (1964). From 1939 to 1970, enforcement authority under FCMA was vested in the Secretary of the Interior.

15. *Washington Crab*, 66 F.T.C. 45; *Treasure Valley Potato Bargaining Ass'n v. Ore-Ida Foods*, 497 F.2d 203 (9th Cir. 1974), *cert. denied* 419 U.S. 999.

16. *United States v. Maryland Cooperative Milk Producers, Inc.*, 145 F.Supp. 151 (D.C.D.C. 1956).

17. *Sunkist Growers, Inc. v. Winkler & Smith Citrus Products Co.*, 370 U.S. 19 (1962).

18. *Treasure Valley*, 497 F.2d 203.

19. *Northern California Supermarkets, Inc. v. Central California Lettuce Producers*, 413 F.Supp. 984 (N.D. Cal. 1976).

20. *Alexander v. National Farmers Organization*, 687 F.2d 1173, 1182 (8th Cir. 1982), which referred to *Fairdale Farms v. Yankee Milk, Inc.*, 635 F.2d 1037, 1044 (2nd Cir. 1980), *cert. denied* 454 U.S. 818.

21. *Washington Crab*, 66 F.T.C. 45.

22.*Case-Swayne Co. v. Sunkist Growers, Inc.*, 389 U.S. 384 (1967); *United States v. National Broiler Marketing Association*, 436 U.S. 816 (1978). At least one court has not denied antitrust protection to a cooperative because it had nonproducer members who were not processors or other middlemen using the exemption to shield otherwise illegal conduct. *Alexander v. NFO*, 687 F.2d 1173.

23.*United States v. Borden*, 308 U.S. 188 (1939).

24.*Maryland and Virginia Milk Producers Ass'n v. United States*, 362 U.S. 458 (1960).

25.*Local 36 of International Fishermen and Allied Workers, etc. v. United States*, 177 F.2d 320 (9th Cir. 1949), *cert. denied* 339 U.S. 947; *Gulf Coast Shrimpers v. United States*, 236 F.2d 658 (5th Cir. 1956), *cert. denied* 352 U.S. 927.

26.*Fairdale Farms*, 635 F.2d 1037 (2nd Cir. 1980); *Treasury Valley*, 497 F.2d 203 (9th Cir. 1974).

27.*United States v. Dairymen, Inc.*, 660 F.2d 192 (6th Cir. 1981); *United States v. Dairymen, Inc.*, 1985-1 Trade Cases 66,638 (6th Cir. 1985); *Alexander v. NFO*, 687 F.2d 1173.

28.*Washington Crab*, 66 F.T.C. at 105.

29.*Id.* at 105.

30.*Id.* at 126-127.

31.15 U.S.C. §45.

32.47 Fed. Reg. 32816 (1982).

33.47 Fed. Reg. 46908 (1982).

34.47 Fed. Reg. 46908 (1982).

35.47 Fed. Reg. 46909 (1982).

36.1982-83 Trade Cases (CCH), dec. 65,211.

37.49 Fed. Reg. 33745 (1984).

38.1985-1 Trade Cases (CCH), dec. 66,424.

39.47 Fed. Reg. 30318 (1982).

40.1982-83 Trade Cases (CCH), dec. 65,038.

41. P. Wilkens, "Marketing and Farm Supply Cooperatives: Commerical Farmer Membership and Use, 1980," Agricultural Cooperative Service Research Report No. 42, at 1 (1984).

42. Data in this section is from "Fishery Cooperatives," Agricultural Cooperative Service Research Report No. 44 (1985), by William R. Garland and Phillip F. Brown.

43. 96 Stat. 1233 (1982).

44. For a thorough discussion of the Export Trading Company Act and its advantages for exporters such as fisheries interests, see "How Agricultural Exporters, Cooperatives and Joint Export Marketing Groups Can Use the Export Trading Company Act," *Journal of Agricultural Taxation & Law*, Spring 1986, pp. 34-69, by Janice A. Payt.

45. 15 U.S.C. §§6a, 45(a)(3).

46. Notice of Application, 48 Fed. Reg. 29,035 (1983); Notice of Certificate, 48 Fed. Reg. 50,385 (1983).

47. Notice of Application, 50 Fed. Reg. 48,100 (1985); Notice of Certificate, 51 Fed. Reg. 16,089 (1986).

48. 130 Cong. Rec. S 10414-10418 (daily ed., October 10, 1984).

49. 131 Cong. Rec. H 5320 (daily ed., July 9, 1985). The sponsors are all senior members of the Merchant Marine and Fisheries Committee: John Breaux (D-La), Chairman of the Fisheries Subcommittee; Walter Jones (D-NC), Chairman, full committee; Norman Lent (R-NY), ranking minority member, full committee; and Don Young (R-Alaska), ranking minority member, Fisheries Subcommittee.

50. 131 Cong. Rec. H 11148 (daily ed., December 5, 1985). The Committee Report is H.R. Rep. No. 99-420, 99th Cong., lst Sess. (1985).

51. 131 Cong. Rec. H 11455-11456 (daily ed., December 9, 1985).

52. 132 Cong. Rec. S 2091-2093 (daily ed., March 5, 1986).

53. 16 U.S.C. §742c. The balance remaining in the Fisheries Loan Fund as of September 30, 1986, would, under existing law, revert to the Treasury as miscellaneous receipts.

54. H.R. Rep. No. 99-420 at 11.

Tax Law Changes and Implications for the Fishing Industry

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Abstract

Federal tax policies can assist in creating economic conditions conducive to developing harvesting, processing, and marketing facilities necessary for full utilization of the country's fisheries resources. These policies need to be developed in concert with fisheries management policies and designed to provide a continuous source of protein from the sea as well as to maximize employment opportunities in coastal regions.

If designed properly, federal tax policies will encourage economic development creating new job opportunities (and maintaining existing ones), resulting in stable (or potentially increasing) federal and state tax revenues. Federal tax law changes should be evaluated regarding their potential impacts upon the commercial fishing industry in addition to their impacts upon projected budget deficits (or surpluses).

A major factor influencing the impacts of tax policies is that the fishing industry is actually made up of many "separate" fisheries, each with its own supply and demand characteristics. There are harvestors, processors, and marketing firms that cross-over among these separate fisheries, thus providing additional complex relationships that influence the impacts of alternative tax policies.

Current federal tax reform proposals are designed to close or reduce some tax credits and deductions, resulting in contributions to reduce the federal budget deficit. These proposed tax law changes do not appear to address concerns related to fisheries development goals on regional or national levels. It is important to evaluate tax reform bills more closely than just whether a fishing firm's tax bill is larger or smaller than under previous tax laws.

The fishing industry should be discussing the impacts of alternative tax policies so that it can influence those people designing them, rather than just playing a reactive role.

Introduction

The United States fishing industry is currently faced with the challenge of providing the nation with opportunities resulting from changes in national and international laws regarding fisheries resources, technological advances in harvesting and processing techniques, and marketing opportunities resulting from an increased awareness of the nutritional value of seafood.

Federal tax policies can assist in creating those economic conditions conducive to development of facilities necessary for the fullest utilization of the country's fisheries resources. Tax policies should be developed in accordance with fishery management policies and be designed to help provide both a continuous source of protein from the sea and maximum employment opportunities in coastal regions.

A tax program, if designed correctly, will encourage economic development by creating job opportunities which also result in additional federal and state revenues from taxes on the additional employment and production in the fishing industry.

Federal and state tax policies can have major influences upon fishermen's decisions regarding capital investments for vessels, gear, and shoreside facilities. It is important for the fishing industry to understand the financial implications of tax policies for harvesting, processing, and marketing operations.

The media is constantly reporting about proposed changes in federal tax codes. While it is difficult to predict the exact tax law changes that may occur during this (or any) session of the Congress, it is possible to look at recent changes and discuss proposed ones.

This paper will first look at broad tax policy goals that can affect the fishing industry. Alternative approaches to generating revenues will be briefly discussed followed by a review of current fishery-related federal tax laws. Proposed federal tax law changes will be reviewed with a full appreciation for the inherent risks involved with predicting congressional actions. Finally, tax policy goals will be recommended that can be used when evaluating current and future tax laws on local, state and federal levels.

Overview of Tax Policy

Taxes serve several important roles, with three key ones:

> " (1) To impact the organization and efficiency of economic activity,
> (2) to redistribute income and wealth among members of society, and
> (3) to raise revenue to pay for government activities."[1]

Hughes also identified how public taxation policies affect the private sector.

> "Taxes affect economic activity in the private sector in two fundamental ways:
>
> 1. They transfer resources from private individuals and firms to the government, reducing net income available to the private sector to spend or save while increasing the funds available for government spending or investment;
>
> 2. They change relative prices of different factors of production and different commodities. (Institute for Contemporary Studies)."[2]

Tax policies on all government levels (federal, state, county, municipal and special districts) will reflect one or more of the three basic roles served by tax programs. I would expect most taxpayers to identify revenue generation as the major role of federal tax policies in the United States. However, i is common for federal tax policies to incorporate the goals of revenue generation, equity and resource allocation in different degrees as the composition of the executive and congressional branches change over time.

There are numerous taxes that are applied to the people and firms that comprise the fishing industry. The most common include income taxes (personal and corporate), sales taxes, estate taxes, property taxes and employment taxes.

This paper will focus upon federal tax laws that affect commercial fishing operations. Changes in federal tax laws since the Tax Reform Act of 1981 have been heavily influenced by the Reagan Administration's policies of reducing the tax burdens of the business sector and those people in the highest income categories. This has been achieved largely through the inclusion of the accelerated cost recovery system into the depreciation rules, expansio of tax credits for business purposes, lowering the top marginal tax rate — from 70 percent to 50 percent — and lowering of other federal income tax rates.[3]

The reduction in effective tax burdens of the wealthy and the business sector has combined with the huge increases in military expenditures to create a situation unique in United States history. One major result was that the 1981-85 period saw the annual federal budget deficit double compared to the highest deficits occurring previous to the Reagan Administration. One of the major tasks faced by the federal government (now involving the executive, legislative and judicial branches) is how to reduce the $200 billion plus budget deficits without throwing the economy into a deep recession.

Since 1981, federal tax acts have produced some tightening of tax credits and deductions for businesses.[4] These minor revisions in the tax codes probably have had little impacts upon fishery-related capital expenditures since 1981.

Discussions regarding proposed tax bills in 1986 often center around the complexity of current tax codes. One argument is that a more simplified federal tax code would assist taxpayers in understanding those tax laws that affect them. It remains to be seen whether the final 1986 legislation will provide strong movement in this direction.

Recent Fishery-Related Tax Issues

There were only a few changes in Federal tax laws affecting the commercial fishing industry in 1985 and early 1986. This probably reflects the attention being given to proposed tax bills being promoted as major overhauls in the Federal tax codes.

Tax Record Keeping Requirements. There has been a repeal of the contemporaneous record keeping rule which had required taxpayers to keep a diary, log or journal, etc., that would substantiate deductions and credits taken for listed property such as automobiles, trucks, boats, etc., used as a means of transportation.

Current tax records needed are part of the "General Record Keeping Requirements" which require fishermen to maintain adequate records that substantiate their statement for travel away from home. This year's Tax Guide states that "Records which are written at or near the time the expenses are incurred will be more credible than oral statements or written records reconstructed much later." It also states that for tax years after December 31, 1985, more stringent substantiation requirements will be in place.[5] The Congress first passed the contemporaneous record keeping rule in 1984 (to go into effect in 1985) and then voted to repeal it as a result of a loud outcry from those affected by its provisions.

Listed Property Rules, Including Investment Credit Limit for Automobiles. New rules for "listed property" took effect during 1985. Listed property includes "1) passenger automobiles; 2) property used as a means of transportation for people or goods; 3) property of a type generally used for entertainment."

A passenger automobile is any four-wheeled vehicle used on public roads rated at or under 6,000 pounds gross vehicle weight. Computers are not listed property if used exclusively for business use. Trucks and boats are included under property used as a means of transportation for people or goods.

The IRS allows use of investment credit for the above categories of listed property only if the property was used for trade or business purposes more than 50% of the fisherman's total use in the year it was placed in service. An additional investment credit limit for passenger automobiles is that the maximum investment credit for automobiles placed in service before April 3, 1985, is $1,000 if used 100% for business and is reduced to $675 for automobiles placed in service on or after April 3, 1985.[6]

New Form 3800. A new "General Business Credit" form (3800) is used for reporting investment credit, alcohol credit, jobs credit and any carry over of these credits from previous years. To take investment credit, the fisherman first fills out Form 3468, Computation of Investment Credit. Only one Form 3468 is completed regardless of the number of assets that the credit is being taken on. Then a Form 3800 is completed with the fisherman filing both Form 3468 and Form 3800 with the tax return.[7]

Federal Unemployment Act Exemption (FUTA). Public Law 99-272 provides an exemption from FUTA tax liabilities for certain fishing boat crewmembers and is retroactive for wages paid after 1980.[8] The question of FUTA liability for owners of certain commercial fishing boats and vessels has been around for several years. Bills that would make permanent an exemption from paying FUTA taxes were introduced into the Congress since the early 1980s.

The new public law establishes those employment categories which are exempt from FUTA taxes. It also explains how to recover taxes paid to FUTA accounts since January 1, 1981. The exemption applies to services performed by fishing boat crewmembers who are paid only by crewshares (a share of the boat's catch or a share of the proceeds from the boat's catch). The fishing "boat's normal operating crew must have fewer than 10 members."[9] This provision indicates that owners of fishing boats that normally have 10 or more crewmembers are liable for FUTA taxes for the entire crew

Owners are also responsible for FUTA taxes on crewmembers paid wages or salaries regardless of normal crew size. Fishing boat owners should use IRS Form 843 (Claim) when filing for a refund of FUTA taxes already paid to the federal government. This can be used going back to FUTA taxes paid from January 1, 1981 to the present time.

Most East Coast boats carry fewer than 10 crewmembers and few, if any, crewmembers are paid wages or salaries. Therefore, the exemption from the FUTA tax liability will probably apply to the overwhelming majority of fishing boats along the Atlantic coast of the United States.

The winners in this issue clearly are those boat owners who no longer are responsible for paying federal unemployment taxes which provide federal unemployment coverage for crewmembers. The losers are those crewmembers who are now denied this coverage.

What is interesting is that several years ago some fishermen working as crewmembers began to support their being covered by unemployment compensation laws. Trade newspapers indicated support in North Carolina and Maine. It appears that these fishermen were in rural coastal areas where a lack of alternative employment opportunities meant that a loss of work in the fishing industry resulted in extremely tough times.

Proposed Federal Tax Law Changes

It should be noted that these are proposed new regulations which have not been enacted into law at this time.

Following is a listing of key items in the bill reported out of the Senate Finance Committee on May 12, 1986. It is important to recognize that any final tax act will be the result of numerous changes as it winds its way through the legislative process.

Individual Income Tax Rates. Tax rates would be reduced in number from 15 to just two individual categories (27% and 15%). Individuals would still be able to deduct home mortgage interests, state and local income taxes, state and local real property taxes, and casualty losses while state and local sales taxes could not be deducted.

Maximum Corporate Tax Rate. The maximum corporate tax rate would drop from 46% to 33%. An alternative minimum corporate tax would be created to avoid the current situation where some corporations having a profitable year can have a zero tax bill.

Investment Tax Credit. This would be repealed under the Senate Finan Committee bill. This can be a major vehicle for reducing tax bills of fishin firms (sole proprietorships, partnerships and corporations). The repeal wo be effective January 1, 1986, with transition rules for certain property plac in service after that date.

Income Averaging. This also would be repealed under the Senate bill. This would be a loss to individual fishermen since annual fishing incomes can fluctuate widely from year to year. The 1985 tax code had already reduced eligibility for income averaging while the new bill would eliminat entirely.

Business Employee Expenses. Expenses that are not reimbursed by an employer would be limited to one percent of adjusted gross income. Since most crewmembers are considered self-employed, this provision probably would not apply to their business expenses that are reported on IRS Schedu C.

Depreciation and the Accelerated Cost Recovery System (ACRS). Proposed changes in ACRS could have significant impacts upon depreciati deductions for fishing boats, equipment and gear. The Senate bill would retain ACRS with changes in the year-classes in which specific depreciabl properties would be categorized.

For example, automobiles and light trucks would stay in the three year- class and would be depreciated using a straight-line method. Property wit an Average Depreciation Range (ADR) of 16 years or more would be plac in the ten year-class. It should be noted that the Internal Revenue Service ADR lists do not have any entries for fishing boats.

According to the IRS all fishing boats and equipment would be consider ten year-class property. This would include fishing nets and traps if the fisherman decided to depreciate them. Another option might be to expense them the year they were placed into service. The ten year-class property category creates a dilemma for the fishing industry since most fishing nets, traps and other equipment tend not to last for ten years. The industry shoul look carefully at this issue and make recommendations to elected federal representatives and senators regarding the appropriate year-classes for various fishing equipment. There is a possibility that an amendment will b proposed to make fishing boats five year-class property. This is being discussed in Washington, yet nothing official has been published.

Expensing. Fishermen would be able to expense $10,000 of tangible personal property in the year it is first placed into service. This would be a

change from the $5,000 maximum presently allowed. It is here where lobster pots and fish traps could be deducted as opposed to the ten year-class depreciation deduction. The issue still is that the two options (expensing versus depreciating over a ten year period) does not recognize that most fishing gear is usually used for periods ranging from one year up to several years. The ten year-class appears to be longer than the actual time periods these properties are used within the commercial fishing industry.

Capital Gains. The long-term capital gains exclusion for individuals would be repealed. There would be a corporate tax rate of 28% on long-term capital gains. Individual tax payers would have long-term capital gains taxed as ordinary income. Long-term capital losses for individuals would continue to be treated as under present tax laws with 50% of the capital loss being deductible up to a $3,000 cap. Additional capital losses over the $3,000 amount could be carried forward to the next tax year. Short term capital losses would continue to be fully deducted in the year that they occur.

Capital Construction Fund (CCF). The CCF would be retained under the Senate bill. Contributions to a corporate CCF account would be considered a tax preference item and would be subject to the minimum tax after 1986.

The proposed tax bill is likely to undergo numerous changes as it winds its way through the legislative process. While the media is reporting that a tax bill will be signed into law in 1986, it is possible that political controversies could kill any major tax act during this year.

Tax Policy Considerations

Numerous factors need to be taken into account when reviewing alternative tax policies relevant to developing U.S. fisheries. Consideration of these factors can provide a comprehensive picture of alternative policy objectives useful to government planners, legislators and the fishing industry.

First of all, the U.S. fishing industry is not a single industry, but instead, consists of many separate industries, each with it's own supply and demand curves which may react differently to government tax incentive policies. There is a need for tax programs to be coordinated with fisheries management plans being implemented on the state and federal levels. Without proper coordination, development policies could encourage additional harvesting and processing capacity in fisheries that are being over-exploited relative to optimum yield.

Realistic tax policies require:

Current and Historical Economic Data. Economic data should cover annual landings (dollar value and pound/bushel measurements), number and types of harvesting units, dockside and support infrastructure, processing units and marketing systems. Alternative employment opportunities should be surveyed. This becomes crucial when establishing economic goals discussed below. Another set of economic statistics needed for policy formulation is the distribution of income among commercial fishermen. Much of these data bases may be established from statistics already available while additional research may be needed to fill in the data gaps in other areas.

Looking at several regional fisheries will illustrate the variety of situations faced by commercial fishermen. Both Long Island (N.Y.) baymen and Chesapeake Bay watermen harvest shellfish. Yet the Long Island bayman has greater alternative employment opportunities available on land than does his fellow shellfishermen living in isolated villages on Maryland's eastern shore. A reduction in fisheries-related employment would cause a longer term unemployment problem in Maryland than on Long Island. This would also occur in the most isolated rural coastal communities throughout the U.S.

Adequate data bases need to be developed on the regional (offshore fishing) and state (coastal fishing) levels to tie in with the development of comprehensive fisheries tax policies. Only with adequate data can policies be developed that take into account the variety of situations faced by different fisheries.

Economic Goals for Specific Fisheries. There is a need to establish development goals/objectives for specific fisheries before the impacts of alternative tax programs can be evaluated. Tax programs should be viewed as one method of promoting development of harvesting, processing and marketing operations. A combination of tax incentives, direct loan and loan guarantee programs, economic development grants, and education and training programs could produce the desired level of fishery development.

It is important to emphasize that an understanding of the different sectors (harvesting, processing and marketing) of the fishing industry and the various economic strata within each sector is crucial when formulating and implementing fisheries development policies. Experience with existing programs offered through the Small Business Administration, National Marine Fisheries Service, Farm Credit Service and other agencies show that a small percentage of commercial fishermen take advantage of financial assistance programs available through these agencies. While financial assistance and tax management programs may be available to all fishermen, actual practice

may result in the more educated or financially secure fishermen taking advantage of them thus creating a highly concentrated industry. A situation could develop where there are a relatively small percentage of wealthy fishermen existing alongside a much larger percentage of marginal fishermen unable to break out of this highly concentrated economic structure.

Tax Policies Should Consider the Total Fishing Industry. The ten years since passage of the Fisheries Conservation and Management Act of 1976 have produced a major increase in the number of fishing vessels in New England. One early result was a bottleneck in the processing/marketing sectors as onshore firms struggled to keep up with the increased landings from domestic vessels. There is a need for comprehensive fisheries development that provides for coordinated development of an integrated industry while minimizing economic bottlenecks.

Fishery development programs (including tax policies) should be considered for all sectors of the industry including harvesting units, dock facilities, processing facilities, and marketing operations. Development programs should also deal with development of underutilized species, fisheries cooperatives, fishermen's credit unions, joint fishing ventures, safety programs, aquaculture, and training and education programs.

Summary

Federal fisheries tax policies should tie into development efforts to:

1. provide realistic integrated economic development goals for specific fishing industries regarding the production of seafood for protein and industrial products;

2. monitor regional and state economic data needed in evaluation of development programs; and

3. ensure that fishery programs are implemented in an equitable manner to prevent economic concentration in the fishing industry which can create a large pool of marginally employed fishermen resulting in large scale coastal unemployment or underemployment.

Current proposals to change the Federal tax codes can be evaluated regarding their impacts upon an individual fishermen's or fishing firm's tax bills. A broader approach to fishery-related tax programs can help evaluate how specific tax policies can assist in achieving the continuing development

of the fishing industry in accordance with broader objectives involving fishery resource conservation and management, economic development and social policy.

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Chapter 12
Fisheries Development

Marketing Strategies for High Quality Products

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Abstract

This paper describes the marketing strategy behind a premium quality groundfish product line. The strategy is made possible by a fishing method which produces the premium product and a fishhandling method which preserves the quality. The fish are hood-caught and boxed at sea. The marketing strategy concentrates on building customer relationships, implementing a premium pricing policy, and maintaining an edge in the marketplace.

For the benefit of those people "from away," as we say in Maine, who haven't heard of Seabank Industries, I will open with a brief description of our company and our product. I operate three automatic longliners which fish out of Rockland, Maine. We fish for groundfish: cod, haddock, cusk, hake and halibut.

These vessels are the first in the New England fishery to be designed and built from the keel up to be automatic longliners. Seabank has been the subject of some controversy for choosing this method over dragging or gillnetting, but we believe longlining produces the highest quality, freshest fish. We have been fishing for about a year now, and the vessels are proving this to be true.

My company, Blue Crown Seafood and Provision Company, sells the Seabank catch, fresh and whole, into markets in the Northeast. We have developed a strategic plan behind the sales and marketing of our product. The strategy is based on general marketing principles applied to the seafood industry. The success of the plan is possible because of the fishing and fishhandling method and the growing awareness and appreciation of quality in the marketplace. Some of our ideas have been difficult to implement, since ninety percent of our present customers are wholesalers and that level of the

industry has been supply- and price-driven for so many years, to the benefit of the wholesale buyers. I will confine my remarks to marketing strategies for high quality products, because that is what I am most familiar with, and because I do not believe a strategy for selling low or average quality fish could work to the seller's benefit, given the structure of the industry and the power of the buyers.

Strategic Planning

When I worked at Harvard Business School before getting into the fishing industry, I used to write case studies about strategic planning. It occurred to me after a while that strategic planning is not much different from taking a trip. First, you have an idea that you want to go someplace. Then, you decide exactly where it is you want to go and what you have to do to get there from where you are, which should include a look at the factors affecting where you are in relation to everyplace else. When you finally arrive at your destination, you are likely to start the process all over again. To me, strategy is a constant run-through of that scenario.

Seabank and Blue Crown have just gone through that cycle once. We have been through out start-up phase, have gotten to a certain point, and now we are in the process of figuring out where to go from here. The following discusses where we are, how we got here and ends by talking about where I think we are going.

In 1981, my husband, Snelling Brainard, and I started Seabank Industries to create a fleet of fishing vessels. He had been involved in the 1960s in the creation of a company that was the pioneer in offshore lobster trapping and wanted to apply the lessons learned there to another type of fishing. After a trip to Norway to observe fishing methods there, Snelling concluded that longlining would be the way of the future in our fishery, and all plans became focused in that direction.

The boats were designed by Woodin and Marean and built by Goudy and Stevens in Maine. Projects for performance were based on information from Norwegian and Canadian fleets and from the Seadog V, a 54-foot dragger outfitted with longline gear and operated under a grant from the National Marine Fisheries Service. The three vessels were financed by industrial revenue bonds guaranteed by the State of Maine and by equity. They are owned by the shareholders of Rockland Fleet Corporation. Seabank is the manager.

Our goals — under the "Where do we want to go?" heading — were

1. to have a fleet to create efficiencies and economies of scale
2. to fish with hooks to protect the stocks
3. to handle fish when it came on board to deliver the best possible product in the marketplace.

After four and a half years of a lot of politics, a lot of delays and long period of development and construction, we launched three identical automatic longliners: the Jessica B, and Rebecca B, and the Cecily B.

The vessels are 76 1/2 feet long with the work area completely closed under a shelter deck, allowing the crew to fish in any kind of weather. The engine room is forward, so that the crew may bunk comfortably in the stern. We use Mustad longlining gear which works as follows. Each vessel carries 24,000 hooks, meaning she has a complement of groundline and gangions to support 24,000 fish hooks which hang from racks on the starboard side of the vessel. Each hook is spaced four feet apart, resulting in about 18 miles of line. After an anchor and buoy are set, the hooks are pulled through an automatic baiting machine mounted on the stern. The knives cut whole mackerel, squid or herring into pieces which are snagged onto the hooks. The machine baits at the rate of four hooks a second with 95% efficiency.

After hooks are set, at anywhere from 100 to 300 fathoms, an anchor and buoy are placed at the end and the vessels steams back to the beginning of the line. The anchor is retrieved and the line is hauled back through a door in the port side of the vessel by means of two hydraulic haulers. A crew member stands at the door to control the hauling speed and to gaff the fish if necessary. The fish are individually handled from that point on to maintain the quality.

Each fish comes over the side alive. As it comes on board, the hook is pulled from its mouth as the line is pulled through the haulers. The line is washed, hooks are straightened and the gear is replaced on the racks to be ready for the next set.

The fish is immediately bled, gutted and washed and lowered to the hold for packing. The goal to handle fish to deliver the best possible product resulted in a plan to box on board. The fish are sorted and weighed and placed on iced, one-way Seabank boxes. The hold, which was built with pens to fit the stacked boxes, can hold up to 100,000 pounds of boxed product and about 20,000 more if the fish is short-shelved. Our largest catch to date is 102,000 pounds of hake brought in by the Rebecca B from the Grand Banks. We fish only five or six days so that the catch is as fresh as possible on landing. The fishhandling method produces the best quality and maintains that quality for a longer time than any other method.

Marketing Strategy

I started Blue Crown in the spring of '85 to sell and market Seabank fish. Some people in the industry questioned why I started a separate selling company. My decision was based on long-term strategy. I have read case histories of many companies at Harvard and as a result of my teaching position at Simmons College Graduate School of Management, where I teach

marketing management and market research. It is clear that a lot of people in business make major mistakes because they never sit down and analyze what business they are really in. It seemed to me that Seabank is in the boat building business, not the business of selling fish. It is presently working on the financing of new fleets in New Hampshire and Greenport, Long Island. Having the various fleets owned by shareholders in different states adds another layer of confusion. With all the different entities involved, I thought it would be wise to establish a consistent selling company for all the fleets. No matter where the vessels are located geographically, the fish will always be Seabank fish and Seabank fish will always be sold by Blue Crown.

My goals on starting Blue Crown were (1) to position Seabank fish as a premium quality product, (2) to get a premium price for that quality, and (3) to establish brand identity for Seabank fish at our customer level. I knew where I wanted to go and formed a plan for how to get there. I tried to follow the four basic marketing rules I teach my students:

1. Put yourself in the shoes of the customer
2. Sell on value, not on price
3. Have an edge in the marketplace
4. Don't ever underestimate the competition

Our edge in the marketplace is the fishing method, the fishhandling method, and the packaging method. This allows us to distinguish ourselves from others. To position yourself and get more for your product, you have to differentiate yourself from the competition. Of course, the best example of doing this successfully in the food industry is Frank Perdue. Frank made his product physically different by feeding marigold petals to turn the flesh yellow. However, he also bred his birds to mature faster, so it wouldn't cost so much to feed them.

He got a seven and a half pound bird to mature in 11 weeks instead of 13. This dropped his feed conversion factor down from 2.65 to 2.3 pounds of feed to one pound of meat. That saving allows him to price his birds competitively and make a profit. This is important when the margins are in pennies, as they are in the fishing industry.

We haven't figured out how to change the color of our fish yet, but we have put the product into a unique package. The Seabank box has become a method of differentiating our product — our edge in the marketplace.

The one-way Seabank box was designed and patented by Champion Paper Company. They named it the SeaShipper. It's a wax-coated paper box which has wet strength to resist fish enzymes. We get up to five percent higher yield, since the fish inside are not squeezed and crushed, and the boxing method prevents bruising in off-loading. The box does not cost any more than boxes used to pack product on shore and pays for itself by the premium obtained over market price. The boxes also create efficiencies in

storage in the hold and in off-loading. It takes us half the time to off-load compared to taking our shelved fish.

Fishhandling and boxing take constant monitoring on our part. There are a lot of factors which can make or break us at this point. If the crewmember in the hold gets tired and throws cusk in with cod, or if the scale is off, or if the packer breaks his glasses, we are in trouble. Blue Crown guarantees quality and correct weight. A grid on the end of the Seabank box is marked for species, size, weight, the date, vessel and packers, so we can trace any problem back to the vessel and the individual crewmember. We charge the boat back for quality and weight adjustments. We have sample quality and weight checks during off-loading to try to minimize any problem later on.

We also designed the Seabank box as a 24-hour marketing tool. I've always been struck by the fact the Coke and Pepsi vending machines are great advertising devices as well as suppliers of product, so I had Champion put the Seabank logo — a stylized wave — in royal blue around the box and added text about the product and how to contact Blue Crown, making the box a highly visible marketing tool. You can identify the boxes immediately from a distance.

The boxes are central to our marketing strategy. They protect the quality from the rail to the customer. They eliminate the need for further handling at the dock, and they keep the fish well chilled at the buyer's plant until they are cut or resold whole.

Following marketing rule number one — putting ourselves in the shoes of the customer — meant translating our quality into something buyers could relate to and make money on. This turned out to be shelf-life and yield. Our shelf-life, depending on the species, is about a week longer than other fish. Our yield has been estimated at five to ten percent greater, although we haven't had any scientific tests done as yet. With most of our customers. we have not had a struggle to get a premium over Boston board price once they have seen the quality difference. Sometimes, we have to work with processors to educate their customers to the benefits of Seabank fish so they are willing to pay a higher price at the other end.

Everyone at Blue Crown works at building relationships with all our buyers. We make visits as often as possible to their plants or stores to keep in touch with their needs. We guarantee our quality, we give them quality and give good value for the price.

Our edge in the marketplace is the product. Without the actual quality inherent in the Seabank product, or one handled in a similar manner, our marketing strategy would not work. Our worst competition is any company which sells ordinary fish billed as a quality product. This leads to a credibility problem which carries all the way to the consumer. Unfortunately, this problem has made fish a risky purchase for the consumer, unlike beef or

chicken. I think this will change as consumption increases and the consumer becomes more educated and conscious about quality.

Looking back on our first year of business, I believe we've succeeded at our goals. Seabank has created a fleet of vessels which are hook-fishing and handling the fish on board to produce a quality product. The method is working. Blue Crown has established Seabank's reputation as a quality producer. When I was in Baltimore to meet the buyers in the Jessup market, one of them said, "Oh, I know you — you're the guys who sell the good stuff." To me that was the highest form of praise.

We have succeeded in getting a premium over the Boston auction price. We have established a brand identity and reputation at the wholesale level for Seabank and Blue Crown. It's been a long process putting some of our marketing strategies to work in this industry, but we're getting there. We've had help from supporters like Frank O'Hara and Dave Allyn in Rockland and loyal buyers like Willard-Daggett and Turner Fisheries who have backed us from the beginning.

The Future

Where are we going from here? I would like now to expand my remarks to include other producers in the industry, because I think those people who do not start thinking about marketing strategies for the future are going to be left out in the cold. This comes under marketing rule number four — don't underestimate the competition.

The United States is the market for world fish. We are already faced with massive volume of imported product — often at lower prices and lesser quality. The only way to beat imports on price is with volume, and we don't have it in our fishery. We have got to concentrate on making the most of our resource. To me, that means preserving it by proper fishing methods and by handling every fish to get a superior quality product. We have to reward the fishermen for the extra work it takes to handle the product on board, either by incentive pay, or as we do, but returning the premium to the boat.

I think seafood is as much of a growth industry as software or medical technology. I do some consulting within the food service industry and try to keep on top of trends. One of the companies I work with just did a survey that showed seafood to be the second hottest trend in restaurants after Mexican food.

A recent Restaurants & Institutions report said that the top patron concern in restaurants is freshness.

Consumption of seafood is up 150 percent from five years ago. Consumer awareness of three factors is increasing this consumption: taste advantage, health benefits, and a new awareness of the variety of species available.

Almost two-thirds of supermarkets have full or full- and self-service seafood selections. Supermarkets are emphasizing quality and service and are not sacrificing quality to price. Most of the sales growth is in fresh fish. Frozen sales have leveled off. Consumers are just not willing to buy the same old "bar of soap" breaded cod fillet.

What does all this add up to? The need for marketing strategies for high quality fish. I see a lot of opportunities in the future of the seafood marketplace and Blue Crown is going to do everything possible to seize those opportunities.

The market will become segmented by product quality and we want to be firmly established in the premium end. My long-term goals are to gain brand recognition for Seabank fish at the retail level and to produce and market a finished fresh fish product that will be ready to pop into the oven.

I'd like to end with my definition of marketing. It comes from a song written by Fats Waller and it goes like this: "Find out what they like — and how they like it — and give it to 'em just that way!"

Impact of the Commercial Fishing Industry Vessel Act and Other Maritime Laws on Fisheries Development

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Abstract

It is well recognized that with the enactment of the Magnuson Fishery Conservation and Management Act (the "Magnuson Act" or the "MFCMA") and its various amendments, the U.S. fishing industry has moved closer to the goal of full utilization of the nation's fisheries resources. Little attention has been given, however, to the corresponding development in the general maritime laws and regulations affecting the operation of fishing industry vessels which has helped to realize the MFCMA goals by eliminating vessel constraints to the full development of the resource. This paper focuses primarily on these developments and the issues under the jurisdiction of the U.S. Coast Guard which arise in the operation of modern fishing industry vessels. These include (1) vessel documentation — with emphasis on the basic requirements for documenting a vessel and special considerations that arise with fishing vessels; (2) vessel inspection and regulation — covering recent changes in vessel inspection exemptions and the extent of inspection requirements for those vessels that are not exempt; and (3) crew requirements — review of citizenship, watch, manning, and related requirements affecting the crew on board a fishing industry vessel, particularly as they have been changed by the Commercial Fishing Industry Vessel Act.

1. Introduction

The enactment of the Magnuson Fishery Conservation and Management Act[1] in 1976 established the legal basis not only for conserving and managing the fishery resources of the United States but also for the promotion of domestic commercial fishing, primarily through a system of preferential treatment for U.S. fishermen and U.S. fish processors.[2] Subsequent amendments furthered these promotional objectives.[3] Lagging behind in this development, however, has been the removal of the impediments in the various shipping and maritime laws as they affect the operation of one of the

Historically, the Congressional response to the special circumstances surrounding fishing vessels more often than not led to their exemption from the requirements imposed on other vessels. The absence of a clear definition of "fishing vessel" created confusion with respect to the treatment to be given to related industry vessels, such as fish processing vessels and fish tender vessels. Legislative "fixes" for a particular industry problem further exacerbated the situation to the point where identical vessels operating in different states, or in the same state but in different fisheries, received significantly different regulatory treatment. This haphazard development combined with the archaic structure of the vessel documentation and shipping laws made advising vessel owners in the fishing industry difficult, particularly if the vessel was anything more than a simple harvesting vessel.

In recent years, the regulatory confusion confronting fishing industry vessel owners has been addressed by Congress and the Coast Guard in four major developments that form the legal authority for Coast Guard regulation of fishing industry vessels. These developments are:

1. the Vessel Documentation Act[5] which helped to eliminate the confusion by simplifying and streamlining the laws affecting vessel documentation;

2. the new vessel documentation regulations,[6] which set forth vessel documentation procedures in a logical and understandable way;

3. revision of Title 46, United States Code, "Shipping"[7] (hereinafter "Title 46 Rewrite") which consolidated and clarified major portions of the shipping laws; and

4. the Commercial Fishing Industry Vessel Act[8] (hereinafter "Fishing Industry Vessel Act") which was the first comprehensive effort by Congress to examine fishing industry vessels in particular and to rationalize various shipping laws as they affect the fishing industry.

The following discussion focuses on issues primarily under the jurisdiction of the U.S. Coast Guard which arise in the operation of modern fishing industry vessels, particularly those which have some fish processing functions. These issues include the basic requirements for documenting a vessel and special considerations that arise with fishing vessels; recent changes in the inspection exemptions and the extent of inspection requirements for those vessels that are not exempt; and the citizenship, watch, manning, and related requirements affecting the crew on board the vessel, particularly as these requirements have been changed by the Fishing Industry Vessel Act. The

cumulative effect of these changes in the laws affecting the operation of fishing industry vessels has been to encourage the development of our nation's fisheries by removing obstacles to the rational operation of these vessels.

2. When is a Fishing Vessel a Fishing Vessel?

a. The Need for Clarification

Prior to the Fishing Industry Vessel Act, specialized fishing industry vessels assisting the harvesting fleet fell outside of the Coast Guard's narrow interpretation of "fishing vessel" for inspection exemptions and other purposes. Uneven Coast Guard enforcement left little guidance for vessel operators and resulted in disparate treatment of similarly situated vessels in different parts of the country.[9]

Under prior law a "fishing vessel" was defined only as a "motor vessel engaged in fishing as a regular business, including oystering, clamming, crabbing or the kelp or sponge industry."[9] Vessels that processed as well as harvested fish were considered to be fishing vessels as long as they processed only their own catch but as soon as the catch of another vessel was processed the vessel lost its status as a fishing vessel and became a processing vessel subject, in many cases, to inspection.[10]

Fish processing and fish tender vessels were defined in the statute only to the extent that certain exemptions existed for those vessels operating in the states of Washington, Oregon and Alaska and, for fish tender vessels, only if operating in the salmon or crab fisheries.[11]

Thus, a vessel engaged in processing fish and measuring less than 5,000 gross tons operating off the coast of Oregon was totally exempt from inspection requirements through 1987, yet the same vessel operating in California or on the East Coast was subject to the full range of requirements for general freight vessels. Similarly, a vessel engaged in tendering fish or fish products and measuring less than 500 gross tons operating in Alaska was exempt from inspection and other requirements through 1987, so long as it was supporting the salmon or crab fisheries. However, if that vessel transported pollock or cod, it immediately became subject to vessel inspection requirements.

The Fishing Industry Vessel Act was intended in large part to correct these deficiencies and to rationalize the application of the various requirements to vessels involved in the fishing industry. For the first time, fishing vessels, and fish processing and fish tender vessels, are all statutorily defined.

b. Fishing Vessel

The Fishing Industry Vessel Act defines the term "fishing vessel" as:

> [A] vessel that commercially engages in the catching, taking, or harvesting of fish or an activity that can reasonably be expected to result in the catching, taking, or harvesting of fish.[12]

The definition is considerably more narrow than the definition of fishing vessel under the Magnuson Act which defines a fishing vessel to include not only a vessel that engages in the actual harvesting of fish or the attempted harvesting of fish but all support vessels, including processing and tender vessels.[13]

With the current trend toward processing the catch on board the vessel, the above definition of fishing vessel must be read in conjunction with the definition of a fish processing vessel below. Vessels which under prior law were considered to be fishing vessels may now be considered processing vessels, subject to different requirements.

c. Fish Processing Vessel

The term fish processing vessel is defined as:

> [A] vessel that commercially prepares fish or fish products other than by cutting, decapitating, gilling, skinning, shucking, icing, or brine chilling.[14]

By excluding the named activities Congress intended to insure that vessels on which incidental or minimal processing takes place as a necessary part of the fishing activity for the purpose of preserving the quality of the fish would not be considered to be fish processing vessels. Fish processing vessels are intended to include only those on which "extensive processing is done to prepare fish or fish products for marketing."[15]

What then is a squid freezer stern trawler? In order to retain world market quality the squid must be frozen shortly after being caught. However, this "processing" is not "cutting, decapitating, gilling, skinning, shucking, icing or brine chilling." Even though freezing is not one of these enumerated exceptions, the Coast Guard has ruled that a vessel which decapitates, eviscerates, and washes fish and then places them in waxed cartons which are topped off and frozen is a fishing vessel, and not a processing vessel. Thus suggesting similar treatment for such a squid boat.[16]

Whether a vessel is considered a fishing vessel or a processing vessel makes little practical difference as long as the vessel is less than 1600 gross tons and presently in service. Note, however, as discussed in more detail below, the distinction may be critical with respect to the citizenship of the crew on certain vessels.

d. Fish Tender Vessel

The term "fish tender vessel" is defined as:

> [A] vessel that commercially supplies, stores, refrigerates, or transports fish, fish products, or materials directly related to fishing or the preparation of fish to or from a fishing, fish processing, or fish tender vessel or a fish processing facility.[17]

This definition was intended to include the old statutory categories of "cannery tenders" and "fishing tenders" and also includes reefer vessels supporting at-sea processing activities, as well as transportation to and from land-based facilities.

The legislative history makes clear that the definitions of fishing, fish processing, and fish tender vessels are limited to those vessels "primarily engaged in or in support of commercial fishing."[18] Consequently, fishing that is incidental to a vessel's normal use — using a rod and reel off the side of a cruise ship, for example, cannot be used to exempt such vessels from requirements to which they are otherwise subject.

e. Fisheries

The term "fisheries" is defined as follows:

> [I]ncludes planting, cultivating, catching, taking, or harvesting fish, shellfish, marine animals, pearls, shells, or marine vegetation *in the navigable waters of the United States* or in the fishery conservation zone established by section 101 of the Magnuson Fishery Conservation and Management Act of 1976 (16 U.S.C. 1811).[19]

The Fishing Industry Vessel Act moved this definition from the general definition section of Title 46 to Chapter 121 concerning vessel documentation because that is the only chapter in which the term is used. The underscored language was added to ensure that the territorial sea and internal waters were not excluded. Otherwise, a vessel without a fisheries license (*i.e.* foreign built) could arguably engage in fishing within the territorial sea.

f. Fishing

The term "fishing" means:

> The planting, cultivation, or taking of fish, shellfish, marine animals, pearls, shells, or marine vegetation, or the transportation of any of those marine products to the United States by the taking vessel or another vessel under the complete control and management of a common owner or bareboat charterer.[20]

The Customs Service uses this definition rather than the Magnuson Act's broad definition of fishing, which includes processing and all support activities.[21] One anomaly created by the reliance on the Customs definition is that a foreign-built, U.S.-flag processing vessel would be ineligible to serve in a mothership capacity if under the complete control and management of a common owner of the fish harvesting fleet, thus frustrating vertical integration of vessel operations. Such a vessel would then be considered to be engaged in fishing which, as discussed below, it cannot do by law because of its foreign build.

3. Vessel Documentation

Federal documentation of vessels is required for the operation of vessels in certain trades. It serves as evidence of the vessel's nationality, and, with certain exceptions, permits vessels to be subject to preferred mortgages.[22] The documentation system is administered by the Coast Guard pursuant to the Vessel Documentation Act of 1980. This Act was designed to improve the laws relating to documentation by eliminating the restrictive administrative and procedural details of prior law. The Act was not intended, however, to alter the fundamental purposes and objectives of vessel documentation and the related substantive policies, *e.g.* U.S.-build requirements, etc.

a. Threshold Requirements

Vessels which *must* be documented include any vessel of at least five net tons which engages in the fisheries, Great Lakes trade or coastwise trade unless (1) the vessel does not operate on navigable waters; or (2) is not self-propelled and is qualified to engage in coastwise trade but is used within a harbor, in whole or in part on U.S. rivers or inland lakes or internal waters or canals of any state.[23] In both cases, however, the owner has the option to document, if the vessel is at least five net tons and is wholly-owned by U.S. citizens.

Any vessel of at least five net tons which is wholly owned by a United States citizen(s) is eligible for documentation, including vessels used exclusively for pleasure and vessels used in foreign trade.[24]

b. Citizenship

Only vessels which are "wholly owned by United States citizens" may be documented under the U.S. flag.[25] The "wholly owned" requirement appears in the regulations, not the present statute. It reflects a predecessor statute and longstanding administrative interpretation.

Individual citizens are those that are native-born, naturalized or derivative citizens of the United States or otherwise qualify as U.S. citizens.[26] An association, joint venture, or other entity is a citizen if capable of holding title to a vessel, and if each of its members is a citizen of the United States.[27] Partnerships are citizens if all of the general partners are citizens of the United States and "the controlling interest in the partnership is owned by citizens of the United States." For coastwise purposes, the partnership is a citizen if all of its general partners are citizens and "75% of the interest in the partnership is owned by citizens of the United States."[28]

A pending Coast Guard Notice of Proposed Rulemaking[29] would impose an equity test with respect to partnerships qualifying as U.S. citizens. Under the proposed rule the "controlling interest in a partnership" would not be deemed to be owned by citizens of the United States if by any means whatsoever control of the partnership were conferred upon or permitted to be exercised by a partner or partners who could not otherwise qualify as a citizen for purposes of documenting a vessel or if more than 50% "of the equity in the partnership" is owned by citizens who would not be able to document the vessel. Thus, even though the statute permits limited partners to be non-citizens, they would be limited in the amount of the equity they can hold in the partnership. Moreover, they cannot exercise any degree of "control" which would be further defined as:

> ... any right to direct partnership business, to limit the actions of or replace any general partner, to direct the transfer or operations of any vessel owned by the partnership, or otherwise exercise any authority over the business of the partnership, but does not include the right to receive a financing return, i.e. interest or the equivalent of interest on a loan or other financing obligation.[30]

A trust arrangement fulfills the citizenship requirements if each of its trustees and each of its beneficiaries is a citizen.[31] This definition creates a

potential problem with "Westhampton Trusts" under which a U.S. citizen trustee holds notes, bonds or other evidence of indebtedness of a foreign lender secured by a preferred ship mortgage on a U.S. vessel. In the event of foreclosure, this definition prevents the U.S. citizen trustee from bidding on the vessel and taking title on behalf of the noncitizen beneficiaries if the vessel is to remain under U.S. documentation.

The citizenship criteria for corporations requires only that the U.S. citizen corporate entity meet the following basic incorporation requirements:[28]

- it is incorporated under the laws of the United States;
- its chief executive officer, by whatever title, is a U.S. citizen;
- the chairman of the board of directors is a U.S. citizen;
- and no more of its directors are noncitizens than a minority of the number necessary to constitute a quorum.

This corporation would be entitled to document a vessel for operation in the fisheries of the United States even if all of the stock of the corporation were held by noncitizens. If the vessel is to operate in the coastwise trade, however, at least 75% of the interest in the corporation must be owned by United States citizens.[29] It should be noted, however, that even if the corporation meets the less stringent citizenship test for a vessel that is not going to engage in coastwise trade it may require a foreign transfer approval from the Maritime Administration (Marad). Thus, although the controlling interest in the corporation may not be critical for the initial documentation of the vessel, the subsequent sale, mortgage, lease, charter or other transfer of a documented vessel or any interest therein to a non-citizen requires prior Marad approval under Section 9 of the Shipping Act, 1916.[30]

Under the Bowaters Act, certain corporations meeting very specific requirements which would not otherwise qualify them as U.S. coastwise citizens may, upon compliance with the special standards set out in the statute and regulations,[31] operate vessels in limited coastwise trade.

c. License Endorsements

The license endorsements on the vessel's certificate of documentation determine its eligibility for particular trades. Although most fishing industry vessels have a fishery license endorsement, such an endorsement is not necessary for certain support vessels.

1. Registry

A registry endorsement alone is permissible for both fish processing and fish tender vessels, as long as neither engage in the harvesting or taking of fish or in coastwise transportation.[*] Registry is the most basic documentation endorsement which requires U.S. citizen ownership but does not impose U.S. build or U.S. citizen control requirements.

2. Coastwise license

A coastwise license entitles the vessel to employment in both the coastwise trade and the fisheries. The basic requirements are that the vessel be at least five net tons, be wholly owned by a U.S. citizen and be built in the United States, with certain limited exceptions discussed below.[*] If the vessel is owned by a corporation it must meet certain more stringent citizenship requirements.

Coastwise trade includes the transportation of merchandise between points in the United States, either directly or by way of a foreign port.[*] Thus, if a fishing industry vessel is to move any merchandise or fish products between any two points in the United States (not necessarily ports), including movement from one vessel to another within the three-mile territorial sea, then the vessel must qualify for the coastwise trade, *i.e.* be U.S.-built and be owned by a coastwise-qualified citizen. In determining whether a particular movement involves coastwise transportation, the Coast Guard defers to the U.S. Customs Service.

Fishing industry vessels do not necessarily need a coastwise license for operation in the domestic fishing industry. Fishing vessels can catch fish within the territorial sea and tranship or land such fish at a coastwise point without engaging in coastwise transportation. U.S.-flag tender vessels can land fish taken on board outside three miles without a coastwise license. A 1982 change in the law allows fish processing vessels to transport necessary processing supplies (e.g. plastic, cardboard, salt, etc.) otherwise considered to be merchandise without being coastwise eligible.[*]

A coastwise vessel can permanently lose its coastwise status if the vessel is sold, in whole or in part, to a non-U.S. citizen; is transferred to a foreign-flag; or is rebuilt outside of the United States and is over 500 gross tons.[*]

Ownership by a U.S. citizen who qualifies as a citizen under the controlling interest test of Section 2 of the Shipping Act[*] but does not qualify under the more stringent coastwise standard will result in a temporary loss of coastwise privileges. These privileges can be restored, however, if the owner subsequently complies with the coastwise citizenship requirements.[*]

3. Fishery license

A fishery license endorsement entitles a vessel to fish within the fishery conservation zone, and landward of that zone, and to land its catch, wherever caught, in the United States.[45] In order to be eligible for a fisheries license, the vessel must be built in the United States or fall within one of the limited exceptions discussed below.

The Nicholson Act,[46] controls the landing of fish in the United States. Its application turns only on the flag of the vessel, not its build. Thus a U.S.-flag vessel, even without a fisheries license, may land fisheries products in the United States whereas a foreign-flag vessel may not.

Last year the Vessel Documentation Act was amended to allow, under certain circumstances, U.S.-flag, foreign-built vessels to engage in the fisheries or the coastwise trade of fisheries products in the territorial sea and FCZ adjacent to Guam, American Samoa, and the Northern Marianna Islands.[47]

d. U.S. Build Requirements

With certain limited exceptions outlined below, every vessel that is documented under the U.S. flag and harvests fish in the fishery conservation zone must be built in the United States. The same limited exceptions to the U.S. build requirements apply to fish processing vessels and fish tender vessels used in coastwise trade.

The Coast Guard considers a vessel to be built in the United States if:

(a) all major components of its hull and superstructure are fabricated in the United States; and

(b) the vessel is assembled entirely in the United States.[48]

A vessel is considered to be foreign built if it does not meet these requirements.[49] An earlier Coast Guard ruling, initially incorporated in the vessel documentation regulations and since deleted, required at least 50% of the cost of all machinery (including propulsion) as well as components which are not integral parts of the hull or superstructure to relate to items procured in the United States. This requirement was particularly troublesome for the fishing industry due to the significant amount of foreign equipment used on many fishing vessels.

Although not defined in Coast Guard regulations, the Merchant Vessel Documentation Division has defined "hull" as follows:

> In the nautical sense the word "hull" means the main body of the ship, exclusive of masts, sails, yards, rigging and superstructure. The hull of a vessel is not the shell or outer casing, but that plus the internal structure of frames, girders, beams, bulkheads and other items which provide both the floatation envelope and the structural integrity of the vessel in its normal operations. A modification to a vessel's scantlings, arrangements and details, below the strength deck, is a modification to the hull.[28]

Superstructure is defined in the regulations as "any structural part of a vessel above or including its deck."[29]

These definitions are critical in determining not only whether a vessel has been built in the United States in the first instance but also, as discussed in more detail below, whether the vessel has been rebuilt in a manner which would result in forfeiture of coastwise privileges.

There are several limited exceptions to the U.S. build requirement which are set out in the statute. Under an old statute known as the Wrecked Vessel Act, a foreign-built vessel that has incurred significant damage to its hull or superstructure as a result of natural or accidental causes occurring in the United States or adjacent waters and has undergone repairs equaling three times the appraised salved value of the vessel in a shipyard of the United States may, upon approval of the Coast Guard, receive coastwise and fisheries privileges.[30] The second exception is for vessels that have been forfeited. A foreign-built vessel that has been adjudged forfeited by a federal district court to the federal government of the United States for breach of its laws is eligible for a fisheries or coastwise license.[31] Foreign-built vessels that have been taken by citizens of the United States during a period of war and are thereafter lawfully condemned as a prize are also eligible for a coastwise or fisheries license.[32] Finally, special relief bills are enacted by Congress on occasion which grant coastwise or fisheries privileges to vessels not otherwise entitled to such license endorsements.[33]

A vessel can lose its coastwise privileges under certain special situations. A coastwise eligible vessel measuring greater than 500 gross tons that is rebuilt outside of the United States permanently loses its coastwise privileges.[34] A vessel is considered to be rebuilt "when any considerable part of its hull or superstructure is built upon or is substantially altered."[35] Rebuilding occurs when the above-described work is performed in a foreign shipyard or when a major component of the hull or superstructure that is itself not built in the United States is added to the vessel in the United States. Thus, it is important to look to the above definitions of hull and superstructure when

determining whether work performed abroad on a coastwise eligible vessel will result in loss of coastwise privileges.

Fisheries privileges, however, are not subject to the same foreign rebuild provisions as are coastwise privileges. In order for a fishing vessel with a fisheries license endorsement to lose that endorsement because of a foreign rebuilding, the vessel must be so substantially reconstructed that it is considered a "new vessel" under Coast Guard regulations. A vessel is considered new if:

> (1) Its hull and superstructure are constructed entirely of new materials; or
> (2) It is constructed using structural parts of an existing vessel, which parts have been torn down so that they are no longer advanced to a degree which would commit them to use in the building of a vessel.[86]

It should be noted that new vessel construction is treated differently than a rebuilding. As indicated above, for new construction all major components of the hull and superstructure must be fabricated in the United States and the vessel must be assembled *entirely* in the United States. Thus, one could not build the new hull and/or superstructure of the vessel in the U.S. and tow the vessel to a foreign yard for completion of the work and general outfitting and have a U.S.-built vessel, even though similar work could be performed on an existing fishing vessel in a foreign yard without loss of U.S.-built status.

It is important to remember that any foreign work performed on a U.S.-flag vessel may be subject to a 50% ad valorem duty if the work is considered to be a repair or involves the addition of equipment to the vessel.[87]

4. Vessel Inspection and Regulation

a. Inspection Exemptions

Compliance with the many requirements necessary for a vessel to be inspected can be extraordinarily costly, particularly if modifications are required to be made to an existing vessel. U.S. inspection requirements cover such items as fire protection, stability, wiring, general engineering, construction and arrangement of the vessel and are typically more rigorous than international standards. Although fishing vessels have long enjoyed exemptions from inspection, other fishing industry vessels have not. Enactment of the Fishing Industry Vessel Act rationalizes the various exemptions for fisheries-related vessels.

In apparent recognition of the unique character of the fishing industry, Congress historically exempted fishing vessels from vessel inspection requirements. Non-harvesting vessels employed in a support capacity in certain fisheries in the Pacific Northwest and Alaska were treated as exempt by the Coast Guard up through the late 1960's when the inspection laws began to be interpreted narrowly in a manner which made both fish processing and tender vessels subject to inspection.[*] In response, Congress enacted narrow exemptions for these particular vessels. Similar vessels apparently were not used in New England and other parts of the country at that time. No effort was made to include any other vessels within the exception.

Under prior law fishing vessels were not separately defined as exempt from inspection but rather defined as exempt from the inspection requirements for particular kinds of vessels, i.e. freight vessel, passenger vessel, or seagoing motor vessel.[*] If fishing "as a regular business" took place on a category of vessel other than a freight, passenger or seagoing motor vessel then the vessel would not have been exempt from inspection requirements. Thus, a seagoing barge or steam vessel could not be used as a fishing vessel without being subject to inspection. The Fishing Industry Vessel Act leaves open the possibility for fish processing, fish tender and fishing vessels to become subject to inspection if each can also be considered a steam vessel, tank vessel, offshore supply vessel or nautical or sailing school vessel. The new provision also states that a fishing vessel, which is chartered part time as a fish tender vessel, is exempt from inspection.[*]

Fish processing vessels were not specifically defined under prior law. The only fish processing vessels that were exempt from inspection were those of less than 5,000 gross tons "used only in processing and assembling fishery products in the fisheries of Alaska, Oregon and Washington." The provision was set to expire on January 1, 1988. The new law removes the geographic and time restrictions, leaving only the tonnage limitation.[*] The practical effect of this change is to make the exemption permanent and uniform throughout the country.

Under prior law, fish tender vessels were exempt from inspection if measuring not more than 500 gross tons and serving as "a cannery tender or a fishing tender in the salmon or crab fisheries of Alaska, Oregon, and Washington" and carrying cargo or personnel to or from vessels or facilities in those fisheries. The new provision removes the geographic, fishery specific, and time limitations and provides a blanket exemption from inspection for fish tender vessels of not more than 500 gross tons.[*] There are certain limited exemptions for vessels of less than 150 gross tons constructed before 1958, certain vessels of less than 300 gross tons and certain fish processing and tender vessels of less than 500 gross tons which may carry cargo to

remote areas in Alaska without being required to meet inspection requirements.[84]

b. Specific Requirements for Uninspected Vessels

Uninspected vessels escape Coast Guard inspection requirements in all significant respects. The requirements are minimal and include navigation aids, life saving equipment, fire extinguishing equipment, ventilation requirements, emergency instruction lists, signaling lights, pilot ladders, etc.[85]

c. New Requirements for Fish Processing Vessels

Under the Fishing Industry Vessel Act new minimum safety requirements apply to uninspected fish processing vessels entering service after December 31, 1987, having more than 16 individuals on board, and primarily employed in the preparation of fish or fish products and operating on the navigable waters of the United States or owned in the United States and operating on the high seas.[86] These new requirements cover navigation equipment, life saving equipment, fire protection and fire fighting equipment, the use and installation of insulation material, storage methods for flammable or combustible material, and fuel, ventilation and electrical systems.[87]

The Secretary of Transportation is to prescribe regulations which are to be tailored to the safety needs and unique operations of vessels in the fishing industry; the statute requires the Secretary to "consider the specialized nature and economics of fish processing vessel operations and the character, design, and construction of fish processing vessels."[88] In addition, the Secretary is to consult with industry representatives "having experience in the operation of these vessels to ensure the practicability of these regulations."[89] Moreover, the regulations are not to require retrofitting on vessels which install equipment prior to the effective date of the new regulation.[90]

In the event that an inspected foreign-flag vessel is converted for operation as a fish processing vessel, the chapter provides for recognition of the certificate of inspection of foreign countries that are parties to The International Convention for Safety of Life at Sea (SOLAS) in lieu of compliance with the new regulations.[91]

d. Loadlines

Generally, merchant vessels larger than 150 gross tons departing from a U.S. port or place on a coastwise voyage are required to have loadlines.[92]

Fishing vessels, unlike fish processing and tender vessels, are not considered to be "merchant vessels" and are thus exempt from loadline requirements, even if larger than 150 tons.

A fish processing vessel larger than 150 gross tons is exempt from coastwise loadline requirements if the vessel is not more than 5,000 gross tons and was constructed before August 15, 1974, or converted for fish processing use before January 1, 1983.[72] Fish tender vessels are exempt from loadline requirements if not more than 500 tons and constructed, under construction or contracted for before January 1, 1980, or converted before January 1, 1983. A 1984 amendment removed the earlier geographical restrictions which limited the exemption to Washington, Oregon and Alaska.[73] A fish processing or tender vessel that engages in international trade must comply with international loadline requirements if it is a new vessel longer than 79 feet or an existing vessel larger than 150 gross tons.[74]

The loadline provisions of the U.S. Code have not been revised and consolidated in the overall revision of Title 46. Legislation passed last year by the House of Representatives (H.R. 1362) and presently pending in the Senate would accomplish this codification by creating a new part C to subtitle II of Title 46. The above enumerated exemptions for fish processing and fish tender would still apply as would the total exemption for fishing vessels. The legislation also provides for a new uniform exemption authority with respect to domestic shipping. The original 1935 Act did not establish clear authority to exempt vessels from the loadline regulations. H.R. 1362 would authorize the Secretary of Transportation to prescribe regulations that specify conditions under which domestic voyage exemptions would be issued.

e. Carriage of Liquid Bulk Dangerous Cargoes

Chapter 37 of Title 46 governs the carriage of liquid bulk dangerous cargo, i.e. tanker-type vessels. Carriage of the vessel's own bunker fuel does not trigger the statutory requirements. Both fishing and fish tender vessels of not more than 500 gross tons "when engaged only in the fishing industry" are exempt from the requirements of the chapter. A fish processing vessel of not more than 5,000 gross tons is similarly exempt. However, with respect to fish processing vessels, the Secretary of Transportation has authority to issue regulations governing such vessels when carrying flammable or combustible liquid cargo in bulk.

f. Measurement of Vessels

For domestic purposes, the measurement of vessels is governed by 46 C.F.R. Part 69, which sets forth detailed provisions concerning the applicable tonnage measurement system. These provisions allow for significant creativity in designing vessels for purposes of avoiding the various regulatory tonnage thresholds under the shipping laws.

The International Convention on Tonnage Measurement of Ships, 1969, entered into force internationally on July 18, 1982. The Convention reduces flexibility in the measurement of vessels and generally is intended to result in the same tonnage determinations for vessels of the same approximate size. The significance of using the international system is that it could result in vessels which presently fall below the regulatory thresholds measuring significantly higher gross tonnages and thus being subject to additional requirements.

The Convention is the subject of pending implementing legislation (H.R. 1362) which would codify the international measurement system. Under H.R. 1362 the transition from the present domestic system to the international system is accomplished through an "optional regulatory measurement" system which is generally intended to preserve the old domestic system for the purposes of applying certain specified provisions of U.S. law. The legislative history of the Fishing Industry Vessel Act reflects congressional intent to allow the existing domestic system to be used for fishing industry vessels rather than the international system.[75]

5. Crew Requirements

For the operator of fishing industry vessels, requirements affecting the vessel's crew are of equal, if not greater, importance than the inspection requirements discussed above. Compliance with inspection requirements increases the fixed vessel costs which can usually be planned in advance and financed over the useful life of the vessel. Crew costs, on the other hand, are less easily managed and have a more immediate impact by imposing higher operational costs. Statutory crew requirements intended for large ocean-going merchant vessels can result in redundant manning levels and over-qualified crew when applied to fishing industry vessels. Such requirements can only result in higher operational costs with, in many cases, virtually no increase in vessel safety.

The Fishing Industry Vessel Act has helped to eliminate inappropriate requirements and to establish uniform standards enabling better planning and

more efficient vessel operations. Recognizing the special characteristics of the fishing industry and its operations, the Act creates a new category of able seamen which allows personnel to qualify for this rating based on experience gained in the fishing industry.

Moreover, exemptions from watchkeeping requirements and merchant mariner document requirements have been extended to more classes of fishing industry vessels. Other requirements have been made more reasonable as well. The following discussion examines these changes under five broad categories: citizenship, merchant marine documentation, manning of vessels, watchkeeping, and protection and relief of merchant seamen.

a. Citizenship

Only a U.S. citizen may serve as master, chief engineer, or officer in charge of a deck watch or engineering watch on a U.S. documented vessel.[46] The master, mates and engineers on U.S.-documented vessels of 200 gross tons or more must be licensed and be U.S. citizens.[47]

For fish processing and fish tender vessels (but not fishing vessels) 75% of the seamen (excluding licensed individuals) must be citizens of the United States "on each departure ... from a port of the United States."[48] If qualified citizen seamen are not available, the Secretary of Transportation may reduce the percentage. Although not defined in this Part, the term "seaman" is broadly defined in Part G to include an individual engaged or employed in any capacity on board a vessel owned by a citizen of the United States.[49] An unresolved issue before the Coast Guard is whether the 75 percent citizen crew requirement applies to processing workers on fish processing and fish tender vessels. Freedom from this requirement could reduce significantly the operating costs of certain vessels, particularly larger factory vessels.

b. Merchant Mariners' Documents ("Z-cards")

Merchant mariners' documents have never been required for individuals employed on fishing vessels.[50] The Fishing Industry Vessel Act extends this exemption to fish tender vessels, existing fish processing vessels of not more than 1600 gross tons, and new fish processing vessels with less than 16 processing workers.[51]

For those fish processing vessels which are not exempt from the requirement, merchant mariners' documents are not, however, required for any processing workers or others in a support position not related to navigation

e.g., individuals working in the laundry or galley.[43] Thus, fishing industry personnel are exempt from classification as "licensed individuals" or "deck crew."

c. Manning Requirements

Excessive manning requirements obviously increase vessel operational costs. Prior to the Fishing Industry Vessel Act, 65 percent of the deck crew on any fish processing or tender vessel were required to be able bodied seamen ("ABs"). The Act modified this requirement by creating a new category of ABs, lowering the percentage requirement to 50 percent for some fish processing vessels, and eliminating it altogether for smaller fish processing vessels and fish tender vessels, regardless of size.

The new category of ABs — "Able seamen-fishing industry" — requires an individual to have at least six months service on deck on board vessels operating on the oceans or the navigable waters of the United States.[44] Only employees on a fish processing vessel are eligible to be "able seamen-fishing industry"; employees on other vessels for which there is an AB requirement must meet the more stringent standards of the "able seamen-special" category, i.e. 12 months of service on deck, or the requirements of the other categories requiring additional months of service.[45]

Able seamen on fish processing vessels entered into service before 1988 and measuring between 1600 and 5,000 gross tons may all be "able seamen-fishing industry" and thus need have only six months of work experience at a minimum.[46] Vessels of less than 1600 tons (except those entering service after December 31, 1987, with more than 16 processing workers) are completely exempt from the AB requirements as well as the merchant mariners' document requirements.[47] For vessels that entered service after December 31, 1987, the employment scale changes and all the able seamen required to be on the fish processing vessel may be "able seamen-fishing industry," provided the vessel has more than 16 individuals on board primarily employed in the preparation of fish or fish products and is not more than 5,000 gross tons.[48] If the vessel has less than 16 processor workers on board, it is exempt from the AB requirement.

For fishing industry vessels that must comply with an AB requirement, fishing industry ABs may be used rather than the other categories of ABs which require more extensive work experience; e.g., a fish processing vessel of less than 5,000 gross tons requiring two watches must have 50 percent of the deck crew at a rating of at least "AB fishing industry". However, because "deck crew" means the normal navigation crew in the deck department and

none of the processing workers or the licensed officers, the total number of ABs required under this provision could be as low as two or three.

d. Watch Requirements

For uninspected vessels watchkeeping requirements are a critical factor in determining overall manning levels. The crew complement is required to be specified on the certificate of inspection of an inspected vessel;[46] however, no such requirement exists for uninspected vessels. Thus, the minimum number of crew, particularly on smaller vessels, is dictated by compliance with the watch requirements. A reduction from three to two watches, for example, would eliminate the need to have an additional licensed officer on board, resulting in an obvious savings in personnel costs.

Fishing vessels are exempt from watch requirements. In general, the Fishing Industry Vessel Act amends the watch requirements to exempt certain fish processing and fish tender vessels from the three-watch requirement applicable to large ocean-going or coastwise vessels. New categories require a two-watch system on medium size uninspected fish processing vessels, while smaller fish processing vessels and tender vessels (regardless of size) are exempt from watch requirements altogether. Large processing vessels over 5,000 gross tons remain subject to the full three-watch requirement.[47]

Watch restrictions have been reduced for many fishing industry vessels; however, fish processing vessels are subject to new requirements depending upon tonnage, number of processing workers, and date of entry into service. These requirements can be summarized as follows:

- Three watches if vessel is over 5,000 gross tons regardless of date of entry into service.[48]
- Two watches if vessel has "entered into service before January 1, 1988 and is more than 1,600 gross tons."[49]
- Two watches, if vessel has entered into service after December 31, 1987, and has more than 16 individuals on board primarily employed in the preparation of fish or fish products.[50]
- No watch requirement if vessel has entered into service before January 1, 1988, and is not more than 1,600 gross tons.[51]

- No watch requirement is vessel has entered into service after December 31, 1987, and has no more than 16 individuals on board employed in the preparation of fish or fish products.[84]

A new requirement for any fish processing vessel of more than 100 gross tons requires "a suitable number of watchmen trained in firefighting on board when hot work is being done to guard against and give alarm in case of fire."[85]

Maximum daily hour requirements for certain ocean-going vessels, provide that a licensed individual may not be required to work more than 9 of 24 hours a day when the vessel is in port or 12 of 24 when the vessel is at sea except in an emergency when life or property are in danger. The Fishing Industry Vessel Act now exempts fishing, fish processing and fish tender vessels as well from these restrictions.[86]

When considered together, the new watch system, combined with the document and crew requirement exemptions, reduce the regulatory obstacles that an owner or operator must overcome to gather and maintain a crew for a vessel operating in the fishing industry.

e. Protection and Relief

The Fishing Industry Vessel Act also amends various provisions affecting merchant seamen protection and the relief available to them when employed on certain vessels. The term fishing vessel is defined, for the limited purposes of this section, in a broad fashion to include fish tender vessels and certain fish processing vessels, *i.e.*, those entering service before January 1, 1988, and of not more than 1,600 gross tons, or entering service after December 31, 1987, with no more than 16 fish processing personnel.[87] The result of this definitional change is to reduce the requirements for merchant seamen protection on board a fish tender or a small fish processing vessel, thus providing uniform treatment with other fishing industry vessels. The consequences affect a wide ranging group of provisions.[88]

6. Conclusion

The last five years have seen a streamlining and rationalization of the major statutory regimes, as implemented by the U.S. Coast Guard, which affect fishing industry vessels. The revision of the Vessel Documentation Act and its regulations, the Title 46 Rewrite, and the enactment of the Fishing Industry Vessel Act all have made significant progress toward bringing the

labyrinth of shipping laws into harmony with the fundamental fisheries development policy established by the Magnuson Act.

The Fishing Industry Vessel Act should reduce uncertainty as to the applicable vessel standards and operational requirements, and should be a real benefit to the fishing industry. The most directly affected segments of the industry are likely to be those using processing and tender vessels in support of their fishing operations.

Of like importance is the reduction in operational costs resulting from the modifications in inspection, manning, watch and other requirements affecting the vessel's crew. This reduction in requirements combined with the new safety requirements reflect a largely successful effort to balance the competing economic and safety concerns within the fishing industry.

There are difficulties, however, in predicting the long-term impact of other provisions of the Fishing Industry Vessel Act. The somewhat arbitrary limitations, for example, on vessels with more than 16 processing workers may well constrain the development of the next generation of processing vessels. Yet, in the short term, the Act may well encourage foreign-flag or other vessel conversions as well as new vessel construction. Moreover, it should ease the burden on processor and tender operators by setting the stage for better integration of vessel operations in the industry. It is for these reasons, that the Act represents a significant contribution toward the goal of full development of the nation's fishery resources.

Notes

1. Pub. L. No. 94-265, 90 Stat. 331 (1976), codified as amended in 16 U.S.C.A. § 1801 *et seq.* (1985) [hereinafter referred to as the "Magnuson Act" or the "MFCMA"].

2. 16 U.S.C.A. §§ 1801(b)(3), (6); 1821-1825 (1985).

3. *See e.g.*, American Fisheries Promotion Act of 1980, Pub. L. No. 96-561, Title II, 94 Stat. 3287 (1980) (codified primarily in scattered sections of 16 U.S.C.A. § 1801 *et seq.*).

4. Pub. L. No. 96-594, 94 Stat. 3453 (1980), codified at 46 U.S.C. Chapter 121 (enacted 1980; effective July 1, 1982).

5. 46 C.F.R. Part 67 (effective July 1, 1982).

6. Pub. L. 98-89 (August 26, 1983).

7. Pub. L. No. 98-364, 98 Stat. 445 (July 17, 1984) codified, as amended, primarily in scattered sections of Title 46.

8. *See* Pacific Shrimp Co. v. United States Dep't of Transp., 375 F. Supp. 1036 (W.D. Wash. 1974).

9. 46 U.S.C.A. § 3302(b)(1983) *amended by* 46 U.S.C.A. §§ 2101(11a), 3302(b) (1985).

10. *See* Koch, *Regulation of Vessels in the United States Fishing Industry: Its Effect On Utilization of the Nation's Fisheries Potential*, 14 Journal of Mar. Law & Com. 347, 365 (1983).

11. 46 U.S.C.A. § 3302(c)(1)(2) (1983), *amended by* 46 U.S.C.A. §§ 2101(11b)(11c), 3302(c)(1)(2) (1985).

12. 46 U.S.C.A. § 2102(lla) (1985).

13. 16 U.S.C.A. § 1802(11).

14. 46 U.S.C. § 2101(11b) (1985).

15. 130 Cong. Rec. H7230 (daily ed. June 27, 1984) (Statement of Rep. Young, which is intended to "serve a legal and administrative interpretation of the bill") [hereinafter referred to as the "Young Statement"].

16. Letter from E.H. Daniels, Chief Counsel, U.S. Coast Guard, 16720 (May 9, 1985).

17. 46 U.S.C.A. § 2101(11c) (1985).

18. *See* Young Statement, *supra* note 13.

19. 46 U.S.C.A. § 12101(6) (emphasis added).

20. 19 C.F.R. § 4.96(a)(5) (1985).

21. The Magnuson Act defines "fishing" broadly so as to enable strict enforcement of that law. 16 U.S.C.A. § 1802(10) (1985).

22. 46 C.F.R. § 67.01-3 (1985).

23. *Id.* § 67.01-5; § 67.01-7.

24. *Id.* § 67.01-9.

25. 46 U.S.C.A. § 12102; 46 C.F.R. § 67.03-1.

26. 46 C.F.R. § 67.03-3.

27. *Id.* § 67.03-5.

28. *Id.* § 67.03-5(a).

29. 49 Fed. Reg. 28744 (July 16, 1984).

30. *Id.* at 28747.

31. 46 C.F.R. § 67.03-7.

32. *Id.* § 67-02-9(a).

33. 46 U.S.C.A. § 802; 46 C.F.R. § 67.03-9(b).

34. 46 U.S.C.A. § 808.

35. 46 U.S.C. 883-1; 46 C.F.R. § 68.01-17.

36. 46 C.F.R. § 67.17-3.

37. *Id.* § 67.17-5.

38. 19 C.F.R. § 4.80b.

39. 46 U.S.C.A. § 883 ("ninth proviso").

40. Discussed in detail in part 3(d) "U.S. Build Requirements."

41. 46 U.S.C.A. § 802.

42. 46 C.F.R. § 67.17-5(d).

43. *Id.* § 67.17-9.

44. 46 U.S.C.A. § 251.

45. Pub. L. 98-454, Title III, § 301(c), October 5, 1984, 98 Stat. 1734, 46 U.S.C.A. § 12106, § 12108.

46. 46 C.F.R. § 67.09-3.

47. *Id.* § 67.09-5.

48. Letter from R.W. Mason, Technical Assistant, Merchant Vessel Documentation Division No. 16713/5-2 (July 28, 1983).

49. 46 C.F.R. § 67.01-1.

50. 46 U.S.C.A. § 14; 46 C.F.R. § 67.19-9.

51. 46 C.F.R. § 67.19-5.

52. *Id.* § 67.19-3.

53. *Id.* § 67.19-7.

54. 46 U.S.C.A. § 883; 46 C.F.R. § 67.17-5(c)(3); § 67.27-3.

55. 46 C.F.R. § 67.27-3(a).

56. *Id.* § 67.27-1(a).

57. 19 U.S.C.A. § 1466; 19 C.F.R. § 4.14.

58. For an excellent discussion of the background of this development, *see* Pacific Shrimp Co. v. United States Dep't of Transp., 375 F. Supp. 1036 (W.D. Wash. 1974).

59. 46 U.S.C.A. § 3302(b) (1983) amended by 46 U.S.C.A. § 3302(b) (1985).

60. *Id.* § 3302(b).

61. *Id.* § 3302(c)(1).

62. *Id.* § 3302(c)(2).

63. *Id.* § 3302(d), § 3302(i) and § 403(a) of Pub. L. 98-364.

64. 46 C.F.R. §§ 25, 26.

65. 46 U.S.C.A. § 4501(a).

66. *Id.* § 4502(a).

67. *Id.* § 4502(b)(1).

68. *Id.* § 4502(b)(2).

69. *Id.* § 4502(b)(3).

70. *Id.* § 4503.

71. *Id.* § 88.

72. *Id.* § 88(b)(2).

73. Pub. L. 98-557.

74. 46 U.S.C.A. § 86b(b).

75. 130 Cong. Rec. S 8457 Daily Ed. (June 27, 1984).

76. 46 U.S.C.A. § 8103(a).

77. *Id.* § 8304; § 7102.

78. *Id.* § 8103(b).

79. *Id.* § 10101(3).

80. *Id.* § 8701(a)(3).

81. *Id.* § 8701(a)(3),(6).

82. *Id.* § 8701(a)(7).

83. *Id.* § 7311a.

84. *Id.* § 7306(b).

85. *Id.* § 7312(f)(1).

86. *Id.* §§ 7312; 8701-02.

87. *Id.* § 7312(f)(2).

88. *Id.* § 8101.

89. *Id.* § 8104(d).

90. *Id.* § 8104(k).

91. *Id.* § 8104(1)(1).

92. *Id.* § 8104 (1)(2).

93. *Id.* § 8104(m)(1).

94. *Id.* § 8104(m)(2).

95. *Id.* § 8102(b).

96. *Id.* § 8104(b).

97. *Id.* § 10101(4)(A), (B).

98. Examples of the exemptions include: vessel's crew is exempt from requirements concerning meals and caloric intake, *Id.* § 10303(a); vessel's master is exempt from the statutory duty to replace seamen lost by desertion or casualty, *Id.* § 10309(c); certificate of discharge to a seaman is not required, *Id.* § 10311(e); master is not required to pay a seaman the balance of wages due within 24 hours of the discharge of cargo or 21 days within the discharge of the seaman, *Id.* § 10313(h); master is not required to make a penalty payment because the initial payment was not affected, *Id.* § 10314(e); restrictions on advance payment of wages are not applicable, *Id.* § 10314(e); regulations applying to both wages and advances are not applicable, *Id.* § 10504(d), § 10505(d); seamen are no longer subject to penalties for failing to be on board at the time specified, *Id.* § 10509(e); proceedings that can be initiated by the crew with respect to unseaworthiness of the vessel are not applicable, *Id.* § 10901; requirements as to slop chests "containing sufficient clothing for the intended voyage for each seaman" are not applicable, *Id.* § 11103(c); several provisions of the Act apply to wages and include, e g., requirement that exemptions from state tax withholding laws apply equally to individuals employed on fishing, fish tender and all sizes of fish processing vessels, *Id.* § 11108; the Act extends protection from wage attachment to any individual on fishing, fish tender and all sizes of fish processing vessels (prior law limited such protection to fishermen on fishing vessels), *Id.* § 11109(c).

Remarks on the Relationship Between the Commercial Fishing Industry and Waterfront Development

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Introduction

As a development consultant on public and private waterfront projects throughout New England for the past eight years, I have had the opportunity to experience first-hand the trends in the development of waterfront properties for both fishing and non-fishing uses. A development consultant, working for either a public agency or private client, provides specific expertise on the special problems unique to coastal locations, including detailed design and operating requirements of the fishing industry and other maritime industries, knowledge of the particularly complex legal and regulatory structure of the waterfront, understanding of the special construction methods and problems encountered, sensitivity to environmental issues, awareness of the problems and potentials of management of the completed projects and an ability to work within a very public review process.

Past projects include a wide range of recreational, residential, commercial and industrial waterfront facilities throughout New England, including every major fishing port. Current projects include a $30 million condominium project on Boston Harbor, $8.5 million retail complex on Gloucester Harbor, an $8.0 million municipal fish pier project for Provincetown, and shoreside support facilities for a private whale watch/charter boat fleet.

Current Trends in the New England Fishing Industry

To properly assess the potential for conflicts between the fishing industry and other uses of waterfront real estate, it is important to understand the complex nature of the fishing industry and to review the dramatic changes which have occurred in the New England fishing industry over the past ten years. The fishing industry is composed of a divergent group of small independent businesses which survive (and hopefully prosper) on the dollar

value spread between the cost of harvesting the ocean's natural resources and the price which the ultimate consumer is willing to pay for a seafood dinner. Employing many thousands of people in New England, the industry is dependent on the efficient harvesting, handling, processing, distribution and marketing of an enormous range of species and sizes of seafood products. Of all of the above activities which are essential to a healthy and viable fishing industry, it is the link between land and sea that is at issue in waterfront development. While many larger economic trends such as the cost of insurance, foreign imports, and overfishing may have a dramatic financial impact on the future of the industry, a place to unload fish, to tie up a vessel and to obtain shoreside services is an essential component to the continuing viability of the industry.

Since the establishment of the Fisheries Conservation Zone in 1977, foreign fishing off our shores has been reduced, there has been limited success in managing fisheries with some stocks seriously overfished. Nevertheless, the economic value of landings has increased dramatically despite a decline in landings.

Volume and Value of New England Landings

1975 — 500 million lbs. worth 150 million dollars
1980 — 790 million lbs. worth 325 million dollars
1985 — 590 million lbs. worth 425 million dollars

Fishermen fish for dollars, not for volume and the increase in value of 185% over the past decade is what makes the industry tick. The total dollar value of the industry is easily in the several billion dollar range when accounting for the added value from processing, sales of fresh and frozen imported products and sales of major domestic and foreign frozen fish processors in New England.

There have been many new entrants into the industry and many new vessels. Vessels are larger and more efficient than in the past and so have a dramatically larger capacity to harvest fish (which is not being utilized due to market and resource constraints). There is some evidence that the industry is overcapitalized, and that there are too many fishermen chasing too few fish. Profitability of fishing as an enterprise has changed dramatically over the past ten years. In 1975, fishing generally was a marginal economic proposition with high risk and low reward. The increase in dockside values and increased fishing power through new vessels made fishing a very profitable proposition in the late 1970's and early 1980's. However, the present picture is quite different. There has been an over supply of vessels and the increase in dockside value has only partially offset the decline in volume.

The average age of both fishermen and vessels has decreased in the past decade. The industry of old men living on subsistence wages has been changed into one where young men with no education and without being able to speak English could make attractive incomes and far more money than in any occupation ashore. Having said that, the bloom is off the rose and with dollar values steady or slightly declining over the past three years, and with large vessel mortgages to pay, it is considerably more difficult to make a living at sea, and many have left fishing. The fisherman, however, is typically an individual who enjoys the style of life and as long as there is a living to be made will likely continue to fish.

The market for New England seafood products has changed dramatically in the past decade. The white table cloth restaurant trade and the heightened consciousness of the healthiness of fish in the diet have increased sales and raised per pound prices. New England processors have reduced greatly their sales into the institutional food markets and focused on quality fresh fish for restaurants and supermarkets.

There has been a dramatic shift away from processing only the fish which comes over the dock. No processor today can afford to rely on the fish landed at his plant to supply him with the steady volume and variety of species to supply his customers. All processors bring fish in by truck to process, and ship out by truck whole fish which is surplus to their needs. The major consequence of this trend has been a dramatic shift away from the waterfront in the siting of seafood processing plants. Most processors in New England today, are not located at dockside. Those who are on the water tend to run the business as a whole fish handling and distribution operation. If they are also processing fish, it is run as a separate profit center, buying and selling product as the market, not the dockside landings dictate. Processors locating off the waterfront have taken into consideration the possible lower real estate prices, better labor supply, better truck access etc., and weighed this against what is a marginal price advantage of unloading boats directly.

Per capita consumption has increased despite the high cost of fish. A strong economy and two wage earner families have meant eating out more often and when one eats out in a restaurant, it is likely seafood will be on the menu. A relatively small portion of total per capita seafood consumption is fresh seafood consumed in the home. The relative affluence of some sectors of our society make possible the financial success of New England fishermen. It is those consumers who are affluent, well educated, and health conscious who are the ultimate consumers of New England seafood.

The service industries are the ones which are most directly affected by waterfront development. Vessel service businesses are directly dependent on

the financial success of the vessels they service. There has been enormous capital investment, perhaps over investment in shoreside support for the fishing industry. Based on the potential of the 200 mile limit and the tremendous growth between 1975 and 1980, the industry over-spent on capital improvements for marine support services. There are today, no doubt, better services, and vastly improved infrastructure but there are signs that some of this investment is in financial jeopardy.

Of particular importance to waterfront development is the issue of vessel berthing. A decade ago our waterfronts were relics of our industrial past, with piers and wharfs constructed to support fisheries which long ago ceased to be viable or to support other marine operations which also had declined. Fishermen were able to utilize these piers and wharves at no cost as there were not other viable maritime uses. Fishermen are adaptable and while the facilities were not ideal, they worked. The fishermen pretty much had the waterfront to themselves, as there were no other users interested in the space.

Obviously, this situation has changed dramatically as there is strong interest in urban waterfronts and a wide range of viable economic uses. In light of this, it is interesting to note that with rare exceptions, the provision of berthing facilities for fishing vessels has always been a losing proposition for the owner of a pier. New privately constructed berthing is almost non-existent in the absence of a viable upland business such as ice, fuel or fish dealers which can subsidize docking through the sales with the boats (they pay for docking, but not as a separate charge). Publicly constructed docking facilities are available in nearly every port in New England, but even there the docking charges rarely cover maintenance, much less depreciation. The average fishing vessel in New England pays about 25% of the actual cost of constructing and operating a public docking facility. Vessels at private piers for the most part do not pay a separate charge, and it is difficult to figure the actual contribution toward docking.

When waterfront development is most often portrayed as a threat to the fishing industry, it is really the threat to fishing vessel berthing which is at issue, not a threat to the entire fishing industry. The reason this is so, in my experience at least, is that the facts of life are that fishing vessels are unwilling to pay a rent which is responsive to the actual cost of constructing and maintaining dockage.

Generally, viable marine businesses that can support the capital investment and provide a decent living for the owner and employees are not lost from the waterfront. They may move from higher value location to a lower value location, but as long as there is money to be made they will survive on the waterfront.

The fishing industry is a powerful economic industry which will adapt and change in response to changing economic forces. To summarize —

- it is here to stay, but it will continue to change its method of operating as market forces dictate.
- there has been a significant growth in the size of the fishing fleet, which is not likely to increase any further.
- there has been tremendous growth in value of seafood, and substantial capital investment in vessels, plants and support businesses.
- there may be in some cases overcapitalization, and the trend is toward greater efficiency, particularly in the utilization of real property.
- the industry has relied in the past on the capital investment made in piers and wharves in past decades to support the needs of the vessels and processors. Radical changes in docking fees or substantial public subsidies will be necessary if the fishing industry is to support the true costs of constructing and operating piers and wharves.
- the two choke points for the industry are fish unloading and docking facilities. It is essential that these functions be maintained if the industry is to survive and prosper.

Trends in Waterfront Development

Many of the same socio-economic trends which have created a strong marketplace for New England seafood, have also brought about changes in the utilization of urban waterfront property. After many decades of neglect and decay, there has been a strong and visible change in the way waterfronts are being used. In most small and large urban areas, there has been substantial investment in retail, office and residential development of waterfront properties. Since the waterfront has become a desirable place to live, work and play, the rotting wharves and falling down piers built decades ago for marine commerce have been transformed with varying degrees of success into attractive and appropriate urban settings.

In general, marine businesses have been on the decline during the past decade. Shipbuilding and ship repair, oil tank farms, and general cargo facilities, once major forces on the waterfront, have succumbed to strong

changes in national and international economies. While these industries are not forever gone, there has been a major retrenchment. The fishing industry, in some ports a major use, has gone through several up and down cycles and is in a leveling off period. The waterfront industries which have grown over the past decade are those which are recreation and tourist related. The pleasure craft marina and excursion vessel business have increased markedly.

The most threatening aspect of change along the waterfront to the traditional marine uses is less from new residential, commercial and office developments on the upland, than from the growing alternative uses for dockside space. Recreational boating has been steadily growing in popularity for the past two decades. Yet is is only within the past few years that boating activity has become popular in the traditional urban harbors where commercial fishing is most prevalent. The increasing desirability of urban harbors for recreational boating and for a variety of excursion and passenger vessel activity, has generated a large increase in the demand for pierside space. These recreational craft and commercial passenger vessels are able to pay a substantial premium over commercial fishing vessels for similar facilities. In addition to financial considerations, these uses frequently are more acceptable to upland real estate owners due to a perceived problem with compatibility of uses.

In viewing the demand for waterfront property for residential, commercial and office space, and for pierside space for recreational marinas and excursion vessels, in comparison to the demand for marine uses, is clear that major changes are coming on the waterfront. The real issue is not whether change is coming, but whether it is coming at the cost of the traditional marine uses.

In my view the answer is not yet entirely clear. Without any outside development pressures, traditional marine uses have been declining for several decades. While it is unlikely that continued declines in these industries are not probable, they will nevertheless face competition from both "non-traditional" marine uses, and the non-marine upland uses. With proper planning and zoning, several outcomes are possible. First, areas may be set aside through zoning for exclusive traditional marine uses. Second, a mixed-use approach may be developed which generates new, improved facilities for marine industries within a larger mixed-use development. Projects may incorporate hotels, offices, retail and restaurant uses which complement some of the traditional marine activities. Finally, public agencies or authorities may undertake the acquisition and/or construction of public facilities exclusively dedicated to specific marina uses. In the absence of specific standards in local zoning ordinances, and other direct actions to create public facilities, it is quite possible that physical or financial displacement will occur in harbors where the relationship between supply and demand for waterfront space is tight.

Chapter 13
Marine Insurance

Fishermen's Personal Injuries: Characterization, Compensation, and Solutions

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Abstract

The U.S. fishing industry, overcapitalized and facing declining stocks and increased foreign competition, has steamed into another major obstacle. Increasing costs and shrinking availability of marine insurance have resulted in serious problems for broad sectors of the nation's fleet. Sharp reductions in the availability of Protection and Indemnity coverage resulting from increasingly erratic jury awards in personal injury cases have idled vessels nationwide. The solution will require both a reduction in the frequency of fishermen's injuries and modifications to the present compensation system to reduce insurance costs while securing equitable compensation for the injured party. This study utilizes the most current information on actual injuries and compensation paid to victims in analyzing the problem and to model proposed changes in the system.

The current compensation system's faults and the impacts of the proposed modifications to that system are explored with respect to these findings and the potential for improving safety and reducing costs is discussed. The cause, frequency, severity, and cost of various injuries are analyzed to determine where initial safety measures might produce the greatest benefits in terms of reducing injuries and insurance costs. The degree to which training, protective clothing, safety devices, and vessel maintenance might reduce the frequency of particular injuries is considered.

Introduction

Among all the industries in the United States, commercial fishing has the dubious distinction of being the most hazardous. Occupational fatality rates

in this industry are seven times greater than the national industrial average, and twice the rate of the coal mining industry, securely in second place.[1] Further catastrophic vessel losses are out-pacing losses in ocean and coastal cargo shipping by margins of between five and seven to one.[2] These losses, coupled with an unpredictable liability system and a shrinking insurance market, have produced a crisis in fishing vessel insurance availability and cost.

The severity of the crisis is evident from the attention the issue has received in Congress. Five subcommittee field hearings have been held since 1984 in fishing centers around the country soliciting comments from the members of the fishing industry, the insurance industry, government, and the academic community. On April 17, 1986, a joint meeting of the Subcommittees on the Merchant Marine, Coast Guard and Navigation, and Fisheries, Wildlife Conservation, and the Environment, heard testimony from twenty-five witnesses in response to proposed legislation addressing the insurance and safety problems facing the commercial fishing industry.

In this paper, we consider the current crisis in terms of its two major components: the poor safety record of the fishing industry, and the legal and regulatory framework influencing the industry and its insurance underwriters. Recognizing the considerable overlap and interplay between these components, each will be reviewed and analyzed separately, assessing the current situation, the potential for improvement, and recent progress in solving this complex dilemma.

I. Safety and the Commercial Fisheries

In a recently completed study conducted by the authors for the National Council on Fishing Vessel Safety and Insurance (NCFVSI), an effort was made to evaluate the nature and magnitude of the current fishing vessel insurance problem.[3] A nationwide, proportional, systematic, stratified sample of closed insurance claims files was collected, with the number of cases selected from each region based on that region's contribution to the total national catch value each year. The database provides information on the characteristics, cause, and duration of disabilities resulting from commercial fishermen's injuries documented in nearly 450 cases over the 5 year period 1980 — 1984, as well as the insurance compensation paid to the victims and their attorneys.

Injuries recorded within the database were characterized by the body parts affected, the nature of the injury, (e.g., laceration, fracture), as well as the severity and duration of the resulting disability, (e.g., temporary total,

permanent partial). The present analysis grouped similar injury sites (e.g., hand and wrist) when injury to these areas would likely occur under similar circumstances are evidenced by the accident scenarios within the database itself. Table 1 lists the injury sites showing frequency as a percent of the total cases sample, and the percentage of the total settlement costs represented by each site.

Table 1
Relative Frequency and Cost of Injuries

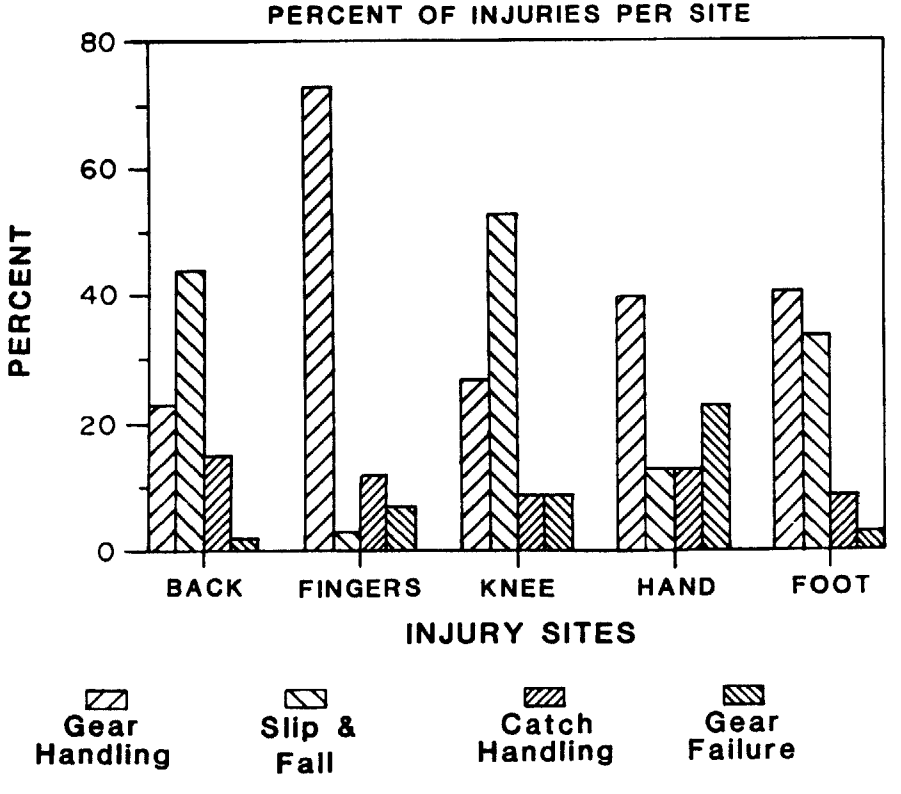
Injury Site	Frequency #	Frequency %	Costs Total Value	Costs %
Back	94	22.1%	$3,446,035	26.2%
Fingers	56	13.1%	$1,957,200	14.9%
Knee/Lower Leg	39	9.2%	$ 802,780	6.1%
Hand/Wrist	37	8.7%	$ 393,250	3.0%
Foot/Ankle	31	7.3%	$1,981,890	15.1%
Internal	22	5.2%	$ 715,850	5.4%
Elbow/Forearm	22	5.2%	$ 206,440	1.6%
Head	18	4.2%	$ 152,250	1.2%
Ribs	17	4.0%	$1,079,000	8.2%
Shoulder/Upper Arm	16	3.8%	$ 109,300	0.8%
Hip/Upper Leg	15	3.5%	$ 45,800	0.3%
Fatalities	13	3.1%	$ 769,800	5.8%
Face/Mouth	12	2.8%	$ 82,000	0.6%
Pelvis/Groin	11	2.6%	$ 667,800	5.1%
Eyes	8	1.9%	$ 71,500	0.5%
Neck	7	1.6%	$ 70,300	0.5%
Toes	4	0.9%	$ 158,900	1.2%
Paralysis	3	0.7%	$ 452,000	3.4%
Ears	1	0.2%	$ 4,700	0.0%
TOTAL			$13,166,795	

In an effort to gain insight into systematic safety problems within the fishing fleet and identify the causes of the most common and costly injuries, those sites which constitute the top 50% of all cases sampled in frequency and settlement cost were reviewed in detail. Specific cause categories identified among these most significant injuries were defined as follows: *Gear Handling* injuries involve the operation and manipulation of the vessel's harvesting equipment, as well as power plant components. *Winch* accidents are a subset of gear handling although they were also analyzed separately. *Slip & Fall* injuries involve those due to loss of footing aboard the vessel or ashore. Falls resulting from being struck by gear, falls overboard, or while

boarding were analyzed separately. *Overboard* cases involve falling off the vessel exclusive of *boarding* cases which include falls while moving between one vessel and another or docking facilities. Injuries occurring while sorting, packing, or processing the catch are covered by *catch handling*. *Gear failure* cases were restricted to instances where equipment breaks or fails to operate and leads to injury. *Stores handling* covered movement of supplies not directly associated with fishing, i.e., food or engine spares. Injuries due to *vessel losses* are self explanatory, as are cases listed as *other*.

Back injuries are by far the most common source of problems for commercial fishermen, followed by finger injuries, injuries to the knee and lower leg, hand and wrist injuries and then foot and ankle problems. Together, these injuries account for 60% of all injuries, and 65% of all settlement costs. Figure 1 summarizes the primary causes of the injuries described below.

Figure 1
Causes of Common Costly Injuries



Sprains, bruises, pinched nerves and pulled muscles provide 70% of back injuries, with another 29% involving fractures or surgery. Thirty-four percent of all finger injuries involve accidental amputation, 29% are fractured or crushed, with lacerations and infections accounting for another 25% of injuries to any or several digits. Most injuries to the knee and lower leg are dislocations and bruises (64%), with another 31% involving fractures, crushing incidents, or requiring surgery. Fractures and sprains or bruises account for 43% and 30% of hand and wrist injuries respectively, with lacerations and infections resulting in another 23%. Fifty-nine percent of foot and ankle injuries involve crush or fracture accidents primarily due to falling equipment, while 25% are dislocations or bruises and nearly 10% involve burns.

Permanent injuries, including all disabilities greater than one year in duration and fatalities, account for 15% of all injuries in the study. However, these account for 60% of the total settlement costs. These are primarily crush and fracture cases including knee and back injuries requiring surgery (41%), followed by major sprains and dislocations (15%), with head injuries and amputations accounting for 8% each. Fatalities are primarily due to drowning or hypothermia (62%), with crush and fractures involved in another 15%. Gear handling including winch operations, and slip and fall accidents contribute almost equally to these injuries, at 27% and 26% respectively. Gear failures are involved in 10% of these cases. Boarding, man-overboard, and vessel losses combine for only 16% of all permanent injuries, but account for 58% of all fatal accidents. Gear handling, including winches, and "other" causes are each responsible for 17% of the fatal accidents with the remaining 8% due to slip and fall events.

Measures to Reduce Injuries

Every case in the database was reviewed to classify the clause according to the above definitions, and to determine what practical measures might reduce the likelihood of similar accidents in the future. Cases contained within cause categories GEAR HANDLING, SLIP AND FALL, CATCH HANDLING, and GEAR FAILURE, account for 86% of the entire database. Specific recommendations were then placed within one of the following potential remedy classes: operational safety, design safety, protective gear, general maintenance, boarding gear, handling procedures for heavy equipment, licensing or inspection of vessels, and general health screening of the crew to assure preventive health care and avoid unnecessary risks. These concepts are discussed in greater detail below.

Operational Safety

Remedies within this category include basic procedural changes following a review of each vessels' operations while loading, unloading, fishing, and underway. The operation of a fishing vessel is a complex affair, and to be conducted safely the process must be assessed as a somewhat flexible series of coordinated tasks. Communication between crewmembers carrying out these tasks is critical, and simple seamenlike procedures including axioms like "one hand for the ship", combined with a commitment on the part of the captain and crew to place a high priority on safety can greatly reduce injuries. Coordination of procedures such as shooting nets or pots, hauling back, catch sorting, door or dredge stowage, winch operations, and the like can provide valuable safety benefits simply by considering where various crewmembers are during specific operations and tasks. With gear handling procedures and problems representing the cause of more than 32% of all injuries, it seems that these procedures need critical review and reconstructing if risks are to be reduced. Operational changes to reduce the risk of injuries require minimal expenditures and hold great potential benefits for everyone concerned.

Design Safety

This category involves a broad variety of technological opportunities available to the fishing industry. Issues range from using properly sized and engineered hardware and rigging for the job at hand, to modifications of the operational components of the entire fishing process. While this category of solutions contains some capital intensive approaches, there remain many low cost opportunities to design safety into the way a vessel is laid out and equipped to fish. Possibilities include designing the work stations of the crew to minimize back strain by elevating the sorting area to waist level; installing hatches with safety stops to reduce risk of fractured or amputated fingers as the vessel rolls; routing hydraulic and other plumbing lines so as to eliminate tripping hazards; ensuring that all protruding corners on bulkheads, shelves, etc., are rounded, and, if necessary, padded. Vessel layouts should be analyzed and, where necessary, modified to minimize the frequency at which crewmembers are able to place themselves in compromising positions vis-a-vis winch cables, by-catch, trawl doors, etc.

Slip and fall injuries represent over 27% of all cases and costs, and cause over 25% of all permanent injuries. Installation and maintenance of *effective non-skid surfaces* throughout all fishing vessels would go far in reducing this problem, and can be accomplished in the form of sandy paint as an absolute minimum or through several more sophisticated and expensive approaches.

Injuries involving the handling of bycatch, due to the weight, sharpness or toxicity of the species involved could often be minimized and catches of desired species enhanced by the use of selective harvesting techniques such as within-trawl separator devices. The fact that bycatch is causing problems beyond the inefficiency obvious to the fisherman should further encourage development and use of this technology.

Another area to be addressed in this category of remedies concerns another major source of painful and expensive back injuries. Crewmembers frequently injure their backs moving catch and bait boxes weighing far more than can be safely handled on a steady non-skid surface, let alone a rolling, pitching, and slippery fish boat deck. As the concept of improving quality by boxing at sea catches hold, fishermen should be encouraged to employ containers incapable of carrying loads which are likely to cause injury.

Protective Gear

Shore side industries have been experiencing steady gains in injury avoidance through the use of protective clothing and specialized work outfits. Despite generations of working on slippery decks with heavy gear swinging overhead, and the constant proximity of Davy Jones' locker, remarkably few American fishing vessels employ such revolutionary gear as hardhats or lifejackets designed for working on deck. There is little or no evidence of efforts to develop effective high traction foot wear to reduce slip and fall injuries. In an industry employing between 100,000 and 200,000 people,* most of whom face similar footing problems, it is remarkable that this area remains almost completely unexplored.

Similarly, more than a third of fishermen's finger injuries result in amputation, with less severe lacerations accounting for another 25%. The use of flexible wire mesh gloves by crewmen cleaning fish, shucking scallops or heading shrimp could sharply reduce the incidence of many such injuries. Yet despite the availability of such products in the marketplace, the fishing industry has failed to capitalize on their safety potential.

General Maintenance of Vessel and Gear

Largely due to the financial squeeze felt by many vessel owners resulting from reduced resource availability, spiraling operating costs, and extremely competitive markets, an attitude of "if it ain't broke yet, don't fix it...," prevails for everything from bilge pumps to winch cables and engines. Worn parts are not replaced, hydraulic leaks persist, overhauls are postponed, and

so on. A recent informal survey showed that while 90% of a selected fleet carried liferafts, one third of those were improperly mounted or inaccessible, and another third were well overdue for annual inspections. Flares, if carried, were often several years out of date.[5]

Additional problems have developed due to the sloppy handling of insurance claims; the number of fishing vessel engine and winch overhauls paid for by hull insurance policies has encouraged some operators to wait until it breaks and have the insurance company pay for it. Poor risk management and claims analysis on the part of the insurance companies is in part responsible for poor maintenance of many fishing vessels. With no rate incentives for safe operators to continue their efforts, or penalties for poorly maintained vessels, less responsible fishermen are in effect subsidized by their more conscientious fellow fishermen. The result is that everyone pays more, especially those injured due to gear failure.

Handling Procedures for Trawl Doors, Dredges, and Pots

While this category is clearly related to both operational and design safety, the frequency with which these heavy components of the fishing gear are responsible for grievous injuries deserves special attention. Major problems surround the deployment and recovery of these critical components and it seems likely that time invested considering new approaches to the handling and perhaps the design of these devices should prove well spent. Many injuries result from the inability of the crew to effectively and safely capture and control these components as they emerge from the sea, and many fingers, toes, arms, and legs are severely injured as they are caught between the vessel's gunwale or deck and the errant gear. It seems that a society which can pluck satellites from orbit might be able to devise a way to safely and efficiently recover fishing gear from the sea. Perhaps a solution as simple as placing handrails inboard of the impact zone might leave the crew with enough fingers to attach tag lines to the gear to aid in its control. Placement of fixed racks outboard of the gunwales where the could be caught without ever coming aboard might be combined with rigging modifications to simplify and and partially automate the capture of doors, dredges, or pots, minimizing the frequency of injuries. The possibility of designing doors which are less dependent upon sheer mass to provide necessary spreading and tracking forces might allow the use of more manageable equipment.

Boarding Gear

Fishing vessels often load and unload at piers and wharfs maintained in poor condition. Few if any such piers are equipped for safe boarding and disembarkation, and despite the fact that boarding accidents are among the top three causes of fatalities, jumps from dock to deck continue to break bones, while those individuals who miss the boat frequently fail to surface alive. Vessel owners must pressure pier operators to provide safe gangways or carry their own on board. Many injuries result when two or more vessels come alongside while at sea, again due to the lack of safe boarding equipment or procedures aboard fishing vessels. The tuna clippers have an inordinate injury rate associated with the speed boats and net skiffs they launch and recover when settling their purse seines.

Licensing or Inspection of Vessels and Crews

A fair number of the problems due to operational safety, design safety, and general maintenance would likely be avoided if minimum standards were maintained for crew training and experience, the design, construction, and maintenance of vessels and equipment. Vessel owners unable to fish without maintaining and operating a safe and seaworthy vessel should be induced to maintain their vessels and gear in better condition. Inspections need not be conducted by government agencies but could be instituted by underwriters, cooperatives, or mutual insurance pools. However, without financial or regulatory discrimination between safe and irresponsible operators, the current problems will remain.

General Health Screening

Worthy of inclusion in any risk management program is a basic health screening for prospective and current crewmembers. Designed to assure preventive health care and assess the presence of serious physical problems such as hernias, back problems, and heart disease, such programs would go far to inform the operator of the actual capacities and potential health risks of the people hired to go fishing. There is no reason that an employer or underwriter should remain unaware of serious physical defects among employees which must perform most of their duties in the rigorous and remote environment of the fishing grounds.

II. The Legal and Regulatory Framework

To date, the fishing industry has shown a remarkable ability to remain largely outside government regulations with the exception of those which attempt to control harvesting effort. In an industry where 95% of the vessels are less than 50 gross tons,[6] only fishing vessels greater than 200 gross tons and processing vessels greater than 5000 gross tons are subject to United States Coast Guard inspections and minimum construction standards.[7] The rest are classified as uninspected vessels under subchapter C, Title 46, C.F.R.. Pursuant to the Motor Boat Act of 1940 and the Federal Boating Safety Act of 1971, no construction or material standards are specified. Equipment requirements are limited to life jackets for each person on board, fire extinguishers, backfire flame arrestors on engine intakes, and ventilation specifications for tanks and engine space. There are no requirements for any additional safety or survival equipment.[8]

While operators of harbor launches are required to document six months of full time experience and demonstrate proficiency in vessel operations, rules of the road, fire protection, first aid, and pollution regulations in order to obtain a license to carry passengers in protected, near-shore waters,[9] only processors with more than 16 workers and vessels over 6000 gross tons are subject to any crew training standards. No such requirements apply to the majority of fish boat operators or crew members working under far more challenging, remote, and dangerous conditions.[10] The authority of the Occupational Safety and Health Administration (OSHA), responsible for considerable safety improvements in land based industries, does not extend beyond the pier head.[11] It is ironic that the industry's effective lobbying to avoid regulation is partially to blame for the hazardous working conditions responsible for many injuries and the resulting insurance dilemma.

Meanwhile, regulations aimed at controlling effort under the Magnuson Fishery Conservation and Management Act[12] have produced extremely limited seasonal openings, measured in some fisheries by hours or days rather than weeks, often forcing vessel operators to fish in weather conditions which would otherwise be considered too dangerous. The Atlantic Surf Clam and Ocean Quahog Fishery Management Plan, for example has limited the 176 permit carrying vessels in the Mid-Atlantic region to six hours of fishing during the six week period.[13] In other cases, poor catches force operators to remain on the grounds for longer periods of time when deteriorating conditions would normally send them into port. Working under intense competition, carrying considerable debt on new vessels, operating under extreme weather conditions, with government regulations restricting catches but withholding licensing or safety regulations, it is little wonder that the industry finds itself in serious trouble. The insurance crisis has left many owners

without the coverage their lien holders require in order to fish, keeping many vessels tied to the docks and forcing others to fish in stormy conditions in order to meet their payments. Many appear unable to justify the investment of time and money needed to maintain their vessels in safe operating condition.

Vessel owners usually carry two kinds of insurance coverage. The Hull policy covers the vessel and gear if lost or damaged, while the Protection and Indemnity (P&I) policy reimburses the vessel owner for liabilities brought about by the vessel and not covered by the Hull policy, including injury or death of crewmembers. For a variety of reasons, both types of coverage have become extremely expensive over the past few years if they can be acquired at all. Since Hull insurance is based on the value of the goods insured or services needed to repair them, claims made upon this policy, while not minor, are fairly predictable. P&I claims on the other hand have experienced a steady escalation, in part due to the nature of the legal remedies available to injured seamen under U.S. Admiralty Law.[4]

Three distinct remedies are involved, known collectively as the "Blessed Trinity" by personal injury lawyers. They are maintenance and cure, the Jones Act, and the unseaworthiness doctrine. The first and oldest remedy available to injured fishermen is known as maintenance and cure. It is defined as the legal obligation of the vessel owner to maintain and cure a seaman injured in the service of the vessel. The rationale for this remedy is that the vessel owner has an obligation to treat illness and injury aboard ship where the seaman has no alternatives for treatment. That obligation continues ashore until the injured seaman has recovered "to the maximum extent practicable." Until mid-1981, most of the costs of cure were actually paid by the U.S. Government through the Public Health Service Hospitals where fisherman received free medical care. The typical amount of maintenance paid varies substantially around the country, with a low of $8 and a high of $30 per day.

The second cause of action, the Jones Act, was passed by Congress in 1920. It provides that:

> "Any seaman who shall suffer personal injury in the course of his employment may, at his election, maintain an action for damages at law, with the right of trial by jury...."[5]

The comparative fault standard was adopted in the statute, which allows a seaman to recover for his injuries even if partially negligent, with the award reduced by a percentage representing his degree of fault. The greatest number of Jones Act cases occurred between 1920 and approximately 1950.

The statute served as the vehicle for nearly all of the seamen's personal injury and death actions during that period.

The most important remedy for an injured seaman today is the doctrine of unseaworthiness. As stated in the landmark *Mitchell v. Trawler Racer*[16] case, the doctrine enables an injured seaman to recover damages against the vessel if his injury was caused by an unseaworthy condition of the vessel, its equipment, or crew. This is true whether or not the unseaworthy condition was caused by the negligence of the vessel owner, the standard required under the Jones Act. The doctrine dramatically expands the potential liability of the vessel owner and his insurance underwriter. Except in cases of deliberate self-injury, it is not difficult to prove a case of unseaworthiness. Once liability is established under either the Jones Act or the unseaworthiness doctrine, the amount of damages is limited only by the skill and imagination of the injured fisherman's attorney. It is that lack of predictability which has driven many underwriters our of the P&I market entirely.

The marine insurance market represents a small part of the property and casualty insurance industry, with fishing vessel insurance only a fraction of that.[17] This fairly small business has not justified specialized risk analysis needed to address the varied nature of the fishing industry. Hence, premiums have typically been set by a seat of the pants approach, without the benefit of accurate actuarial data or consideration of the safety efforts or loss records of individual operators. The fishing industry is typically viewed as a whole, with rates in the Florida scallop fishery reflecting the loss records of the Alaskan king crab fishery, thereby failing to provide vessel owners with incentives for the improvement of safety aboard their vessels. At the same time, poor handling of legitimate claims by insurance underwriters and adjusters has driven many a potential settlement into the courtroom for a larger award.

During the late 1970's and early 1980's, high interest rates and the potential for earning high returns on invested premium dollars generated strong competition among underwriters. The unregulated marine insurance industry was hungry for dollars to invest and eagerly accepted premiums without paying sufficient attention to the operations they were insuring or the cash surplus necessary to maintain credibility. This "cash flow" underwriting continued until the interest rates fell. At the same time, the fishing industry ran into a series of stock collapses, suffered a number of major losses, and submitted substantial claims. Insurance companies began withdrawing from the market, leaving the fishing industry with no option but to pay the substantially increased rates demanded by those few companies remaining. The property and casualty insurance industry as a whole has just recently posted its first profit in over two years, due largely to the soaring stock market and growth in premiums of almost 27%.[18]

Today, Congress is working to develop consensus legislation based on five preliminary bills and the testimony presented in April. The primary focus of four of the bills is to address the ways that injured fishermen are compensated after an accident, hoping to provide underwriters with a higher degree of predictability. The basic approach is to encourage the re-entry of insurance companies into the market by limiting the liability of vessel owners. Two bills (H.R. 277 and H.R. 3156) grant limits outright while two others (H.R. 4415 and H.R. 4407) offer limits on a quid pro quo basis requiring vessel owners to provide basic communication and survival equipment on all commercial fishing vessels. A fifth (H.R. 4465), simply seeks safety requirements as a matter of principal, under the belief that fewer fatalities should translate to lower premiums. Only H.R. 4407, introduced by Congressman Jones of North Carolina, addresses the issues of vessel inspection and crew licensing aboard commercial fishing vessels.

The Liability Issue

In addition to identifying safety problems, the NCFVSI study analyzed the compensation paid in each case to evaluate the nature of the liability problem and propose a solution to the problem. It was found that the current system is quite flexible in operation, which accounts for both its strengths and weaknesses. Minor cases, especially if the fisherman seems honest, where the boat is clearly at fault, and no lawyer is involved, are usually settled on the basis of lost wages and medicals. The adversarial relationship takes over if a lawyer becomes involved, and only the minimum maintenance is typically offered. The serious cases with permanent partial or total disability often produce high awards, but these are generally in the same range as awards made under state workmen's compensation laws. The problem lies in the medium range of cases in which there is temporary total disability. Fearful of impressively high jury awards, insurance companies have been settling these cases for increasingly high amounts. As word of these awards spreads along the docks, an epidemic of claims can occur, especially in areas where the fisheries are in serious trouble. It is this type of abuse which must be eliminated by any new system.

Recommendations made in the NCFVSI study included raising the minimum maintenance rate to $30 per day, with the difference between that rate and the fisherman's lost wages being paid by a disability income insurance policy available to fishermen demonstrating income greater than $11,000 per year. Further, since the average disability was found to be fourteen weeks in duration, the study recommended a bar to Jones Act claims for temporary injuries less than one year in duration. The combined impact of the increased maintenance and disability insurance would give the fisher-

man a no-fault remedy paying full income and medical expenses for up to a year. This would cover the vast majority of cases fairly, predictably, and without the need for an attorney to demonstrate fault. This approach would provide a 21% reduction in settlement costs when applied to the cases in the study sample, with less of that award money going to attorneys and more to the fisherman.

H.R. 4407, introduced by Congressman Jones, is closely modeled after the proposal discussed above. Maintenance would be raised to the greater of either $40 per day or 80% of the fisherman's annual income rate. The higher maintenance rate yields a net savings of 19% over the current system when modeled with the sample cases. The bill has several other provisions which would contribute to future stability in this area of law. Sec. 21(a) provides an annual review of the maintenance amount, eliminating the need to return to Congress to "fine-tune" the rate. Sec. 22(b) provides for a medical arbitration panel when there is a disagreement regarding a seaman's fitness to return to work, discouraging frivolous cases. Sec. 22(c) places a limit on non-pecuniary damages of the lesser of $350,000 or 3 times the amount of pecuniary damages, unless gross negligence or willful misconduct is proven on the part of the vessel owner. Sec. 22(d) gives federal court judges the ability to review attorney's fees, an increasingly common provision under federal laws and one which would certainly be appropriate in this area dominated by contingency fees and relatively large awards.

H.R. 4415, introduced by Congressman Studds, is a simple, straightforward, and dramatic change in existing law. It most closely resembles the result that would be achieved under a good workmen's compensation law. Maintenance is increased to $40 per day, but damages under either a Jones Act or unseaworthiness action are limited to lost wages and medical expenses, unless gross negligence or willful misconduct is shown. Substantial savings occur when non-pecuniary damages are eliminated, and a 31% reduction over the current system is projected while providing a generous level of recovery.

One potential problem with both H.R. 4415 and H.R. 4407 is the $40 maintenance rate. Our research disclosed many fisherman are still earning only $30 per day and the higher figure would create the potential for abuse. That issue was addressed in the most recent draft bill, the "Fishing Liability and Safety Act of 1986" which was prepared in response to the comments received at the April 17 hearing and released on May 8, 1986. This new bill represents the most likely direction liability reform will take.

This new proposal limits recovery to medical expenses (cure), and maintenance at the greater of 80% of lost wages of $11,000 per year ($30 per

day). It does not apply if the fisherman needs continuing medical care, cannot return to his previous employment, or has incurred the loss of an appendage, sight, hearing, or permanent disfigurement. In addition, total liability is limited to $500,000 for each incident unless it is proven that he loss arose out of the gross negligence or willful misconduct of the owner or employer. The statute of limitations would be reduced from the current 3 years to two years. Using our database, a 26% reduction in settlement costs is projected under this proposal.

III. Solutions

Safety Requirements Under Proposed Legislation

Survival and communications equipment prescribed in H.R. 4415, H.R. 4407, and in H.R. 4465 are intended to reduce the losses from potentially deadly mishaps at sea and include the following measures:

1. VHF radio communications equipment to provide basic communications capability between vessels and shore-based personnel who can assist fishermen involved in accidents or dealing with problems before they escalate into tragedies. Vessels operating beyond the range of these radios would also be required to carry more powerful Single Sideband radios to provide similar capability to these offshore vessels.

2. Emergency Position Indicating Radio Beacons (E.P.I.R.B.s), which broadcast a homing signal on radio frequencies monitored by aircraft, satellites, vessels at sea, and land based rescue personnel. The main effect of universal distribution of these devices among commercial fishing vessels would be to reduce the delay in initiating search and rescue efforts should a vessel encounter sudden difficulties and fail to send a distress signal over conventional radios. In addition, the directionality of the signal sharply reduces search time in the event of inadequate information provided by frightened seamen aboard sinking or burning vessels. E.P.I.R.B.s are independent of vessel power supplies and can save valuable time when rescue or assistance crews are trying to determine the whereabouts of a vessel in need of pumps or medical aid. Indeed, the time saved in locating a vessel in need of assistance will often eliminate the need to search for survivors in liferafts by turning a rescue effort into an escort mission.

3. Liferafts or lifeboats sufficient for all aboard. Surprisingly enough, despite the inability of many fishermen to swim, many vessels operate without any alternative means of survival in the event of a fire, capsize,

or sinking! By requiring functional liferafts, as well as annual maintenance checks, fishermen would be compelled to provide themselves with a fighting chance when disaster strikes.

4. Survival suits which provide protection from hypothermia by conserving body heat otherwise quickly drained away from persons immersed in ocean waters. Healthy humans can last only minutes in cold water; perhaps a few hours in tropical seas. Despite being available for over a decade, many vessels in cold water areas still sail without these critical and proven lifesavers; many others fail to stow them in accessible places or follow annual cleaning and maintenance schedules.[19]

5. The fifth component of the safety requirements is up to date visual distress signals including flares and smoke markers which serve to aid potential rescue vessels in pinpointing the location of disabled vessels or their survivors and require replacement every three years.

The nature of the equipment listed above reflects the need to provide an additional margin of safety to victims and potential victims of the perils of working at sea. They each add a critical increment of time so important in the unforgiving ocean environment. In providing this margin they add a cost to the operation of the vessel which cannot be ignored. At the same time, significant reductions in vessel losses, personal injuries and fatalities can be realized through the use of this gear.

The United States Coast Guard budget for Search and Rescue operations for fiscal year 1984 totaled $415 million dollars.[20] Twenty eight percent of the 242,077 total hours spent responding to distress calls involved search efforts to locate the vessel involved.[21] Commercial fishing vessels accounted for 9% of the 57,431 S.A.R. cases the Coast Guard responded to nationwide, for a total of 5,171 cases.[22] While these vessels often operate year round in less favorable weather conditions and farther offshore than most pleasure boats, and likely involve greater search and rescue effort, information needed to quantify these differences is lacking. It is clear, however, that average search efforts for fishing vessels in trouble offshore in bad weather require considerably more personnel, equipment, and logistical support than small runabouts with engine trouble in protected coastal bays. Another important consideration involves the exposure of Coast Guard personnel and equipment to injury or loss during fishing vessel search and rescue operations, often in rough seas, far offshore. Even if fishing vessel S.A.R. costs were as low as the average for all vessels, every one percent reduction in fishing vessel search and rescue costs represents an average of just under $400,000. Similarly, reductions in search costs alone would average over 100,000 for each percentage point. Clearly, the potential savings in S.A.E. costs com-

bined with the benefits enumerated above represent strong incentives for fishermen, insurers, and society at large to ensure that every vessel is equipped with the survival and communication gear outlined in the proposed legislation.

Additional provisions in both H.R. 4465 and 4407 would require vessel stability tests for all new vessels, as well as those making significant modifications to their hull or equipment configurations. This concept developed in response to Coast Guard figures showing 41% of 248 fishing vessel losses in 1983 alone were stability related.[29] Current costs for such tests remain high, however, and strong resistance has been expressed, leading researchers to seek less costly alternatives. Statutory requirements for vessel safety standards, inspections, and crew licensing proposed in H.R. 4407 are similarly aimed at problems identified through investigations of vessel losses.

Progress on Vessel Safety

Considerable discussion at the joint congressional hearing in April, 1986, focused on how the enforcement of any mandatory measures would be carried out, and who would pay for it. The fishing industry has traditionally been interested in addressing the safety issue only in so far as it will reduce costs rather than increase their burden. Insurance companies have been reluctant to develop the expertise needed to determine the adequacy of safety measures or provide rate incentives for safety efforts. They have also been reluctant to predict any reduction in premium costs in response to reduced losses or liability changes. The United States Coast Guard is already under serve financial limitations in performing its current charges, and is hoping to avoid further fragmentation of its capabilities that the enforcement of fishing vessel safety and inspection requirements would cause.

In spite of these traditional barriers, the problem has proven important enough that substantial progress on the issue of vessel safety can be seen across the country as groups of fishermen explore alternative insurance strategies. Upon considering self-insurance programs, recognition of the safety issue and its significance seems to be having an impact, and many of the recommendations for reducing risks discussed above are being implemented in progressive fishing centers nationwide.

Since the summer of 1984, a Coast Guard Task Force on fishing vessel safety has been working with the fishing industry to develop a voluntary safety initiative program addressing both vessel standards and crew training. To date, five Navigation and Vessel Inspection Circulars have been published and a crew awareness program and training manual are being produced in

cooperation with the North Pacific Vessel Owners Association, and the National Sea Grant Marine Advisory Service.[24] In the Northwest in just over six months, nearly 300 fishermen have attended classes in firefighting, medical emergencies at sea, and safety and survival, with a navigation and stability class just now underway. An intensive program of surveying individual vessels to analyze operational and design safety problems came on line in early June.[25]

On the East Coast, the Virginia Institute of Marine Science has been working with fishermen to develop crew training programs with a focus similar to those in the Northwest.[26] In addition, a video has been produced showing all aspects of offshore scalloping operations from handling the dredge to shucking house procedures. It is so effective that at least one fleet operator requires new crewman to familiarize themselves using the film prior to even stepping aboard a vessel. This employer has been very active in developing the program after finding that their own records showed up to 70% of all accidents were winch and gear related, with slip and fall responsible for another 20%. He then surveyed each vessel with its captain describing every procedure during a typical trip, learning about problem areas on specific vessels as well as systematic flaws in the entire fleet. This was followed by an investment of over $75,000 in improvements from non-skid to retrofitting handrails throughout the fleet. This kind of commitment has already had impacts in terms of crew awareness and a real appreciation on the part of the crews for the concern of their employer.[27]

In Alaska too, fishermen and vessel owners are developing similar programs in cooperation with the Sea Grant program. The members of the Southeast Fisheries Association have contracted with a marine surveyor to set up a program addressing vessel safety, construction and design aspects as well as providing crew training.[28] In the interest of safety and product quality, the New York and New Jersey Port Authority's Fishport has decided on the exclusive use of fifty pound capacity boxes for both boxed at sea and repackaged product,[29] a measure which will likely prevent a considerable number of back injuries.

While it was not possible to accurately assess the costs of systematic implementation of the recommended safety measures, it is clear that even small reductions in injury rates represent major savings in so dangerous a business. Many problems can be avoided by improvements in the operational safety of vessels involving minimal costs, and considerable opportunity exists for the development of new products which reduce injury potentials. What is needed are incentives which encourage or force the fisherman to make safety a high priority. As vessel owners struggle to find insurance coverage, a general trend towards periodic inspections required by the vessel's insurer

seems likely to become standard practice, with the additional costs of inspecting safety gear becoming a normal operating expense. The crew training classes described above cost participants less than $100 each with some underwriters requiring vessels to use crews which have gone through the program, and another providing discount coupons to encourage participation.[10]

A major concern expressed at the April 17 congressional hearing was that the expense of establishing and enforcing mandatory safety and training programs would be too much for the fishing industry to afford. Further, it was argued, the creation or expansion of another bureaucratic nightmare of regulations was not needed or appropriate. Despite the poor record of both the fishing and insurance industries in establishing or enforcing voluntary safety standards over the past decade or more, officials of the fishing industry and the Coast Guard argued that there was neither capacity nor need for Coast Guard enforcement of mandatory regulations. Based on the nature of the fishing industry, Admiral James S. Gracey, Commandant of the U.S. Coast Guard is convinced that a cooperative, flexible, voluntary program will provide a cost effective solution to the safety problem with more rapid results at lower costs to the government than the manpower-intensive enforcement efforts needed with traditional regulatory approaches.[11] Thus far, the outlook has been encouraging.

Changes within the fishing industry have altered the way new crewmen become fishermen and eventually captains, and the need for structured training is painfully evident as one reads the grim details of accidents due to the victims' or their fellow crewmembers' inexperience. The fact that no training is currently required for fishermen suggests a great deal of potential for improving the safety of American fisheries. A system of structured, mandatory crew training programs run by private businesses, fishermens' cooperatives, or public education facilities may provide the best mechanism for improving safety, regardless of whether implemented and enforced by the government, fishermen, or the insurance industry. While several fishermens' organizations have been developing safety programs with the help of Sea Grant Colleges and the Coast Guard, universal implementation will still require financial incentives on the part of the insurance industry, the Internal Revenue Service, or fisheries management agencies.

The efforts of the U.S. Coast Guard Fishing Vessel Task Force to establish vessel construction and design standards incorporating safety principles in the design and operation of conventional gear is equally important, since a large part of the problem is due to the over-capacity of the U.S. fleet in the first place. The fact that minimal effort has gone into safety considerations as the U.S. fleet's harvesting capacity has expanded beyond the resources available

suggests that a shift from catch efficiency to reduction of costs as a primary focus would be appropriate. Efforts to develop less dangerous fishing techniques can play a major role in reducing such costs, with benefits well beyond the lives and limbs saved. Adding modified versions of the protective clothing so effective in land based heavy industry to the wardrobe of the commercial fisherman will go far to reduce losses. Additionally, fisheries management in this country desperately needs to directly address the issue of over-capacity in ways which do not intensify the safety risks which are basic to this industry.

While it is inevitable that some vessels will be lost despite all efforts, the potential margin of time provided by functioning communication gear and E.P.I.R.B.s will doubtless result in considerable fewer losses. Many current losses could be avoided simply by reducing the time involved in locating and reaching troubled vessels before problems become overwhelming. The ocean environment is so unforgiving that minutes without necessary protection in the form of liferafts or exposure suits can be deadly. In cases such as one occurring this past month off Block Island, R.I., time margins can be so short that communication issues become secondary to basic survival and the lack of adequate equipment can prove fatal. In this particular case, a lobster boat sprung a plank less than two miles offshore and quickly sank, leaving its two crewmen clinging to lifejackets in forty degree waters. Coast Guard rescue boats responding to radio calls were on the scene in less than ten minutes, yet without exposure suits or a life raft, one crewmember died of hypothermia, while the other remained hospitalized in serious condition.»

Clearly there is a need to improve the safety record of the U.S. fishing fleet. The prime beneficiaries of the proposed regulations will be the more than one hundred fishermen who will otherwise die this year thinking it will only happen to "the other guy," and the Search and Rescue crews who risk their lives pulling bodies out of the sea. Operational safety gains will greatly reduce lesser injuries. It appears likely that any legislative changes will contain limitation of liability provisions and the increased predictability the insurance industry has called for. A clear opportunity exists for beneficial cooperation between all the affected groups to turn the situation around without major government involvement or expense.

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A State Supported Mutual Insurance Company for the New Jersey Commercial Fishing Fleet

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Abstract

The author has headed a study group, financed by an NMFS S-K Grant, which has researched the viability of forming a mutual insurance company to insure the New Jersey commercial fishing fleet. In order to prevent the collapse of the fishing industry, caused by high insurance premiums, the State of New Jersey would be asked to participate, lending the Mutual funds, as necessary, to insure adequate loss reserves.

Introduction

The commercial fishing industry in the United States, along with many other industries, is facing a crisis occasioned by an increase in insurance premiums unprecedented in recent memory. The causes of these increases have been debated and "blame", if that word is proper in this context, has been variously assigned to improper underwriting, inadequate attention to loss control, run-away jury verdicts, etc. The purpose of this project is not to rehash or resolve these debates, but rather to consider one specific alternative to the present commercial insurance market for the underwriting of commercial fishing vessel insurance risks.

Most commercial fishing vessel insurance in the United States is written by domestic insurance companies. Over the past few years this market has contracted with several companies leaving the market altogether. Some of the coverage of the fleet has been placed, in the past, with underwriters in the British market. That market is also unenthusiastic about our fishing fleet at this time. There are also several mutual insurance associations covering selected groups of vessels in several areas of the country. Entry into those mutuals, however, is extremely selective and limited. The focus of this study

is the evaluation of whether a mutual can be formed to insure the New Jersey commercial fishing fleet at a savings in premium over the cost of comparable insurance available in the market.

The commercial fishing industry is important to New Jersey, adding over one half billion dollars to the state's economy annually. It is estimated by the New Jersey Fisheries Development Commission that over 10,000 jobs are created directly, indirectly, and induced, by the commercial fishery alone. The total is created if the charter/party boat segment of the commercial industry is included.

Insurance is critical to the fishing industry. A vessel subject to a mortgage is rarely permitted to sail without insurance. In fact, failure to keep the vessel insured is invariably an incident of default under most forms of vessel mortgage. There is good reason for this. Not only does the mortgagee risk losing its collateral in the event of a loss of the vessel, but a collision giving rise to a claim by another vessel, or an injury to a crewman giving rise to a personal injury claim, creates a maritime lien which, under admiralty law, is superior in priority to the mortgage.

When a fishing vessel is laid up for lack of insurance, neither the owner, nor the crew, is able to earn a living. Frequently, as is common with small businesses, the family home is pledged as secondary collateral to secure the loan. If the sale of the boat at foreclosure fails to satisfy the outstanding balance on the loan, the home is at risk as well. This point is of particular importance in the present crisis. Many fishermen have their life savings, and their family's welfare, invested in their boats. Over the years preceding the present crisis, a well-maintained vessel could be expected to hold its value in the marketplace as inflation offset depreciation. Many young fishermen started in business with the purchase of a well-used, but still serviceable vessel following an apprenticeship aboard another captain's boat. However, the present high cost or unavailability of insurance is making mortgage loans difficult, if not impossible, for many young fishermen to obtain, despite falling interest rates. The result is that the market for fishing vessels is contracting at the very time when many vessels are appearing on the market through forced sales and foreclosures. Vessel values are steadily eroding. If the plight of the aspiring fisherman or the owner who can not obtain insurance to continue to fish is unfortunate, so then is the situation of the older fisherman who had hoped to retire on the proceeds of the sale of his vessel, but now finds the market depressed to the point that he is unable to sell the vessel for enough money to satisfy the mortgage, let alone secure his retirement.

This then is the context in which we began our project. Our purpose has been to explore the possibility of creating a mutual insurance association for the commercial fishing industry in New Jersey.

We believe that the New Jersey fleet has a better overall loss record than the commercial fleet nationally. We cannot confirm this because our survey has been limited to the New Jersey fleet only. One would have to survey the fleet on a national basis to make any informed statement on this point. However, losses reported in our survey were less than for the Third Coast Guard District generally.

We believe that an industry mutual that is run by its members, with an awareness of the need to control claims if the mutual is to prosper, can be more effective than the insurance industry has been in the past in controlling losses through peer pressure and the establishment of a tradition of improved safety.

The mutual concept, we believe, in which the capital and reserves belong to the members, offers the best prospect for controlling premium costs in the future, assuming of course, that the mutual itself survives its early years while capital and reserves are accumulated.

In order to establish a mutual, however, we will need the financial support of the State of New Jersey, to provide a source for loans to cover any losses in excess of the capital reserves of the mutual, since the excessive premium calls necessary to make up for such losses over a short timeframe would present a severe financial hardship on the members and could destroy the mutual.

In proceeding with this project, we have surveyed the New Jersey commercial fishing fleet, including party and charter boats, which do not sell their catch, but are involved in making their living from the sea. That data has been submitted to actuaries who have analyzed it and projected the capital requirements and premium rates for the mutual. We have researched the tax treatment of the mutual.

We have drafted the By-Laws for the mutual and have outlined amendments to existing the statutes, under which the mutual would be formed which will better accommodate its formation. We have also drafted the form of policy.

Finally, we have reviewed the recent substantial effort by the U.S. Coast Guard in drafting a proposed set of nonmandatory regulations which, if adopted and followed by underwriters or the industry itself, should result in a substantial increase in safety.

Fishing vessel safety and risk containment and control have been exhaustively investigated and discussed for some time, particularly during the past four or five years. Among other safety and casualty reduction measures, studies have pointed out the need for better hull design and construction, more professionally qualified crews, and better onboard safety equipment and training in its use. Most recently, with an increase in Hull and P and I losses, and associated large increases in premiums, attention is being directed to applying practical solutions to reducing them. The U.S. Coast Guard Navigation and Inspection Circulars 5-85 through 9-85 are an important example of this. On the West and Gulf coasts, training manuals and safety training programs for fishermen are being prepared. John Sabella Associates, working with Captain Gordon G. Piche, U.S.C.G., Manager, Fishing Vessel Safety Task Force, and his staff, have prepared the North Pacific Fishing Vessel Owners Association Safety Manual which addresses many of the practical aspects of safe vessel operation which the Navigation and Inspection Circulars, being technical in nature, do not cover. Together, the Circulars and the Manual represent the most ambitious attempt, to date, to compile, in written form, the advice of master fishermen and experts in vessel design and construction on the "dos and don'ts" of safe vessel operation.

The problem of the high cost of insurance has also attracted the attention of Congress. Both the Senate and the House Committees responsible for oversight of the fishing industry have held hearings on the matter. Several bills have been introduced in the House and referred to the Merchant Marine and Fisheries Committee for consideration. Two of these bills, H.R. 4415, introduced by Congressman Studds, or Massachusetts, and H.R. 4407, introduced by Congressman Jones, of North Carolina, address both the insurance and safety issues by proposing a trade-off reducing the recovery available to an injured fisherman for non-pecuniary damages in return for a substantial increase in safety requirements for vessels and an increase in the "maintenance and cure" payment to injured fishermen required by maritime law.

The study group has participated in many of these events and reviewed and evaluated relevant material. The N.J. fishermen's survey has provided information for an insurance profile of the fleet by port and fishery. In addition, findings and conclusions of recent research have been discussed directly with vessel owners, captains, crew members, brokers, agents, and surveyors in the State. The experience of industry groups in other parts of the country, surveyors, and naval architects and marine engineers has also been evaluated through literature review and personal contact.

These initiatives provide background for a loss control and containment program specifically formulated for the N.J. commercial fishing fleet. It is recommended as an important element in the formation of a mutual insurance

association. Together with the 'mutuality of interest' cited by an official of a well established insurance club in the industry as the most critical factor influencing the long-term success of an insurance association, this program should make it possible to overcome many N.J. Hull and P and I insurance problems. While we have focused on the creation of a "New Jersey" program, this effort, like the rest of this study should provide a readily adaptable model for similar programs in other geographic areas, modified, of course, to fit the specific needs of the locations.

Survey response demonstrates the importance of future mutual efforts to contain and control risk. Many N.J. vessels in all categories are fitted out to a high standard with respect to seaworthiness design, construction and safe operation while others appear grossly deficient. This is a result of the unregulated nature of this aspect of the fishery. Personal opinion and individual motivation substitute for objective standards in the risk management and safety field. As many fishermen interviewed stated, the person who runs the vessel often represents the true risk, as that individual is responsible for its operating condition, provided the vessel itself is a seaworthy design and well built.

Only 53% of the vessels responding to the survey had a life raft, most (76.5%) on seaclammer/quahoggers, while as expected, only 23% of the inshore craft carried one. Survivor packs were in 77% of the liferafts on longliners, which is understandable in this offshore fishery. A large percentage (82%) of the combination scallopers, which are also long-ranging, and which carried liferafts also had survival packs. The average for survival packs on all vessels was 51% of those carrying hydrostatic liferafts.

However, liferaft releases, a critical item, were only fitted on 28% of vessels answering, the larger otter trawlers, scallopers, and seaclam/quahoggers having the highest average, ranging from 32-42%. Only 23% of the longliners had release fittings, perhaps because liferafts on these vessels are more accessible. Inshore and oyster boats are both lacking in any of the gear discussed above. Clearly, a great deal must be done in this vital area for all classes of vessels.

Survival suits appear more acceptable as 74% of vessels responding had them, 47% having strobe light attachments. Most were on long-liners (93%) and scallopers (94%). No oyster boats, and only 27% of the inshore boats had them on board.

Merely 30% of vessels surveyed had an automatic EPIRB (emergency position indicating radio beacon) in the liferaft while 45% had a manual one located in the pilothouse. All of the longliners had a manual EPIRB, while

inshore boats show 14% for automatic in the liferaft, and 23% for manual in the pilothouse.

Emergency radio power fitted, ranged from 22% for longliners to 59% for seaclam/quahog vessels, the average being 33%. Interestingly, 57% of oyster boats were fitted with emergency radio transmitters. Channel 16 (the emergency frequency) was constantly monitored by 61%, of whom 72% stated the channel was crystal controlled. These percentages were fairly consistent through all vessel classes.

Several observations can be made concerning basic lifesaving equipment. There appears to be a general acceptance of the need, but inconsistency in having all or any particular combination of this equipment throughout any vessel class. The reasons for this can be attributed in many cases to port or fishery tradition based on perception; while in other instances usefulness may be considered in relation to additional cost. A high number of oyster boats are without any safety devices, depending entirely on emergency radio power to summon assistance when needed. Although described as 'inshore', many lobster potters, which range quite far offshore in the spring and fall, are without appropriate safety gear perhaps lulled into a feeling of security by their perception of themselves as "inshore" fishermen.

The opportunities for a mutual to initiate a mandatory safety equipment program at its inception are apparent.

Most vessels seem appropriately fitted with navigation equipment for their fishery — 100% with depth finders, 91% with radar and 97% with loran. Autopilots are notable with 67% of vessel respondents having them, but with a consequent hazard of too great a reliance on them resulting in poor watch keeping practices. An auto-pilot makes a very poor lookout.

With respect to alarm systems, bilge water detection devices were fitted in 73% of the total of all classes. However, this percentage varied from class to class: inshore, 71%; longliner, 92%; otter trawlers, 51% (very low for offshore work); oyster, 71% (probably because of wooden vessel age); sea clam/quahogger 90% (vital considering frequent overloading and lack of free board); and scallopers, 88%. Smoke detection, auxiliary alarms, water intake fitting alarms, and radar watch equipment is fitted on very few boats, although 38% had auxiliary engine alarms. A high percentage (84%) of the longliners were fitted with radar alarms (necessary in their offshore fishery and frequency of shipping lane and other traffic during their longer distance trips).

Substantial improvement could be accomplished by a mutual in the alarm system area, too. One instance stands out. Although bilge alarms are fitted on many vessels, it is not clear how the bilges run, whether each compartment is truly watertight, and if so, whether it has an individual bilge alarm. Unexpected flooding, beyond a point where it can be controlled, is a major cause of vessel sinkings.[1] Fire detection systems are also lacking, with fire another major cause of vessel sinkings.

Only 30% of all classes of vessel have ever had a stability test (including test) performed. This is remarkable considering the nature of fishing vessel design and the periodic addition of top hamper on many. The recourse to outrigger-paravane gear to improve sea kindliness demonstrates how this fundamental vessel characteristic is accommodated. The 30% figure runs consistently through the fleet with the exception of seaclam/ocean quahoggers, 55% of which have had stability checks. Obviously, underwriters have demanded this, considering the nature of the vessels and the business. Ensuring that vessels are properly designed and are periodically checked for stability should be a major long-term concern of a mutual insurance company.

An additional basic seaworthiness factor is freeboard, the distance from the vessels waterline to her uppermost watertight (main) deck, which is an important element in overall vessel stability. Fishing vessels, because of working gear requirements, are traditionally lowsided which means that hatches, deck openings and door seals must be watertight. Freeing ports must be in first class condition and constantly checked. This is not always so. Average freeboard characteristics by class in feet, light ("lt.") and loaded ("ld.") are: inshore, lt. 1.5', ld. 1.1'; longliners lt. 6.2', ld. 5.7' (an exception due to lighter gear handled); otter trawlers, lt. 3', ld. 2.2'; otter trawler/potter/seiners, lt. 3.4', ld. 2.4'; oyster lt. 2.2', ld. 1.3'; sea clam/quahogger, lt. 1.3', ld. 0.8' (remarkable with open holds!); scalloper/otter trawlers, lt. 2.1', ld. 1.4'.

Here is strong evidence that a long-term objective of the mutual must be to encourage an optimal mix of vessel seaworthiness and integrity commensurate with the vessel's fishing capabilities and opportunities. Frequently, the hazards of the fishing industry are unwittingly increased by otherwise well-meant action. For example, the current federal management plan for surf

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[1] A total of 889 fishing vessels were lost between 1970-1982 as a result of flooding, foundering, or capsizing. An additional 472 vessels were lost, during the same period, as a result of fire/explosion.]

clams allows clammers to fish in the federal management zone for 6 hours every other week. The captain must reserve his date well in advance and is allowed to designate only one alternate date. As a result, if the first date is passed due to bad weather, the boat must sail on the second or forgo its only opportunity to fish for a month. The second date may well prove to offer even worse weather. An important element of Congressman Jones' bill (H.R. 4407), therefore, are the provisions of Title III which will require the federal management councils to take safety into consideration in adopting their plans.

Responses concerning watertight bulkheads show such a variation in positioning and type (although most had a forward collision bulkhead) it is not possible to draw specific conclusions. This phenomenon is another indication of how individual, ad hoc standards influence critical risk containment specifications.

As is standard practice, 90% of all respondents had a pilot house monitored engine alarm system usually keyed to oil pressure.

Lifesaving and monitoring equipment is inspected at least annually on 95% of the vessels. The breakdown is: each 3 months, 31%; twice a year, 21%; and once a year, 43%. Very few vessels post instructions or practice drills for fire emergencies, abandon ship or USCG rescue technique procedures, most considering it not applicable.

Very few captains had licenses or formal training. Those who did appeared to have acquired them during previous seagoing careers. Specific training in many aspects of risk containment and control through a mutual sponsored educational program would appear essential. We do not suggest the our captains and crews are not competent. Rather, their training, which is by apprenticeship, is attuned to passing on the fine points of finding and catching fish, which is the operation in which the vessels spend all of their time. When one learns a trade by doing it, there is little opportunity to experience the trauma of disaster, especially if one's training is aboard a well-run vessel. Training and drills in disaster control, fire fighting, and other non-routine matters are required to round out the fisherman's training.

Most fishermen and owners interviewed individually and in groups during the course of fieldwork were enthusiastically supportive of the mutual insurance idea and were familiar with the theoretical basis of an association. Many had reservations about certain points, particularly their situation if the mutual ceased functioning after they joined, leaving them again subject to the vagaries of the conventional insurance market. The credibility of a mutual will depend heavily on the fishermen's perceptions regarding the likelihood of its long-term survival. This is important, as they consider the advantages

against the cost of possible additional equipment and vessel alterations as a condition of acceptance into the Mutual. Many held the view that much loss and risk exposure were the result of overloading, staying out too long in bad weather and inept vessel management by an irresponsible minority. "It's every man for himself in a crisis on a fishing vessel," was one such view. It was also held that there are different levels of operational competence and responsibility in different fisheries and ports. "It is the person who runs the vessel who makes for insurability," according to most. This reflects the well-known community and port background which underlie fishery skills and operations. If safe and responsible vessel operations in seaworthy, fully found vessels are a port tradition most captains in that port will adhere to them. Mutual management and organization must take this factor strongly into account.

An analysis of survey results comparing the basic safety equipment on board Pt. Pleasant otter trawlers with other New Jersey vessels of the same class illustrates this. In most cases Pt. Pleasant vessels exceeded other vessel norms. A higher percentage (86%) of Pt. Pleasant otter trawlers carried liferafts versus 65% for the other ports. Liferafts containing survival packs were found on 86% of Pt. Pleasant otter trawlers responding compared to 38% on similar vessels in other ports. In Pt. Pleasant, 57% of the trawlers had automatic liferaft releases, versus only 19% for the rest of the New Jersey otter trawler fleet. Survival suits, attached strobe lights, automatic liferaft EPIRB's and manual pilothouse EPIRB on Pt. Pleasant vessels were close to the norm being 79%, 57%, 36% and 50% respectively. Emergency power located high up in the vessel, constantly tuned channel 16, and crystal controlled channel 16 percentages on Pt. Pleasant otter trawlers compared to the rest were: 64% to 19%, 64% to 57% and 71% to 85%.

On the other hand, Belford otter trawlers as indicated by survey results appear to have opted for survival suits with strobe lights as their best persona safety insurance with 90% of Belford vessels having them. In other categories Belford vessels are significantly below the norm with the exception of their emergency radio equipment which is close to the norm percentage.

Captains frequently acknowledged their own responsibility for crew and work safety and resented unethical standards represented by 'dishonest' crew claims and a legal system which appeared to ignore this. Almost all interviewed believed fishermen or their representatives should participate in the management of a mutual, especially in establishing standards. The most important management role was said to be in the "acceptance of safe and rejection of unsound vessels". No one, however, wanted to judge similar vessels to his own in his home port.

Many recommended 'pooling' similar risks by port or fishery even to the extent of setting up individual premium accounts. The reason given for this was that it would not be fair for vessels with certain inherent minimal risk exposure to pay for high risk vessels. Interest was also expressed in fishermen gaining equity in established reserves. Reservations were frequently stated concerning the possibility of high mutual salaries and overhead which emphasizes the necessity of fishermen involvement in management and information being available to them on all aspects of the Mutual's management and operation. In general, although the idea was not usually referred to directly, the establishment of basic competency and skill requirements appears to be recognized by most fishermen. However, the subject of individual captain licensing by the USCG elicited broad reaction ranging from wary interest to strong objection, indicating this possibility would have to be approached over a period of time in order to develop a system minimizing 'bureaucratic' control of fishermen and the fleet. Competency testing and certification by a mutual, after instruction in certain disciplines such as fire fighting, is suggested as the best path through which to approach the issue.

Risk Containment and Control Organization

Research evidence indicates that one of the first actions undertaken by the N.J. Mutual must be the formulation and administration of a risk containment and control program. Safety regulations must be established, and adopted, to be used by appointed surveyors, as an objective measure of acceptability. All vessels applying for membership must initially adhere to certain basic safety standards as part of their vessel survey to qualify for insurance. Considering the complexities of a fleet with great variation in design, operations, and skill levels, it is recommended that standards above the basic be phased in over a longer term. The first objective should be to achieve maximum safety results with greatest impact at a reasonable cost helping in the shortest possible time. A program must be established to ensure that new entrants into the fishery are built and operated to the highest standards considered practical by the Mutual board and their advisors. More comprehensive equipment and operating standards, and crew training levels might also then be set by the Mutual applying to different vessel types in each main port as a result of experience and reasonable cost/benefit criteria.

It is suggested, however, that particular attention be paid to catastrophic injury and loss of life situations regardless of criteria applied to insurance premium reduction efforts alone. The installation of better deck machinery protective equipment, above and below deck fishing systems, and training in vessel emergency procedures should be undertaken based on their lifesaving

merits alone. The costs of prevention are far less than those associated with post-casualty rescue, and compensation for human pain and suffering.[2]

Among the first actions taken by the N.J. Mutual must be the appointment of surveyors and the establishment of detailed and precise survey standards and procedures. Ideally, the qualifications for a surveyor should include expert knowledge of all aspects of deck machinery and layout, fishing equipment and operations, and the skills and experience required of individual vessel captains. Guidance in these matters can come from many sources within the Mutual, either from the board of directors, or from advisory committees of individual ports or fisheries with knowledge and experience in their particular areas. Provided with such guidance the experienced surveyor can make a real contribution to increasing the safety of the fleet.

It is recommended that surveyors occupy a key position in the Mutual organization. Surveyors should be employed by the Mutual and be responsible only to it. They must be given authority by the Board to represent the Mutual in the field, recommending acceptance or rejection of vessels or changes in vessels and operations to qualify for insurance coverage to the Board. The full backing of the Board is essential in this important matter. Surveyors should also be responsible for keeping track of vessels in their areas with regular surveillance and periodic inspections at times set by the Board to insure high levels of individual vessel maintenance, an important element of long-term safety.

Elevating standards above current practice should quickly be undertaken by Mutual surveyors. Overall vessel integrity, including such items as watertight doors, deadlights, fish holds, lazzaret seals, bilge drains, freeing port capacities, positioning of deck machinery, and equipment and many similar vessel features should be evaluated. Engine room conditions, overall deck layouts for safe working conditions, access, ladders, galley arrangements and equipment, sanitary devices, standing rigging, boom and tackle capacities, boom topping lifts, and rope and line conditions should also be considered by Mutual surveyors as determined by an active, interested Board. Location of safety equipment, engine and smoke alarms, and familiarity with their use might also be frequently tested (beyond periodic survey). Particular attention should be paid to the inspection of life raft hydrostatic release devices.

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[2] The National Transportation Safety Board estimated the search costs of $10 million in the loss of the vessel 'Amazing Grace' November 14, 1984 off the Delaware coast would cover the expense of fitting all 33,000 U.S. documented fishing vessels with EPIRB's.

An energetic approach along these lines (with a written deficiency report for the captain having a time limit for correction) will ensure standards may be quickly learned and adhered to. A mutual must reinforce the concept of 'mutuality of interest' to encourage deficiency remedy.

A training program should be implemented, perhaps in cooperation with the New Jersey Marine Science Consortium, the Sea Grant program, and the community colleges in the coastal counties. The first steps of such a training program should focus on the following subjects: (1) the use and deployment of basic, standard safety equipment; (2) on-board emergency procedures; (3) USCG, S.A.R. assistance techniques and shipboard procedures; (4) fire-fighting; (5) damage control; and (6) basic first-aid emergency practice. Eventually, certification in courses such as these might be established as a mandatory qualification for Mutual membership. Fishermen's handbooks on these topics, adapting existing reference materials for N.J. conditions, should be produced and distributed.

Once the management and organization of a program for surveying and inspecting vessels is in place, an attempt might be made, as part of the on-going risk containment and control program, to introduce a merit rating system wherein vessels exceeding the current standards earn premium reductions as an additional incentive reward for improving their own safety and thus reducing the mutual risk. Further, reduced premiums for better seaworthiness, safety standards, and operations might be earned by ports or fisheries reflecting loss experience for those ports or fisheries reflecting variations in potential risk exposure. Such a program might be expected to generate maximum peer pressure to conform to recognized standards of safety and to improve upon them. These decisions can be made by the Mutual Board in consultation with their surveyors, advisors, and the memberships.

At the inception of the Mutual and as a condition of acceptance for insurance, the following safety devices should be on every vessel eligible: survival suit for every crew member *stored in one particular place*, each suit with strobe light attachment; a USCG approved liferaft with survival pack and working hydrostatic relief positioned on deckhouse top or at high point with sufficient capacity for all aboard; an automatic class A, EPIRB in the liferaft, a manual EPIRB in the pilothouse (both tested once per month); an emergency power source located as high as possible in the vessel, usually the pilothouse, for an emergency crystal controlled VHF tuned to Channel 16.

Concurrent with the Phase I program, the Mutual should produce descriptive literature for familiarization and training in the need for and deployment of all required safety equipment.

Another immediate Phase I step recommended is the institution of a safety training program, the topics of which have been referred to previously. For example, the North Pacific Vessel Owners Association plans to offer a two year safety orientation program of 45 hours for $300 shared by vessel and individual fishermen. It is suggested that these two steps be accomplished (together with the previously mentioned more rigorous survey) within six months of the Mutual's inception.

While these activities are in progress, the Board should consider and formulate more basic and comprehensive design, construction and operating standards, working with naval architects having experience in designing fishing vessels, and the USCG. Once decisions are made concerning the most immediately effective options available at reasonable cost, a second set of mandatory eligibility standards should be established.

Among those areas suggested as most important at this stage are load limits and stability test required for all clam and ocean quahog vessels; a stability test to be performed as part of any major vessel alteration such as addition of heavy overhead net reels and gantrys; the installation of comprehensive compartmental bilge and water intake detection alarm systems; engine and auxiliary detection alarm systems; and smoke detection alarm systems. Each system must be controlled and monitored from the pilot house. In addition, shutoff diagrams for all hull fittings with operating procedures should be posted. A list of minimal safety spares to be carried such as hose clamps, replacement hoses, electrical tapes, anchor warps, pilot house window coverings, wooden plugs for every hull fitting, and repair kits for all essential machinery, and equipment should be produced and distributed. Battery installations, pumps, and deck lighting, security and efficiency, electrical systems condition and maintenance, ventilators, and gas cylinder installations should receive closer attention by surveyors during Phase II. An approach to accomplishing these measures should be started by the first year of Mutual operation.

Obviously some of these changes would be expensive for certain vessels. Others changes might be inappropriate to certain classes while many should be absolutely mandatory in certain classes, i.e., stability tests for clam and ocean quahog vessels. At this stage the discretion of the Board and its decision-making authority will be tested. Phase II requirements could well form the basis for reduced premium ratings through meeting or exceeding set standards as determined by the Board.

Phase III should take place over a period of years, as the outcome of the expert advisory work initiated in Phase I. The criteria for this effort can be found in USCG, Navic Circulars 5-85 through 9-85. At a predetermined

point, all new vessels applying for insurance would be required to be built to these design, engineering, and construction criteria. Stability, one compartment flooding damage standards, through hull fitting specifications, freeboard and load limits, on deck free surface criteria, ballast placement, and fishing gear heeling moment testing are examples of this. In fact, the Mutual will be acquiring the characteristics of a traditional classification society such as Lloyds, ABS, or Bureau Veritas in the fishing vessel sector. Some of these responsibilities could be assumed in co-operation with other Mutual associations.

Longer term, the Mutual or the New Jersey Commercial Fisherman's Association, Inc., (C.F.A.) might well become involved in risk control research and development activities co-operating, again, with other groups and associations in the insurance field. Non-flammable hydraulic fluids and fish hold insulation materials could be investigated. Educational responsibilities are coincident with training. Safety publications produced and distributed, in co-operation with New Jersey's Marine Consortium, state institutions or the Mid-Atlantic Development Foundation might be considered.

All of these suggestions will cost money. The Board's responsibility will be to ensure that investment in these measures will pay dividends in decreased loss of life and personal injury with a concurrent reduction in overall insurance costs to fishing vessels and fishermen. The proposed New Jersey Commercial Fishing Industry Loan Fund, offering financing at favorable rates to commercial vessels investing in risk containment and control can assist in reducing certain costs. The Mutual or the C.F.A. should work to ensure that all fisheries, and various State assistance programs, contribute to this effort.

The key to a successful long-term risk program will be the Mutual Board's management ability, power to make decisions, and create change on vessels, while maintaining credibility and support among vessel owners, captains, and fishermen in dealing with contentious fisheries issues.

APPENDIX

New Jersey Commercial Fishermen's Mutual Insurance Study 1987 Loss Forecast

Johnson & Higgins
May, 1986

Introduction

Johnson & Higgins has been engaged by Clark, Ladner, Fortenbaugh, & Young to project expected losses and estimate needed rates to cover the Hull and P&I exposures faced by New Jersey commercial fishermen. This report presents our methodology and findings.

Our results are based on a survey sent to the commercial fishermen of New Jersey, and have been used without independent audit. In some cases premium data was used to supplement the loss experience reported. This was particularly true in the development of the indicated Hull rates, where there were no total losses reported in our survey. In addition, United States Coast Guard tapes of reported hull and personal casualty losses have also been used to support our conclusions.

Summary

Exhibit 1 presents projected direct premiums and average rates for both the Hull and P&I coverages. Projected 1987 Hull premium for the proposed mutual is $1,535,000, based on 100 insured vessels. This figure was derived as follows:

> Based on survey results, the average 1985 Hull policy limit was $279,000. After inflation, this represents about $307,000 at 1987 cost levels. We have proposed that an average rate of $50 per $1000 of Hull limit apply. The average Hull premium is 50 times 307 or $15,350 per vessel.

Projected 1987 P&I premium is $772,400, based on an average rate per employee of $1,931, and four employees per vessel. The average P&I premium per vessel is $7,724. Total estimated direct premium in the mutual is $2,307,400, and average premium per vessel is $23,074.

New Jersey law requires that no single risk comprise more than ten percent of total capital and surplus. If we assume that the mutual begins with $1,000,000 in contributed surplus (each vessel contributing $10,000) then the maximum possible limit is $100,000. While we have applied this limit separately to Hull and P&I, it is possible that the New Jersey Insurance Department will interpret the law strictly and require that the combined retention be no more than $100,000.

Reinsurance to bring the mutual's net retention to $100,000 per risk will be costly. In exhibit 2 we have estimated these costs based entirely on reported losses, i.e. without consideration of the hard insurance market. It is likely that actual reinsurance costs will exceed our indicated costs, or that reinsurance may be unavailable at a $100,000 attachment.

Projected ceded premium for Hull is $1,035,000 for a proportional contract; for P&I we estimate approximately $200,000 in ceded reinsurance costs (excess of loss). Total net premium retained by the mutual is estimated to be $1,064,800, and total estimated ceded premium is $1,242,600. We expect almost 2/3 of the Hull premium and losses will be ceded, and about 1/3 of the P&I will be reinsured. Net premium retained in the mutual will be $1,064,800, resulting in a 1:1 premium to surplus ratio.

Hull Rates

Exhibit 3 contains indicated Hull rates for the period effective January 1, 1987. The rates shown are for a minimal $500 deductible, proposed credits for other deductibles are shown in exhibit 4. An analysis of deductible versus policy limit shows that most commercial fishermen purchase a deductible of approximately three percent of policy limit, and nine out of ten purchase a deductible of between one and ten percent of limit. We have only shown credits for deductibles within this range, and believe that the minimum deductible offered should be one percent of limit.

Exhibit 5 shows how the selected 1987 average rate was derived. The top part of the exhibit shows how the average claim size was estimated. Exhibit 8 contains the raw claim data used in our report. No total losses were reported in the returned questionnaires. Based on United States Coast Guard data for vessels of all types, third district only, approximately six percent of all claims should be total losses (average size $307,247) 43 percent should be losses in which seaworthiness has been affected (average size $61,676), and 49 percent losses of a minor nature (average size $18,428). The averages shown are based on Coast Guard data for fishing vessels only. For total

losses the average size is the anticipated average 1987 policy limit. Weighing these figures together, we anticipate an average hull claim to cost about $54,000 in 1987.

Projected frequency of loss was based on the returned questionnaires. Reported frequencies varied from 2.3 percent in 1982, to 11.8 percent in 1983. We expect a frequency of about eleven percent in 1987. Total expected losses per vessel are the product of the frequency of loss (11 in 100) and the average size of loss (53,985) or $5,938. Dividing by the average policy limit total losses represent about $19.33 per thousand dollars of insurance purchased. Assuming that expenses other than losses (state premium taxes, claims defense, commission and brokerage, other) represent 35 percent of the premium dollar, the indicated premium is $19.33/.65 or $29.74, which is significantly less that the actual average 1985 rate indicated by the questionnaires ($37.85). Based on the reported increase in average premium from 1984 to 1985 (38.9 percent) we believe the average 1987 rate charged to commercial fishermen will be over $50 per $1,000. For this reason we propose an average rate of $50 per $1,000 of limit be charged by the mutual. This rate will be very competitive with those of other insurers writing Hull coverage, and should be adequate based on New Jersey commercial fishermen's reported loss experience.

The next step in our analysis was to develop deductible credits and to adjust our average rates for variations in policy limit. In the absence of full credible size of loss data, indicated deductible credits were computed by assuming that all losses are of one of three sizes, $18,428 - (minor), $61,676 - (major losses affecting seaworthiness), and for the full face amount of the policy. These losses were adjusted by the deductible to determine how much the policy would pay. The resulting credits were tempered by 25 percent, to account for possible antiselection, and the potential for claims to be inflated so that deductibles are recouped. The results are shown in exhibit 4. Based on our results, the average policy will receive a credit of about 8.3 percent for taking a higher deductible than $500.

Exhibit 6 shows how indicated rates by policy limit were derived. While most (94 percent) Hull losses will be partial losses, payment for this type of loss will be only partially correlated to policy limit. For example, if the same radio is stolen from a $500,000 boat or from a $100,000 boat, the policy will pay the same amount, irrespective of limit. For this reason, average rate will increase less rapidly than policy limit, i.e. it should not cost twice as much to insure a $600,000 vessel as a $300,000 vessel. The variation of rate versus policy limit is called the amount of insurance curve, and is a concept well understood by Homeowners actuaries and underwriters. In Homeowners insurance the amount of insurance curve is developed by relating losses to

exposure for houses in each of several different value ranges. With only a small number of losses reported each year in the survey results, we cannot take a loss based approach. Instead, we have relied upon the actual variation of historical premiums charged to policy limit. The calculations in exhibit 6 were done as follows:

> 1985 reported premiums by policy limit were first adjusted to a common deductible level, using the credits in exhibit 4. Several different curves were fit to the resulting premiums, with policy limit as the independent variable, and adjusted premium ($500 deductible) as the dependent variable. The best fit resulted when a log-log curve was used. The resulting equation is premium ($500 ded.) = 79.98 times policy limit to the .935 power, which has been used to develop the indicated rates in exhibit three.

Many other factors are important in the rating of property risks. Exhibit 7 relates 1985 Hull limit to fair market value. The exhibit shows that the average boat is 80 percent insured to value. While this amount is likely to cover the mortgage holder in the event of a total loss (in fact, 80 percent insurance to value is generally required by banks for Homeowners insurance), it is insufficient to protect the owner of the boat, and is reflective of the hard insurance market. We believe full insurance to value should be required of all applicants, or coinsurance penalties should apply.

Another potentially important rating factor is the year the vessel was built. Exhibit 9 shows the average reported 1985 Hull rate by year of construction. The data shows a very definite downward trend. We have not proposed any specific credits for newly constructed vessels, because of the possibility of overlap with amount of insurance credits, experience credits, and schedule rating credits. Age built should continue to be captured in the premium and loss database, and monitored over time as the experience of the mutual develops, for possible use as a rating variable in the future.

Many of the factors which influence losses cannot be estimated on the basis of industry loss data by itself. These factors are generally accounted for by the use of schedule and experience rating credits. Data provided on the Coast Guard database provides some guidance on the size of these factors.

Exhibit 10a shows total losses for fishing vessels only by cause of loss. Exhibit 10b shows the corresponding data for vessels of all types. Causes of loss have been categorized as environment related, vessel related, and either personnel or management related. The majority of all losses are caused by personnel or management related faults, 63 percent based on all data, and 43 percent based on fishing vessel data only. Approximately 25 to 40 percent of losses are vessel related, and from ten to 15 percent are environment related.

Using the lower figure for conservatism, since only 25 percent of all losses are vessel related, a maximum schedule credit of fifteen percent for superior construction or special safety equipment is indicated. Larger credits, possibly as much as 25 percent (total), might be applied for holders of marine operators licenses, and other certificates of competency. Experience rating credits or merit rating could also be applied, based on past claims experience. A merit rating plan similar to that used to surcharge automobile drivers might be appropriate, since the annual frequencies of loss are similar (roughly ten percent), and both coverages are transportation related with human error the primary cause of loss.

Exhibit 11 contains miscellaneous data on losses by environmental conditions. Approximately 15 percent of all losses occur in conditions of rain, drizzle, or fog. Approximately half of all losses occur during twilight or darkness.

Exhibits 12 through 65 contain some of the raw data used in our analysis. Exhibit 12 tracks average premium by year. From 1981 through 1984 the average premium was little changed, approximately $28 per $1,000 of limit. In 1985 premium rates increased by about 40 percent to $39 per $1,000; based on conversations with underwriters, we believe the average premium today to be at least $50 per $1,000. Exhibit 13 shows that the average deductible also increased from 1984 to 1985 by 26 percent. The average 1985 deductible and Hull limits reported on the returned surveys, and exhibit 15 contains the raw premium and amount of insurance data used in our analysis. Finally, exhibit 16 contains a listing of all third district casualty losses involving vessels reported to the United States Coast Guard.

P&I Rates

Exhibit 1 shows the proposed 1987 P&I rates per employee. The proposed base rate ($100,000 limit - $500 deductible) is $1,412. Exhibits 2 and 3 support our indicated rate. The rate for a $300,000 limit was based entirely on the P&I loss experience as reported in the surveys, no industry data was used. Rates for other limits were calculated using the latest approved I.S.O. increased limits table for general liability risks in the State of New Jersey, since the largest loss reported was $130,000.

Exhibit 2 shows how average frequency was calculated. The upper portion of the exhibit shows the number of reported cases and total number of employees as reported in the questionnaires. Claim counts were developed to ultimate using insurance industry data. Ultimate claim frequencies of from 3.02 to 4.56 claims per 100 employees result. We estimate there will be 3.81

claims per one hundred employees in 1987. Data for 1985 was not used in our selection because of the uncertainty in the final number of claims that will be reported for this year.

Exhibit 3 develops the average claim severity within several different deductible levels. Each reported case was trended to 1987 cost levels using a 13 percent per annum trend factor, limited by a variety of deductibles, and the resulting average claim sizes tabulated. Indicated deductible credits range from 1 percent for accepting a $1,000 deductible to 18 percent for a $10,000 deductible. The product of the expected frequency of 3.81 claims per hundred employees, and the average severity of $32,936 gives the total expected 1987 losses of $125,487 per one hundred employees. Adjusting this to reflect a 35 percent expense ratio gives an indicated rate of $1,931 per employee. This rate is approximately 30 percent above the actual average P&I rate charged in 1985.

Exhibit 4 contains the P&I limit and deductible data used in our report. The average limit purchased was $140,000. Data for 69 risks is shown. Of these, 12 risks purchased a $1,000,000 limit, and 9 purchased a $100,000 limit. Most fishermen purchase a $200,000 limit or $300,000 limit. The average deductible is $1,232. Only two risks purchased a deductible in 1985 over $2,500. The average deductible credit under our proposed rating plan is 2 percent of the $500 deductible rate. Exhibit 5 contains the raw P&I loss data for the 1981 to 1985 years. The reported number of claims varies from 88 in the 1981 year to 235 in the 1985 year. As mentioned earlier, it is possible that there are still many unreported claims for the 1985 year. For this reason, we have not considered this year in making our claim frequency selection.

Chapter 14
Habitat Degradation and Product Inspection

Natural Resource Damage Claims Under the Superfund Law: A Hidden Benefit for Restoration of Degraded Fisheries Habitat

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Abstract

The natural resource damage provisions of CERCLA are a little known tool which states and the federal government can use to assess damages to and restore resources damaged by oil and other hazardous substances. NOAA's trusteeship is principally within the coastal and marine environment and over fish and other biological resources. Therefore, we are particularly concerned with the impact of pollution on fishery resources and their habitat. Much of NOAA's trusteeship overlaps that of coastal states whose waters are the habitat for significant fishery resources. Accordingly, we expect to continue our practice of working closely with states on the preparation of any damage assessments and the resolution of any resource damage claims.

Thank you for inviting me to speak at your conference which addresses a myriad of issues confronting the fisheries industry today. I have been asked to discuss an issue which may not be well known to this audience: the application of the Superfund law to restore fisheries resources and their habitat which have been damaged by releases of hazardous substances, including NOAA's implementation of this law. I am pleased to address this topic. Let me say at the outset that the views I present are my personal opinions and do not necessarily represent the official views of NOAA or the Administration, although I do not believe anything I have to say is inconsistent with NOAA or Administration policy. Moreover, as I write this paper, the Congress is continuing work on a 5-year Superfund reauthorization bill and we are in the

inal stages of preparing for trial on our first natural resource damage case. Events in either arena could affect the substance of this paper and, as necessary, I will supplement it with verbal remarks at the Conference.

The conference organizers asked me to speak specifically about NOAA's claim for damages resulting from PCB contamination of New Bedford Harbor, Massachusetts. Before I discuss certain aspects of this case, which will be tried in the federal district court in Boston, Massachusetts, beginning September 8, 1986, let me describe the factual and legal setting within which this and other claims for damages to natural resources, including fishery resources, can be brought.

Effect of Pollution on Marine Resources

According to a recent article in Forbes Magazine,[1] cancerous fish have surfaced in epidemic proportions in at least ten fresh- and saltwater shorefronts and estuaries around the country. Up to a quarter of the English sole in 20 areas in Puget Sound are diseased. So, too, are nearly all the saugers, a type of perch that inhabits Torch Lake, Michigan. More than 90% of the two-year old Atlantic tomcods that swim in the Hudson River also have liver cancers. Likewise, in Ohio's Black River tumor-laden catfish are common. And two years ago a quarter of the winter flounder in part of Boston Harbor suffered from liver cancer.

Further, "[w]arns Thomas Cameron of the National Cancer Institute: The correlation between fish cancer and pollution is a red flag that there may be problems for people exposed to these waters by bathing, drinking, and eating the fish."

Congress shares these concerns. The House Fisheries & Wildlife Conservation & the Environment Subcommittee plans to convene hearings in June to raise public consciousness about fish and water pollution.

Some federal agencies, funded by new research grants, are starting to look for an answer to the dilemma. The Environmental Protection Agency has allocated $14 million this year to assess environmental risks in Buzzards Bay, Narragansett Bay, Long Island Sound, Puget Sound and Chesapeake Bay. Likewise, the National Oceanic & Atmospheric Administration (NOAA) has mounted its own effort: an investigation costing $5 million this year alone that will examine correlations between cancerous fish and contaminated sediments in 50 coastal areas.

Last year, again according to *Forbes*, the Washington State legislature created the Puget Sound Water Quality Authority, and the State's Department of Ecology has stepped up enforcement actions by 30% over 1984. Michigan has restricted sales of tainted carp and catfish, and New York State now forbids sale of PCB-tainted striped bass as well.

After issuing warnings against consumption 2 years earlier, in 1979, the Commonwealth of Massachusetts closed 3 areas or New Bedford Harbor to specified types of fishing due to PCB contamination. Since then the FDA has lowered its tolerance level for PCBs in fish and shellfish for human consumption from 5 to 2 ppm.

According to a recent *L.A. Times* article,[3] unexpectedly high levels of DDT began to show up over a year ago in the Los Angeles area. After it became known that bottom fish, including white croaker, had high levels of DDT, the State Department ot Health Services posted warnings, which are still in effect, against eating fish. The cause is believed to be DDT dumped from 1947 to the early 1960's from the Montrose Chemical Company in Torrance, California.

The public and health experts are concerned about the effects of pollutants in fish on consumers and the marketplace. What legal remedies are available to individuals or government officials? To date, it seems as if commercial fishermen don't have any direct legal recourse. Commercial fishermen, shell-fishermen and the Massachusetts Lobstermen's Association have already tried to recover from the same defendants NOAA is suing for damages to their fishing grounds and their claims were dismissed in both state and federal courts. The state court entered a judgment for Aerovox and Cornell-Dubilier in 1983 because the fishermen failed, on their negligence claim, to show physical damage directly caused by the defendants.[3] The fishermen then filed their claims in federal court, but lost at both the district and circuit court levels. The First Circuit Court of Appeals, upholding the District Court of Massachusetts, ruled that the fishermen's maritime tort claim for damages to fishing grounds was preempted by enactment of two federal statutes, the Clean Water Act and the Marine Protection, Research and Sanctuaries Act, and that therefore the fishermen could not recover based on a common law maritime damage claim.[4] The Court of Appeals relied on the *Seaclammers* case,[5] in which the Supreme Court dismissed shellfishermen's claims for economic losses caused by sewage disposal under the same statutes. Accordingly, at least in the First Circuit, individual fishermen do not have any direct recourse for economic losses caused by pollution of fishing grounds.

Superfund Law

The Superfund law provides one available remedy for damages to resources, including fishery resources, held in trust for the benefit of the public. Standing to sue resides in the federal and state governments acting as trustees for the resources. In 1980, Congress enacted the Comprehensive Environmental, Response, Compensation and Liability Act (P.L. 96-510, CERCLA), popularly known as the Superfund law. The principal purposes of Superfund were, of course, to authorize the Environmental Protection Agency (EPA) to respond to emergency spills of hazardous substances and to cleanup inactive hazardous waste disposal sites throughout the country with money from a fund supported by taxes levied on the petrochemical industry. The fund, in turn, would be replenished by EPA's recovery of its cleanup costs from private responsible parties. As I mentioned above, the taxing authority for Superfund expired on September 30, 1985, and Congress currently is working on a reauthorization bill, which also may affect the natural resource provisions discussed herein.

A little known part of the Superfund law is a mechanism that Congress established for recovery by the President or authorized state officials of damages to natural resources, including fishery resources, destroyed or injured by a spill or release of hazardous substances.[6] Working from similar natural resource provisions in other federal laws, such as the Clean Water Act, the Outer Continental Shelf Lands Act, the Deepwater Port Act and the Trans Alaska Pipeline Safety Act, Congress intended to provide for restoration or rehabilitation of the natural resources injured by hazardous substances released from a facility at the same time the site was being cleaned-up to protect human health.

The principal section of Superfund which addresses natural resources, Section 107(f), authorizes the President or the authorized representative of any state to act on behalf of the public as trustee for natural resources in order to assess and recover the damages to natural resources within their respective areas of responsibility. The elements of a damage claim are (1) a release of (2) a hazardous substance, (3) from a facility, (4) resulting in damages (5) to natural resources.[7] If there is no private responsible party to hold accountable for the damage, trustees can also file a claim directly against the Superfund which the Environmental Protection Agency (EPA) administers.[8] Within the federal government, the President has delegated his trust responsibility to the Secretaries of Commerce, the Interior, Agriculture, and Defense, and any other federal land managing agency.[9]

The National Oil and Hazardous Substances Pollution Contingency Plan[10] addresses the allocation of trust responsibilities as between various federal

and all state trustees. The Plan covers both CERCLA and the Clean Water Act."

As a general principle, the Plan divides trust responsibility for fisheries and marine mammals in accordance with the statutory division of responsibility between Interior and Commerce. So, for example, NOAA is principally a trustee for those fishery, marine mammal and endangered species resources for which it is responsible under the Magnuson Fishery Conservation and Management Act of 1976, as amended,[12] the Marine Mammal Protection Act,[13] and the Endangered Species Act;[14] whereas Interior is the trustee for those biological and marine resources and lands which it manages under its statutes. As one can imagine, at the time of a spill, the trajectory of the oil or hazardous substance does not respect neat statutory lines so that, for any particular incident, particularly in the marine environment, trustee responsibility is often overlapping as between Interior, Commerce and the affected states. Accordingly, the Plan admonishes co-trustees to cooperate in carrying out their responsibilities as trustees.[15] I will return to the subject of co-trustees later.

NOAA Superfund Program

Having briefly reviewed the legal framework for natural resource damage actions, I now turn to a consideration of how NOAA has implemented its responsibility as a trustee under Superfund. Initially, NOAA carried out this responsibility by reviewing all sites evaluated for EPA's National Priorities List of Superfund waste sites located in coastal and marine environments, amounting to 1,200 sites, to determine whether these sites contained threatened natural resources of concern to NOAA. This review culminated with the publication of the Coastal Hazardous Waste Site Review identifying approximately 100 sites that could encompass threatened natural resource damages, particularly fisheries. The information in this Review can be used by NOAA and state trustees for further evaluating included sites as well as for similarly ranking new sites. For example, in EPA's Northeast Region, we have identified some 12 sites that could affect fishery resources, including sites in Connecticut, Maine, Massachusetts and New Hampshire.

United States v. AVX, Inc., et al.

To return to the specifics of our New Bedford Harbor case, the statute of limitations expired for filing resource claims for those losses of which a trustee had knowledge for more than three years from the date of enactment of CERCLA, on December 11, 1983. NOAA believed that it would be

barred by this limitation from filing a claim for damages to fishery resources at New Bedford Harbor, Massachusetts, due to its knowledge of the 1979 fishery closures. Consequently, NOAA referred to the Justice Department and Justice filed on our behalf on December 9, 1983, a claim for natural resource damages against six past and current owners and operators of two electrical capacitor manufacturing plants located in New Bedford, Massachusetts. These manufacturing plants, currently owned by Aerovox, Inc. and Cornell-Dubilier Electronics, used PCBs in the manufacture of electrical capacitors and had discharged PCBs into the Acushnet River Estuary and Harbor over a period of 30 years, from 1947 to the late 1970's when the use of PCBs was banned by federal law. As of the date of our filing this claim, releases continued from both facilities and from the sewage outfall into the Harbor. The nature of PCBs is that they are persistent and bioaccumulative. EPA also joined our claim, captioned as *U.S. v. AVX, et al.*, Civ. No. 83-3882, (D. Mass. 1983), for recovery of their cleanup and remedial costs at the site. On December 10, the Commonwealth of Massachusetts filed their own claim and shortly afterwards the two cases were consolidated.

To reiterate, the facts which NOAA felt compelling about this damage case included the following: (1) PCB contamination had resulted in bans against recreational and commercial fishing in the Harbor without foreseeable abatement; (2) there is a fishery management plan (FMP) for lobster in the North Atlantic which applies partly in state waters, falling within NOAA's responsibility as a trustee for affected lobster; and (3) the Superfund statute of limitations was about to run.

Since filing, NOAA has conducted a joint damage assessment with the Commonwealth of Massachusetts to measure the lost value to society of those natural resources damaged by PCB pollution. We calculate the total measure of this damage to be approximately $35 million.

As I mentioned above, the Government's case on liability of these defendants and damages to natural resources is currently scheduled for trial commencing September 8, 1986, in federal district court in Boston. Judge Young has ruled that the resource claim, being in the nature of a tort claim, will be tried to a jury. We await the outcome of this precedent-setting case with great interest.

Before spending any recovered sums, NOAA will develop a plan, with public participation, to restore the damaged resources consistent with EPA's chosen remedy.

New Bedford Damage Assessment

Having filed a claim in order to avoid a statutory bar to filing, NOAA, naturally, was not in a position to quantify the damages to the fishery resources in the complaint. So, after filing, we began to develop, jointly with the Commonwealth of Massachusetts, an assessment of the damages to the fishery and other natural resources in the Harbor, including beaches and sediments. In accordance with CERCLA and accepted economic theory, we have measured the damages to the affected natural resources according to their lost use value to the public — implicitly acknowledging that this approach could be more conservative but also more feasible than the cost of restoration. Moreover, restoration would have been related to EPA's clean-up option which is still approximately 2 years away from selection.

Under this theory, our economists have analyzed the reductions in the flow of goods and services to the public from the contaminated resources and assigned an economic value to these losses. The value of these lost uses should equal society's minimum willingness-to-pay to use the damaged resources in their uncontaminated state. Because the damaged resources are either non-marketed resources (such as harbors, sediments, beaches) or, as in the case of lobster, the pollution has had no known effect on market price, our economists have assigned a proxy or substitute value for the actual lost use. For example, in order to measure the loss to the fishermen, one section of the public, caused by pollution in the Harbor, we have measured their increased costs of travelling beyond the closed harbor for fishing. Similarly, we have measured the losses to the recreating public of closed areas for angling as well as for closed beaches and other recreational areas which have been polluted by PCBs.

If NOAA and Massachusetts are successful with our theory of natural resource damage and recover the amount of damages we calculate, we are required to use the money to "restore, rehabilitate or acquire the equivalent" of the damaged natural resources." Any restoration plan will be developed with full participation of the affected public as required by CERCLA Section 111(i). Depending upon our restoration plan and EPA's clean-up, implementation may have to await completion of EPA's remedial plan to assure restoration of the habitat in a way that is compatible with EPA's clean-up.

Other Cases

Aside from the assessment of natural resource losses in and around New Bedford Harbor, NOAA also has participated in a comprehensive settlement of the clean-up of the Western Processing site at Kent, Washington. This

precedential settlement between EPA and some 197 defendants, including the Boeing Company, will require, *inter alia*, the defendants to provide a plan to restore Mill Creek to a pre-contaminant level so that it will once again be inhabitable by anadromous fish. This will be accomplished through revegetation of the Creek banks.

Because NOAA has two roles — as Scientific Support Coordinator to the Coast Guard at the time of a spill and as trustee for natural resources injured by a spill or release of a hazardous substance — we are often on the scene shortly after an accident occurs. This was the case, for example, for an oil spill that occurred in the Delaware River in the fall of 1985, caused by the grounding of the tanker GRAND EAGLE. This incident resulted in the oiling of approximately 78 acres of wetlands. NOAA did an assessment of the injured wetlands and arrived at a damage figure of approximately $200K. The United States Attorney has filed a contingent claim on the federal government's behalf in order to recover these damages as well as NOAA's and the Coast Guard's costs in immediately responding to the accident. If NOAA recovers damages, we propose, subject to restoration planning and in cooperation with interested states, to use the money for partially replanting vegetation damaged by oiling to enhance the wetlands' recovery.

Finally, NOAA is continuing to carefully review the list of NPL sites in the coastal and marine environment in order to determine our next priorities for damage assessments and restoration which either we, a state trustee or a potentially responsible party could conduct.

Related Federal Actions

Actions of other federal agencies with whom NOAA shares responsibility for Superfund implementation do influence NOAA's implementation of its trusteeship. For example, both EPA, the principally responsible federal agency for Superfund implementation, and Interior have rulemaking responsibility under CERCLA, and have promulgated or proposed regulations to carry out this responsibility.

As Fund manager, EPA has issued final procedures for the filing and arbitration of natural resource damage claims against the Superfund. As I mentioned above, as an alternative to commencing an action in court against responsible parties, a trustee can file a claim directly against the Superfund for (1) the reasonable costs of assessing injury to, destruction of, or loss of natural resources as the result of a release of a hazardous substance; and (2) the cost of the restoration of such injured natural resources. The EPA claims procedures establish detailed rules by which trustees can file damage claims

against the Fund and reflect certain policy determinations." For example, EPA has established the following priorities for evaluating all claims against the Fund: the highest priority to sites where an imminent and substantial threat warrants an assessment, a removal or enforcement action; the second priority to NPL sites where EPA intends to institute a remedial action financed by the Fund; the third priority to non-NPL sites with damages resulting from releases at NPL sites; and, the lowest priority to sites not on the NPL. This prioritization implements EPA's view that Congress intended public health concerns to take precedence over other concerns. Accordingly, it is within EPA's discretion to decide at any one time whether any money in the Superfund is available for natural resource damage claims. Other significant features of the claim procedures include the requirements of "preauthorization" of restoration claims — which device was declared "null and void" by the District Court in *New Jersey v. Thomas*." Finally, the rules limit the jurisdiction of the Board of Arbitrators to questions of fact alone — which excludes determinations by EPA — whether a claim is valid or preauthorized.

I have previously referred to Interior's publication of regulations for the conduct of damage assessments. As stipulated by the parties in *New Jersey v. Thomas*, above, proposed regulations for the conduct of Type B or "full-field" assessments were proposed in the Federal Register on December 20, 1985; final regulations are due to be published on June 23, 1986. Proposed regulations for simplified or "Type A" assessments were published on May 5, 1986, with final regulations due on October 7, 1986."

The "Type B" regulations establish, for detailed or "full-field" assessments, the procedures and methodologies for performing such assessments, including such overall procedural requirements as participation by potentially responsible parties and the public notice and preparation of an assessment plan. The regulations also prescribe the methods and criteria that trustees should use for determining whether particular resources have been injured and for measuring damages.

For example, in recognition of the fact that scientists have not yet established the actual biological effect of many hazardous substances on living resources, fish and shellfish are considered to be injured if they exceed established FDA limits for human consumption. (*E.g.*, the current FDA limits for PCBs in fish is 2 parts per million.) The regulations also dictate when a trustee can employ a use value approach and when the trustee can use restoration costs to measure damages. The proposed regulations require a trustee to choose the lesser of these two values — either recover society's lost use value or restore the resource. There is an exception to this general rule in the case of certain defined "special resources" in which case the trustee can elec

to use restoration value. However, the proposed definition of "special resources" is limited to resources protected by federal statute and therefore omits fishery resources and endangered species which may be protected by regulation.

A trustee must follow the regulations in order to obtain the benefit of a legal presumption in an administrative or other legal proceeding that its assessment is correct. However, under the proposed regulations, only those assessments conducted by federal trustees are eligible for this treatment. (Reauthorization is expected to correct this problem.) While states may request that federal trustees conduct assessments on their behalf, federal trustees are under no obligation to do so and are unlikely to agree if federal responsibilities dictate other priorities.

Significant Court Decisions on Natural Resource Issues

The *AVX* case will be the first natural resource damage case to be tried that the federal Government has brought under CERCLA. Therefore, it is a precedent-setting case not just for NOAA but also for the United States. No other resource damage cases have yet proceeded to a final decision on the merits under Superfund.

There are a few similar cases in the mill. One of the more important of these, in which NOAA is not involved, is the Rocky Mountain Arsenal (RMA) case in Jefferson County, Colorado. *United States v. Shell Oil Co.*[28] Since the 1940's, both the Army and its tenant, Shell, had handled chemical pesticides and munitions at RMA, contaminating resources on and off-site. After being sued by Colorado acting as a trustee for damages to resources, the United States sued Shell for contribution to the cost of the remedy. In one significant pre-trial ruling, the judge, in denying defendant's motion to join the Army as a defendant, found that the federal government's responsibility as a trustee is a fiduciary obligation, which is owed to the public and includes a duty to restore. The court also reasoned that co-trustees (in most cases, the states) can sue to enforce this obligation.

Effect of Reauthorization

Finally, reauthorization of CERCLA is imminent and, if enacted, will bring changes to its natural resource damage provisions. Likely amendments will affect access to the Fund for resource claims, the statute of limitations, and the exercise of a state's trusteeship by local governments. Although the

details may change, I believe Congress' commitment to restoring damaged resources, including fisheries and their habitat, will remain intact.

I know that NOAA's commitment remains as well. Thank you.

Notes

1. April 21, 1986, *Forbes,* "On the Waterfront," p. 124 ff.

2. *L.A. Times,* April 24, 1986.

3. *Nunes v. Aerovox;* No. 11445 (Bristol County Sup. Ct., filed Oct. 10, 1980).

4. *Conner, v. Aerovox, Inc.,* 730 F.2d 835 lst Cir. (1984), *cert. denied, sub nomsub. Conner v. Aerovox, Inc., — U.S.*_____, 105 S. Ct. 1746 (1985).

5. *Middlesex County Sewerage Authority v. National Seaclammer's Assoc.,* 453 U.S. 1 (1981).

6. CERCLA § 107, 42 U.S.C. § 9607.

7. *Id.*

8. CERCLA § 111, 42 U.S.C. § 9611.

9. Executive Order No. 12316, 46 FR 42237 (1981).

10. 40 CFR Part 300, §§ 300.72-.74.

11. CWA § 311(f)(4) and (5), 33 U.S.C. § 1321(f)(4) and (5).

12. 16 U.S.C. § 1801-1882.

13. 16 U.S.C. §§ 1361, 1362, 1371-1384, 1401-1407.

14. 16 U.S.C. §§ 1531-1543.

15. 40 CFR § 300.74.

16. CERCLA § 107(f), 42 U.S.C. § 9607(f).

17. 50 FR 51196-51226, December 13, 1985, to be set forth at 40 CFR Parts 305 and 306.

18. Civ. No. 84-1668, D. N.J., *aff'd* in *State of New Jersey v. Thomas,* 782 F.2d 1031 (3rd Cir. 1986).

19. These regulations are being issued in accordance with a court-approved settlement in the case of *State of New Jersey et al. v. Ruckelshaus et al.*, (now Thomas), cited above, in which New Jersey and other states sued EPA and Interior, respectively, over their failure to promulgate claims procedures and damage assessment regulations in accordance with CERCLA's statutory mandate for both and a 2-year deadline for promulgating assessment regulations. Type B regulations were proposed at 50 FR 52126; Type A regulations were published at 51 FR 16636.

20. *United States v. Shell Oil Co.*, 605 F. Supp. 1064 (D. Colo. 1985).

Account of the Report "Massachusetts Marine Fisheries — An Assessment at Mid-Decade" With Emphasis on Habitat Degradation Issues

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Abstract

This paper is a description of a state agency's attempt to call attention to significant problems endangering coastal marine fisheries resources and their environment. It relates the strategies adopted to raise public consciousness and the manner in which the state intends to deal with these problems.

Late in 1984 the Massachusetts Division of Marine Fisheries decided to write a white paper describing economic, environmental, and management problems facing the Commonwealth's marine commercial and recreational fisheries. DMF's purpose was to increase public and legislative awareness of the problems confronting the state's fisheries and to prompt state agencies to accelerate their efforts to address those problems. This paper was to be written with assistance from the state's Office of Coastal Zone Management and input from the Department of Environmental Quality Engineering.

In November, 1985 the paper, "Massachusetts Marine Fisheries—Assessment at Mid-Decade," was released. Five hearings were held along the coast to acquire public comment on the paper's accuracy and recommendations as to how the state could address local problems and concerns. In addition to issues related to pollution and habitat loss/degradation, impacts of excessive fishing, state regulatory/management/research shortcomings, and impediments to fisheries (e.g., the U.S./Canada boundary and inadequate port facilities) were discussed.

The DMF white paper marks the beginning of a process which is expected to culminate in actions to remedy or alleviate the problems described herein. A Marine Resources Coordinating Committee, chaired by the Secretary of Environmental Afffairs and assisted by five task forces composed primarily of state agency personnel, is scheduled to bring proposed actions to public hearings in July, 1986.

ıtroduction

Late in 1984 the Massachusetts Division of Marine Fisheries decided to rite a white paper describing economic, environmental, and management 'oblems facing the Commonwealth's marine commercial and recreational sheries. We were disturbed particularly by increasing coastal habitat ɜgradation reflected by findings of liver cancer in winter flounder and new ıd more frequent closings of productive shellfish harvesting areas. We felt white paper was long overdue. This paper was written with assistance from ıe state's Office of Coastal Zone Management and input from the Depart-ıent of Environmental Quality Engineering.

Our purpose was to increase public and legislative awareness of the roblems confronting the state's coastal marine fisheries resources and their nvironment and to prompt state agencies to accelerate their efforts to address ıose problems. While some of the report revealed new findings, much of the aper was an assemblage of recent research and investigations done by ɜderal and state scientists, consultants, universities, and private research ıstitutions. All were brought together under one cover.

After one year's work, in November, 1985, our paper entitled "Massachu-etts Marine Fisheries Assessment at Mid-Decade" was released. Five public ıearings were held along the coast to acquire comment on the paper's ccuracy and recommendations as to how the state could address local ıroblems and concerns. In addition to issues related to pollution and habitat oss/degradation, impacts of excessive fishing, state regulatory/management/ esearch shortcomings, and impediments to fisheries (e.g., the U.S./Canada ıoundary and inadequate port facilities) were discussed.

ssues of Concern — Habitat Degradation

Some habitat degradation issues of greatest concern to us were:

1) In 1984 a high prevalence (8%) of liver cancer was documented in Boston Harbor winter flounder. The harbor had the highest reported prevalence on the East Coast. Additional DMF sampling in the harbor during the winter of 1985 revealed a prevalence of 42%. Important questions were: What is the actual extent of this problem in the harbor and elsewhere along the Massachusetts coast? Are there any public health concerns? What is the cause of the problem; e.g., contaminated sediments?

This problem is one more contributing factor to public fear that all fish are unsafe. This unwarranted belief impacts markets for fish which are free of contaminants. It puts a stigma on seafood.

2) The amount of closed area to shellfish harvesting on the South Shore and southeastern Massachusetts is increasing at an alarming rate. At the end of 1984 about 25,000 acres or 40 square miles were closed. This represented a 28% increase over what was closed in 1980. Eighty percent (20,318 acres) of this total is capable of sustaining shellfisheries, especially for soft-shell clams.

   On the North Shore and in Boston Harbor there is a total of about 8,300 acres of soft-shell clam harvesting areas. At the end of 1984, 60% of the North Shore areas were closed or restricted. In Boston Harbor 100% of the areas were closed or restricted. If closed areas without soft-shell clams but with species such as mussels, surf clams, and ocean quahogs are included in the total, acreage on the North Shore and in Boston Harbor subject to a public health closure reaches about 24,800 acres (38 square miles).

   Important commercial and recreational shellfish areas have been closed resulting in heightened fishing pressure on remaining open areas and adverse social, economic, and biological impacts. The expansion of closed areas due to bacterial contamination especially in southeastern Massachusetts is indicative of a serious problem and graphically illustrates the degradation of our coastal waters precluding their use for commercial and recreational fishing.

3) Commonly used pesticides in the cranberry industry are highly toxic to fish, shellfish, crabs, and shrimp. Since most major watersheds in Buzzards Bay and on Cape Cod drain large areas of cranberry bogs, there is cause for concern that pesticides might pose a threat to shellfish resources in these areas by causing immediate mortality or affecting reproductive success.

4) Conservation Commissions and proponents of coastal alteration projects frequently misunderstand regulatory standards of the Wetlands Protection Act (Massachusetts General Laws Chapter 131, Section 40). The Wetlands Protection Act is administered by local Conservation Commissions that often lack the expertise and staff to properly assess projects' potential effects on wetland areas. Additionally, careful state reviews of all Conservation Commissions' "Order of Conditions" are not always possible.

5) The Wetland's Restriction Act (Massachusetts General Laws Chapter 130, Section 105) enacted in 1965 has not been aggressively pursued by the state. The Wetlands Restriction Program created by this Act first maps wetlands and then restricts work in entire wetland systems in advance of any work being proposed. The Program allows the state to stipulate on property deeds what is prohibited in wetland areas. Unfortunately, out of 90,000 acres of salt marsh and tidal flats in the state, only about one third have restrictions of one kind or another.

6) Public works projects, such as highways and bridge construction, are exempted by the Legislature from the Wetlands Protection Act. The Department of Public Works channels storm water and road run-off with its contaminants into coastal ponds and streams.

7) Inadequate state attention is given to the identification, control, and abatement of non-point sources of pollution in marine waters. The primary responsibility for identification and abatement of non-point pollution rests with the local community affected. However, local communities find it difficult to carry out these responsibilities since non-point sources of pollution, such as land run-off and faulty septic systems, are difficult to identify and control.

8) There are inadequate data on sources, total volume, and composition of point source discharges of pollutants. This problem is due in part to insufficient state agency staffing and the lack of specific federal standards for many toxic substances. Additionally, industries discharging their wastes into municipal sewage treatment plants monitor their own waste streams for priority pollutants and submit their reports to treatment plant operators. There is great potential for abuse of this kind of honor system. While there is some state monitoring of individual discharges, the extent of monitoring is insufficient to ensure industrial compliance with discharge permits.

9) Investigations to identify the existence and extent of pollution-related problems, identification of trends through monitoring, and major efforts to develop remedies or means to curtail pollution have been minimal.

Hearings and Media Coverage

Over 400 people attended the hearings. The makeup of the audience was quite diverse including fishermen, members of Conservation Commissions, legislators, shellfish constables, and individuals associated with environ-

mental and conservation groups. From audience comments and written correspondence many excellent recommendations were obtained. Groups such as the Massachusetts Shellfish Officer's Association, the Cape Cod Museum of Natural History, the Association for the Preservation of Cape Cod, Town of Bourne Selectmen, Massachusetts Association of Conservation Commissions, and Ocean Spray Cranberries provided written comments.

Very few people took issue with any of the points made or problems identified in the report. DMF was complimented and frequently told that it was about time the state took notice of the problems facing the fisheries and their environment. This was a very gratifying response.

There were a few critics, however. Representatives of the cranberry growing industry were displeased that DMF noted the potential for a pesticide problem due to the use of pesticides for agriculture, especially cranberries. They stated that there were no data to prove that a problem existed. Also, some Conservation Commission members felt our comment about Commission members, in general, were unjustified.

We had hoped that the report would get media coverage and would prompt others, especially newspaper reporters, to write articles based on the report. As stated above, one of our goals was to focus and increase public and legislative attention on the issues. We were successful. We had front page coverage in many newspapers such as the Boston Globe, the Cape Cod Times, the Gloucester Times, and smaller newspapers such as the Scituate Mariner. The Cape Cod Times even had a three part series based on the report. Many other articles appeared in other newspapers. Additionally, we were on "Live on 4," Channel 2 News, and other news networks. Quite a few radio stations provided coverage too.

Habitat loss and degradation was the focus of much public comment especially on Cape Cod. Concern about wetland loss was very great. The Cape Cod Times recently published an article entitled "Wetlands supply on Cape dries up." This article echoed many of the points raised in the white paper and made the point that many Conservation Commission decisions to deny such practices as building too close to a pond or filling in a wetland were overturned by the state (i.e., DEQE) being guided by state regulations inadequate to protect the special Cape Cod environment.

Some public recommendations were:

1) Provide Conservation Commissions with much more technical assistance to help them understand and deal with the cumulative effects of projects such as pier construction and dredging;

2) Increase communication and cooperation between DEQE and the towns and their Conservation Commissions;

3) Find disposal sites for heavily contaminated dredged sediments;

4) Address and resolve the pollution problems of Boston Harbor and adjacent bays to reduce the growing threat of pollution to southern regions such as Cape Cod Bay; and,

5) Chart existing storm drains emptying into coastal waters and assess their contribution to coastal pollution.

New State Initiatives

The DMF white paper marks the beginning of a process which is expected to culminate in actions to remedy or alleviate the problems described therein. A Marine Resources Coordinating Committee (MRCC), chaired by the Secretary of Environmental Affairs and assisted by five task forces composed primarily of state agency personnel, is scheduled to bring proposed actions to public hearings in July, 1986.

The task forces, entitled "Habitat Degradation/Loss," "Fisheries Resource Management," "Water Quality," "Public Health," and "Infrastructure, Access, and Impediments to Fisheries," have written reports which will be reviewed and edited by a steering committee. The final report will include the following: 1) a description of the issues and previous attempts to address and resolve problems; 2) a prioritization of issues including the level of effort required to address the issues; 3) recommended legislation or management changes to resolve problems; 4) additional information (studies, reports, etc.) necessary before issues can be addressed; and, 5) proposed budget and staff needs. The MRCC, having the Commissioners of EOEA agencies as members, will then make decisions as to which Steering Committee recommendations to adopt.

Accomplishments

The white paper was written to focus attention on important problems affecting marine commercial and recreational fisheries. It was to prompt agencies to accelerate their efforts to address these problems. Additionally, it was to serve as a forum in which other entities; e.g., Conservation Commissions, could voice their concerns.

We have achieved some of our goals. For example, the report has:

1) led to the formation of the MRCC and increased communication and cooperation between EOEA personnel as they strive to develop an action plan in response to the report. (Whether this communication and cooperation continues after the action plan is completed remains to be seen, however);

2) provided legislators with additional support for their own attempts to address coastal resource problems. For example, Representative Henri Rauschenbach of Brewster filed a bill (Coastal Assessment Resource Management Act or CARMA) this April to give EOEA $2 million to coordinate and improve regulations affecting the coast and $15 million for basic research on the status of the coastal environment. The bill also would establish a $10 million grant program that would assist coastal communities in preparing coastal area assessment programs and resource management maps. Representative Rauschenbach stated that the white paper influenced his drafting of the bill;

3) caused the cranberry industry to be more aware of concern about its use of pesticides. A dialogue has been established between the industry and the Department of Fisheries, Wildlife, and Environmental Law Enforcement;

4) led to a better understanding by DEQE of Conservation Commission problems with the agency and administration of the Wetlands Protection Act;

5) appears to have made the Legislature more receptive to (or at least aware of) state agency needs regarding enhanced resources to address habitat degradation issues; and

6) exposed the magnitude of the shellfish contamination problem and promoted renewed discussion between DMF and DEQE on the most efficient and sensible ways to monitor and manage shellfish harvesting areas affected by contamination.

Conclusions

It is not possible to predict what Task Force recommendations will be accepted by the MRCC. Many are being formulated. Some involve significant amounts of funding. Some involve very little money, but require

changes in the way some agencies do business. The latter may be the most difficult task to accomplish.

The challenge will be to convince the Administration and Legislature that agencies are not crying wolf and are not just using the white paper as a ploy to increase their size and influence. The challenge also will be for EOEA to act swiftly before the white paper and the issues it raises begin to fade in the memories of those who will have the greatest influence on initiating changes for the betterment of the state's marine living resources and their environment.