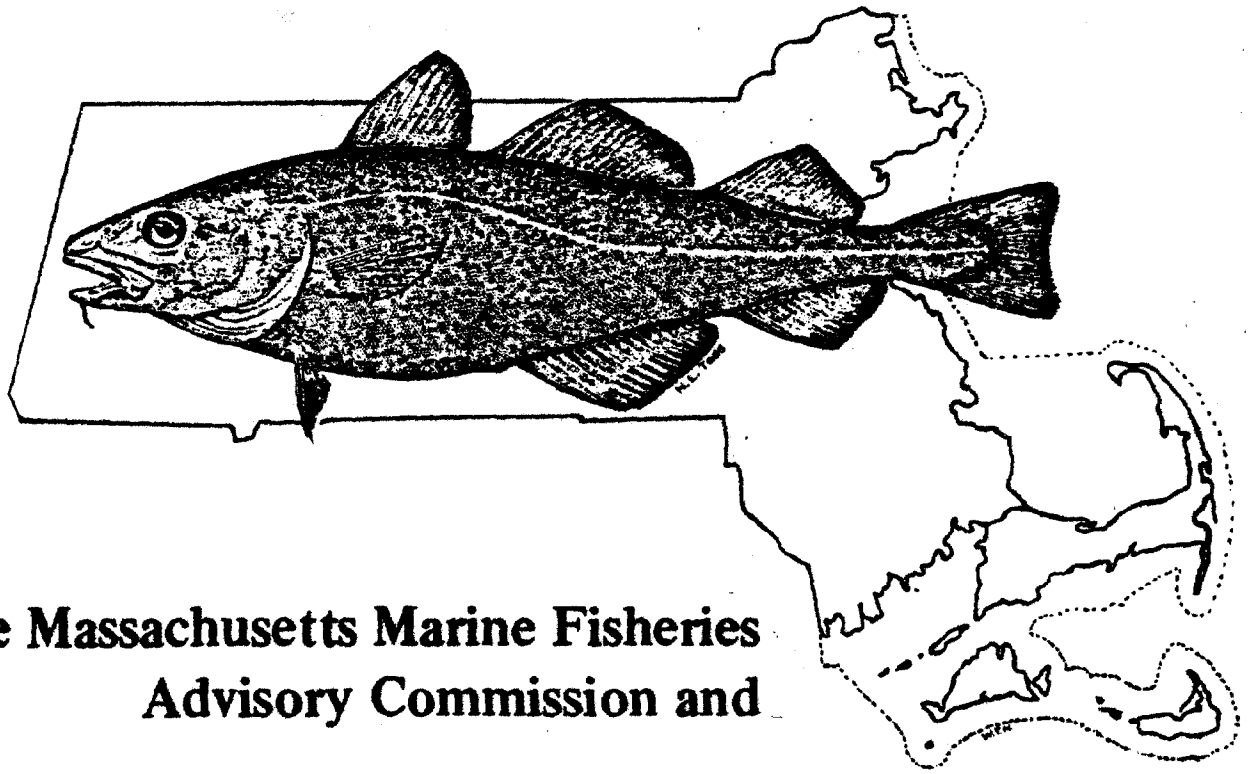
Massachusetts Marine Fisheries Management Policy Report



The Massachusetts Marine Fisheries Advisory Commission and

The Massachusetts Division of Marine Fisheries

Funded by: Massachusetts Coastal Zone Management Program

March 1982

Coastal Zone Management Program

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COASTAL ZONE
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wealth of Massachusetts
King, Governor

Executive Office of Environmental Affairs
John A. Bewick, Secretary

EDWARD J. KING
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE • BOSTON 02133

July 1, 1982

The Massachusetts Marine Fisheries
Advisory Commission
c/o Division of Marine Fisheries
100 Cambridge Street
Boston, Massachusetts 02202

Dear Commissioners:

I wish to congratulate you on a job well done and I am pleased to approve the Massachusetts Marine Fisheries Management Policy Report in fulfillment of Executive Order #165. The policies contained in this report will act as benchmarks for the revitalization of the Commonwealth's valuable commercial and recreational fisheries. These policies will also ensure the continued viability and stability of the Commonwealth's marine resources and environment so that our children and their children may benefit from their uses and pleasures.

The Commonwealth, from its earliest days, has been linked to the sea and has been a national leader in commercial fish production and recreational fishing opportunities. These policies, produced by the joint efforts of the fishing industry, state government and the public will maintain Massachusetts' leadership position for the mutual benefit of all.

Sincerely,

Edward J. King

Edward J. King
Governor

EJK:RFD:dn

COMMONWEALTH OF MASSACHUSETTS

By His Excellency

EDWARD J. KING
GOVERNOR

RULES AND REGULATIONS
AUG 1 9 31 AM '79

EXECUTIVE ORDER NO. 165

Fisheries Policy Development

WHEREAS, the fishing industry is clearly of major social and economic importance to the Commonwealth; and

WHEREAS, the Fishery Management and Conservation Act of 1976 represents an unprecedented and long overdue commitment by industry and government to undertake comprehensive management of our valuable fishery resources; and

WHEREAS, to be truly effective, this endeavor must be complemented by meaningful and timely state programs that will result in wise use of our fishery resources and a more prosperous fishing industry; and

WHEREAS, a necessary first step in this regard is the formulation of sound policy to guide development, management and enhancement of the Commonwealth's resources consistent with necessary socio-economic interests; and

WHEREAS, in Massachusetts this responsibility rests with the Marine Fisheries Advisory Commission with support from the Division of Marine Fisheries.

NOW, THEREFORE, I, Edward J. King, Governor of the Commonwealth of Massachusetts, by virtue of the authority vested in me as Supreme Executive Magistrate of the Commonwealth, do hereby charge the Marine Fisheries Advisory Commission, with support from the Division of Marine Fisheries, with the task of developing a comprehensive fisheries policy for the Commonwealth of Massachusetts.

Given at the Executive Chamber in Boston this 26th day of July in the year of our Lord one thousand nine hundred and seventy-nine and of the Independence of the United States of America two hundred and four.

Edward J. King
EDWARD J. KING
GOVERNOR
Commonwealth of Massachusetts

Michael Joseph O'Reilly
Secretary of the Commonwealth

GOD SAVE THE COMMONWEALTH OF MASSACHUSETTS

MASSACHUSETTS MARINE FISHERIES MANAGEMENT
POLICY REPORT
March, 1982

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Prepared for the
Massachusetts Marine Fisheries Advisory Commission
by the
Division of Marine Fisheries
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The preparation of this publication was funded by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, and U.S. Department of Commerce under a program implementation grant to the Commonwealth of Massachusetts.

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ACKNOWLEDGEMENTS

Policy program personnel wish to thank the public, Division staff members, and various State agencies who contributed their comments and advice in policy development. In particular, we extend our gratitude to those involved in drafting, reviewing, and revising the policies; Director Philip G. Coates, the Division's Assistant Directors, and the Massachusetts Marine Fisheries Advisory Commission.

We also thank Assistant Director W. Leigh Bridges for his administrative support and program guidance, Eleanor Bois and Marie Callahan for typing the manuscript, and Noga Waldman of Coastal Zone Management for preparing the report's coastal maps. Special thanks to Robert S. Barlow for not only developing policies while on the Marine Fisheries Advisory Commission, but for his assistance in arranging lobstermen's meetings, distributing questionnaires, and providing printing services.

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Massachusetts Fisheries	5
	A. Fisheries	11
	1. Finfish	11
	2. Shellfish	12
	3. Crustaceans	13
	4. Recreational Angling	15
	5. Other Marine Resources	24
	6. Marine Habitats	24
	B. Fishing Ports	29
	1. Gloucester	30
	2. New Bedford	30
	3. Boston	31
	4. Provincetown	31
	5. Sandwich	31
	6. Other Ports	32
	C. Resource Management Zones	32
	1. Fisheries Conservation Zone (FCZ)	32
	2. Massachusetts Territorial Waters	38
	3. Contaminated Area Restrictions	39
	4. Sanctuaries	41
	5. Coastal Zone	48
	D. Processors	48
	E. Imports	49
	F. Mariculture and Fisheries Enhancement	51
III.	Division of Marine Fisheries	55
IV.	Fishery Related Agencies and Organizations	60
	A. International	60
	B. National	60
	C. Interstate	62
	D. State	63
	E. Educational Institutions	65
	F. Local	67
	G. Private Organizations	68
V.	Public Concerns	70
	A. Port and Harbor Facilities	70
	B. Gear Conflict	71
	C. Law Enforcement	72
	D. Licensing	73
	E. Underutilized Species, Marketing, Fish Quality, and Joint Ventures	74
	F. Information and Education, Gear Technology	75
	G. Vessel Safety, Insurance, Financing and Loans	76
	H. Shellfish	76
	I. Sportfishing Access	77
	J. Recreational Saltwater License	78

Page

VI. Principles, Policies, and Proposed Actions..... 80
A. Statement of Principles..... 80
B. Statement of Policies and Proposed Actions..... 81
1.0 Fisheries Management..... 81
1.1 Resource Management..... 81
1.2 Restrictions and Allocations..... 83
1.3 Regulations and Enforcement..... 84
1.4 Fisheries and Habitat Enhancement..... 86
1.5 Mariculture..... 88
1.6 Environmental Concerns..... 89
1.7 Coordination of Marine Management, Research, and Academic Programs..... 91
2.0 Research and Development..... 93
2.1 Fisheries Development..... 93
2.2 Marketing and Promotion..... 96
2.3 Fisheries Assistance..... 98
2.4 Research.....100
3.0 Information and Education.....102
3.1 Statistics.....102
3.2 Information/Education.....103
3.3 Licensing.....104
VII. Program Recommendations.....105
A. Division of Marine Fisheries Programs.....105
B. State Programs.....106
C. Recommended Legislation.....106
Glossary of Terms and Abbreviations.....108
A. Terms.....108
B. Abbreviations.....109
Literature Cited.....111
Appendices.....115
I. Commercial and Recreational Questionnaire Results.....115
II. Sportfishing Clubs and Commercial Fishing Associations, Commissions, and Unions.....131
III. Comments and responses to draft Marine Fisheries Policy Report.....135
IV. Scientific and Common Names of Important Finfish, Shellfish, Seaworms.....147
V. Policy Program public meetings.....150
VI. Agency Policy Meetings.....151

LIST OF TABLES

Number	Title	Page
1.	Comparison of the ten top-ranked states according to commercial fish landing value in 1979, with fiscal year 1981 expenditure for state marine resource programs.....	8
2.	Estimates of the number of vessels and people employed in various sectors of the Massachusetts Fisheries, 1977-1979...	9
3.	Estimated number of participants in Massachusetts Marine Recreational Fisheries for 1977 to 1979.....	10
4.	Estimated value of Massachusetts agriculture and fisheries for 1970-1979.....	10
5.	Massachusetts commercial landings and value of selected species and total landings and value for all species, 1977-1979.....	17
6.	Combined commercial and recreational shellfish harvest and estimated value for Massachusetts in 1977 and 1978.....	18
7.	Number of shellfish permits issued by the local cities and towns of Massachusetts in 1977 and 1978.....	18
8.	Massachusetts coastal and offshore lobster landings and values for 1977 and 1978.....	19
9.	Number of lobster licenses issued by the Division of Marine Fisheries from 1976 to 1979.....	19
10.	Estimated number of marine recreational fishing trips and participants in Massachusetts, 1979.....	20
11.	Estimated marine recreational fishery cost, effort, and catch statistics for New England region in 1979.....	20
12.	Percentage of type fish sought and estimate number of fish caught by New England recreational anglers in 1979.....	21
13.	Estimated Massachusetts marine recreational fishery catch in numbers and percent for 1979.....	22
14.	Estimated number of people and vessels involved in recreational fishing support businesses in Massachusetts....	23
15.	Massachusetts fishery (finfish) by port.....	33

Number	Title	Page
16.	Estimated numbers of vessels for selected ports, 1979.....	34
17.	Commercial landings at certain Massachusetts ports and total Massachusetts landings for 1977 to 1979.....	35
18.	Number of processing and wholesale plants and average employment in Massachusetts from 1970 to 1978.....	53
19.	Estimated imports of fresh, whole, or headed Canadian groundfish by Massachusetts in 1978.....	54
20.	Organizational chart, Division of Marine Fisheries.....	59

LIST OF FIGURES

Number	Title	Page
1.	Massachusetts Commercially Important Ports and Harbors.....	36,37
2.	Massachusetts Territorial Waters.....	42
3.	Restricted areas for trawling along the Massachusetts coast.....	43
4.	Restricted areas for seining along the Massachusetts coast.....	44
5.	Polychlorinated Biphenyl (PCB) Contamination Areas of New Bedford Harbor.....	45
6.	Ocean Sanctuaries in Massachusetts.....	46
7.	Jurisdiction area of the Massachusetts Coastal Zone Management Program.....	47

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(February, 1982)

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I. Introduction

In recent years there has been renewed interest in the seas. Exploitation of offshore oil and minerals; utilization of fishery resources; competition for commercial, residential, and recreational uses of the coastal zone; and threats of environmental degradation have increased public concern for, and appreciation of the marine environment. This concern has spawned state and federal regulations to protect the marine environment and resources. The federal Coastal Zone Management Act; Endangered Species Act; Marine Mammals Protection Act; Outer Continental Shelf Lands Act; National Environmental Policy Act; Marine Protection Research and Sanctuaries Act; and the Magnuson Fisheries Conservation and Management Act of 1976 (200 mile limit) all have had a profound effect upon both the fishing industry and the state fisheries management agency.

With reductions in foreign fishing and possible increases in certain stocks, Massachusetts commercial fisheries have resurged. Commercial fish landings have increased and new boats have entered the fisheries. However, this prosperity created new problems and aggravated old ones. Additional vessels may have caused overfishing of certain stocks; conflicts between gear types increased; and competition with the expanding recreational fisheries has intensified. Limited and poorly maintained port facilities were overtaxed; catch increases were not matched by increases in domestic and foreign market sales; seasonal gluts occurred; and ex-vessel fish prices fell.

Recreational fisheries also experienced problems relating to growth. Fishing effort has increased, but public access to the coastal waters via beaches, ramps, and piers has not kept pace. Some important sportfish species have declined, but programs to manage recreational fish are lacking.

Responsibility for these problems rests with the Commonwealth's fisheries agency, the Division of Marine Fisheries. In addition, the Division must deal with a myriad of environmental, conservation and management regulations, and programs recently promulgated by state and federal authorities. In light of the 200 mile limit, the nature of fisheries management in Massachusetts has changed drastically. Prior to 1977 the Commonwealth's participation in fisheries management was limited to the State's three-mile territorial waters. The State had no voice in managing fish stocks vital to Massachusetts fishing industry outside state waters.

Now Massachusetts plays an important role with the New England Fisheries Management Council and National Marine Fisheries Service in managing the fisheries in the Fisheries Conservation Zone (FCZ). As a participating Council member, the Division must provide information and review management plans. As part of a unified management approach the Division must manage fisheries in state waters in concert with federal management regulations or face possible federal pre-emption of State management authority. This responsibility has placed an added burden on the Division's management, research, and statistics collecting programs.

Enactment of the 200 mile limit, growth of recreational and commercial fisheries, and increased government regulation make it necessary for Massachusetts to reassess its role relating to the fisheries. The State must develop fisheries policies to coordinate agencies and programs to assure long-term stability of the fishing industry as well as wise management of the living marine resources. The first step in policy development is to define the purposes, means, and responsibilities of the State in fisheries management, development, and promotion. A fisheries policy will provide guidance in decision making and stabilize management direction and philosophies. It will reduce conflicts, omissions, and redundancy between State agencies. In addition, the public will obtain an understanding of their responsibilities in fisheries management and be more aware of the State's position on fishery issues. The policy will be a basis for cooperation amongst government, industry, and public for the benefit of the fisheries and the resources.

Massachusetts last examined its fishing industry and fishery programs in 1960. The report, "Final Report on the Studies of Massachusetts Marine Fisheries Problems", 1960, was prepared by the newly organized Marine Fisheries Advisory Commission, composed of members with commercial or recreational fisheries expertise. It reviewed major fisheries problems and made 18 recommendations for remedial actions. The report provided the impetus for changes in fisheries that are still apparent today such as: state review of coastal alteration and wetlands projects, coastal pollution monitoring, improved fisheries management by regulation rather than legislation, creation of a permanent Advisory Commission, creation of local shellfish constables, participation in the University of Massachusetts Cooperative Fisheries Research Unit, acquisition of a research vessel, and provision for a Public Access Board. The recommended establishment of a Marine Fisheries Fund and and Estuarine Research Program provided the funds and projects to begin a credible marine research program. Although the latter two recommendations are no longer in effect (the Marine Fisheries Fund was rescinded in 1975 by the Legislature, and the Estuarine Program was reorganized into Area Teams in 1977), the 1960 report was the basis for the creation of a fisheries agency more responsive to fishery needs.

Some of the problems addressed in 1960, however, are still evident in 1981. The need for effective law enforcement capabilities, adequate shellfish purification facilities and research vessel, a south shore research station, and sportfishing public access have not been satisfied in the twenty years since first recommended. Meanwhile, recent developments have created more complex problems that require comprehensive and multidisciplinary approaches to fisheries management.

In 1979 Governor King issued Executive Order #165 calling for the Massachusetts Marine Fisheries Advisory Commission to develop a state fisheries policy. With continued support from the Governor, the Division of Marine Fisheries received a Massachusetts Coastal Zone Management grant in December 1979.

As a first step, 23 coastal states, the National Marine Fisheries Service (NMFS), and the Atlantic States Marine Fisheries Commission (ASMFC) were surveyed for existing fishery policy reports. Some states had fishery development plans, but only Alaska had a written policy outlining general management guidelines. NMFS and ASMFC had fishery plans and policies that provided some useful information, but they dealt primarily with national and international issues and had little relation to Massachusetts fisheries. The lack of an adequate state fisheries policy model resulted in a considerable amount of time establishing a workable policy format.

To review and assess Division activities, a program questionnaire was created. Division project leaders were asked to describe their project's objectives, accomplishments, and funding. They identified how their project, and the Division as a whole, could provide improved public service. These questionnaires were reviewed by respective Assistant Directors (i.e. Bureaus of Research, Commercial Fisheries, Recreational Fisheries, and Administration), who, in turn, completed a bureau questionnaire.

The next step was to identify commercial and recreational fishery problems and issues, and provide a vehicle for the public to express their opinions. Two questionnaires were written, (see Appendix I). To obtain further public input, a series of meetings (Appendix V) were held along the Massachusetts coast in which issues and solutions were discussed in depth. Twenty-six meetings were conducted both for the general public and for commercial and recreational fishing groups.

A series of meetings with fisheries related government agencies were held (Appendix VI) to define agency responsibilities and program coordination. Discussion centered on coordinating programs in which the Division participated, reducing duplication of independently run programs, and filling program gaps in which services are omitted.

During the input phase of the program, development of fisheries policies was initiated. Draft policy statements were formulated and submitted for comment to the Division's administrative and biological staffs, and the Marine Fisheries Advisory Commission. The administrative staff met with project personnel frequently to define and refine policies. The Marine Fisheries Advisory Commission met monthly to review, comment, and advise on policy development. After Division and Advisory Commission approval, the draft policy report was made available for public and State agency review. After obtaining comments, the draft was revised and the final report issued.

For purposes of this report, a policy is defined as the establishment of principles and guidelines for future action. Policies stated in this report do not relate to a particular situation or fishery but attempt to span the broad spectrum of fishery issues. These policies are intended to be general enough to maintain their relevance over time, but specific enough to provide guidance to administrators, biologists, and the public in dealing with fishery matters. In addition to policies, proposed actions

are included in the report. These are recommendations to improve existing situations. They may refer to ongoing programs, or suggest legislative or program changes necessary to bring Massachusetts fisheries and government closer to the stated aims of the policies. However, they do not represent complete program proposals which would be more appropriate to an Operational Plan than a Policy Report. Informational sections are presented to provide the reader with an understanding and appreciation of fisheries and the agencies involved in marine affairs.

The established policies will be reviewed at least annually by the Division of Marine Fisheries and Marine Fisheries Advisory Commission. At that time, policy implementation will be examined and any amendments to the policies made. Policy implementation will be judged on the basis of evaluation of agency compliance, policy utilization, enacted legislation, and program relevance. The Division's internal staff will provide implementation monitoring. Policy amendments may be made at the behest of the general public, user groups, industry members, or other agencies and institutions. If major policy amendments are suggested, the MFAC may hold public meetings before any policy additions, deletions, or alterations are made.

II. Massachusetts Fisheries

With commercial landings valued at $175.5 million in 1979, Massachusetts ranked fourth in the nation in value of fish landed (Table 1). Yet, of the ten largest seafood producing states, Massachusetts spent the least for fisheries management and promotion. In addition, $7.8 million worth of shellfish were harvested by recreational shellfishermen in 1978, and an estimated $30 million was expended by recreational rod and reel fishermen in 1979. Fisheries provide income for an estimated 16,200 (Mass. Division of Employment Security, 1979) to 16,443 people (Table 2), in such diverse fields as fishing, processing, wholesale, retail, bait and tackle, and charter and party boat fishing. An additional 824,954 people participated in Massachusetts saltwater recreational fishing in 1979 (Table 3).

Fishing and agriculture (i.e., livestock and crops) are the most valuable natural resource-based industries in Massachusetts. In 1979 their combined value was $431.1 million, of which 41% was derived from commercial fisheries (Table 4). The value of commercial fisheries has been growing at a 21% annual rate of increase since 1975, compared to a 6% annual rate for agriculture. Fish landings surpassed either crop or livestock value in 1978. Nationally, fish product value indices rose rapidly from 1967 to 1977, increasing by 239.4% versus 92% for crops (Council of State Governments, 1979).

While these statistics are impressive, they underestimate the real value of the Commonwealth's marine resources. First, the statistics themselves represent the minimum of actual fisheries value. Other data must be expanded or estimated. As examples, the recreational finfish catch is commonly expanded from a base of interviews on a very small portion of the total fishermen. Data on foreign fish imports to Massachusetts are unavailable because Federal Customs records imports only by port of entry, not destination. Therefore, the percentage of imports sent to Massachusetts from Portland, Maine must be estimated.

Second, landing values are poor indicators of total fisheries economic impact. The fishery is a primary industry, meaning that unlike other industries producing a finished product in one step, fishing is only the first in a series of steps. After the fish is landed it must be processed, packaged, distributed, and sold. This creates economic activity far above the original landing value. The amount of additional economic activity generated by a dollars worth of product is commonly measured by an economic multiplier.

In Rhode Island the multiplier for most industries is 1.69, but for fisheries it is 4.24 (Council of State Governments, 1979). This means for every $100 of fish landed, $424 worth of economic activity is generated in wages, materials purchased, services paid for, etc. Using the Rhode Island fisheries economic multiplier of 4.24, Massachusetts commercial fisheries landings generated $744 million in economic activity in 1979. Add to this the multiplied value of the 1978 inshore commercial shellfish harvest $7.8 million x 4.24 = $33.1 million) and a conservative estimate of recreational angling and its support industries in 1975 of $122 million, brings the total value of Massachusetts fisheries to almost $900 million.

The history of Massachusettes fisheries is based to a great extent on the cod. This fish played such an integral part in the exploration of America, and the economic, political, and social life of Massachusetts that the Great and General Court of Massachusetts chose, in 1784, to hang a representation of the codfish in the House of Representatives as a memorial to its importance. The cod was important both for it's abundance and it's storage qualities when salted and dried.

In 1497, John Cabot discovered the great codfish grounds of the Northwest Atlantic that would be exploited by Europeans for almost 500 years, spurring the colonization of America's Northeast seaboard. The first settlements in Maine and New Hampshire were fish curing stations established before the Pilgrims arrived. When the Pilgrims landed in Plymouth they were befriended by an English speaking Indian who had learned the language from fishermen. The Pilgrims came to escape religious persecution, but it was fishing that brought the first settlers to Gloucester, Marblehead, Salem, Weymouth, and Scituate (McFarland, 1911).

By 1630, the colonists had established a profitable fishing industry that was the only New England product valued in European markets. Because the New Englanders caught and salt-cured cod in winter, the quality was far superior than European fish and commanded a better price in the markets of Spain, Portugal, and France. To protect its' only industry, the General Court of Massachusetts established a commission for management and quality control of the fish trade in 1635. Low quality or "refuse" salt cod was shipped to the West Indies islands to feed the slaves. In trade, the boats returned with sugar and molasses to supply the new rum distilleries in Newport and Boston. This trade soon evolved into the "Golden Triangle" trade route which lasted for fifty years until the Revolutionary War in 1775 (Jensen, 1972). New England boats brought salt cod to Europe, picked up slaves along the African coast, traded the slaves in the West Indies for sugar and molasses, and returned to New England. Many of New England's most famous families earned their fortune in the Golden Triangle trade.

Massachusetts fisheries prospered in the decade between 1765 and 1775, with 20 towns cod fishing, 605 boats fishing, 4,175 fishermen, and 9,600 men involved in curing, packaging, and transporting (McFarland, 1911). However, the Revolutionary War devastated the fisheries with losses in fishermen, boats, docks, and gear. One of the most important negotiating points in the subsequent peace treaty was fishing rights in Canadian waters. Although John Adams secured the fishing rights, it was not the last dispute over U.S.-Canadian fisheries. Six times from 1811 to 1911, treaties, conventions, and international arbitrations attempted to define fishing rights in Northwest Atlantic waters.

In addition to the direct effects of the war, fisheries suffered from foreign import duties and fishing subsidies. To aid the fisheries, in 1791 Congress approved allowances to fishing vessels based on vessel size, amount caught, and months fished. This allowance was increased in 1819 under the stipulations that a logbook be kept and that fishermen would be compensated by a share of the sale of the catch. The act was

repealed in 1866 but the share or lay system of payment still exists.

By the 1860's, fisheries had stabilized. Although salt cod was still the most important product, mackerel (salted or pickled) had been growing in value since 1815. European trade diminished only to be replaced by demand from the expanding western states. The last half of the century saw the rise of Gloucester as a center for salt cod, mackerel, and halibut, surpassing landings at Boston and Provincetown combined.

With the advent of the steam engine at the turn of the century, and otter trawl shortly thereafter, the fisheries changed. More fresh fish were landed in shorter trips. As demand for fresh fish increased, Boston became the leading fishing port because it was the New England marketing and transportation center. Dependent on the salt cod fishery, Gloucester suffered from decreased demand and cheaper Norwegian, Canadian, and Icelandic imports in the 1920's and 30's (Boeri and Gibson, 1976). However, Gloucester's processing industry survived by processing imported salt cod, improving filleting techniques, and developing new processing methods (e.g., quick-freezing). Improvements in transportation and processing allowed the introduction of new species to the fresh and frozen markets of the East and Midwest.

During World War II, New England fisheries prospered from military contract buying and Europe's inability to fish. Exports were five times the amount of imports and, for the first time, fishermen were guaranteed a price for fish landed. However, after the war contract buying ceased and operating costs rose with postwar inflation. With the economy improving in the 1950's, demand for fish increased. Fishermen began to reduce their catch to raise prices. In a countermove, processors turned to imported fish to meet demand and found readily available supplies and lower prices from Canada and Iceland. Fish price increases reduced the effectiveness of fresh fish import tariffs based on weight. In addition, frozen whole fish and fish blocks were imported duty-free. In 1953, introduction of the frozen fish block that could be processed into fish portions and fish sticks caused a boom in the convenience food retail market and fast food franchises. Unfortunately for domestic fishermen, over 80% of frozen fish blocks were imported. U.S. fishermen were increasingly restricted to supplying the limited fresh fish market. By 1974, frozen imports were 15 times greater than domestic production (Massport, 1977).

In 1961, Russian fishing ships began fishing Georges Bank. They were followed by fleets from 15 other countries until there were approximately 300 large trawlers off our coast. Initially, the highly efficient foreign vessels fished only the non-traditional species such as hakes, herring, and squid. However, with foreign effort increasing, more of the traditional New England fisheries, particularly haddock, began to feel the mounting fishing pressure.

Table 1. Comparison of the top ten ranked states according to commercial fish landing value in 1979 with fiscal year 1981 expenditure for state marine resource programs.

	Millions of Dollars[1]	Millions of Pounds[1]	Expenditures in Millions of Dollars[2]
Alaska	597.0	898.5	26.3
California	227.5	728.4	12.1
Louisiana	198.5	1,529.1	3.5
Massachusetts	175.5	374.7	1.3
Texas	160.2	84.9	2.2
Florida	124.0	163.0	2.3
Washington	116.0	170.0	67.0*
Virginia	84.6	572.7	1.9
Maine	80.3	232.1	2.7
North Carolina	58.4	390.5	1.7

* $55 million spent on salmon research.

[1]Fisheries of the U.S., 1979.

[2]Personal communication with Atlantic States Marine Fisheries Commission, data is exclusive of law enforcements costs.

Table 2. Estimates of the number of vessels and people employed in various sectors of the Massachusetts fisheries, 1977-1979.

	1977		1978		1979	
	Vessels	People	Vessels	People	Vessels	People
Finfish[1]	933	3,359	1,170	4,212	1,629	5,664
Lobster[2]	1,513	1,513	1,560	1,560	1,674	1,674
Shellfish	632[3]	3,596[3]	861[4]	3,621[4]	NA	NA
Charter boat[5]	-	-	125	250	-	-
Party boat[5]	-	-	91	283	-	-
Bait and tackle dealer[6]	-	-	-	276	-	-
Boat rental[6]	-	-	NA	90	-	-
Processing[7]	-	6,253	-	6,040	-	[illegible]
Mariculture[8]	-	-	-	-	-	111

[1]Number of vessels is the sum of boat licenses and offshore lobster licenses issued by DMF. This assumes that most offshore licenses were issued to boats that primarily fish finfish and catch lobsters incidentally.

[2]DMF lobster licenses, combining coastal commercial and coastal seasonal only.

[3]Kilbride, 1978.

[4]Anderson, 1979.

[5]Nicholson and Ruais, 1979.

[6]Massachusetts Salt Water Fishing Guide.

[7]NMFS, Fishery Statistics of the United States, 1978, 1979.

[8]Personal communication, J. Michael Hickey, DMF, 1979.

Table 3. Estimated number of participants in Massachusetts marine recreational fisheries for 1977 to 1979.

	1977	1978	1979
Lobster[1]	8,559	8,915	10,479
Shellfish	38,727[2]	38,222[2]	38,475[3]
Angling	NA	NA	776,000[4]

[1]DMF license statistics.

[2]As reported by shellfish constables of coastal cities and towns.

[3]The average of the number of shellfish license issued in 1977 and 1978.

[4]NMFS, Marine Recreational Survey, Atlantic and Gulf Coasts, 1979, Washington, 1980.

Table 4. Estimated value of Massachusetts agriculture (based on cash receipts from farm markets)[1] and fisheries (based on ex-vessel price)[2] for 1970-79 in millions of dollars.

	Livestock & products	Crops	Total agriculture	Ex-vessel fish prices
1970	-	-	168.6	47.0
1971	82.2	76.4	158.6	48.3
1972	84.6	75.1	159.3	56.8
1973	105.0	84.3	191.1	56.2
1974	104.4	96.3	200.7	62.3
1975	107.6	98.7	206.3	82.9
1976	109.3	111.9	221.2	95.8
1977	105.1	120.5	225.6	114.0
1978	112.2	129.9	242.1	152.3
1979	117.8	137.8	255.6	175.5

[1]Dept. of Food and Agriculture, Massachusetts Agricultural Statistics, 1970-1979.

[2]Fisheries statistics of the U.S., 1971-1980.

Management of fisheries outside the 12 mile U.S. contiguous zone was the responsibility of the International Commission for the Northwest Atlantic Fisheries (ICNAF), organized in 1950. While ICNAF's research was accurate, management efforts were ineffective. In 1973 a bill was submitted to Congress to extend U.S. management jurisdiction to 200 miles. The Fisheries Conservation and Management Act was passed in 1976, resulting in reduced foreign fishing effort and revitalization of U.S. and Massachusetts fisheries.

The following sections describe the various aspects of the fisheries, their value, and interdependency. While each section is separated for discussion purposes, the components within the fisheries are interrelated. The amount and type of fish landed is directly related to gear, regulations, processing capabilities, and imports. A change in the status of one component will affect the fisheries as a whole.

A. Fisheries

1. Finfish

There are approximately 46 edible finfish species of varying value in the Massachusetts fisheries. Massachusetts landings of 18 of these species were worth $90.4 million in 1979, an increase of over $30 million in two years (Table 5). There were an estimated 779 finfish vessels (this includes many lobster boats that gill net part of the year), employing 2,789 fishermen in 1977. About 62% of the vessels were trawlers, 12% gillnetters, and 23% using various gear such as gillnets, long lines, pots, and trawls, depending on the season (Mass. Division of Marine Fisheries, 1977).

Groundfish or bottomfish is a term to describe a number of commercial species dwelling on or near the bottom. These fish are primarily caught by otter trawl; however, some are caught by line trawl. Recently gillnetting has become an important groundfish catch method. While the federal groundfish management plan covers only cod, haddock, and yellowtail flounder, other species such as pollock, whiting, the hakes (red and white), redfish, anglerfish, and five flounder species (winter flounder, grey sole, American dab, windowpane, and fluke) can be considered in the groundfish category. In 1979, the combined value of cod, haddock, and yellowtail was $50.1 million, almost twice the total value of other groundfish species ($27.0 million). While some fishing effort is directed specifically towards redfish, whiting, and flounder, most other groundfish species are caught incidentally in the cod, haddock, and yellowtail fishery.

There is a seasonal directed otter trawl fishery for whiting (also called silver hake) from May to November from Cape Cod Bay to Gloucester. Massachusetts boats landed 60% of the 1977 catch in the northeast, with Gloucester being the primary port. This species is usually processed frozen for human consumption but is sometimes converted to fish meal for pet food.

Night midwater trawling for adult sea herring in recent years has become a profitable new fishery in Massachusetts and Cape Cod Bay. In addition to non-resident vessels, there were three sets of Massachusetts pair trawlers fishing state waters and landing their catch in Gloucester in 1977. Gear conflicts with fixed lobster gear made it necessary to impose areal and seasonal closures for this gear in 1976. However, from 1977 to 1979, landings have increased 13.1 million pounds and value has almost doubled to $3.6 million.

Menhaden is an oily, unpalatable member of the herring family that is usually processed for poultry feed and oil. It is fished in the harbors and coastal waters by purse seiners (5 in 1977), and landed in Gloucester for processing. This migratory, schooling fish is sensitive to temperature and oxygen conditions. Cool summer temperatures may reduce migration into Massachusetts waters. Oxygen depletion and other causes may induce massive kills. Landings over the past three years have fluctuated from a high of 56 million pounds in 1972, down to 17.4 million in 1977, and back up to 48 million pounds in 1978. Menhaden were second to cod for total pounds landed in 1978.

Atlantic bluefin tuna is a highly migratory species that enter state waters during the summer months and are fished by hand gear or purse seine. Previous to 1977, this was primarily a recreational fishery conducted by rod and reel from charter boats, although harpoons, handlines, and purse seines have been used since the 1940's. In the early 70's Japanese buyers began purchasing tuna and price per pound rose from $ .05 to well over $1.00. Since some tuna exceed 1,000 pounds each, the fishery quickly became more commercial than recreational. In 1977, 3,704 hand gear permits (e.g. handline, harpoon, or rod and reel) were issued by NMFS, and two purse seiners (limited to two by state regulation) were operating in state waters.

Because of increasing demand for adult eels in Europe, eel fishing in Massachusetts has increased in recent years. Eels are catadromous fish which leave fresh water and coastal estuaries to spawn in deep water in the Caribbean. Young eels (elvers) return to the streams and grow to adults living up to 20 years. Eels are under town management, but the Division has promulgated broad base state regulations to protect elvers. While no uniform reporting system exists, the best catch estimate made by Division personnel (E. Amaral, DMF, personal communication) is 150,000 pounds landed, worth $90,000 in 1977.

2. Shellfish

There are over 12 shellfish species of commercial or recreational value in Massachusetts fisheries. Included in this group are species caught by otter trawl (squids), drags (sea scallops, bay scallops), pots (conchs), hydraulic dredges (sea clams and ocean quahogs), and hand gear (soft-shell clams, bay scallops, oysters, razor clams, mussels, and quahogs). In 1979, 22.6 million pounds of shellfish worth over $54.1 million were landed in Massachusetts commercial shellfisheries,

according to NMFS statistics.

Sea scallops ($48.3 million) accounted for 89% of total shellfish landing value, and 28% of total fish landing value. The sea scallop fishery has prospered since 1974 when a large population of scallops was found on western Georges Bank. Both landings and price per pound increased yearly until 1978, when landings began to decline although price per pound continued to increase. In 1977, 90 vessels and 1,000 fishermen were fishing from 8 Massachusetts ports: New Bedford, Provincetown, Martha's Vineyard, Sandwich, and Chatham reported the most significant landings. Although scallops are the most valuable shellfish to Massachusetts fisheries, they are predominantly caught outside state waters and are under federal management control.

Interest in the two New England squid species, long finned (Loligo) and short finned (Illex), as domestic and export fish products has increased in recent years. The larger sized Illex squid is fished north of Cape Cod by inshore trawlers. The smaller Loligo squid supports an inshore spring trawl fishery during its spawning migration south of Cape Cod. While both species support seasonal trawl fisheries, they are considered underutilized and could provide greater landings and value to Massachusetts fisheries.

The inshore recreational and commercial fisheries for quahog, softshell clam, oyster, bay scallop, razor clam, sea clam, mussel, and other shellfish, were valued at $8 million and $9.8 million in 1977 and 1978, respectively (Table 6). Bay scallops (60%) and quahogs (21%) provided the greatest value to the predominantly hand raking and small boat, scallop dredge fisheries. Numbers of participants in the inshore shellfisheries averaged 41,560 in 1977 and 1978 (Table 7). In 1977 and 1978, the vast majority of participants in the shellfisheries (94% and 91%, respectively) were recreational fishermen. However, these fishermen accounted for only 19% (1977) and 16% (1978) of landed shellfish value (Kilbride, 1978; Anderson, 1979).

3. Crustaceans

This group of 5 important species contributed a reported 11.5 million pounds of landings and $17.2 million to the total Massachusetts fisheries in 1979 (Table 5). The lobster fishery, with its incidental catch of rock and jonah crabs, is the most valuable fishery conducted within state waters. The offshore red crab is a small but stable fishery, while the inshore-offshore northern shrimp fishery has suffered a drastic decline in recent years.

Lobster fishing had primarily been an inshore pot fishery under state management before offshore otter trawl and then pot fisheries developed on Georges Bank in the 60's and 70's. The Massachusetts lobster fishery can be divided into three components: coastal commercial, coastal recreational, and offshore commercial. Total 1978 lobster landings and value for all components were 8.9 million

pounds (Anderson, 1979) worth $16.9 million. This comprised approximately 25% of U.S. landings (Table 8). The coastal commercial lobster fishery is further divided into regular and seasonal licenses. Since 1975, the regular commercial fishery has been limited to a maximum of 1430 licenses to control expansion of the fishery and reduce the risk of overfishing. Due to new legislation effective 1981, 130 licenses will be added from a list of applicants with fisheries experience. Thereafter, 100 licenses will be added each year. Seasonal commercial licenses are issued only to fulltime students (288 in 1979), permitting them to fish a maximum of 25 pots from June 15 to September 15. Coastal recreational lobster licenses (Table 9), allow sportfishermen to dive or fish up to 10 pots for family consumption, 10479 licenses were issued in 1979. The third license category, the offshore permit, allows lobsters caught in out-of-state waters to be landed in Massachusetts. The reported 1978 offshore catch was 1.9 million pounds, valued at $3.6 million (Anderson, 1979). This fishery is conducted by pot and otter trawls on board vessels primarily out of Harwich, Sandwich, and Westport. Many of the 521 offshore permits issued in 1979 were to finfish boats to allow them to land lobsters caught incidental to trawling operations outside state waters.

Although commercial license holders comprise only 18% of lobster fishermen, in 1978 they landed almost 97% of the reported lobster catch. Most of the lobstering activity occurs in Essex and Plymouth counties, which accounted for 61% of total licenses and 62% of pounds caught in 1978. In the same year, the total value of lobsters landed plus boat, pot, and diving gear value was $34.2 million. The value of the Massachusetts lobster fishery has increased over the years, as has the number of participants. Even though coastal commercial licenses have been limited since 1975, the number of licenses issued in all categories has increased 28% from 1976 to 1979 (Table 9).

Red crabs are large, deep water (250-400 fathoms), offshore crustaceans that support a small pot fishery based in New Bedford. The fishery was worth almost a million dollars in 1979 (Table 5). Crabs are cooked onboard the vessels and shucked onshore. The meat is frozen in five pound blocks, and the legs are sometimes individually quick frozen (IQF).

Northern shrimp are a small but long-lived (six years) shrimp species that has sustained a trawl fishery in the Gulf of Maine off and on for over 40 years. Massachusetts, Maine, and New Hampshire boats began to seriously exploit this resource in the early 60's, but by the 70's the declining fishery faced reduced fishing seasons and catches.

The shrimp trawl fishery out of Gloucester between 1969 and 1975 annually averaged 6.4 million pounds landed and up to $5 million in value. The fishery, formerly conducted year round off Gloucester by as many as 52 boats in 1973, has declined to a short winter fishing season with annual catches not exceeding a million pounds since 1976. Although

explanations for the decline differ, a probable combination of overfishing and unfavorable environmental conditions reduced the shrimp population in spite of joint management efforts by Massachusetts, Maine, New Hampshire, and NMFS under the auspices of the Atlantic States Marine Fisheries Commission (ASMFC).

4. Recreational Angling

Recreational angling was always presumed to be a small component of Massachusetts fisheries. However, recent NMFS estimates infer that sportfishing accounts for a surprisingly large amount of the edible fish harvest possibly 40-50% as much as commercial fishing, most of which goes unreported.

Because recreational fisheries are so difficult and expensive to survey, statistics are incomplete and imprecise. In addition, because fishermen are unlicensed, fish at irregular times, and over large areas, it is difficult to estimate the real value of sportfisheries. In Massachusetts one can land and sell a giant Atlantic bluefin tuna for $1,500 without a commercial rod and reel license, while someone who catches and sells $63 worth of scup (based on estimated 1980 value for 100 pounds plus one fish) must be licensed. Many anglers sell thousands of pounds of fish each year and still consider themselves recreational fishermen.

In the recent federal recreational fishing survey conducted in 1979 (NMFS, 1980), an estimated 776,000 people made over 2.7 million salt water fishing trips in Massachusetts. Interestingly, 275,000 (35%) of the total recreational anglers were non-residents, indicating that sport fishing is an important attraction for tourists (Table 1). In New England, the average fishing trip lasted 3.9 hours, cost $10.60, and involved traveling 30.3 miles (Table 11). Incidental expenditures by Massachusetts fishermen in 1979 was estimated at $30 million. Of the four fishing categories, private/rental boat fishing was the most successful, averaging 6.2 fish caught per trip, accounting for 79% of the weight of fish caught and 54% of the trips in the region. The U.S. Coast Guard's Annual Boating Statistics for 1977 reported 170,000 private marine recreational boats in Massachusetts. It was estimated (Bromberg, 1973, cited in Nicholson and Ruais, 1979) that in 1973 there were 34,390 private boats in Massachusetts used in salt water angling. The federal fishing survey revealed that Massachusetts fishermen caught 20.5 million fish, 56% of the total fish catch (numbers) in New England. The species most sought after by fishermen in the region (Table 12) were bluefish (24%) and winter flounder (19%), while 26% of the fishermen had no preference. The most commonly caught species in Massachusetts (Table 13) in terms of millions of fish were winter flounder (10.2), cod (1.8), pollock (1.5), and mackerel (1.1).

Accurate estimates of total economic impact of recreational fishing are difficult to obtain because they involve estimates of sales of fishing tackle, boats, motors, trailers, fuel, food, lodging, travel

expenses, insurance, and other costs. In 1975 an estimated $3.4 billion (U.S. Dept. of Interior, 1977) was expended nationwide on saltwater fishing. In New England and New York in 1975, after sales, value added, wages and capital expenditures were considered, the total economic impact of recreational fisheries was $610 million, with an estimated 8,300 people employed (Centaur, 1977, as cited by Nicholson and Ruais, 1979). Assuming that 20% of the value and employment figures were generated in Massachusetts (based on 20% of total fishing trips in New England and New York area 1979), then the Commonwealth's recreational fisheries total worth was an estimated $122 million, and employed 1660 people in 1975.

Money spent by recreational anglers contribute to the Massachusetts restaurant, hotel, and tourism industries. Anglers support the charter and party boat, bait and tackle, and boat rental businesses. An estimated 91 party boats and 125 charter boats, with carrying capacity of 4,631 and 750 respectively, operate in Massachusetts (Nicholson and Ruais, 1979). Party and charter boats charge a fee for carrying saltwater anglers to fishing grounds. Party boats are usually large vessels with an average capacity of about 51 fishermen. The captain decides where and what to fish. While they pursue cod throughout the fishing year, other species fished include: winter flounder in spring; pollock, bluefish, fluke, and haddock in summer; and winter flounder, pollock, and haddock in fall. In contrast, charter boat fishermen have more choice in the species fished and most commonly seek bluefish and striped bass in the summer months. These boats are generally smaller and carry six or less people (limited by Coast Guard regulation).

While making 8% of the trips in New England in 1979, charter and party boats accounted for 10% of the recreational catch (Table 14). Data from Nicholson and Ruais, 1979, indicate that seasonal employment in the Massachusetts charter and party boat industries averages 250 and 283 people, respectively (Table 14).

There are 138 bait and tackle shops and 45 boat rental operations located in coastal Massachusetts that are dependent on recreational fishing. In addition, there are 148 public and private coastal boat launching ramps in Massachusetts waters, approximately one every eight miles of coastline. Assuming that two people are employed per boat rental and bait and tackle operation, the total estimate of people employed at some time of year by Massachusetts recreational fisheries, including charter and party boats, is 899 (Table 14). While the involvement of people and expenditure of money in recreational fisheries is probably large, the precise value of recreational fisheries in Massachusetts is still an unknown quantity.

Table 5. Massachusetts commercial landings and value of selected species and total landings and value for all species, 1977-1979 (in millions of pounds and millions of dollars).

	1977		1978		1979	
	Pounds	Value	Pounds	Value	Pounds	Value
Cod	41.4	13.7	49.2	17.2	81.3	23.9
Haddock	25.1	8.0	33.2	10.6	33.4	14.2
Pollock	16.2	2.4	21.6	3.8	19.7	4.0
Hakes	5.8	0.8	6.2	9.9	6.4	1.1
Yellowtail flounder	28.1	13.3	33.2	10.6	22.9	12.0
Other flounder	34.1	11.5	38.8	17.6	35.8	15.7
Redfish	14.2	2.2	13.1	2.3	16.1	3.6
Whiting	27.2	2.3	27.2	3.8	7.6	1.4
Sea herring	37.7	1.4	40.5	2.7	50.8	3.6
Atlantic bluefin tuna	1.6	1.1	2.1	2.1	2.1	3.2
Swordfish	0.8	1.2	4.2	5.6	3.7	5.8
Menhaden	17.4	0.4	49.0	1.2	29.0	0.7
Anglerfish	1.9	0.7	2.2	0.8	2.6	1.2
Total all finfish[1]	279.3	62.1	336.5	83.3	329.4	94.5
Lobster	5.1	9.3	7.3	14.4	7.7	16.0
Rock crab	0.1	-	0.3	0.6	0.2	0.1
Northern shrimp	0.5	0.3	0.1	-	0.9	0.3
Red crab	2.5	0.8	2.7	0.9	2.7	0.9
Total all crustaceans[1]	8.3	10.5	10.3	15.4	11.5	17.2
Quahog	0.3	0.7	0.5	0.9	0.5	1.5
Soft-shelled	0.1	0.3	0.1	0.2	0.3	0.7
Surf	0.2	0.1	-	-	-	-
Conch	0.1	0	0.1	0.1	0.1	0.1
B. scallop	0.2	0.5	0.3	1.1	0.3	1.4
S. scallop	17.0	28.0	17.0	42.2	14.2	48.3
Squid	3.1	0.5	1.2	0.2	7.0	2.0
Total all shellfish[1]	20.1	30.1	18.8	44.7	22.6	54.1
Total all species[2]	319.3	114.0	376.9	152.3	374.7	175.5

[1]NMFS, Massachusetts landings, 1978, 1979 with Massachusetts supplemental landings added. Totals include other minor species not listed above.

[2]NMFS, Fisheries of the United States, 1978, 1979.

Table 6. Combined commercial and recreational shellfish harvest and estimated value for Massachusetts in 1977 and 1978.

	1977		1978	
	Bushels	Value*	Bushels	Value*
Quahog	181,123	3,224,421	104,267	2,081,441
Soft-shelled clam	62,133	1,353,118	56,698	1,363,708
Oyster	23,403	386,510	4,978	86,397
Bay scllop	151,731	2,388,573	297,329	5,978,874
Razor clam	754	11,048	722	12,226
Sea clam	36,543	281,171	14,339	108,423
Mussel	24,914	73,371	15,312	95,805
Other	43,882	375,079	14,004	146,142
		8,093,291		9,873,016

* Calculated by using value of commercial harvest price/bushel, as reported by shellfish constables, to estimate the recreational catch value.

[1]Kilbride, 1978

[2]Anderson, 1979

Table 7. Number of shellfish permits issued by the local cities and towns of Massachusetts in 1977 and 1978.

	1977[1]	1978[2]
Resident family	33,036	31,254
Non-resident	4,776	3,995
Commercial	2,550	3,621
Other	915	2,973
	41,277	41,843

[1]Kilbride

[2]Anderson, 1979

Table 8. Massachusetts coastal and offshore lobster landings and values for 1977 and 1978 (in millions of pounds and millions of dollars).

	1977[1]		1978[2]	
	Pounds	Value	Pounds	Value
Coastal commercial	5,432,427	10,136,748	6,729,745	12,748,445
Coastal recreational	333,103	621,560	298,853	554,139
Offshore commercial	488,465	967,811	1,897,699	3,633,048
	6,253,995	11,726,119	8,926,297	16,935,632

[1]Kilbride, 1978

[2]Anderson, 1979

Table 9. Number of lobster licenses issued by the Division of Marine Fisheries from 1976 to 1979[1].

	1976	1977	1978	1979
Coastal commercial	1,369*	1,371*	1,368*	1,386*
Coastal seasonal	146	142	192	288
Coastal recreational	8,122	8,559	8,915	10,479
Offshore commercial	243	298	414	521
	9,880	10,370	10,889	12,674

[1]Division of Marine Fisheries license records.
*Moritorium on licenses.

Table 10. Estimated number of marine recreational fishing trips and participants in Massachusetts, 1979[1].

	Coastal Residents	Non-coastal Residents	Out-of-state Residents	Total Participants
Number of trips	2,015,000	166,000	562,000	2,743,000
Number of participants	454,000	47,000	275,000	776,000

[1]Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, 1979, NMFS, 1980.

Table 11. Estimated marine recreational fishery cost, effort, and catch statistics for New England region in 1979[1].

Method	Hrs	Mean Cost	Miles (one way)	# fish caught/trip	% weight fish caught	# of trips (thousands)
Pier/jetty	3.2	3.7	19.0	3.1	7	1,425
Beach	3.5	8.1	28.9	1.7	4	1,254
Party/charter	4.1	27.1	60.8	4.7	10	533
Private/rental	4.7	12.5	31.1	6.2	79	3,771
All methods	3.9	10.6	30.3			

[1]Marine Recreational Fishing Statistics Survey, Atlantic and Gulf Coasts, 1979, NMFS, 1980.

Table 12. Percentage of species sought and estimated number of fish caught by New England recreational anglers in 1979[1].

Species	Species sought as % of interviews*	Number caught (thousands)
No preference	26	-
Bluefish	24	4,824
Winter flounder	19	12,448
Mackerel	9	2,172
Cod	8	2,602
Striped bass	6	185
Other fish	6	2,499
Tautog	6	999
Pollock	4	2,277
Flounder, summer	3	571
Flounders	3	523
Smelt	3	644
Scup	3	4,581
Total catch all species		44,064**

* Exceeds 100% because of multiple answers.

** Total includes other species not listed.

[1]Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, 1979, NMFS, 1980.

Table 13. Estimated Massachusetts marine recreational fishery catch in numbers and percent for 1979[1].

Species	Number (thousands)	Percent
Winter flounder	10,249	45
Cod	1,835	8
Pollock	1,510	7
Mackerel	1,093	5
Bluefish	969	4
Scup	949	4
Tomcod	698	3
Smelt	521	2
Herrings	475	2
Flounder, summer	378	2
Black sea bass	330	1

[1]Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, 1979, NMFS, 1980

Table 14. Estimated number of people and vessels involved in recreational fishing support businesses in Massachusetts.

	Vessels or dealers	People
Charter boats[1]	125	250[1]
Party boats[1]	91	283[1]
Bait and tackle dealers[2]	138	276*
Boat rental dealers[2]	45	90*
TOTAL		899

[1]Nicholson and Ruais, 1979.

[2]Massachusetts Salt Water Fishing Guide.

*Estimated on the basis of two people per dealer operation.

5. Other marine resources

In addition to the well known commercial and recreational species, there are other marine organisms of substantial, but undocumented value. The bait fisheries supply recreational rod and reel fishermen, and party and charter boat operators with seaworms, shellfish, and finfish for bait. Seaworms are the most valuable bait species, and bring about $2.50 per pound to the diggers. Squid, surf clams, ocean quahogs, and grossly contaminated soft-shelled clams are commonly used as bait for cod, haddock, mackerel, and flounder. Menhaden, minnows, small eels, and certain small shrimp species provide biat for striped bass, bluefish, and smelt. Small unmarketable finfish and refuse from processed commercial species are employed for lobster bait. While bait fisheries are undoubtedly valuable, estimates of actual value are not available.

Marine algae are sometimes harvested for food purposes. In Canada dulce is gathered and dried for human consumption. In Massachusetts, particularly on the South Shore, Irish moss (Chondrus crispus) is raked from intertidal rocks and processed for carrageen, a binding substance used in ice cream, makeup, and other products. Irish moss harvest in 1978 was reportedly valued over $14,000 (Anderson, 1979).

Other commercial and recreational fisheries exploit marine species on a small scale basis. Periwinkles and limpets are harvested to fill ethnic market demands. Horseshoe crabs are in demand not only for eel bait, but also for medical research. Blue claw crabs support a popular recreational dipnet fishery in Nantucket Sound. Adequate data does not exist to substantiate the actual value of these fisheries.

In recent years, public appreciation of the marine environment's aesthetic values have increased. The annual spring alewife runs attract hundreds of spectators. The public is willing to expend money to observe marine fauna in their natural habitat as indicated by the popularity of whale watching and SCUBA diving. Because these activities support commercial ventures it underlines the importance of maintaining the quality of the marine environment.

6. Marine Habitats

The coastal areas of Massachusetts contain numerous natural habitats that provide spawning, nursery, and feeding areas for important forage, sport, and commercial marine species. Massachusetts has tried to maintain the delicate balance between man and nature by the passage of legislation to protect these habitats.

In 1963 Massachusetts enacted and implemented one of the nation's first wetlands protection laws. The Jones Act (M.G.L. c. 130, s. 27A) prohibits alteration of saltmarshes, tidal flats, and banks bordering on coastal waters without approval by local authorities, the State

Department of Public Works, and the Director of the Division of Marine Fisheries. In 1965, an act for the Protection of Coastal Wetlands (c. 130, s. 105) was enacted authorizing the Commissioner of the Department of Environmental Management to restrict certain uses of coastal wetlands. In 1972 M.G.L. c 130, s. 27A was repealed and combined with its inland wetlands counterpart the Wetlands Protection Act (Hatch Act). Collectively they formed section 40 of Chapter 131 which prohibits removing, filling, dredging, or altering any bank, beach, dune, river, pond, lake, or coastal wetland without approval of local conservation commissions. Other habitat protection legislation include the waterways program (M.G.L. c. 91), Ocean Sanctuaries (M.G.L. c. 132A, s. 13-17) and water quality certification program (M.G.L. c. 21).

a. Saltmarsh Areas - Saltmarshes play an important role in the biological productivity of adjacent coastal waters. They stabilize the shoreline and are rich in organic nutrients. It is well documented (Odum, 1961 and Teal, 1962) that these areas are the most efficient primary producing environments on earth and provide natural spawning, feeding, and nursery areas for forage (herring, smelt), sport (striped bass, bluefish), and commercial (winter flounder) marine species. Sheltered waters and grasses also provide important nesting and feeding areas for numerous species of waterfowl, and invertebrates. In Massachusetts, an estimated 25,470 plus acres are protected under Chapter 130, section 105 and Chapter 131, section 40. The largest is the Parker River-Plum Island area where an estimated 8,410 acres of saltmarsh are protected. Other areas that have sizeable acreage of protected saltmarsh include the North River estuary, Essex Bay, Plymouth-Kingston-Duxbury Bay, Pleasant Bay, and Barnstable Harbor-Sandy Neck area. Smaller saltmarshes include Annisquam River, Lynn-Saugus area, Dorchester and Hingham Bay, Wellfleet Harbor, Westport River, Waquoit Bay-Eel Pond, and Bass River.

   Although some of the saltmarsh areas are privately owned and subject to local taxes, very little direct economic benefit is derived other than the harvesting of high water cord grass known as salt hay. In colonial times hay was extensively used for thatching roofs and for cattle bedding and fodder, however small amounts are harvested today for garden mulch and insulation. The majority of salt hay comes from the Parker River-Plum Island area where in 1965, 439 tons at a revenue of $10,975 were harvested (Jerome, Chesmore, Anderson, 1968). In addition, 20 acres of salt hay selling for $750. was harvested in the Mount Hope Bay-Taunton River area in 1974 (Curley, Lawton, et al. 1974).

b. Shellfish Beds and Areas - Productive shellfish areas exist throughout the coastal area. It is estimated that over 25,000 acres of estuaries, bays, intertidal areas, and beaches provide niches for valuable commercial and recreational shellfish such as soft-shelled clams, quahogs, bay scallops, razor clams, and oysters. Unfortunately a majority of productive areas are closed due to sewage contamination. Boston Harbor, Quincy Bay, and Hingham Bay have extensive contaminated soft-shelled

clam beds which are closed to all harvesting except for some areas open for depuration. While areas on the South Shore such as Cohasset, certain parts of Plymouth Bay, Mount Hope Bay, and New Bedford Harbor are closed to most shellfishing, primarily for quahogs. Substantial soft-shelled clam populations exist in the Annisquam River area, and Plum Island Sound estuaries of the towns of Essex, Ipswich, Rowley, Newbury, and Newburyport. Portions of these areas are also closed because of contamination. The South Shore and Cape and Islands areas contain major populations of uncontaminated quahogs, bay scallops, and oysters.

Extensive beds of quahogs can be found in the bays and estuaries of Westport, Bourne, Barnstable, Wellfleet, Pleasant Bay, and Nantucket Harbor. Bay scallops tend to inhabit protected estuaries and bays. Bourne, Lewis Bay, Pleasant Bay, Nantucket Harbor, and Wareham in the past have all reported substantial landings by commercial and recreational fishermen. A large oyster population has been documented in Wellfleet Harbor while minor populations are found in Wareham, Bourne and the great ponds on Martha's Vineyard.

Surf clams provide a small but growing commercial dragger fishery located around Cape Cod and the Islands. Large beds are fished in Cape Cod Bay off Sandy Neck, Barnstable and from Provincetown to Wellfleet in the Billingsgate Shoal area. Other surf clam areas include the south side of Martha's Vineyard, outer Cape Cod, and Horseneck Beach, Westport.

Mussels have recently gained in popularity as a desirable food item. They are found attached to rocks, piers and other stationary objects. Large beds have been found in Sandwich and Barnstable Harbors, and at the mouth of the North River.

c. Anadromous Fish Runs - Anadromous fish species such as alewives, smelt, and shad are important to the sport and commercial fisheries of Massachusetts. In 1935 the Division of Fish and Game initiated a program of fishway construction and maintenance to allow the passage of alewives around dams and other obstacles during their spring runs. When the Division of Marine Fisheries was established in 1943, it assumed anadromous fish restoration responsibilities. The Division maintains and has enhanced or constructed approximately 95 fishways.

The alewife or "river herring" are the most abundant anadromous fish in Massachusetts. They spawn from April to May when water temperatures range from 55-66°F. An estimated 90 rivers, ponds, and brooks support spawning runs. Major runs exist in the Parker, Charles, North, Town Brook, Herring (Bourne), Stoney Brook, Agawam, Nemasket, and Palmer Rivers, with most being town regulated. After spawning, adults return to the sea leaving the fertilized eggs to hatch later in the spring. Young, 2-4" herring spend summer in the ponds then migrate downstream to the sea in the fall. Adult herring are valuable as prey or forage for sportfish and are a source of bait for lobster and recreational fishermen.

Blueback or summer herring are usually managed as if they were alewives, but are actually a separate species. They spawn in many of the same rivers as alewives but later when temperatures reach 70-75°F.

An estimated 12 rivers in the Commonwealth support shad spawning populations with an active sportfishery in the Indianhead River tributary of the North River, the Parker River, Palmer River, and Connecticut River. Shad are also occasionally caught in the Merrimack River, South River (Marshfield), and Runnings River (Seekonk). In addition, the Division is restoring populations in the Charles and Taunton River systems. Shad are the largest of the herring family attaining an average adult weight of three pounds. They spawn somewhat earlier than alewives when water temperatures reach 50°F, then return to the sea. The eggs hatch on sandy substrate in 12-15 days, and the young migrate to the sea in autumn.

Rainbow smelt occupy an estimated 25 rivers and streams during the early spring spawning period when water temperatures reach 40°F. They ascend streams for short distances to lay their eggs in clusters on gravel bottom. The young hatch in 10-13 days and move back out to sea during the summer. Smelt are highly prized as a food fish, and a substantial fall and winter fishery exists in many bays and estuaries during the June 16 through March 14 open season. North of Boston, the Parker, Rowley, Essex, Mill, and Annisquam River estuaries provide the best fishing while to the south the Weir, Jones, Agawam, and Weweantic Rivers are the most popular.

d. Beach types - Miles of barrier beaches, rocky shore lines, and open ocean beaches comprise a substantial area of Massachusetts coastline. Rocky shorelines to the north of Boston include the coasts of Swampscott, Marblehead, Beverly, Rockport, Gloucester, and Manchester ending at the barrier beaches of Plum Island. The rocky areas provide valuable habitats for lobsters, mussels and various sessile (i.e. bottom attached) animals. The bedrock, tidal pools and kettle holes house a variety of marine life such as periwinkles, limpets and sea urchins while numerous amounts of Irish moss and rockweed grow throughout the area.

Toward the South Shore the rocky terrain gradually becomes sandy beach interspersed with barrier beaches. Barrier beaches are sandy, low, sparesly vegetated peninsulas or islands that protect a saltmarsh from the sea. Barrier beaches are ever-changing due to the action of waves and wind. The beach areas of Scituate, Marshfield, and Plymouth's Long Beach have been altered by erosion and residential development which has disrupted the large colonies of terns and gulls that traditionally nest there. High, sandy bluffs stretching from Plymouth to Sagamore are eroding at a rate of approximately 2-3 feet per year. Lobster and surf clam populations are quite dense in this area just off the beach and heavy fishing effort is conducted.

Southern areas facing Buzzards Bay from Wareham to the Rhode Island

border are densely residential and industrial regions with the major ports of New Bedford and Fall River. Large portions are rocky and gravel but some small beach areas can be found. A large barrier beach is located in Westport at Horseneck Beach. This area receives extensive recreational use and provides good surfcast fishing.

Cape Cod accounts for over 300 miles of the total 1,200 miles of Massachusetts coastline. In Cape Cod Bay there are numerous barrier beaches such as Sandy Neck (Barnstable), Chapin Beach (Dennis), Wellfleet, and the Provincelands. The Cape Cod National Seashore and Monomoy on the outer side, and ocean beachs of Chatham, Harwich, Yarmouth, Mashpee, and Falmouth on the southside comprise many miles of coastline primarily used for recreational purposes. Surfcast fishing has been an active recreational pursuit on most of the Cape beaches and migratory fish such as striped bass and bluefish can be caught from the shore and jetties.

South of Cape Cod, the islands of Martha's Vineyard and Nantucket, and the Elizabeth Island chain form the remaining areas of Massachusetts coastline. Martha's Vineyard has approximately 50 miles of varied coastline from the unique clay cliffs of Gay Head and rocky terrain of Chilmark to the sandy beaches of the southside of the Island. Chappaquidick and Cape Poge to the east of Martha's Vineyard contain approximately 15 miles of open beach and dunes on the eastern part of the Island and are protected by a wildlife trust. Wasque Beach is a popular site for sportfish surfcasting. Shifting sands and erosion along the southern beaches have greatly altered the coastline affecting sizeable populations of nesting terns. Nantucket Island consists mainly of sandy bluffs and exposed beaches. Due to its location on the eastern seaboard, it is vulnerable to storm damage and extensive erosion has occurred in many areas. The Elizabeth Island chain separates Vineyard Sound to the southeast from Buzzards Bay to the northwest. Fifteen islands totaling over 8,300 acres are mainly rocky with a few small sandy beaches. With the exception of Cuttyhunk and Naushon, the islands are privately owned and have remained in a more natural state than most coastal land in Massachusetts.

e. Subtidal area - The territorial waters of Massachusetts have the distinction of providing two marine environments markedly differing in physical, chemical, and biological factors resulting in diverse marine fauna. Divided by the land masses of Cape Cod and Nantucket Shoals, the waters of Cape Cod Bay and Massachusetts Bay are characterized by cold water and strong tidal currents while the southern areas, influenced by the Gulf Stream are warmer, less current affected, and support different species. Temperature and salinity varies with depth, bottom type, and current. Overall surface water temperatures in both areas range from -1°C in February to 25°C in August (Bumpus, 1973). Salinities range from 24-35 ‰ depending on the proximity of estuaries, salt ponds, and spring to early summer runoffs (Bumpus, 1973). Depths vary, with the north shore areas averaging from 9 to 55 m and predominately rocky, to major portions of Cape Cod Bay averaging from 18 to

36 m with a bottom of relatively smooth sand and mud. Vineyard and Nantucket Sounds have primarily sandy substratum marked by numerous shoals and depths averaging 9 to 18 m. Buzzards Bay, also shallow (9-18 m) is mainly rocky and uneven (Howe, et al., 1979).

Non-tidal currents along the Massachusetts coast flow in a southerly direction turning westward southeast of Nantucket Island (Bumpus and Lauzier, 1965). A branch enters Cape Cod Bay along the western shore, circulates counterclockwise, and rejoins the main flow. Within Cape Cod Bay tidal currents are parallel to the coast, while in Massachusetts Bay they are perpendicular (Bumpus, 1974). Nantucket and Vineyard Sounds show strong (almost 3 knots) tidal currents with a net easterly drift, while a counterclockwise drift appears to exist in Buzzards Bay (Bumpus, 1973).

Water temperature and bottom type are two controlling factors that determine distribution and seasonal abundance of marine fish and crustaceans. With the two distinct bodies of water existing in Massachusetts' territorial sea a great diversity of species of fish can be found. Information from recent groundfish surveys conducted by the Division's Resource Assessment Program showed that some species are specific to an area or bottom type. Grey sole are caught in state waters only on smooth bottom, whereas winter flounder are found throughout Massachusetts waters at many depths and on virtually all bottom types. In contrast, tautog are most abundant south of Cape Cod in shallower water (less than 18 m) and inhabit broken bottom near rock outcroppings (Howe et al., 1979). Resident species such as cod, the hakes, ocean pout, longhorn sculpin, yellowtail, winter flounder, American plaice, skates, lobster, and rock crabs are widespread over inshore grounds in early spring. As water temperatures warm these species intermingle with migratory fish such as scup, black sea bass, summer flounder, herring, mackerel, butterfish, and dogfish sharks which have moved shoreward and northeasterly from wintering grounds. Sportfish such as striped bass and bluefish are also included in this migratory group but tend to have a near shore movement (Howe et al., 1979). As water temperatures rise, migratory species advance northerly, some only into Cape Cod Bay and others into the Gulf of Maine. Resident species tend to disperse into deeper, cooler water (Howe et al., 1979).

The subtidal area serves as an important spawning ground for a great many species, particularly from April to September. Loligo squid, scup, black sea bass and searobin spawn in Buzzards Bay-Nantucket Sound in the spring. In Ipswich Bay, herring spawn in spring and northern shrimp hatch out their eggs in winter. Many eggs and larvae drift southward from the Gulf of Maine and young of the year fish move from the estuary nursing grounds into nearshore areas.

B. Fishing Ports

There are 51 commercial fishing harbors in Massachusetts (Figure 1). Five ports (based on 1977 landing exceeding $1 million) are considered primary

ports: Gloucester, New Bedford, Boston, Provincetown, and Sandwich. Other ports of importance are: Chatham, Plymouth, Scituate, Hyannis, Martha's Vineyard (four harbors), Nantucket, Newburyport, and Beverly-Salem. Each port differs in number and types of vessels, processors, port facilities, and species landed. Within each port, the catch varies with fluctuations in fish prices and seasonal fish migration. Addition of new boats, transient nature of the fleet, and seasonal gear changes (e.g. from lobstering to gill netting) make it difficult to categorize the numbers and types of vessels in each port. According to DMF estimates, these 11 ports in 1977 accounted for 252 million pounds of fish (not including sea scallops, shellfish, and lobsters), valued in excess of $55 million, employing an estimated 2258 fishermen on 565 finfish boats (Table 15). In 1979, the number of finfish boats in these 11 ports increased to an estimated 628 (Table 16, Martha's Vineyard and Nantucket totals were estimated). Landings in the five major ports in 1979 accounted for 84% of the catch and 73% of the value of all commercial species landed in Massachusetts.

1. Gloucester

Gloucester is a fresh fish harvesting, and fresh and frozen fish processing port. It has consistently been the leading New England port in volume landed and is ranked seventh nationwide. In 1979, 160.2 million pounds of fish worth 29.7 million dollars (Table 17) were landed in Gloucester by a fleet of 369 vessels (Table 16). Finfish vessels numbered 243, and consisted of offshore and inshore trawlers, gillnetters, seiners, herring pair trawlers, and Danish seiners. The 126 lobster boats made this port the leading lobster center on the North Shore. Groundfish, whiting, menhaden, sea herring, redfish and shrimp are important to the fresh fish industry. The areas fished include the Gulf of Maine and Georges Bank.

While fresh fish is important to the fishermen, only one out of the 12 processors deal solely in fresh fish. Much of the fresh fish is shipped to New Bedford, New York, and Philadelphia. The lack of adequate processing, cold storage, and offloading facilities restricts the quantities that can be landed and the price paid. Many processors deal with imported frozen fish and fish blocks.

2. New Bedford

New Bedford has the highest catch value of any east coast port and is noted for both fresh fish and scallops worth over $40 million in 1977. Scallops accounted for $20.2 million or half the value of the total catch. The 164 finfish, 50 scallop, and 17 lobster boats, landed 86.0 million pounds of fish valued at $67.4 million in 1979. Many of the draggers are new steel hulled vessels. Fishing is conducted for scallops on Georges Bank and Nantucket Shoals, for yellowtail on Nantucket Shoals and Rhode Island Sound, and for cod and haddock on Nantucket Shoals and Georges Bank.

Twelve of the fifteen processors handle fresh fish, mostly flounder,

cod, and haddock. In 1977, an estimated 700 to 800 people were employed in fish processing. Although processing and cold storage facilities exist, docking space is limited.

3. Boston

While Boston ranked third in Massachusetts in pounds landed (30.3 million) in 1979, it is primarily a center for fresh fish importing and processing. Fresh fish is trucked in from Canada, Maine, and other Massachusetts ports. Boston's 21 fresh fish and 5 frozen fish processors deal in cod, haddock, flounder, and redfish.

The 37 finfish vessels range from small gill net boats fishing outside Boston Harbor to large offshore trawlers fishing Georges Bank and the Gulf of Maine. While the docking space is adequate for the number of vessels, offloading and processing facilities need improvement. Massport (Massachusetts Port Authority) has undertaken the task of remodeling and improving the Boston Fish Pier's facilities.

Centered around the Boston Fish Pier is the largest lobster landing, importing, and wholesale center in Massachusetts. Numerous dealers purchase lobsters from the 98 lobster boats moored throughout the harbor. In 1977 over 788,000 pounds of lobsters worth $1.5 million were landed in Boston.

4. Provincetown

In 1979 this port landed 23.4 million pounds of mostly flounder, cod, and scallops worth $10.3 million. This represents an increase of over 5 million pounds since 1977. Many Boston and New Bedford vessels contribute to the landings of the Provincetown fleet of 44 finfish, 4 scallopers, and 6 lobster vessels. The addition of 25 vessels over the past four years has aggravated the berthing conditions on the deteriorating town wharf. Lack of ice and cold storage facilities means that ice must be trucked in from New Bedford and fish trucked out immediately after landing. Two wholesale buyers truck fresh fish to Hyannis for freezing and chilling and then on to markets in Boston, New Bedford, New York, and Philadelphia.

5. Sandwich

The Sandwich fleet increases from about 18 finfish and scallop boats in summer, to about 30 during the winter. When recreational boats leave the basin at the east end of the Canal, vessels from New Bedford and Provincetown return. Fourteen lobster vessels are based in Sandwich. Landings in 1979 totaled 17.5 million pounds worth $9.8 million, up almost $5 million from 1977. Three processors handle fresh fish, shellfish and lobsters. A fourth processor, with two freezer plants, buys mackerel, menhaden, and sea herring.

6. Other Ports

Many of the Plymouth and Scituate vessels fishing for cod, yellowtail, winter flounder, and swordfish land at either port. In 1979, there were 14 finfish and 31 lobster boats in Plymouth, and 19 finfish and 12 lobster boats at Scituate. A number of lobster boats switch to cod gillnetting during the winter. At both ports, boats tie up at the town pier, ice is delivered, and fish shipped by truck.

Chatham has a unique fishing fleet because of the harbor's physical characteristics. A shallow sand bar at the entrance to Pleasant Bay limits the 88 vessels (1977) to 30-50 feet in length. In 1977, most of the smaller vessels (20) jigged for cod, while the larger boats (68) primarily longlined for cod and flounder. By 1979, almost all the longline boats had switched to gill nets. Although catches have increased because of gill nets, many fear damage to the cod stocks and a lessening of the previously high fish quality. There are two buyers that ship the catch to markets in Boston and New York.

Hyannis' small commercial fleet is limited in summer to six vessels (1979), because of competition from recreational vessels for the scarce berthing space. During the winter as many as 16 scallop and finfish boats land in Hyannis and sell to the one local buyer.

Martha's Vineyard has four ports: Vineyard Haven, Oak Bluffs, Edgartown, and Menemsha. Menemsha is the main commercial port for the Island's finfish, scallop, lobster, and swordfish fisheries. The Island has four buyers, one in Vineyard Haven, two in Menemsha, and one in Edgartown. Except for Menemsha, commercial docking facilities are limited.

As with other ports in vacation areas, the commercial fleet in Nantucket must make way for recreational boats, especially in summer. The local scallop and finfish fleet swells to over 32 in summer during the squid and fluke season, putting a further strain on dockage facilities. There are three buyers on Nantucket, but fish are shipped to the mainland and most of the locally consumed fish is shipped in from Hyannis.

C. Resource Management Zones

Fish distribution, bottom type, vessel size, and gear type are all factors influencing where fishing is conducted. Other factors are the resource management areas controlled by federal, state, and local governments. These areas are primarily controlled for environmental and resource management purposes, however, some are restricted due to contamination. The following is a discussion of regulated resource areas affecting Massachusetts fisheries.

1. Fisheries Conservation Zone (FCZ)

The federal Magnuson Fisheries Conservation and Management Act (MFCMA) of 1976 (200 mile limit) established federal authority over management of fisheries from state territorial seas out to 200 nautical miles.

Table 15. Massachusetts fishery statistics for selected ports.[1]

1977

	Total pounds landed	Total value	Total boats	Total fishermen
Gloucester	147,646,535	$20,852,897.	180	650
New Bedford	62,219,000	22,232,697.	124	750
Boston	22,251,298	5,960,077.	37	175
Provincetown	8,360,000	2,686,040.	44	174
Sandwich	4,996,000	1,930,106.	16	31
Chatham	3,050,000	838,470.	88	207
Plymouth	1,770,000	528,000.	14	50
Scituate	775,000	282,000.	22	80
Hyannis	613,600	191,000.	7	12
Martha's Vineyard	283,960	228,282.	21	88
Nantucket	19,903	9,177.	12	41
Totals	251,985,296	$55,738,746.	565	2,258

[1]Source: The Commercial Fisheries of Massachusetts, 1977, Division of Marine Fisheries.

Table 16. Estimated numbers of vessels for selected ports, 1979.

Gloucester

243 finfish
126 coastal lobster

New Bedford

164 finfish
50 sea scallopers
17 coastal lobster

Boston

20 finfish
98 coastal lobster

Provincetown

44 finfish
4 sea scallopers
6 coastal lobster

Chatham

68 finfish
5 sea scallopers
8 coastal lobster

Plymouth

14 finfish
31 coastal lobster

Scituate

19 finfish
12 coastal lobster

Hyannis

6 finfish
1 sea scalloper
1 offshore lobster

Sandwich

17 finfish
1 sea scalloper
14 coastal lobster

628 - Total finfish boats for above major ports (Martha's Vineyard and Nantucket estimated).

Estimated total for all Massachusetts ports, 1979.

Finfish:	735
Sea scallopers:	76
Coastal lobster:	1243
Offshore lobsters:	27

Source: Division of Marine Fisheries, 1980.

Table 17. Commercial landings at certain Massachusetts ports[1] and total Massachusetts landings for 1977 to 1979[1] (millions of lbs, millions of dollars, all species).

	1977		1978		1979	
	Lbs	Value	Lbs	Value	Lbs	Value
Gloucester	150.9	21.5	185.1	28.9	160.2	29.7
New Bedford	75.5	43.2	71.9	54.6	86.0	67.4
Boston	22.2	6.0	27.3	8.1	30.3	10.7
Provincetown	17.9	6.9	19.9	9.1	23.4	10.3
Sandwich	15.3	5.0	(*)	(*)	17.5	9.8
Total Massachusetts	319.3	114.0	376.9	152.3	374.7	175.5

(*) Not reported to avoid disclosure of private enterprise.

[1]NMFS, Fisheries of the U.S. 1977, 1978, 1979.

Figure 1. Massachusetts commercially important ports and harbors.

1. Newburyport-Salisbury
2. Newbury
3. Ipswich
4. Rockport
5. Gloucester
6. Manchester
7. Beverly-Salem
8. Marblehead
9. Swampscott
10. Lynn
11. Nahant
12. Saugus
13. Winthrop
14. Boston
15. Hull
16. Quincy-Hingham
17. Cohasset
18. Scituate
19. Green Harbor
20. Plymouth
21. Ellisville
22. Sandwich
23. Barnstable
24. Sesuit
25. Rock Harbor
26. Wellfleet
27. Pamet River
28. Provincetown
29. Nauset Town Cove
30. Chatham
31. Stage Harbor
32. Saquatucket Harbor
33. Wychmere Harbor
34. Allens Harbor
35. Bass River
36. Hyannis
37. Cotuit
38. Green Harbor
39. Falmouth Inner Harbor
40. Woods Hole
41. West Falmouth
42. Little Bay
43. New Bedford
44. Westport
45. Cuttyhunk
46. Menemsha
47. Vineyard Haven
48. Oak Bluffs
49. Edgartown
50. Madaket
51. Nantucket

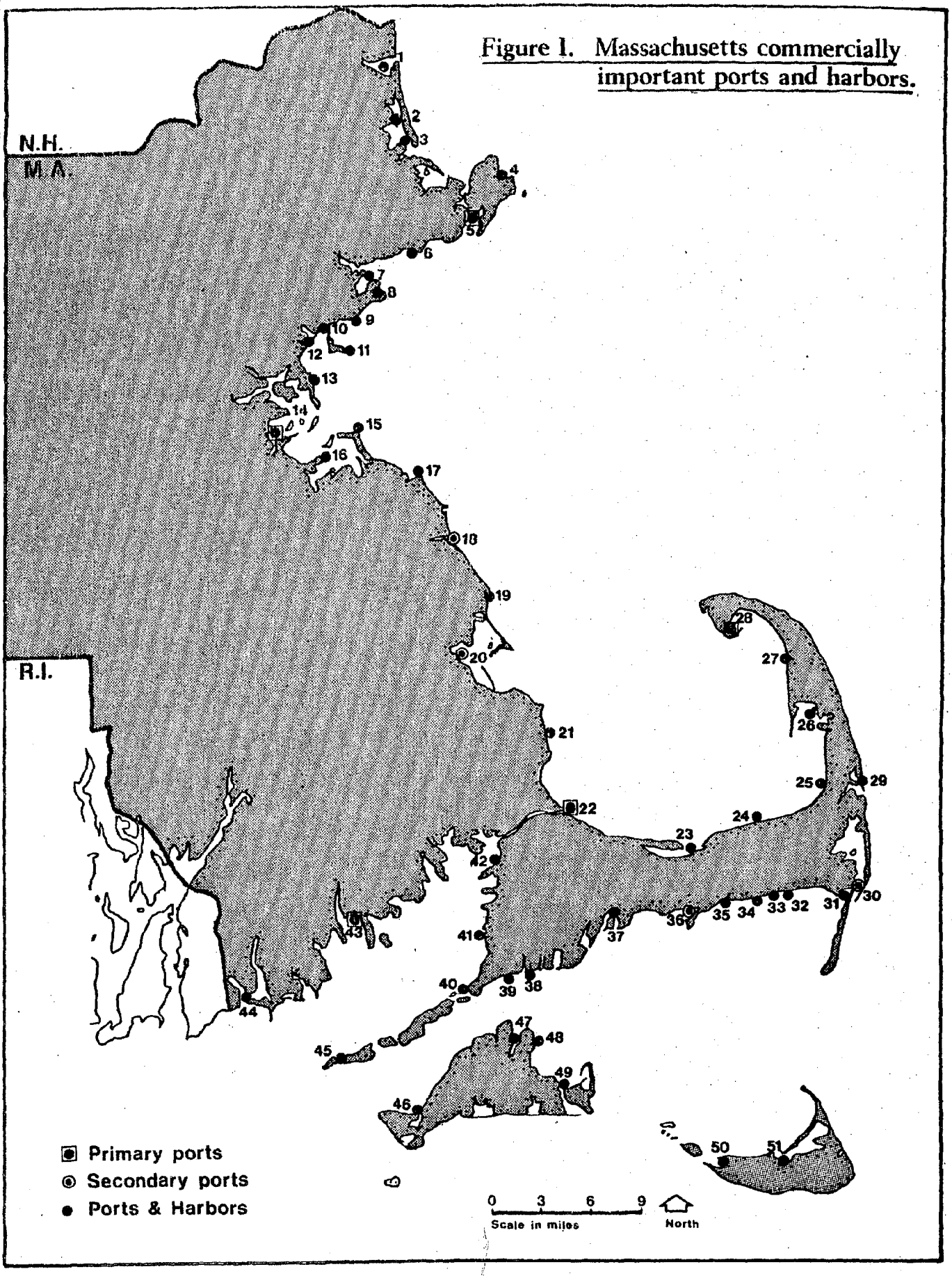


Figure 1. Massachusetts commercially important ports and harbors.

With regulations promulgated by the New England Fisheries Management Council (NEFMC), the National Marine Fisheries Service (NMFS) has the authority to enforce regulations for foreign and domestic fishing in this zone. A state must manage fish stocks common to state territorial seas and the FCZ consistent with NEFMC fisheries management plans, or face the possibility of pre-emption of management authority by the Secretary of Commerce.

The New England Council has fishery management plans in place for groundfish (cod, haddock, and yellowtail) and sea herring. A sea scallop plan has been submitted to the Secretary of Commerce and management plans for lobster, silver hake, other hake, redfish, red crab, and pollock are under various stages of development. The Mid-Atlantic Fisheries Management Council has approved management plans for butterfish, surf clams, ocean quahogs, mackerel, and squid (both Loligo and Illex).

2. Massachusetts Territorial Waters

The Massachusetts territorial sea extends three miles (amended from three nautical miles) from the mean low water mark covering over 1,200 miles of coastline and over 1600 square nautical miles of ocean. In addition, the internal waters under jurisdiction of the Commonwealth include bays and inlets where a baseline from headland to headland is drawn to represent the shoreline. The internal waters extend seaward three miles from the baseline. Under this provision the western portion of Massachusetts Bay, southwest Buzzards Bay, and all of Cape Cod Bay fall under the Commonwealth's jurisdiction (Figure 2).

The Commonwealth manages most living marine resources in the territorial waters, and generally regulates consistent with FCZ regulations. Marine mammals are protected by the National Marine Fisheries Service. Endangered species are protected by both the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Control over shellfish (in uncontaminated waters), sea worms, and eels is exercised by cities and towns. Local communities may manage alewives if the Director approves their petition to do so. Town jurisdiction extends only to three miles and does not include central Cape Cod Bay and western Massachusetts Bay.

Management actions can be enacted either as statutes by the Legislature or as regulations promulgated by the Division of Marine Fisheries. Statutes enacted by the Legislature are codified under M.G.L. c. 130, General Laws relating to Marine Fish and Fisheries. However, many statutes or special acts dating back hundreds of years have not been codified, and in some cases are antiquated, conflicting, or unenforceable. Under M.G.L. c. 130, s. 17A (approved 1962) the Director of the Division has the power, with approval by the Marine Fisheries Advisory Commission, to specify the manner, size, quantity, season, hours, and areas by which fish may be taken. The Attorney General's Office is of the opinion that regulations promulgated under authority of s. 17A (10) supercede conflicting special acts. Founded in 1960, the nine member commission is made up of commercial and recreational fishermen,

people associated with the commercial and recreational fisheries, and other individuals chosen for their knowledge and experience in marine fisheries. The Commission reviews, comments, and votes on regulations affecting Massachusetts marine fisheries; discusses fisheries problems and issues; and recommends solutions. It works closely with the Director in matters pertaining to the Division and its programs and advises on policy matters.

Certain areas of the Commonwealth's internal waters have fishing gear and seasonal restrictions imposed for management purposes (Figures 3 and 4). A myriad of statutes and regulations have evolved to form a patchwork of regulated areas to discourage gear conflict, protect the resources, and avoid navigational hazards. Restrictions range from banning netting in an area (as in Buzzards Bay) to requiring a special permit to fish in an area (e.g., seining Atlantic bluefin tuna in Cape Cod Bay). Additional restrictions were established to prevent mobile trawling gear from damaging stationary lobster gear.

The waters three miles from shore from the New Hampshire border along the coastline to Provincetown, off the eastern coast of Chatham and Orleans, and the eastern coastline of Nantucket Sound are closed to trawling during the lobstering season from spring to fall. The inner harbors and coastal bays are managed under regulations which require a special permit to net in these specified areas. In recent years the Division has attempted management regulations by special permit as a means to control fishing effort, reduce gear conflict, and obtain management information. By issuing or revoking special permits, the number of fishing vessels in an area can be controlled and fishing regulations effectively enforced.

3. Contaminated Area Restrictions

Restricting resource harvesting in coastal areas for certain public health reasons is a responsibility of the Division of Marine Fisheries. The Shellfish Sanitation Program within the Department of Environmental Quality Engineering (DEQE) works under regulations established by the Department of Public Health and guidelines established by the U.S. Food and Drug Administration. They conduct frequent tests of the waters overlying shellfish beds and issue notices of reclassification. Upon notification, the Division issues area opening and closure notices. Primarily, these closures are the result of sewage pollution, but seasonal closures for paralytic shellfish poisoning (PSP) and long-term closures for toxic substances have also occurred.

a. Contaminated shellfish areas

From Boston Harbor north, an estimated 6,250 acres of productive shellfish bottom with an estimated annual potential harvest of 73,450 bushels of soft-shelled clams are contaminated by sewage waste to such an extent that shellfish harvesting must be restricted. South of Boston, additional shellfish areas, primarily containing quahogs, are

restricted. The Shellfish Sanitation Program classifies these areas according to the MPN (mean probable number) of Escherichia coli (E. coli) bacteria per 100 ml of the overlying waters; 70-700 MPN being moderately contaminated and above 700 grossly contaminated. E. coli is a harmless bacteria, commonly found in mammalian intestinal tracts, however, its presence in the water column indicates the possible presence of more harmful bacteria and viruses which cause hepatitis, gastroenteritis, and other diseases. Filter feeding bivalve shellfish like soft shelled clams, surf clams, quahogs, mahogany quahogs, oysters, and razor clams filter out and store bacteria and viruses along with their planktonic algal food. Non-filter feeding shellfish (periwinkles and whelks), crustaceans (lobster and shrimp), and finfish do not take up bacteria and viruses. Scallops are filter feeders also, but because only the adductor muscle or eye of the scallop is eaten, they do not pose a health hazard.

Some of Massachusetts most productive shellfish areas are contaminated. Of the 6,250 acres of contaminated productive shellfish bottom on the North Shore, 49% are classified as moderately contaminated. From this area an estimated annual production of 38,800 bushels are available for harvesting. Through the work of the DEQE's Division of Water Pollution Control, many of the formerly grossly contaminated areas have had pollution levels reduced and have been reclassified as moderately contaminated. The Division of Marine Fisheries, in conjunction with the DEQE Shellfish Sanitation Program, and the U.S. Food and Drug Administration issues Master Digger Permits for the harvesting of soft shelled clams from moderately contaminated areas. These clams must be purified at the Division operated Newburyport Shellfish Depuration Plant prior to sale. After holding the clams in sterilized waters for forty-eight hours, the result is a clean, high quality product.

The Division's Shellfish Relay Permit program allows the transfer of shellfish from contaminated to clean areas for natural purification. This is commonly used for purifying quahogs on the South Shore and the Cape where there are no purification facilities, but many clean areas for relaying.

b. Paralytic Shellfish Poisoning (PSP) Closures

Since 1972, periodic blooms of the single-celled dinoflagellate, Gonyaulax tamarensis, have appeared in Massachusetts waters. Gonyaulax will bloom when sunlight and nutrient conditions are just right, usually in the spring and fall. Rarely does it occur in sufficient quantities to discolor the water, however, the 1972 bloom was so massive that the colorful but misleading nickname "red tide" was applied. This may be confused with the fish killing red tide in southern waters caused by another dinoflagellate. As with sewerage pollution, Gonyaulax does not effect finfish or crustaceans. Only filter feeding (bivalve) shellfish can filter out and store the dinoflagellate, although whelks may become poisonous from eating

bivalve shellfish. When a person eats contaminated shellfish, the Gonyaulax releases a powerful chemical poison, called a neurotoxin, which attacks the human nervous system. Effects range from slight tingling sensations to severe respiratory arrest and, very rarely, death, depending on the amount of toxin ingested.

Certain areas along the coast such as the North Shore and Nauset Inlet are more prone to annual PSP outbreaks. Although the shellfish eventually purge themselves, occasionaly the PSP persists, particularly if the bloom was large or winter temperatures reduce shellfish activity. Shellfish along the entire coast are tested periodically for PSP by DEQE's Shellfish Sanitation Program. The test results are sent to the Division for public notification of shellfish area openings and closures.

c. Toxic substance closures

The accumulation or spilling of toxic substances such as Polychlorinated biphenyls (PCB's), oil, or mercury has forced resource closures of certain harbors in Massachusetts. PCB's discharged from two plants on the Acushnet River (Kolek, 1980), led to the 1977 restrictions on harvesting certain species in three areas off New Bedford (Figure 5). A buildup in mercury in the substrate, from marine anti-fouling paint, resulted in shellfish closures in small areas of upper Sippican Harbor and Falmouth Inner Harbor. Oil spills or leaks have closed Great Harbor, Falmouth and Red Brook, Bourne to shellfishing.

4. Sanctuaries

Sanctuaries are areas of the ocean set aside to protect important habitat, an exceptionally productive ecosystem, an area of historic or cultural interest, or an area of scientific or educational value (Conservation Law Foundation, 1980). Sanctuaries exist on both the federal and state levels. The U.S. Department of Commerce may designate areas as Federal Marine Sanctuaries (16 USC 1431-1434). Under M.G.L. c. 132A, s. 14 and 15, the Massachusetts Department of Environmental Management (DEM) has named five Massachusetts Ocean Sanctuaries: North Shore, South Essex, Cape Cod Bay, Cape Cod, and Cape and Islands (Figure 6). In these sanctuaries any act which disturbs the seabed, such as drilling, dumping industrial wastes, building structures, or removing sand and gravel is prohibited. Fishing activities are not restricted under Massachusetts Ocean Sanctuary provisions.

Recent court litigation concerning a jurisdictional dispute between Massachusetts and the Federal Government over central Nantucket Sound was temporarily resolved. While neither party conceded jurisdictional control over the area, both agreed that if central Nantucket Sound was designated a federal marine sanctuary, Massachusetts would relinquish its claim provided (a) no additional federal regulations governing

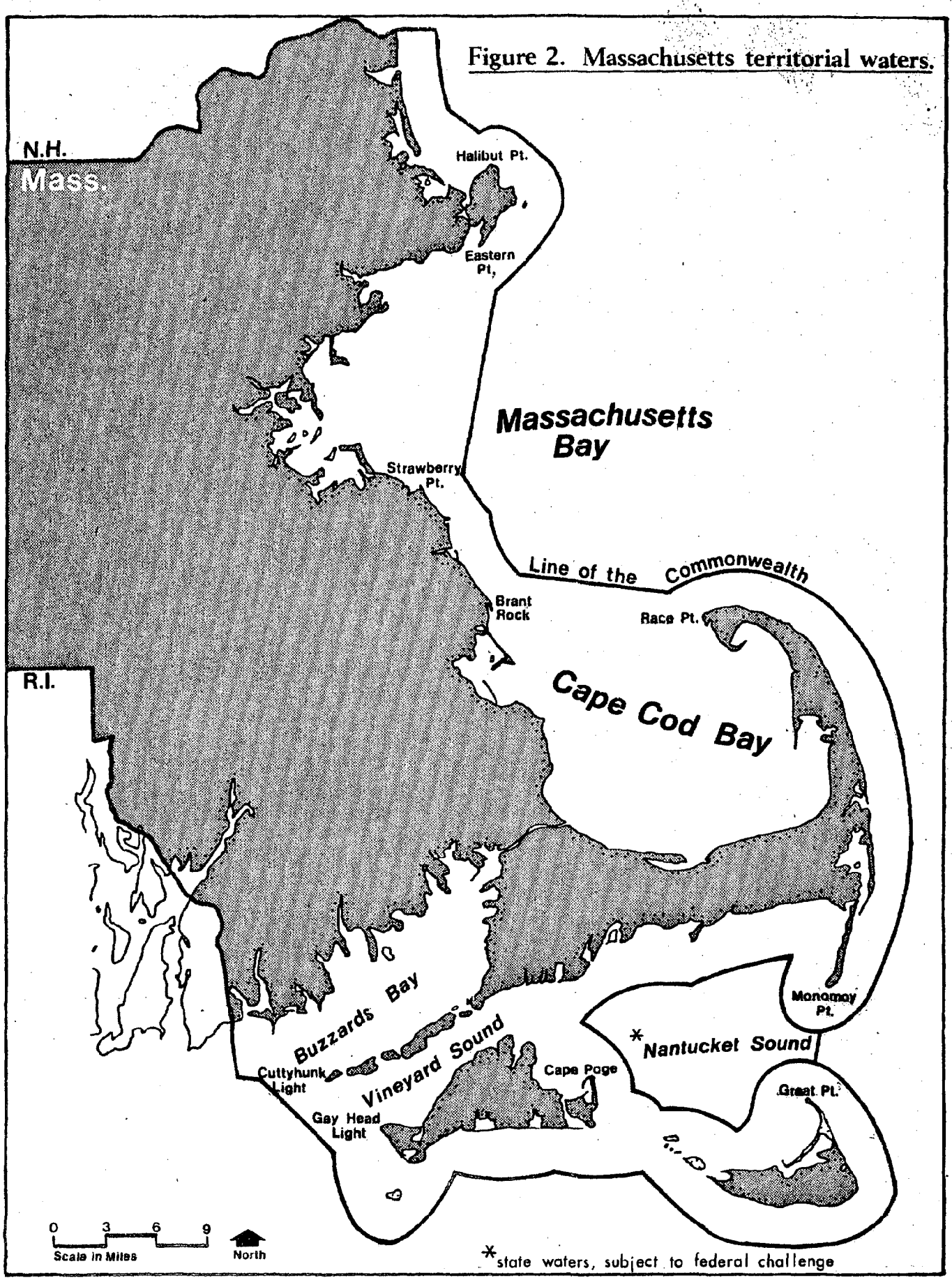


Figure 2. Massachusetts territorial waters.

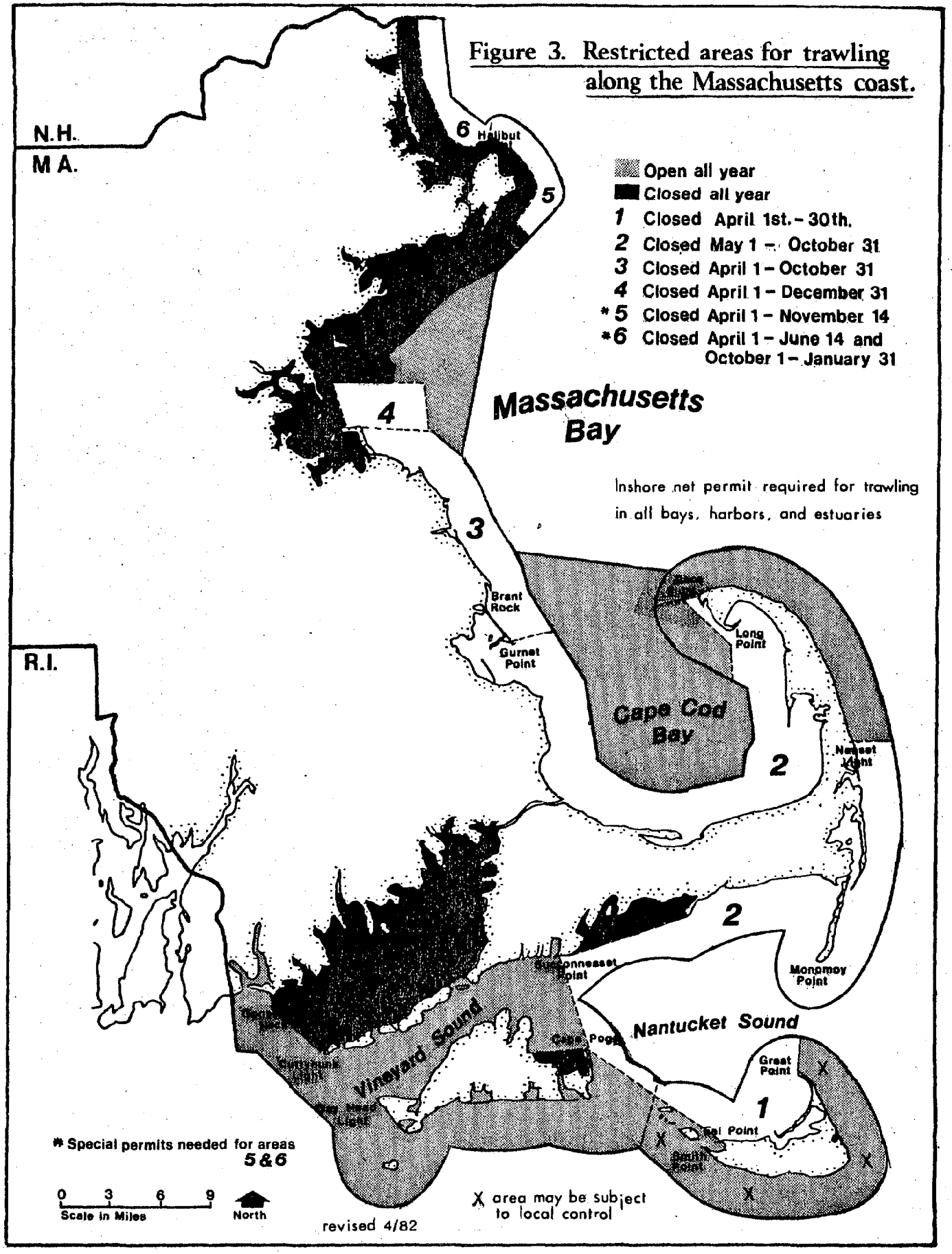


Figure 3. Restricted areas for trawling along the Massachusetts coast.

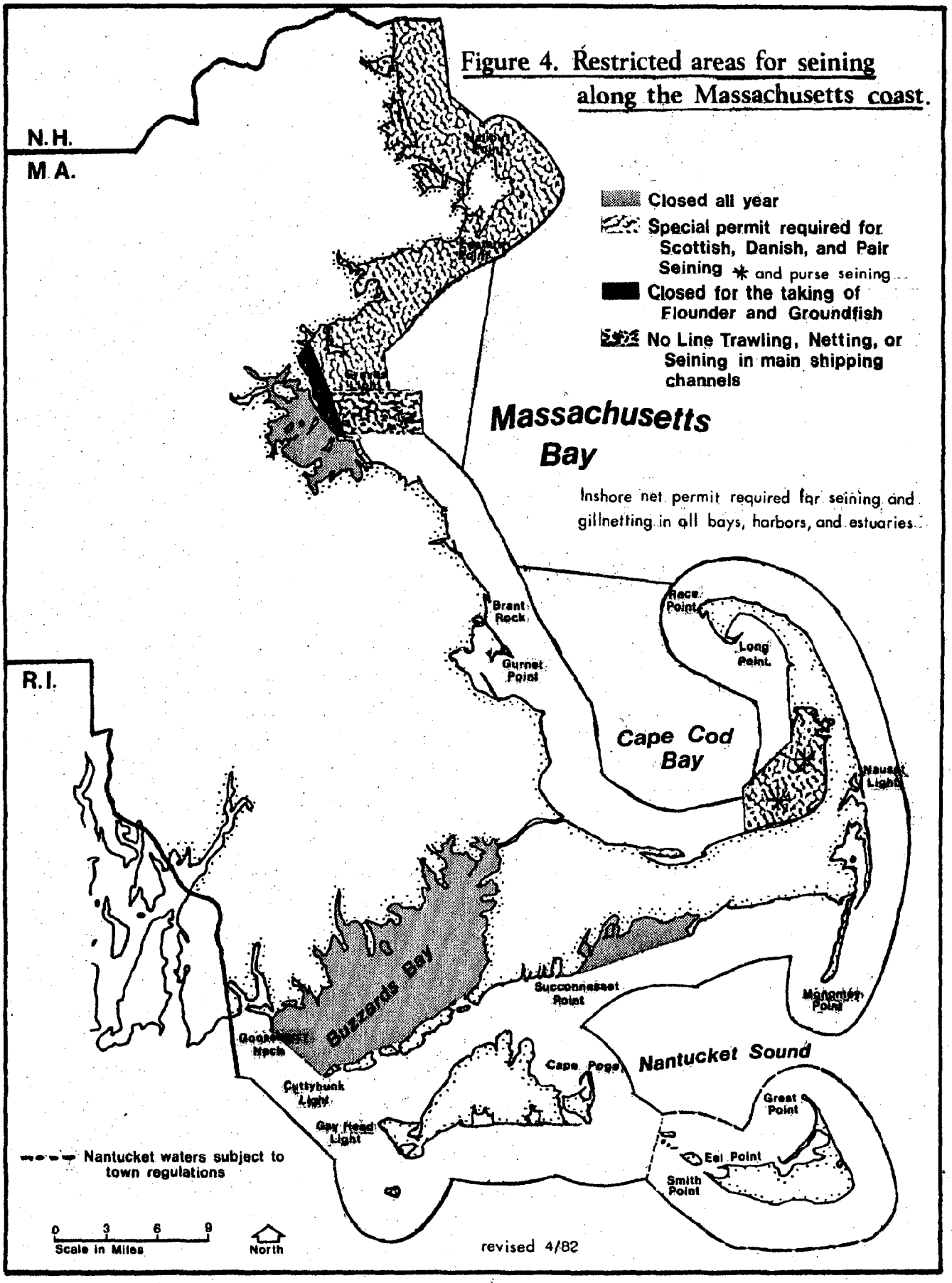


Figure 4. Restricted areas for seining along the Massachusetts coast.
N.H.
M.A.
R.I.
Closed all year
Special permit required for Scottish, Danish, and Pair Seining * and purse seining
Closed for the taking of Flounder and Groundfish
No Line Trawling, Netting, or Seining in main shipping channels
Massachusetts Bay
Inshore net permit required for seining and gillnetting in all bays, harbors, and estuaries.
Brant Rock
Gurnet Point
Race Point
Long Point
Cape Cod Bay
Buzzards Bay
Succonnesset Point
Cape Poge
Nantucket Sound
Great Point
Eel Point
Smith Point
Cuttyhunk Light
Gay Head Light
Nantucket waters subject to town regulations
0 3 6 9
Scale in Miles
North
revised 4/82

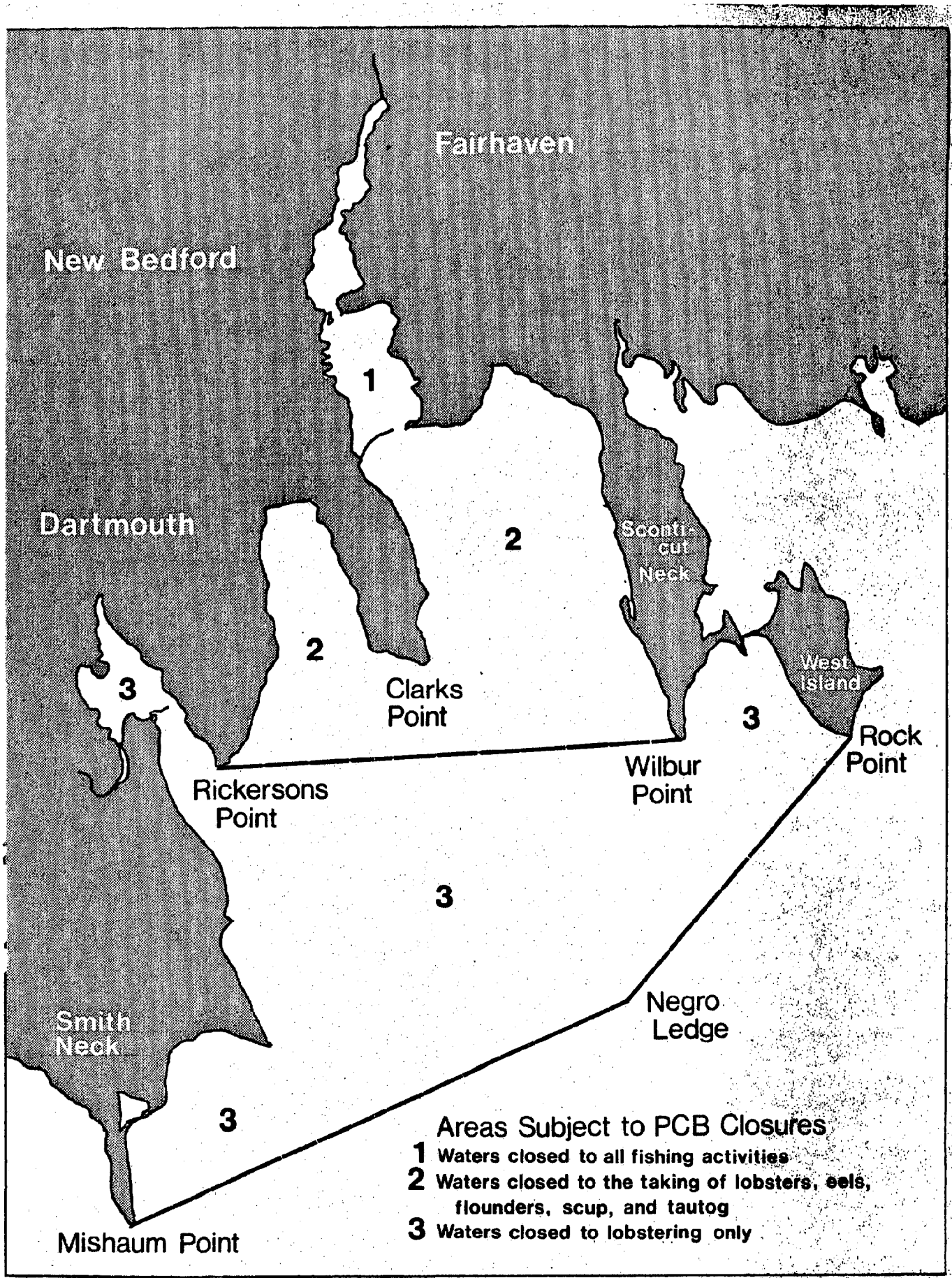


Figure 5. Polychlorinated Biphenyl (PCB) Contamination Areas of New Bedford Harbor.

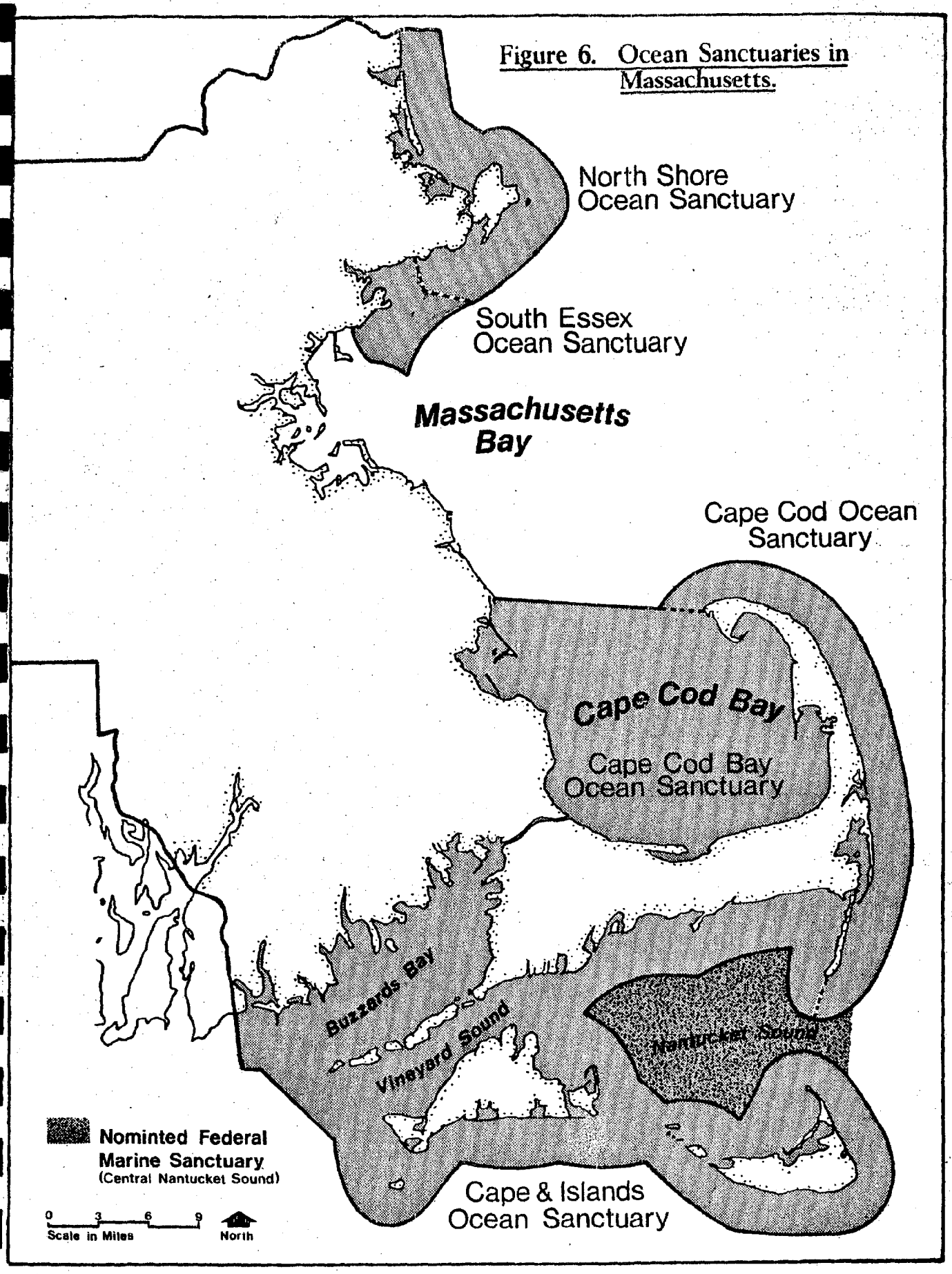


Figure 6. Ocean Sanctuaries in Massachusetts.

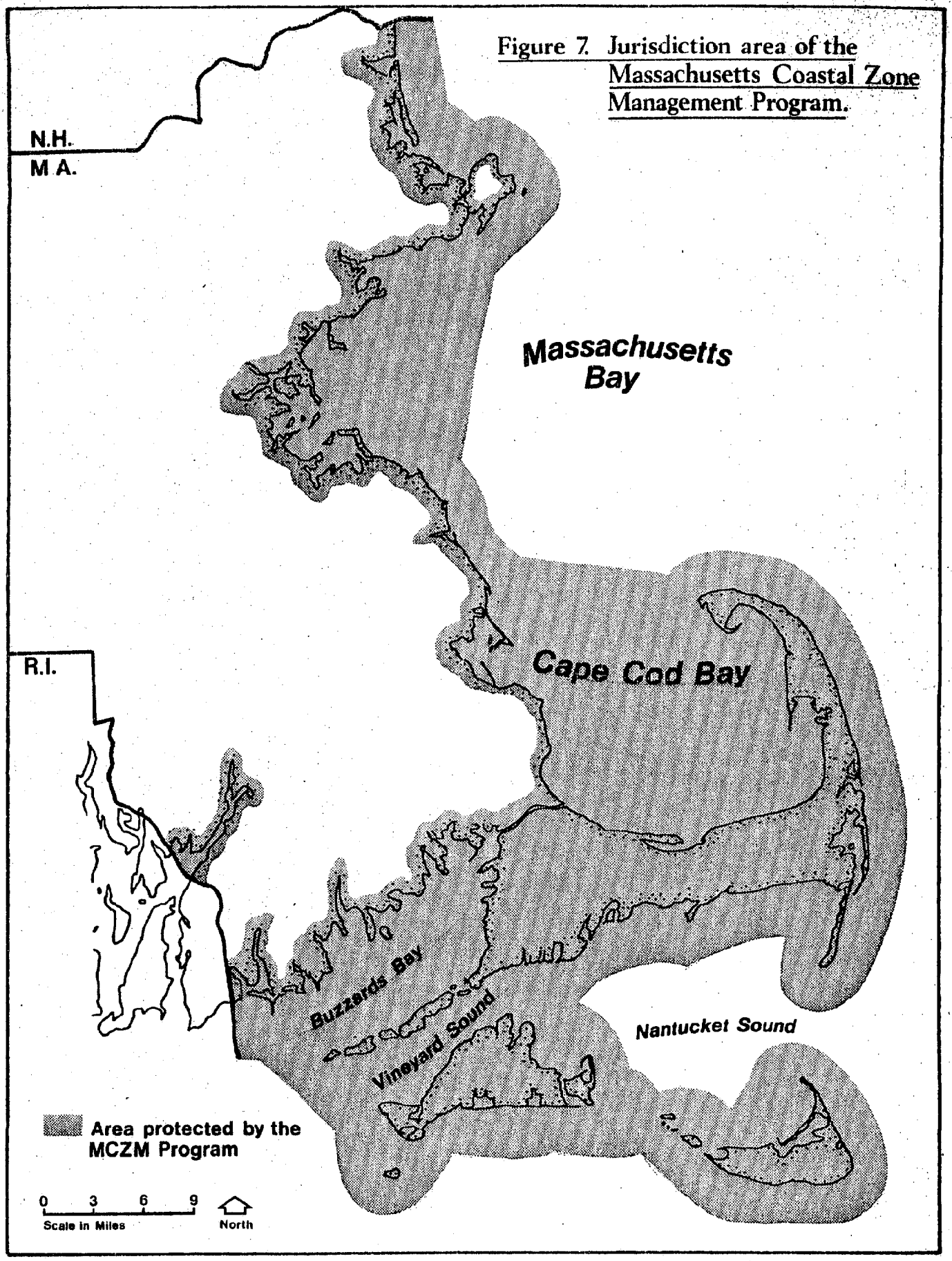


Figure 7. Jurisdiction area of the Massachusetts Coastal Zone Management Program.

fishing activities be imposed, and (b) that federal marine sanctuary rules conform with regulations of the Massachusetts Ocean Sanctuary Act.

5. Coastal Zone

The Federal Coastal Zone Management Act of 1972 (P.L. 92-583) is administered by the Department of Commerce and funds development of coastal zone programs in coastal states. The Massachusetts Coastal Zone Management Program has the responsibility of achieving "effective management, beneifcial use, protection, and development of the coastal zone" (Section 302 (a) of CZMA). This extends to:

"The seaward limit of the state's territorial sea (i.e., 3 miles), extending from the Massachusetts-New Hampshire border south to the Massachusetts-Rhode Island border, and landward to 100 feet inland of specified major roads, rail lines or other visible rights-of-way. The coastal zone includes all of Cape Cod, Martha's Vineyard and Nantucket" (Figure 7).

D. Processors

In 1976, approximately 114 Massachusetts fish processing firms produced $311 million worth of fish products or about 68% of the total New England value of fish products (Hughes and Kellogg, 1977). The Massachusetts value of processed products increased to $358 million in 1977, with 123 plants employing 4,454 people on a yearly basis and 5,302 seasonally (Table 18). In addition, 86 wholesale plants, employing 951 people, purchased and marketed processed fish to 845 retail markets (from DMF licensing statistics). Using these figures, and assuming one person for each retail market, an estimated 7,098 people were employed at sometime in 1977 in fish processing, wholesale, and retail firms.

There are four general types of fish processors in Massachusetts. Of the 123 processing firms in 1977, forty-one percent, primarily filleted fresh finfish. They handled about 22% of the processed fish product value, employed 27% of the processing work force, and averaged $1.8 million in sales. They largely processed Massachusetts fish, but a significant amount was imported from other states, Canada, and other countries.

Although reliable figures are not available, as much as 90% of the fish supply for the 13 large finfish processors originated from foreign imports in the form of frozen fish blocks. Processors, located in Gloucester and New Bedford, produced unclassified (i.e., not identified by species name) frozen fish portions, sticks, dinners, and other products for a nationwide market. Although small in number, they produced about 53% of the Massachusetts processed fish product value (1977), employed 50% of the work force, and averaged $14.3 million in sales.

Fifty-five shellfish processors make up the third category of

Massachusetts seafood processing firms. Except for shrimp and soft shelled clams, these processors deal in shellfish supplied by Massachusetts fishermen. This sector averaged sales of $1.1 million annually (1977), employed 23% of the work force, and produced 17% of the product value.

Three industrial fish processors averaged $3.6 million in sales (1977), employed 12% of the work force, and produced 3% of the product value. Gloucester is the primary industrial fish processing port in Massachusetts. Menhaden and other unmarketable fish are reduced to fish oil and meal, the latter is used for chicken feed.

Centers for fresh fish processing in Massachusetts and New England are New Bedford, Boston, Gloucester, and Cape Cod (Georgianna et al., 1978). Gloucester processors handle mostly cod, haddock, pollock, and ocean perch. Boston processes 79% of the haddock, 67% of the cod, and 81% of the pollock processed in Massachusetts. New Bedford, the major scallop processing center, also processed cod, haddock, and flounder, especially yellowtail flounder. Massachusetts firms import and process a large percentage of the Maine landings of cod (59%), haddock (90%), pollock (76%), and flounders (67%). It was estimated that virtually all of the Newport, R.I., cod, haddock, pollock, and ocean perch landings and 90% of the flounder landings were shipped to Massachusetts for processing.

In the wholesale category, there were six Massachusetts fishermen's cooperatives operating in 1979 (NMFS, 1980). Cooperatives are owned and operated by fishermen. They buy fish from fishermen and purchase supplies for fishermen. Collective pooling of catch can sometimes increase profits by eliminating a layer in the marketing process. The cooperatives assist fishermen by purchasing fuel, ice, and fishing gear at lower bulk rates. All six cooperatives marketed the members' catch, five were also involved in purchasing. The six cooperatives represented 929 fishermen and 514 vessels.

Since establishment of the 200 mile limit in 1976, foreign fish buyers have expressed interest in joint ventures to supplement fish supplies reduced by foreign fishing quotas. A typical proposed joint venture would involve U.S. fishermen harvesting underutilized species for direct transfer and sale to foreign processing ships. U.S. fishermen would profit from harvesting species with little or no marketability in the U.S. and fishing pressure on some traditional species may be reduced. However, direct sales to foreign buyers may prevent U.S. processors from establishing necessary processing capabilities to create domestic and export markets.

E. Imports

About 60% of the fish products consumed in the United States are imported from foreign countries. Before World War II 95% of the fish products were supplied by the domestic fleet, this fell to 71% by 1948 (Massport, 1977). Between 1950 and 1970, U.S. population and fish consumption rose, while domestic landings remained between 2 to 2.5 million metric tons. During this period imports rose from 25%

to 60% of U.S. fish consumption.

Fish imports are classified into two major categories: frozen (whole and blocks) and fresh (whole, headed or filleted finfish, live lobsters, and shellfish). It is nearly impossible to obtain statistics on foreign imports into Massachusetts. Federal import statistics are kept by custom district, not by state. Although all imports to the Boston Custom District may be processed in Massachusetts, it is difficult to estimate the percentage of Massachusetts imports originating from the Portland Custom District. Most of the 116 million pounds of frozen fish portions, sticks, and dinners processed in Massachusetts in 1976 were European and Canadian imports.

Imported fresh finfish, lobsters, and shellfish are primarily of Canadian origin. It is estimated that 8.3 million pounds of fresh finfish worth $3.1 million (Kellogg, 1980) were imported into Massachusetts from Canada in 1978 (Table 19). Canada exports 90% of its groundfish harvest to the United States (Environment Canada, 1976). Canada also exported 13.1 million pounds of live lobster, and 2.3 million pounds of lobster meat to the U.S. in 1978. An unknown quantity of imports from Canada, estimated at 25% (Brown, 1974), originate on the duty free French islands of St. Pierre and Miquelan off Newfoundland. Polish, West German, Portuguese, and Spanish vessels offload fish at these ports for processing in Canada and the United States. This circumvents the U.S. law prohibiting landing fresh fish in U.S. ports by foreign built and operated vessels.

Frozen fish imports do not directly compete with fresh fish, the mainstay of the New England fisheries. However, the import of primarily Canadian fresh finfish, lobsters, and shellfish suppress ex-vessel prices paid to Massachusetts fishermen. Canadian federal and provincial subsidies to the fishing industry provide Canadians with an advantage in U.S. markets. Government subsidies on vessel purchase, construction, repair, and conversion; fish handling and storage; processing plant construction and expansion; boat insurance and fuel have reduced the Canadian imported fish prices by an estimated $ .30/pound (Capalbo et al., 1977) and lobster prices an estimated $ .33 to $ .44/pound (Hasselback, 1979). Concern over imports is not new. Until 1939, tariffs ($ .025/pound) on foreign groundfish effectively increased import prices 40% (Massachusetts Port Authority, 1977). Tariffs were reduced for Canadian fish in 1939 to $ .018/pound for the first 15 million pounds or 15% of U.S. consumption and $ .025/pound thereafter. This rate was extended to other countries in 1948, and because fish prices increased, this lower rate only added 9% to the import costs. Today tariffs present even less of a barrier to fresh fish imports, while there are no tariffs at all for imported frozen fish processed in the United States.

Since 1952 there have been five attempts (1952, 1954, 1956, 1962, and 1977) to increase tariffs on Canadian fresh fish imports. All of these petitions have either been disapproved by the U.S. Tariff Commission

or vetoed by the President. Even though U.S. laws state that foreign subsidies provide justification for countervailing duties, opposition to increased tariffs has been based on maintaining international relations and keeping fish prices to consumers low.

F. Mariculture and Fisheries Enhancement

Mariculture is defined as the propagation and husbandry of marine animals or plants by private industry for commercial reasons. For purposes of this report, fisheries enhancement is defined as use of public funds for propagation or husbandry of marine species to augment existing stocks or introduce new species for public use. Recently mariculture has engendered an increasing amount of public interest and support. However, this support should be tempered by the knowledge of mariculture's limitations. Massachusetts' climate conditions are not optimum for most established mariculture species. Any species selected for mariculture must be short-lived, fast-growing, and command a high market value. It's nutritional needs, reproductive cycle, and disease susceptibility must be well understood. In addition to facing local opposition to seashore use, a mariculture operation may need as many as five state permits (three from DEQE, one from DEM, and one from DMF), two federal permits (EPA and Army Corps of Engineers), and three local permits (from the Zoning, Conservation and Shellfish Commissions).

Depending on techniques used, mariculture (and fisheries enhancement) can be intensive or extensive. In intensive mariculture most or all of the animals life cycle, feeding, and grow-out is under complete control. Production is high, as is labor and capital costs, but a high quality product is produced with low mortality. In extensive mariculture the fish spend part of their life cycle in the natural environment. While total biomass produced is large and measures are taken to control reproduction and mortality, the mortality is greater in the open ocean than in a controlled environment. Anadromous fish can be raised in this manner, but legal questions exist on ownership of fish when they return to the river.

The most common form of mariculture in Massachusetts is the private shellfish grant. Under M.G.L. c.130, s. 57, municipalities, after Division inspection, may grant private individuals exclusive rights to the sea bottom for shellfish mariculture for periods not exceeding 10 years. In addition, M.G.L. c. 130, s. 68A allows municipalities to license off-bottom shellfish culture using rafts, racks, or floats.

As of 1980, a total of 50 grants in 13 towns were issued encompassing a total of 391 acres; the grants range in size from 1/4 acre to 93 acres. The average grant was 5-7 acres and usually consisted of a small 'family-type' operation; larger grants employed up to 10 people. Assuming two people per small grant, an estimated 111 people are involved in shellfish grant mariculture in Massachusetts. Seventy-five percent of the grants cultured eastern oysters, the remainder grew quahogs, bay scallops, or mussels. All were leased from towns for a

3-10 year period with option of renewal at the discretion of the Division and the town involved (personal communication, J.M. Hickey).

In addition to shellfish grants, there are three closed system aquaculture operations in Massachusetts. A commercial prawn (Macrobrachium) growing farm in New Bedford, a commercial operation in Salem growing invertebrates and finfish for sale as marine specimens and food respectively, and a non-profit, educational fresh water aquaculture center in Falmouth.

The Division of Marine Fisheries has a number of fishery enhancement programs such as the Coho Salmon Project, Lobster Hatchery, and Connecticut River Anadromous Fish Restoration Program. The Division is involved in the Merrimack River Anadromous Fish Restoration Project and various local shellfish enhancement programs. Other publically funded marine enhancement programs include shellfish hatcheries in Mashpee, Eastham, Tisbury, and Edgartown. Other coastal towns have expressed interest in regional shellfish hatcheries to provide seed stock and learning centers for their constituents. Interest in mariculture development has been demonstrated by other agencies such as: Coastal Zone Management, Sea Grant, Department of Food and Agriculture, the Secretary of Environmental Affairs, Massachusetts Cooperative Extension Units, and local economic development commissions.

Table 18. Number of processing and wholesale plants and average employment in Massachusetts from 1970 to 1978.

	Processing			Wholesale			Total		
	Plants	Season	Year	Plants	Season	Year	Plants	Season	Year
1970	125	4,800	4,097	108	1,043	894	233	5,843	4,991
1971	110	4,643	3,965	102	918	812	212	5,561	4,777
1972	107	4,482	3,876	99	942	851	206	5,424	4,727
1973	104	4,875	4,208	97	852	751	201	5,707	4,959
1974	117	4,739	3,885	92	849	746	209	5,588	4,631
1975	120	4,638	3,845	91	885	787	211	5,523	4,632
1976	114	4,370	3,637	96	1,019	868	210	5,389	4,505
1977	123	5,302	4,454	86	951	831	209	6,253	5,285
1978	113	4,999	4,312	93	1,041	809	206	6,040	5,121

Source: Fishery Statistics of the U.S. 1978, 1979.

Table 19. Estimated imports of fresh, whole, or headed Canadian groundfish by Massachusetts in 1978.[1]

	Quantity (thousand-lbs)	C.I.F. Value (thousand dollars)
Cod	1,461	487
Haddock *	5,341	2,166
Flounders	1,491	488
Ocean Perch	13	8
Pollock *	0	0
Whiting	0	0

* Note: All imports of fresh, whole, or headed fish classified as cusk, haddock, hake, or pollock are assumed to be haddock.

[1]Source: Massachusetts Imports of Canadian Fish Products. C. Kellogg, Massachusetts Division of Marine Fisheries, 1980.

III. Division of Marine Fisheries

The Division of Marine Fisheries within the Department of Fisheries, Wildlife and Recreational Vehicles under the Executive Office of Environmental Affairs is responsible for the management of the Commonwealth's living marine resources. The Division is charged with promoting and developing the commercial and recreational marine fisheries of Massachusetts. Functioning under the statutes of M.G.L. c. 130 and regulations approved by the Marine Fisheries Advisory Commission, the Division manages the harvest of finfish, mollusks, crustaceans, seaworms, and marine plants within the territorial waters of Massachusetts. To accomplish these duties, the Division issues licenses, conducts research, provides technical assistance to communities and fishermen, collects statistics, publishes information and educational material, constructs fishways, purifies shellfish, and propagates fish and curstaceans. Division personnel interact with many federal, interstate, state, and local management agencies and various private fisheries related organizations in conducting agency functions.

Prior to 1942, responsibility for marine fishery management rested within a bureau of the Division of Fish and Game. In 1943 the Division of Marine Fisheries was established with a staff of six biologists and five conservation helpers. The first marine facilities were the Martha's Vineyard Lobster Hatchery, built in 1948, and the Shellfish Depuration Plant, acquired from the town of Newburyport in 1961. The Division remained a small organization until two events occurred: the formation of the Marine Fisheries Advisory Commission in 1960 to study fishery problems in Massachusetts, and the enactment of the Commercial Fisheries Research and Development and Anadromous Fish Act (P.L. 89-304). The Commission recommended establishment of a Marine Fisheries Fund, fishery research programs, construction of laboratory facilities, and purchase of a research vessel. P.L. 88-309 provided federal funding to realize many of these recommendations.

Presently, the Division has a staff of sixty-nine including administrators (8), biologists (27), biological aids and laborers (16), marketing and extension specialists (6), clerical (10), laboratory personnel (1), and a lawyer (1). In addition to its Boston office, the Division maintains five facilities: the Newburyport Shellfish Purification Plant; Cat Cove Marine Laboratory (Salem); two offices for south shore personnel (Sandwich); and a lobster hatchery (Martha's Vineyard). An Anadromous Fish Hatchery and Rearing Station to be operated jointly by the Division of Fisheries and Wildlife and Division of Marine Fisheries, is under construction in East Sandwich. A 52' research vessel and a number of smaller outboard boats are employed for sea sampling. Future plans call for construction of a marine station to house south shore personnel and replacement of the existing research boat with a larger, more seaworthy, and versatile vessel.

Before 1975, Division program, administration, and operating costs were appropriated from the Marine Fisheries Fund. The Fund was established in 1962 from revenues received from licenses, fees and a portion of the unrebated gas tax proportional to fuel usage of fishing boats. With State

reorganization in 1975, the Fund was repealed and Division revenues reverted to the General Fund. The Division's budget for Fiscal Year 1979 was $1,703,609 of which $493,629 was received from federal grants and private trusts. Although $1,209,980 was appropriated from the General Fund for FY 1979, this does not reflect the actual cost to the state. The Division contributed $573,977 to the General Fund from its licensing program, fees from the shellfish purification plant and fines. In addition, $402,900 was received from federal FY 79 reimbursements. The net actual cost to the state for managing and developing its fisheries was $233,103.

Not included in the above budget is the annual appropriation for shellfish reimbursement to the cities and towns. Although it varies from year to year, $250,000 was distributed to local communities to partially reimburse (up to 50% depending on the amount appropriated) them for shellfish management work in FY 1979.

The Director of the Division oversees the Marine Fisheries Advisory Commission, Council Liaison to the New England Fishery Management Council, Legal Counsel, and four bureaus. The Council is responsible for all legal/legislative aspects of Division operations. Council Liaison participates in New England Fishery Management Council meetings/hearings as a representative of the Director and reviews fishery management plans to provide state input and assure state compatibility with management and enforcement practices. Four bureaus, each with an Assistant Director, govern various research, administrative, and management of sport and commercial fisheries programs (Table 20).

The Bureau of Administration and Operations coordinates and administers all fiscal activities of the Division. This includes budget preparation, requisitions for goods and services, vendor payments, and maintenance of the Budgetary Control Register. It coordinates personnel recruitment, administers federal grant and non-federal trust activities, and issues licenses and permits. It is involved in conducting public and adjudicatory hearings as prescribed by M.G.L. c. 30A, and administering distribution of financial aid to communities for shellfish propagation and management.

In addition, the Bureau is responsible for the maintenance of the Division's physical facilities. Cat Cove Marine Laboratory provides the Division with comprehensive, accurate, and timely laboratory services including testing for Polychlorinated Biphenyls (PCB's), heavy metals, pesticides, and Paralytic Shellfish Poisoning (PSP). The Shellfish Depuration Plant purifies moderately contaminated soft-shelled clams to produce a product suitable for human consumption. Two field offices on the South Shore house a variety of projects. The Lobster Hatchery and Research Station on Martha's Vineyard is responsible for the hatching, rearing, and liberating of post-larval lobsters into state waters to augment the natural population. The Hatchery also conducts research on the biology, genetics, and possible mariculture of lobsters.

The Division issues licenses in three major categories: commercial

fishermen, dealer, and special permit. In 1979, a total of 19,946 licenses were issued, an increase of 4,801 since 1976. During this period the number of commercial shellfish licenses increased by 625, commercial boat under 60 feet licenses by 558, and non-commercial lobster licenses by 2,357. Total revenues from licenses in 1979 were $526,884. Although license fees provide partial funding for Division research, management, and administration, licensing is important for other reasons. Licenses serve as an indicator of resource use, specifying the number of fishermen, type of gear, and size of vessel utilized. Name and address information provide a directory for distributing information to fishermen and collecting statistics from fishermen. Limiting the number of licenses issued is a management tool for reducing overfishing. Finally, licenses, and the threat of revocation, are vital to enforcement of marine regulations.

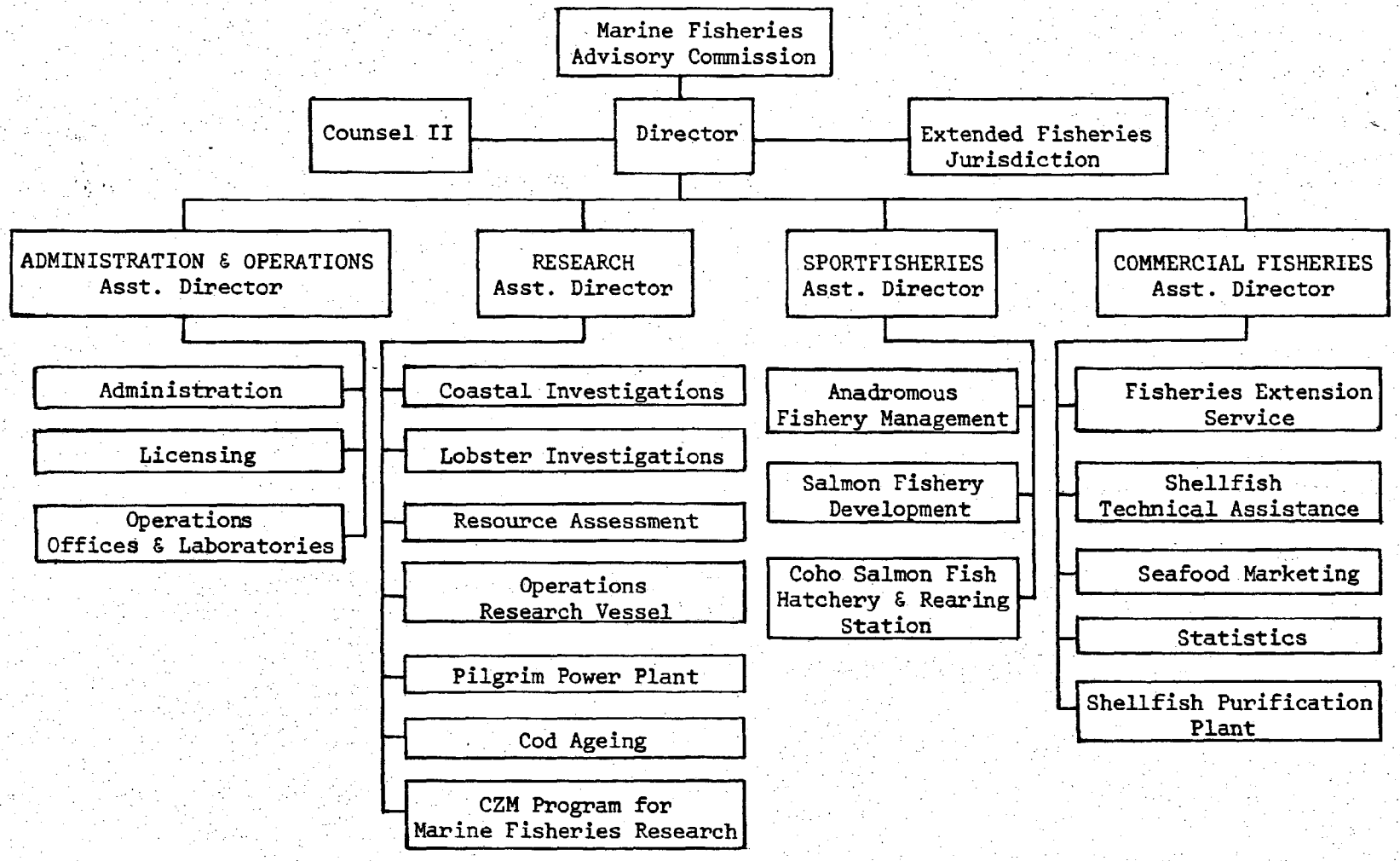
The Bureau of Research provides information which will result in improved fishery management, enhancement of stocks, habitat protection, and development of the fishing industry. Specific objectives include: research that has direct application to fishery management problems; evaluation of environmental impacts of coastal alteration; and, providing liaison with other states and federal agencies on marine research matters. Seven major programs operate from this Bureau. Three area teams, geographically divided into the North Shore, South Shore, and Cape and Islands provide information and technical assistance to the public. They recommend management strategy for wise utilization of coastal resources to commercial and recreational fishermen, state and federal agencies, and resource user groups. Coastal Lobster Investigations Program is responsible for managing coastal lobster resources. Through catch sampling and tagging studies, an indication of resource condition can be estimated. Within the same lobster account, biologists at the Lobster Hatchery on Martha's Vineyard, mate adult lobsters, raise the young to the fourth stage, then release them to the wild. Attempts to produce blue or red lobsters as a natural tag are ongoing as well as other studies to test the fesability of culturing lobsters on a commercial basis. The Resource Assessment Project conducts semi-annual bottom-trawl surveys of the state's territorial sea to acquire a perspective on marine resources subject to state management. Objectives include an estimate of relative abundance, population structure, and fish distribution in relation to temperature, salinity, and depth. As part of Resource Assessment the Cod Ageing Program assists the National Marine Fisheries Service in evaluating the age structure of sampled populations. The Pilgrim Power Plant Study, under contract to the Plymouth Nuclear Power Plant, evaluates long-term effects of power generation on the marine ecosystem. The knowledge accumulated adds to the large data base necessary to predict, assess, and guide operation of the existing unit and possible future units. The Division's Policy Program is also within the Bureau of Research.

The Bureau of Sportfisheries is concerned with management of sportfish and development and maintenance of anadromous fish resources. The Division cooperates with the Public Access Board to assess recreational fishing access needs and develop plans for boat launching and fish pier facilities. A Coho Salmon Project has developed techniques of hatching,

rearing and stocking a strain of Massachusetts Coho Salmon to establish a recreational fishery during low cycles of native sportfish populations. The Anadromous Fish Management Program restores, maintains, and enhances existing fish runs and manages the various anadromous fish species.

The Bureau of Commercial Fisheries is responsible for management of the State's commercially important marine resources and supports development of the Commonwealth's commercial fishing and seafood industries. Four projects, each dealing with specific aspects of commercial fisheries are incorporated in this Bureau. The Fisheries Extension Service provides the commercial fishing industry with technical assistance, workshops and training seminars, introduction of new fishing techniques, and distribution of fisheries information. The Seafood Marketing Program objectives are to stimulate market development for underutilized species, promote domestic and foreign expansion of Massachusetts markets, and encourage institutional use of state fish products. The Shellfish Technical Assistance Project aids local shellfish and the shellfish industry in management and enhancement of shellfish resources. The Fisheries Statistics Project collects, compiles, and distributes landings and economic data for Massachusetts marine resources.

Table 20. Organizational chart, Massachusetts Department of Fisheries, Wildlife & Recreational Vehicles, Division of Marine Fisheries



IV. Fishery Related Agencies and Organizations

A. International

1. International Convention for the Conservation of Atlantic Tunas (ICCAT)

Established in 1969, the Convention is responsible for the management of the Atlantic bluefin tuna (Thunnus thynnus) in the Atlantic Ocean and adjacent seas. After national quotas and other management measures are established by ICCAT, the National Marine Fisheries Service establishes U.S. quotas and regulations for commercial and recreational fishing. While the Division regulates the number of tuna purse seining boats in Cape Cod Bay, all management and quota restrictions in state waters are under ICCAT and NMFS control.

2. Northwest Atlantic Fisheries Organization (NAFO)

Formerly the International Commission for the Northwest Atlantic Fisheries (ICNAF), this organization conducts research and manages the fisheries of the Northwest Atlantic outside the 200 mile limit of the United States and Canada. Although the U.S. is not a member, NMFS shares data with NAFO, and sends an observer to meetings.

B. National

1. National Marine Fisheries Service (NMFS)

The National Marine Fisheries Service is part of the National Oceanic and Atmospheric Administration in the Department of Commerce and is the Federal marine fisheries management and research agency. Massachusetts is one of the 19 states within the NMFS Northeast Region, which includes the New England states, all the states south to Virginia, and west to Minnesota. The Northeast Region is divided into two regional organizations: The Regional Office and the Northeast Fisheries Center. The Regional Office interacts with state fishery agencies and the fishing industry, and it organizes and implements fishery management plans. Programs conducted out of the Regional Office include Marketing, Financial Assistance, Fisheries Development, Law Enforcement and Marine Mammals, Fisheries Management, Habitat Protection, and Market News, and Federal Aid (i.e., P.L. 88-309 and P.L. 89-304). The Northeast Fisheries Center is the regional research organization for the Northeast and Mid-Atlantic areas. The Center is directed from Woods Hole and includes seven labs each with specific objectives.

The Division works closely with NMFS in many areas and numerous Division programs are partially funded by NMFS's Federal Aid Program. Under the Commercial Fisheries Research and Development Act (P.L. 88-309) NMFS partially funds the Division's Fishery Statistics Program, Resource Assessment Project, Shellfish Technical Assistance Project, Fisheries Extension Program, and Seafood Marketing Program. Under

the Anadromous Fish Conservation Act (P.L. 89-304) NMFS provides partial funds for the Division's Anadromous Fisheries Management Project, and the Anadromous Fish Hatchery and Rearing Station. The latter is in cooperation with the Massachusetts Division of Fisheries and Wildlife. The Division's Cod Ageing Program is funded under a contract with the Northeast Fisheries Center, Woods Hole.

2. U.S. Fish and Wildlife Service (USF&WS)

The USF&WS operates fish hatcheries and conducts research to preserve and manage freshwater fish, waterfowl, and wildlife on federal and open lands. It jointly administers the Anadromous Fish Conservation Act with NMFS and it disperses Dingell-Johnson funds to the states (obtained from a 10% tax on rod and reel gear) for recreational fisheries programs, development, and research. The Division participates in the Merrimack River Anadromous Fish Restoration Program and the Connecticut River Anadromous Fish Restoration Program funded by USF&WS under the Anadromous Fish Conservation Act (P.L. 89-304). Together with the Massachusetts Division of Fisheries and Wildlife, other state wildlife agencies, the USF&WS and the Division are attempting to restore Atlantic salmon and shad to certain rivers. The Division also reviews and comments on coastal alteration projects under the Fish and Wildlife Coordination Act (P.L. 85-264).

3. New England Fisheries Management Council (NEFMC)

One of nine quasi-governmental management bodies created by the Magnuson Fisheries Conservation and Management Act of 1976 (i.e., the 200 mile limit), the Council is responsible for developing management plans for species in the New England region of the Fisheries Conservation Zone (FCZ). Seventeen voting members serve on the council, including 10 Governors' nominated members serving 3-year terms, (one from each state and six at-large), the fisheries administrators of the five coastal New England states, and the Regional Director of NMFS. Non-voting members are representatives of U.S. Fish and Wildlife Service, United State Coast Guard, and Department of State and the Executive Director of the Atlantic States Marine Fisheries Commission.

Massachusetts is represented on the Council by the Director of the Division. He is assisted by the Council Liaison. Other Division personnel participate in meetings, oversight committees, and the Scientific and Statistical Committee to provide state input in the management of the New England fisheries.

4. Office of Coastal Zone Management (OCZM)

Created by the Coastal Zone Management Act of 1972 (P.L. 92-583), the office provides funds to coastal state governments for developing and conducting Coastal Zone Management programs (refer to Massachusetts Coastal Zone Management Program).

5. Office of Sea Grant (OSG)

Developed through the National Sea Grant College and Program Act of 1966 (P.L. 89-688), the office is the only national intergovernmental program cooperating with state and local governments, academic institutions, and industry to promote marine research development, technology, environmental research, education, training, and advisory services for coastal zone areas. It provides grants to public and private universities, institutes, laboratories, and other agencies.

OSG is involved in such areas as technology development, identifying underutilized resources, socio-economic and legal studies, and marine advisory programs. Programs are funded with a maximum of 66 2/3% federal monies. In Massachusetts, the Woods Hole Oceanographic Institution and MIT are Sea Grant institutions.

6. United States Army Corps of Engineers

The Corps approves applications for construction in coastal zones, rivers, and waterways. They inspect and approve construction projects, establish danger zones, prescribe navigation regulations, and investigate obstructions and complaints. The Division, from time to time, is asked to comment on fishery impacts resulting from alteration of marine environment and, on ocean disposal sites for dredge spoils.

7. Food and Drug Administration (FDA)

Working under the Department of Health and Welfare, the major responsibility of the FDA is to enforce federal legislation and programs to assure that all food, including seafood, shipped interstate is safe for human consumption. FDA regulates and inspects interstate shipments of fish and shellfish for possible contamination. In particular, swordfish caught beyond state territorial waters are tested for mercury content exceeding the federal .5 parts per million limit. FDA administers the State-Federal-Industry Cooperative Shellfish Sanitation Program. This program provides for the harvesting, depuration, and marketing of moderately contaminated shellfish that otherwise would remain unutilized. The Division's Newburyport Shellfish Purification Plant is operated under Shellfish Sanitation Program guidelines.

C. Interstate

1. Atlantic States Marine Fisheries Commission (ASMFC)

Based in Washington D.C., the Commission is composed of all Atlantic coastal states, each represented by the head of the fisheries administrative agency, a legislative appointee, and a governor's appointee. The Commission provides a forum for discussion and resolution of common fishery problems. Under Amendment I of its charter, the

states can develop joint management regulations for fishery resources primarily in state waters and shared by one or more states. Under contract from NMFS, the Commission administers the federally funded Interstate Fisheries Management Program. The Division is involved actively in the ASMFC, and has assisted in developing interstate fisheries management plans for northern shrimp, lobster, striped bass, and summer flounder.

D. State

1. Executive Office of Environmental Affairs

The Secretary of Environmental Affairs is appointed by the Governor and is responsible for the State's environmental policies and laws. The following departments and divisions come under the direct supervision of the Secretary.

a. Department of Fisheries, Wildlife and Recreational Vehicles (DFW&RV)

Under the direction of the commissioner, the DFW&RV manages and studies inland and marine fish, wildlife resources, and licenses marine and recreational vehicles. The following Divisions act directly under this Department:

(1) Division of Marine Fisheries (DMF)

See Section III.

(2) Division of Fisheries and Wildlife (DF&W)

This Division is supervised by a seven-man advisory board appointed by the Governor, and is responsible for the management, protection, and enhacement of all wildlife and freshwater fisheries of the State. Their fisheries jurisdiction commences on rivers and streams where the water does not rise and fall with the tide or above the first upstream dam. The DF&W conducts research, promulgates regulations, and issues licenses for freshwater recreational fishing. It stocks and manages such sportfish as trout, largemouth bass, sea run brown trout, walleye pike, and pickerel, and assumes management responsibilities over anadromous fish in fresh water. Many of its fishery programs are partially funded up to 75% by the Dingell-Johnson Federal Aid Program. The Division of Fisheries and Wildlife has a cooperative agreement with Marine Fisheries and NMFS in the building and operation of a coho salmon and sea-run trout hatchery in East Sandwich. In addition, both Divisions participate in the program for restoration of Atlantic salmon and shad in the Connecticut and Merrimack Rivers.

(3) Public Access Board

This Board purchases land, designs projects, and funds construction of access facilities to forests, ponds, and sea shores for

recreational purposes. In particular, the Board facilitates construction and operation of ramps and fishing piers for public access to salt water angling. The Board has a head Administrative Assistant and is composed of one member from each of the following agencies: DMF, DF&W, Division of Waterways (DEQE), Division of Marine and Recreational Vehicles, and Division of Forest and Parks (DEM).

(4) Division of Law Enforcement (DLE)

The DLE was recently transferred back to DFW&RV from under the Secretaries supervision. In addition to enforcing the rules and regulations relating to marine fisheries (M.G.L. c. 130), the Division of Law Enforcement performs similar service for the Division of Fisheries and Wildlife (M.G.L. c. 131), Division of Forest and Parks, Division of Water Pollution Control (M.G.L. c. 21), and the Division of Wetlands (M.G.L. c. 131, s. 40). There are 17 coastal enforcement districts (1 officer per district) and an enforcement vessel to patrol approximately 1,200 miles of coastline.

b. Massachusetts Coastal Zone Management (MCZM)

This office is responsible for developing policies, implementing studies, and advising wise use of the Massachusetts coastal zone. Studies include the impact of Georges Bank oil exploration, Outer Continental Shelf (OCS) dredge and spoil disposal practices, and port and harbor development. They also review projects under the Massachusetts Environmental Policy Act. CZM offers technical assistance to coastal communities through a management program and financial assistance. It provides for federal consistency with CZM policies, and strives for making the state's regulatory and management programs work in a more assured, timely, and consistent manner. CZM interacts directly with the Division through grants providing funds for such positions as the Resource Economist, and Marine Fisheries Management Policy Program personnel.

c. Department of Environmental Quality Engineering (DEQE)

The main regulatory agency under the Secretary of Environmental Affairs, the Department administers most permit programs dealing with coastal alteration and municipal and industrial waste disposal. It monitors contaminated shellfish areas, and air and water quality. Several Divisions operate under the jurisdiction of DEQE: the Division of Land and Water Use administers the Wetlands Protection Act (M.G.L. c. 131, s. 40), the Waterways Program (M.G.L. c. 91, s. 1-59), and the Community Sanitation Program (M.G.L. c. 111).

The Division of Air and Hazardous Materials is responsible for monitoring sources of air pollution to assure they do not exceed federal emission standards. The Division of Water Pollution Control has permitting authority over municipal sewage treatment works (M.G.L. c. 21, s. 27, 43) awards grants for the construction of

sewage treatment and collection systems, and issues water quality certificates. The Division of Mineral Resources licenses exploration and extraction of mineral resources in coastal waters (M.G.L. c 21, s. 54).

The Division of Marine Fisheries reviews proposals for coastal alterations under the Wetlands Protection Program and coastal dredging under the Waterways Programs to prevent damage to marine resources. Upon notification by DEQE's Shellfish Sanitation Program, the Division opens or closes shellfish areas to harvesting (see contaminated areas, II, C, 3).

d. Department of Environmental Management (DEM)

This department administers the Coastal Wetlands Restriction Program (M.G.L. c. 130, s. 105) and Ocean Sanctuaries (M.G.L. c. 132A, s. 13-17). The Coastal Wetlands Restriction Program imposes restrictions to environmentally harmful development on selected coastal wetlands. Occasionally the Division is asked to comment on a restriction proposal.

2. Department of Commerce and Development

The Department assists in the establishment and expanison of industries in Massachusetts. It provides industries with local statistics, aids in site selection, imparts financial advice, and works for legislative support. Through the Division of Tourism, it promotes sportfishing by distributing informational literature and by sponsoring the Governor's Cup fishing derby.

3. Department of Public Health (DPH)

Through the Division of Food and Drug, the DPH oversees and inspects seafood processing plants, implements health and sanitation regulations relating to fish and shellfish, and is responsible for PCB and mercury closures. Food and Drug inspects trucks, shucking houses, and retail businesses dealing in seafood before the Division of Marine Fisheries issues permits. The Shellfish Sanitation Program of DEQE operates under regulations and guidelines established by DPH as part of the National Shellfish Sanitation Program.

E. Educational Institutions

1. Massachusetts Cooperative Fisheries Research Unit

The Unit is based at the University of Massachusetts (Amherst), Department of Forestry and Wildlife Management and is jointly funded by the U.S. Fish and Wildlife Service, the Division of Marine Fisheries, Division of Fisheries and Wildlife and the University. The Unit Leader and Assistant Leader conduct research and advises graduate students conducting fisheries research. In recent years the Unit has concentrated on anadromous fish research. The University

has a small coastal research facility in Gloucester.

2. Massachusetts Maritime Academy

In 1978 the legislature established (Chapter 428) the Marine Fisheries Education and Training Program at the Massachusetts Maritime Academy. In conjunction with the Department of Fisheries, Wildlife and Recreational Vehicles, the Secretary of Manpower Affairs and in cooperation with the National Marine Fisheries Service, the Academy is empowered to: develop and implement a fishery training program; identify potential manpower shortages in the fisheries; and develop and implement an extension program to train fishermen in sound business management practices.

Courses are conducted at the Buzzards Bay Campus, Essex Agricultural School, and onboard the training vessel MARITIME QUEST. In the future the Academy may introduce a Navigation and Safety Training program which will certify fishing captains in proper vessel handling.

3. Massachusetts Cooperative Extension Unit

This unit serves as a public information and ecuation distribution network for agriculture, home economics, youth, and community resource development. Funded by the U.S. Department of Agriculture and based at the University of Massachusetts (Amherst), it supports the County Extension Agents (funded 20% by the Unit and 80% by the County). The Unit's Community Resource Development Program, through a three-year MIT Sea Grant contract, is training it's extension agents in fisheries related matters at the Massachusetts Maritime Academy, and in cooperation with the Division of Marine Fisheries, has recently reprinted the Massachusetts Salt Water Fishing Guide.

4. Massachusetts Institute of Technology Sea Grant Program (MIT Sea Grant)

The Sea Grant Program at MIT is an integral part of the university. In addition to supporting fisheries research, education, and advisory projects through grants, the program also supports studies of ocean and coastal usage and development. Their resources include facilities and faculty in marine science and engineering, a research vessel, a Marine Resources Information Center, and fisheries engineering and marketing advisory personnel.

5. Woods Hole Oceanographic Institution (WHOI)

WHOI is a non-profit research and education institution. While their interests cover a wide spectrum of chemical, physical, and biological oceanography, many important studies on finfish and shellfish have been conducted at this institution since 1930.

The WHOI Sea Grant Program has conducted studies and workshops on marine resources. Recent projects include studies on the biological,

physical, and geological aspects of the coastal zone; chemical processes and pollution; aquaculture; and marine policy.

6. Other Marine Related Institutions

While not primarily directed at fisheries, there are other Massachusetts institutions that make important contributions to marine science. The Marine Biological Laboratory (MBL) at Woods Hole, Massachusetts, is a marine research and education center cooperating with a number of New England colleges. The Boston University Marine Program (BUMP) operates out of MBL. Northeastern University, Southeastern Massachusetts University, and Cape Cod Community College offer marine science programs. The New England Aquarium's Marine Mammal Salvage Program is funded by the National Marine Fisheries Service and the Provincetown Center for Coastal Studies is a non-profit marine information and education organization.

F. Local

1. Board of Selectmen or City Council

The board of selectmen or city council has management responsibilities over shellfish, eels, and seaworms in the coastal towns and cities (M.G.L. c. 130, s. 52-56). In areas where waters are mildly or grossly contaminated by sewage pollution or contaminated by paralytic shellfish poisoning (PSP) or toxic substances, control remains or reverts to the state. However, local management control over contaminated shellfish is possible through development of management plans approved by the Division. Local communities may issue commercial and recreational licenses for the taking of these resources and are responsible for management regulations, propagation, and enforcement. Many communities have shellfish commissions which act for the board of selectmen or city council. The Division of Marine Fisheries may reimburse the cities and towns for up to 50% of their shellfish management expenditures from funds annually appropriated by the legislature (M.G.L. c. 130, s. 20A). The board of selectmen or city council may issue grants in coastal waters to private individuals for purposes of growing and harvesting shellfish (M. G. L. c. 130, s. 57, 68A). Upon written request to and approval from the Director of the Division, the board of selectmen or city council may control and manage the anadromous fisheries within their towns or cities (M.G.L. c. 130, s. 94).

2. Conservation Commissions

The conservation commissions of the local cities and towns review applications for dredging, filling, and other coastal alterations under the Wetlands Protection Act (M.G.L. c. 131, s. 40). Their responsibility is to assess the probable impact of a project and assure that the fisheries are not harmed. However, they do not have management responsibilities over fisheries. The area of purview extends to 100 feet beyond either the 100 year flood plain or the landward edge of a wetland, whichever is greater.

3. Regional Development Groups

A number of county or regional commissions have taken an active role in developing the fisheries in their area. These groups organize meetings, distribute information, and fund studies in an effort to improve the economic climate for fisheries. While not limited to fisheries development, the Cape Cod and Nantucket Planning and Economic Development Commissions and the Martha's Vineyard Commission are particularly involved in assisting the fisheries on a regional basis.

G. Private Organizations

1. New England Fisheries Development Foundation (NEFDF)

The newly formed NEFDF evolved from the New England Fisheries Development Task Force which oversaw NMFS funded fisheries development activities. The NEFDF is a private, non-profit foundation dedicated to developing the harvesting, processing, and marketing sectors of the commercial fishing industry. Reorganization into a foundation provides greater operational flexibility through the receipt of funds from private, federal, regional, and state sources. The foundation will examine proposals and issue grants for projects to improve gear and processing technology, develop fisheries for underutilized fish, expand markets for traditional species, and other projects to spur the growth and diversity of the New England fishing industry.

2. New England Fisheries Steering Committee, Inc. (NEFSC)

The general purpose of the committee is to promote the welfare of the New England fishing industry by disseminating information on fishing techniques and by improving markets for fishery products. The Committee acts as the regional representative for industry at the national level and provides a channel of communication between industry segments. The Division supports the objectives of the Committee and serves as a non-voting associate member.

3. Fisheries Associations and Other Organizations

A number of organizations have been founded to bring together fishermen and/or processors with common interests and problems (Appendix II). These groups take an active role in providing services to their members, distributing fisheries information, and advising regulatory agencies. The Massachusetts Lobsterman's Association (MLA) has assisted in developing state lobster conservation regulations and participated in federal lobster management plan development. It has developed group life insurance and boat insurance plans for its members. MLA and Massachusetts Inshore Draggerman's Association (MIDA) officers have worked with the New England Fisheries Management Council and Marine Fisheries Advisory Commission. MIDA has established an insurance plan with safety guidelines for its members. Other organizations (Appendix II)

such as the Interstate Party Boat Association, Cape Cod Charter Boat Association, Massachusetts Striped Bass Association, Massachusetts Sportsmen's Council, and various sportfishing clubs have actively served recreational fishermen by promoting and protecting their interests.

Processor associations in Gloucester, Boston, and New Bedford perform a similar function in cooperating to solve problems and advising government on regulatory issues. These associations provide a vital link between government agencies and the fishing industry by which information and public input are exchanged.

The Massachusetts Shellfish Officer's Association, while not a government agency, brings together the shellfish managers from all the cities and towns. The MSOA promotes management consistency between local communities, regional shellfish development and enhancement plans. The association provides a unique opportunity for coordination and cooperation between state and local shellfish managers.

V. Public Concerns

In developing a comprehensive marine fisheries policy, a necessary and important part of the process is the involvement of the public. Before the policies were drafted, the general public had the opportunity to air their concerns to affect the shaping of policy. This was provided at meetings with commercial and recreational fishermen, sportfishing clubs, fisheries organizations, and other fishery related interests to obtain their views and opinions on topics affecting their livelihood and/or recreational enjoyment.

Public meetings were held in major ports and coastal communities throughout the Commonwealth of Massachusetts mainly during the two-month period of February and March, 1980 (Appendix V). Adequate notification of meetings was a high priority and was accomplished by direct mail, newspaper ads, television and radio interviews, and posters. While meeting attendance ranged from excellent to poor, most meetings provided a good forum for the exchange of ideas. Issues dissussed included port and harbor facilities, licensing, gear conflict, distribution of fisheries information, boat insurance and loans, law enforcement, fisheries regulations, habitat protection, and topics pertaining to state fisheries management or lack thereof.

In conjunction with public meetings, two fisheries questionnaries were distributed (see Appendix I). One addressed problems in the commercial fisheries sector including finfish, lobster, and shellfish. The other, a recreational questionnaire, concerned problems facing rod and reel fishermen, recreational shellfish and lobster fishermen, and party and charter boat fishing activities. Specific comments on other problem areas were encouraged. In addition, questionnaires were mailed to members of organizations such as the Massachusetts Lobsterman's Association (MLA) and the Massachusetts Inshore Draggermen's Association (MIDA); and, a Portuguese translation of the commercial questionnaire was prepared and distributed in New Bedford. Letters were sent to sportfishing organizations to solicit additional comments on public access, fishing information, commercial vs. recreational fishing, sportfish, and a saltwater fishing license.

The following topics drew the most response from the questionnaires, public meetings, and personal communications. Since these topics evoked similar responses coastwide, they are discussed on a collective basis, while citing specific examples.

A. Port and Harbor Facilities

Lack of adequate piers, docks, dredged channels, ice, and other facilities was a major concern for all areas of the coast including the primary ports of Gloucester, Sandwich, and Provincetown, but particularly the secondary ports of Scituate, Chatham, and Plymouth and smaller ones like Newburyport, Hull, Beverly, and Nantucket. Conditions cited by fishermen were deteriorating docks, congested offloading and

docking areas, and lack of ice and boat maintenance facilities. The public contends that the communities give little or no support to the commercial fishery regarding improvements in harbor facilities.

Since fishing is not a highly visible industry in small ports, it is difficult to convince local officials of its economic value. Coastal communities with fiscal constraints are not willing to allot money to improve facilities that only benefit a small percentage of the population and tax base. Newburyport, for example, expends a great deal of effort and money for downtown and waterfront restoration to induce tourism and pleasure craft usage and very little on their commercial fishing industry.

The public suggested the following courses of action. 1) The state should assist the fishermen by providing economic studies documenting the importance of commercial fishing in each port. Fishing generates a lot of unnoticed dollars back into the community by way of employment, fish processing, marketing, boat supplies, boat maintenance, taxes, and tourist interest. 2) Massachusetts should initiate a statewide port and harbor development program. Division extension agents should survey areas, solicit opinions, and make preliminary recommendations on projected port facility needs. The state should provide port and harbor development funds or act as liaison to find federal development grants for local communities. 3) The state should assist communities with the technical aspects of applying for grants, obtaining permits, and designing facilities. A comprehensive state wide program would be more efficient than each individual community organizing, planning, and funding port development projects on a piecemeal basis.

B. Gear Conflict

The traditional conflict between stationary and mobile fishing gear has been well documented in the past. In 1977, the Division organized an ad hoc Gear Conflict Committee, composed of knowledgeable fishermen, to deal with disputes between gill netters and trawlers on the North Shore and lobstermen and pair trawlers on the South Shore. As different species become valuable, new gear is employed, the intensity and scope of fishing activities change and new conflicts are created.

This is particularly true in the rapidly developing gill net fisheries on the North Shore, South Shore and outer Cape Cod. It is easy to enter the gill net fishery because of the small capital outlay necessary for gear and boat. There are no restrictions on net numbers, mesh size, or length. As a result the fishery is undergoing a large influx of inexperienced and part-time fishermen unfamiliar with proper net setting and marking techniques. Nets are sometimes set perpendicular to shore or without adequate markings or radar reflectors. In addition, lobstermen are fishing gill nets in winter, while many longliners have switched to gill nets. The general increase in gill net numbers result in encroachment onto traditional trawling grounds. This and improper handling techniques result in both natural and man-induced gear loss.

Many were concerned over the effects of gill netting on fish quality, spawning success, navigation, fish stocks, and recreational fishing. Fish quality is poor if fish remain in the net for 24 hours or more. Gill nets can be set on most bottom types, including some important spawning grounds heretofore unavailable to mobile gear. Nets stretched across river mouths or near shoals present hazards to navigation. Gill nets may continue to catch and destroy fish long after they are lost at sea. Party/charter boat fishermen complained of gill nets set in "star patterns" on Jeffrey's Ledge that interfere with traditional hook and line fishing.

Both commercial and recreational fishermen declared a strong desire for state regulatory action. Suggestions included a thorough research into the developing Massachusetts' gill net fishery and what actions other states have implemented. Regulations should be based upon protecting spawning grounds, improving fish quality, limiting number of gill nets, and reducing gear loss.

Gear conflicts between trawlers, and between pair trawlers and lobster gear were discussed. Large offshore and out-of-state trawlers compete with small inshore trawlers in state waters. Inshore trawlers have a limited fishing range and depend on resources within State territorial waters, especially during bad weather seasons. Larger vessels capable of fishing offshore in most weather conditions, deplete inshore waters before moving offshore, leaving less for the inshore boats. Pair trawlers fishing for herring in State waters at night have caused extensive damage to lobster gear on the South Shore.

In an issue related to gear conflict, sportfishermen contend that trawlers and fish weirs take large quantities of sportfish, spawning fish, and forage fish within state waters. The public suggested seasonal closures of certain areas known to contain large numbers of spawning sportfish and initiating a system of limited entry and/or vessel size constraints to limit inshore fishing to a reasonable number of small boats.

C. Law Enforcement

The Division of Law Enforcement operates within the Executive Office of Environmental Affairs. Although it is not part of, or controlled by, the Department of Fisheries, Wildlife, and Recreational Vehicles, DLE primarily enforces rules and regulations of the Division of Marine Fisheries (M.G.L. c. 130) and the Division of Fisheries and Wildlife (M.G.L. c. 131).* In addition it must enforce the rules and regulations of four other agencies. The Law Enforcement Division is severely hampered by shortages of personnel, budget constrains, and numerous responsibilities. Officers find it difficult to enforce both marine and inland laws within the large coastal enforcement districts.

The lack of effective enforcement was expressed at most meetings and was rated a severe problem on a high percentage of the questionnaries. Many abuses were mentioned in the lobster fishery such as: violation of the ten pot limit by recreational lobstermen; improper marking or

* The DLE was transfered into the DFW&RV shortly before this report was printed.

construction of buoys and pots; taking short and egg-bearing lobsters; divers removing lobsters from traps; lobstermen setting pots in closed areas and in marked channels; and, poachers hauling pots at night.

A solution suggested at a number of meetings was to incorporate law enforcement directly into the resource agency it primarily serves and/or create a marine law enforcement unit. Commercial lobstermen suggested using smaller and less conspicuous vessels to enforce lobster laws. In addition, this would facilitate the laborous task of checking licenses, gear markings, and escape vents. Increasing the authority and/or training of local shellfish officers, policemen, and harbor masters and Marine and Recreational Vehicle officers would also aid the enforcement of marine fishing laws.

Examples of enforcement problems in the mobile gear fisheries included trawlers landing fish during closed seasons, exceeding landing quotas, fishing with small mesh nets, and fishing inside closed state waters. Fishermen contended that too many conflicting and restraining regulations were already in effect and were impossible to enforce even with more officers. They favored institution of mesh regulations rather than closed areas and quotas. Enforcement of mesh size regulation could be eased if there were minimum fish size limits enforced for fishermen and buyers alike. Fishermen said that as long as there is a market for 'snapper' cod and small flounder, they would continue catching them with small mesh nets.

The public believed Law Enforcement officers had limited knowledge of commercial fishing operations and gear; this hampered interpretation of marine regulations. A solution to this concern might be to provide seminars and courses in gear and fishing techniques for the officers.

Other topics of discussion were problems related to prosectuion of violations. Most violations, however small, must be tried in court. Rather than bring minor violations to court, on-site citations similar to traffic tickets should be issued. Because judges commonly deal with serious crimes, they tend to underrate the importance of resource violations. Many convicted resource violators receive little or no punishment.

D. Licensing

The major concern involving licenses was abuse of the $5.00 rod and reel permit's exemption for those who catch and sell less than one hundred pounds plus one fish per day. Many fishermen, including some from out-of-state, catch and sell more than the limit without a license. While some fishermen ignore the regulations, others find ways around the law, such as selling 100 pounds of fish at five different markets or distributing fish to friends for them to sell. These violations commonly occur in the striped bass sportfishery and results in the loss of valuable management statistics.

In a related issue, the definition of a commercial versus a non-commercial sportfish fisherman was discussed. This was of particular concern

for Cape Cod residents who feel out-of-state fishermen take advantage of the Massachusetts striped bass fishery by landing and selling 500 to 600 pounds per day. They expressed the need for a license residency requirement and/or a $100-500 rod and reel license for selling striped bass. While some favored a license others opposed any kind of licnese that would effect the catch or sale of sportfish. These people felt that the fish they sell offset the cost of fuel and maintenance for their boats and they should not be subject to further bureaucratic regulation and cost.

There appeared to be few problems with procedures for submitting catch reports or processing license applications. However, the public did suggest that licenses be issued at Division field stations in addition to the Boston office. This would reduce traveling when licenses are needed quickly. Mail handling and costs would also be reduced. Others thought that the numerous types, fees, and conditions for obtaining licenses were confusing, and that the Division should either simplify the licensing system or provide more information. This is particularly true in issuing seasonal lobster permits where there is confusion over student eligibility, fishing seasons, and pot limits.

A number of people questioned the legality of restricting the number of commercial lobster licenses issued. They felt that this was unconstitutional and inhibited a persons right to make a living from the sea.

E. Underutilized Species, Marketing, Fish Quality, and Joint Ventures

Underutilized species are relatively untapped resources for Massachusetts fisheries. With traditional fish and shellfish such as cod, haddock, flounder, scallops, and lobster fully utilized and increasingly regulated, fishing communities have to look for other types of fish with market potential. Consequently, consumers must be made aware of the many nontraditional fish available that are nutritional, flavorful, and less expensive. This can be done through promotion campaigns and expanding domestic and export markets.

Commercial fishermen, particularly in the ports of Chatham, Sandwich, and Provincetown, expressed interest in developing markets for underutilized species such as dogfish shark, cusk, and hake. They lacked knowledge of proper techniques to keep catch quality high enough to satisfy foreign market standards. They needed information on modern storing, offloading, and processing techniques to maintain fish quality. Fishermen indicated the need for consumer information programs to educate the public in the availability and preparation of nontraditional fish. Fishermen urged the greater use of Massachusetts caught fish in state institutions, school lunch programs, hospitals, and nursing homes.

Fish quality, fish prices, and Canadian imports were also discussed. Since buyers do not always acknowledge better quality by paying higher prices, some fishermen suggested a state-sponsored grading system similar to the U.S. Department of Agriculture's system for meat and poultry. Other marketing suggestions included promoting "Massachusetts caught fish"

following the idea of "Massachusetts grown vegetables". Advertising "Massachusetts lobster" rather than the commonly used 'Maine lobster' was also suggested. Competition from foreign imports, particularly from Canadian lobsters and fresh fish reduced ex-vessel prices to Massachusetts fishermen. Canadian government subsidies and low import tariffs keep imported fish prices low and increase price competition for U.S. caught fish.

The subject of joint ventures with foreign countries correlated with marketing underutilized species. Some fishermen did not want the red tape or high quality demands involved with joint ventures. While others feared losing their domestic buyers and felt that foreign markets were not secure. The Division, by providing information on foreign buyers regulations, quality standards, and processing methods, could aid fishermen and fishing organizations that are interested in a joint venture. In this way the U.S. fishermen could make their own negotiations and insure a quality product at a fair price.

F. Information and Education, Gear Technology

Most commercial fishermen expressed interest in obtaining information on gear technology developments, European fishing methods, and fisheries meetings. There was strong support for the publication of an informative monthly newsletter or periodical. Included in such a newsletter could be articles on various Division programs, new legislative acts, and biological data obtained from research projects.

The Division's Fisheries Extension Program was appreciated by those that have utilized it. However, some fishermen said the agents, while knowledgeable about traditional gear, needed more information on new techniques and large boat gear (40 feet +). While the extension agents were helpful, they did not provide experienced fishermen with new information. In realizing that there were just three agents and one coordinator, the fishermen suggested an increase in part-time or seasonal personnel.

The Marine Fisheries Education and Training Program conducted at the Massachusetts Maritime Academy was well received. According to its Director, over 800 commercial fishermen and other participants have received instruction and training in fishing gear, marine engines, electronics, net mending, navigation, and business management. People who took the courses remarked that they were informative, but were geared to novice fishermen or to persons engaged in part time fishing. In the future they would like to see a more intensive curriculm for the experienced fishermen, held evenings at local high schools. Although the MIT Sea Grant funded the fisheries Training Program, fishermen felt that Sea Grant had done little else to help commercial fishermen.

Recreational fishermen believed that sportfishing information could be best distributed through the local Chamber of Commerce. This would help both the vacationer and novice find where to fish and what to catch. The Division should supply brochures and booklets describing fishing

areas, access areas, and state fishing regulations. The Division should further educate the novice in fishing techniques and inform them that there are other edible fish to catch besides striped bass, bluefish, and flounder.

G. Vessel Safety, Insurance, Financing and Loans

Fishermen all agreed that vessel safety and complying with Coast Guard safety guidelines was important. Insurance companies give premium deductions as incentives for installing special safety gear on vessels (e.g. survival suits). Some fishermen wanted more information on insurance company safety guidelines. In most cases, fishermen felt that insurance matters were best handled through group co-ops and fishing organizations. Several associations already had excellent comprehensive insurance packages for their members and it was the general concensus that the state need not become involved.

Fishermen believed that financing and loans for new boats, gear, and electronic equipment are best handled by the individual, even though banks are not inclined to loan money to repair older vessels. Some fishermen found that federal loan applications involved too much red tape and paper work. Local banks that are more familiar with the fishing industry, were generally more favorable and charged less interest than federal guaranteed loans.

While fishermen did not want any new state financial aid programs, most felt that assistance would be needed in the event of a natural (e.g. paralytic shellfish poisoning) or chemical (e.g. oil spill) disaster, provided the Division could substantiate individual catch loss on the basis of past catch reports.

H. Shellfish

At meetings in Ipswich, Bourne, and Westport and with the Massachusetts Shellfish Officers Association, shellfish issues were discussed in depth. Topics of concern included shellfish licensing issues, the need for a regional shellfish hatchery, use of contaminated shellfish as bait, and state shellfish sanitation and purification programs.

Dual state and local commercial shellfish licensing requirements were not a problem. However, the delay involved in obtaining a state license before shellfishermen can be issued a local permit does create problems. These delays are also experienced with shellfish seed and transplant permits. As previously mentioned, a recommended solution would be to issue licenses at Division field stations and upgrade the efficiency of all licensing procedures.

MSOA members expressed interest in developing a regional South Shore public shellfish hatchery to augment the supply of seed stock. Although seed stock is available from private sources, the seasons or amounts available are not adequate for local shellfish propagation needs. While a public facility may satisfy the town's seed shellfish needs, the hatchery

could also be used as a training center, possibly affiliated with a university. An additional hatchery function could be shellfish disease inspection. Instead of sending shellfish specimens out-of-state for required disease-free certification, the work could be done in-state more timely. Meanwhile, it was suggested that the Division provide pathological inspection capabilities for shellfish and other fish.

The State's shellfish purification plant was discussed at a number of meetings. With the plant operating at full capacity and still not able to meet increased demand, shellfishermen recommended expanding the existing facility and, building additional facilities, encouraging construction of private depuration facilities, or decreasing depuration time from 48 to 24 hours. In addition, shellfishermen felt that more coordination between the Department of Environmental Quality Engineering (DEQE) and the Division of Marine Fisheries was necessary in conducting the Shellfish Sanitation Program. Delays in opening areas, early area closures and bureaucratic red tape were cited in control of Paralytic Shellfish Poisoning (PSP) and contaminated shellfish. Unnecessary delays in opening and closing notification resulted in loss of valuable fishing time or confiscation of PSP contaminated shellfish after purification at the Depuration Plant. Another aspect of the contaminated shellfish issue is the use of this neglected resource for bait. A North Shore party boat owner said a large population of contaminated shellfish off Newburyport cannot be harvested and used for bait because of the inability to resolve interagency problems over regulation and enforcement. Some believe that when bait fishing was allowed a portion of the shellfish were illegally sold for consumption. Therefore the whole area was closed to any shellfishing.

The public recommended the Division take action on a number of fronts. The Division should implement a shellfish resource assessment program to define the extent and value of inshore and offshore shellfish resources and aid in state and local shellfish management. The Division should provide more mariculture technical assistance including information on culture techniques, species selection, proper equipment, and cost estimation. Finally, commercial shellfishermen claimed that local shellfish regulations discriminated against them in favor of recreational shellfishermen, and they asked for Division support.

I. Sportfishing Access

Decreasing availability of coastal fishing sites and launching ramps was a major concern at all recreational fisheries meetings. With increasing numbers of sports fishermen, the limited number of ramps and piers, and the closing of other access sites, the public's ability to enjoy recreational fishing has diminished. Although the State Public Access Board has provided over $667,000 for repairing 315, and building 160 additional coastal parking lanes since 1980 and has 351 more lanes planned, the Board's funding, and thus its construction rate has decreased, in recent years. This funding decrease is compounded by the rapid increase in acquisition and construction costs.

Other factors are causing reductions in sportfishing access sites. Some state and town ramps are in poor condition due to vandalism and lack of maintenance. A number of proposed ramp construction sites are being opposed by local residents who claim the ramps would cause environmental degradation. Similar problems exist with shore fishing sites. Many beaches and shoreside parks are closed at night because of vandalism. Beach property owners are attempting to restrict beach fishing access by closing paths or persuading the town to ban nearby parking. Many bridges and piers are being closed to fishing because of alleged safety problems.

The public believed the Division must provide strong support for adequate funding of the Public Access Board. The Board must look for funding sources in addition to state capital outlays; implement long-range plans by acquiring future access sites; and publicize economic and sociological justification for new ramps and piers. In addition, either the Division or the Board must update information on beach, pier, ramp, and party/charter boat locations.

J. Recreational Saltwater License

In general, public opinion is against any new license or regulatory burden, so the initial public opinion for a recreational rod and reel license was understandably negative. The public believed that recreational fishing was the last free, god-given right that wasn't licensed or taxed. Since they already pay for tackle, bait, and gas, the imposition of a fishing license would only add an additional financial burden. A license may force the young, old, and financially pressed to abandon recreational fishing.

After the initial objections were expressed, the general reaction focused on how, if at all, would a recreational license benefit the fishermen? Would the revenues be used for sportfish programs? Would there be more Division sportfish programs? Would public access be upgraded? The questionnaire results indicated that if the above questions were answered in the affirmative then 55% of the recreational fishermen would favor a license, otherwise they were against it.

Other aspects of the recreational license question were the need for recreational catch statistics and the possibility of Massachusetts increasing its share of Federal Dingell-Johnson funds. Without a license the Division's ability to estimate numbers of fishermen, fishing method used, and resulting catch is extremely limited. This makes substantiating the value of recreational fisheries and the need for sportfish management and development programs difficult. Funds for additional programs may come from license revenues but substantially more money may be obtained from the Dingell-Johnson fund.

Dingell-Johnson monies are collected through the ten percent Federal excise tax on all fishing gear and tackle. The U.S. Fish and Wildlife Service redistributes funds to the states based 60% on the number of licenses issued and 40% on land area. An estimated $280,000 was alloted to Massachusetts in 1980. Because Massachusetts has no saltwater license all

the money went to fresh water fishery programs, even though saltwater fishermen contributed a substantial amount to the Dingell-Johnson fund. The final recommendation was for a feasibility study to examine the possible revenues (both state and federal) from a license; its effects on the fisheries, individuals and dependent industries; and what sport-fish programs revenues could support.

VI. Principles, Policies, and Proposed Actions

A. Statement of Principles

1. Massachusetts fisheries are renewable resources that are of major importance to the employment, economic, and recreational needs of the people. They contribute significantly to the supply of valuable fisheries products, to tourism, and to state revenues.

2. Renewable marine resources can be maintained and enhanced if properly managed, but there is a limit to their productivity. If mismanaged or unwisely utilized, they may be depleted and the fisheries disrupted. The living marine resources of the Commonwealth are common property. They shall be utilized to the greatest benefit of the public.

3. Historically, this right was "free and open", based on the presumed inexhaustibility of these resources. However, increases in commercial and recreational fishing, use of modern fishing technology, and environmental alterations have negated this premise. Therefore, it is clearly necessary that the Commonwealth protect, manage, and enhance marine resources for continued benefit and enjoyment by present and future generations.

4. Those who derive benefit from a public resource must share the responsibility for management. They must participate in the regulatory process, comply with regulations, contribute necessary information, and share in management costs if management is to be successful.

5. The Division of Marine Fisheries is the lead agency in the Commonwealth for the management and enhancement of marine fishery resources and the promotion and development of the recreational and commercial marine fisheries.

B. Statement of Policies and Proposed Actions

1.0 Fisheries Management

1.1 Resource Management - Management of living resources requires a delicate balance between their conservation to allow for natural biological growth and replenishment and their utilization to obtain economic, social, and aesthetic rewards of their abundance. The Commonwealth will actively promote conservation, management, and optimum utilization of living marine resources for the benefit of all. Implied in the concept of optimum utilization is the consideration of relevant social, economic, and biological factors in determining highest beneficial uses of the resource.

The goal of managing the Commonwealth's marine resources is to maximize their availability over time. In this way, to the extent possible given resource limitations, long-term social and economic benefits can be derived from their utilization. The resources shall be managed to provide: economic stability and social well-being in the commercial fishing industry; enjoyment and food to recreational fishermen; overall benefit to the public and economic benefit to the industries dependent on commercial fishing, recreational fishing, and tourism; and wholesome, high quality protein to the public.

Fisheries are conducted by individuals and private enterprise. The opportunity to engage in fishing should be available to everyone except when it is necessary to limit entry to a fishery for biological, social, or economic reasons. Although economic stability of the fisheries is a desirable objective, the preferred approach is to maintain fish abundance at adequate levels rather than directly managing the economic performance of the fishing industry.

1.1 Proposed Actions

The Division will:

A. work closely with the following agencies whose management responsibilities affect stocks utilized in Massachusetts fisheries: National Marine Fisheries Service to exchange assessment and statistical data and conduct fisheries research; New England, and other Fisheries Management Councils, to develop fishery management plans and regulations for fisheries outside Massachusetts waters; Atlantic States Marine Fisheries Commission and other coastal states, to manage fish stocks common to territorial waters of two or more states;

B. improve capabilities to gather and analyze biological, sociological, and economic data to provide a sound basis for

fisheries management including:

(1) maintaining existing NEFMC liaison position to review federal fisheries management plans for offshore fisheries important to Massachusetts;

(2) establishing staff with capabilities to develop state management plans for species predominantly under Massachusetts jurisdiction;

(3) implementing a sea sampling program on board Massachusetts commercial fishing boats to collect valuable catch and effort data unobtainable elsewhere, and to assess fishery conditions and fishermen's views.

(4) improve statistics (sec. 3.1) and licensing (sec. 3.3) programs to obtain better economic and sociological data.

C. solicit input from user groups and the general public concerning management issues, and form ad hoc advisory committees when needed to address management problems;

D. propose legislation to eliminate local control of surf clams, sea scallops and ocean quahogs;

E. propose legislation to change the shellfish local aid fund reimbursement systems to a grant system that will provide towns with incentives to prepare management plans to facilitate full development of their shellfish resources;

F. integrate all aspects of the Shellfish Sanitation Program into a single agency.

G. examine the eel resources to determine the appropriate management and jurisdictional responsibilities.

H. support efforts to decentralize and streamline the federal fisheries management process so that timely and effective management can be achieved. By transferring more management authority from Washington to the Regional Councils, management plans can more efficiently respond to changing fishery conditions;

I. support efforts to implement the state-federal management program under the Atlantic States Marine Fisheries Commission in order to fully develop fishery management of species that occur predominately in state waters;

J. propose the adoption to necessary legislation to implement Amendment I of the Atlantic States Marine Fisheries Commission charter to allow Massachusetts to enter into interstate fishery management agreements.

1.2 Restrictions and Allocations - Fisheries management employs statutes and regulations limiting the amount, means,or types of resource harvesting as tools to maintain and increase resource abundance. Fishery resources will be available for utilization by all user groups unless fishing conflicts or resource depletions dictate the need for allocation or fishing restrictions. Restrictions can be based on area, gear, time, season, or fish size. Allocations may limit the number of fishermen or quantities of fish taken, and allowances may be considered for traditional fishing practices and historical resource users.

Introduction of new fishing practices or patterns may result in resource or gear conflicts. The Division supports resolution of these conflicts by mediation, with allocation or restrictions to be instituted when other means fail. In such cases, the Division recognizes the importance of traditional fishing practices and patterns but may modify or introduce restrictions to prevent conflicts resulting from new fishing practices. The Division may reserve fishery resources or areas for certain recreational or commercial uses where social, economic, or other factors make joint utilization inappropriate.

1.2 Proposed Actions

The Division will:

A. consult with the Marine Fisheries Advisory Commission on fisheries problems and issues, and submit to the Commission regulatory proposals relating to marine fisheries for appropriate action;

B. promulgate regulations that complement Federal Fisheries Management plans developed by the New England, Mid-Atlantic, and other Fisheries Management Councils and international management organizations, subject to the needs and concerns of the Commonwealth;

C. implement reasonable and enforceable landing/possession limits as a means to regulate total harvest. Refrain from using quotas when possible;

D. consider adopting seasonal area closures in state territorial waters to allow for spawning of important commercial and recreational species;

E. re-establish the Gear Conflict Committee to develop recommendations for reducing present and potential gear conflicts.

1.3 Regulations and Enforcement are essential components of effective management. Effective resource management is impossible if regulations are unenforceable or unsupported by user groups.

The Division shall advocate minimum regulatory control. The regulatory process shall be timely, simple, and provide opportunity for public input. Regulations shall be designed to achieve well defined goals, maximize public compliance, and facilitate enforcement. Other factors to consider in designing regulation are energy conservation, safety, fish quality, and market demands. Each regulation shall contain a clear statement of rationale, and provide for penalties commensurate with the violation.

Recognizing that fisheries support commercial enterprises and that illegal harvesting adversely affects the commercial fishermen's livelihood, the recreational fishermen's enjoyment, and the fishing industry as a whole, the Division advocates effective enforcement of laws and regulations established for management of the Commonwealth's marine fisheries resources. The Division of Marine Fisheries will cooperate with the Division of Law Enforcement to increase the level of effectiveness of marine fisheries law enforcement.

1.3 Proposed Actions

A. The Division will:

1. propose legislation to increase penalties and fines for violations of fishery statutes and regulations. At present, illegal fishing can be highly profitable even after existing fines are paid;

2. utilize Division adjudicatory hearing procedures for recurring resource violators;

3. re-codify all statutes relating to marine fisheries and replace archaic, inappropriate and conflicting statutes and special acts with up-to-date regulations and statutes; and promulgate all future fishery management restrictions other than emergency actions, through regulations approved by the Marine Fisheries Advisory Commission;

B. The Division recommends:

1. supporting legislation to transfer the Division of Law Enforcement into the Department of Fisheries, Wildlife and Recreational Vehicles;

2. the creation of an Enforcement Policy Board, composed of members from each agency served by the Division of Law Enforcement, to assign direction and priorities consistent with management needs for enforcement of state resource and environmental laws;

3. the creation of a separate marine fisheries law enforcement unit within the DLE, staffed with officers trained in, and assigned to, enforcing marine fisheries laws;

4. initiating a marine fisheries enforcement training program for Division of Law Enforcement officers, and encourage deputization of Division of Marine and Recreational Vehicles officers, and local shellfish constables;

5. that the Division of Law Enforcement develop capabilities to provide intensive short term enforcement in certain problem areas and during certain fishing seasons;

6. the Division of Law Enforcement establish a Counsel position acting as a prosecuting officer to expedite processing of court cases for fishery violations;

7. initiation of an informational program to appraise the Massachusetts judicial system as to the serious nature of resource violations as threats to the economic and social well-being of major commercial and recreational industries.

1.4 Fisheries and Habitat Enhancement - Creation of artificial habitat, introduction of exotic species, and restoration and development of anadromous fish and shellfish populations are effective methods of increasing productivity, providing additional recreational and commercial fishing opportunities, and enhancing the forage base. The Division will support and participate in such enhancement efforts if these activities do not disrupt traditional fishing practices or adversely impact existing fish populations or the ecosystem.

Priority will be given to restoration efforts involving fish passage facilities which achieve maximum benefit at minimum costs. The Division will discourage development of alewife populations in drinking water supplies where stream flows are generally inadequate to support fish passage on a sustained basis.

Introduction of fish species not native to the Massachusetts marine ecosystem will only be considered if life histories and disease relationships are well documented, and a substantial need can be demonstrated.

Artificial reef construction will be supported where substantial natural cover is absent; hydrographic conditions, materials used and construction methods employed will ensure long-term usefulness; the physical and biological oceanographic conditions will support reef type fish; and where it will not adversely affect other fisheries.

In light of the existing energy situation, many tidal rivers and streams are being studied as possible locations for low-head hydroelectric installations. While the potential benefits are great, consideration must be given to protection of anadromous fisheries. Low-head hydroelectric installations shall be designed and constructed with fishways as an integral part, provided the Division believes the resource justifies the cost. Installations shall be operated to minimize adverse effects on fish and fisheries as a result of drawdowns, dewatering below the dam, or fish impingement on turbines.

1.4 Proposed Actions

The Division will:

A. expand the Anadromous Fisheries Management Project to increase native anadromous fisheries by assisting towns in managing existing runs, removing hinderances to migration, preventing pollution, building fishways, re-establishing or introducing new runs where feasible; and developing a research capability that will form a sound scientific basis for managing anadromous fish resources;

B. increase stocking levels of coho salmon as a means of accumulating data to evaluate the potential of a hatchery sustained coho fishery in Massachusetts coastal waters;

C. determine feasibility of restoring or creating discrete populations of striped bass in Massachusetts coastal waters as a means of compensating for lost fishing opportunities resulting from the recent decline in coastal migratory stocks;

D. in the absence of private shellfish hatcheries that provide seedstock to towns, support development of cost-effective public shellfish hatcheries to supplement nautral reproduction;

E. support the shellfish relay system as a means to purify and utilize the substantial contaminated shellfish resources.

F. examine the feasibility of private shellfish depuration.

1.5 Mariculture - The Commonwealth encourages and supports mariculture as a potentially valuable method of increasing the supply of seafood products and employment. The Division will adopt a lead role in reducing institutional, social, technical, and economic barriers restricting mariculture growth. Institutional barriers will be lessened by streamlining the cumbersome permit process and reducing legal impediments to construction of mariculture facilities and product sales. While recognizing that priorities assigned to mariculture depend on local competition for coastal usage, the Division will support mariculture operations when they do not adversely impact on local marine resources and traditional industries. The Division will provide technical assistance and favor economic incentives to improve conditions under which mariculture in Massachusetts can grow.

1.5 Proposed Actions

The Division will:

A. prepare a Massachusetts mariculture plan to detail methods, programs, and legislation necessary to improve the status of mariculture. The plan will clarify legal ambiguities and define areas where mariculture should receive high priority. It will create guidelines for types of species and operations that the Commonwealth will support, and actions necessary to further private mariculture development;

B. propose legislation to streamline the permit process for mariculture operations;

C. inform the public of available financial and tax incentives to encourage private enterprise investment in mariculture;

D. support efforts to develop state fish and shellfish pathology capabilities to provide shellfish disease free certification, discern causes for fish kills, and promote disease prevention in mariculture operations.

1.6 Environmental Concerns - Maintenance and enhancement of fishery resources are partially dependent on the protection of habitat, sustaining a viable food chain, and improvement of water quality. Habitat protection need not exclude other uses of coastal areas.

The Division shall review coastal alteration proposals with the intent of lessening and if possible, eliminating significant impacts on marine resources. The Division will provide data or identify data needs necessary to render sound judgements regarding impacts of coastal alterations on marine resources. Recommendations on alteration projects shall include those measures of established technology necessary to mitigate resource impacts.

In the absence of any adverse environmental impacts, it shall be Division policy to favor fishery related coastal development over non-fishery related development. When resource values ultimately conflict with coastal facility development, the Secretary of Environmental Affairs shall resolve the issue.

In conflicts between fishermen and marine mammals or endangered species, the Division will work for a reasonable compromise providing safety for protected species, while limiting negative impacts on fisheries.

In the exploitation of non renewable resources, the Division will work towards minimizing the impacts on fisheries.

1.6 Proposed Actions

The Division will:

A. support existing policies established by the Coastal Zone Management Program of 1978;

B. comply with its' responsibilities to review and comment respective to the Fish and Wildlife Coordination Act (1934) amended 16 U.S.C. (661-666) for protection of fish and fish habitat in coastal waters and streams;

C. take an active part, when requested, in the review process of the:

(1) Wetlands Protection Program (M.G.L. C. 131, s. 40) in order to conserve coastal wetlands as valuable spawning and nursery habitat for commercial, recreational, and prey species, and as an area of high primary productivity in the marine food chain;

(2) Waterways Program (M.G.L. C. 91, s. 1-59) in order to protect marine resources, promote maintenance dredging of fishing ports, and prevent hazards to navigation;

(3) Water Pollution Control Certification Program (M.G.L. C. 21, s. 43) in order to protect the public health and increase the utilization of available shellfish resources;

(4) Army Corps of Engineers Section 10 Permit Program in order to protect the marine environment and resources from any deleterious effects of coastal alteration, dredging or ocean dumping;

D. oppose introduction into the marine environment any substances that:

(1) reduce fish and water quality;

(2) cause fish kills;

(3) induce fish stress or diseases that reduce an organisms' ability to survive, grow, or reproduce.

E. support utilization of living marine resources in any area designated as a state ocean sanctuary or federal marine sanctuary;

F. request that the Secretary of Environmental Affairs resolve any interagency conflict over recommendations on coastal alteration proposals and that EOEA develop a rational policy and program for disposal of dredge spoils in Massachusetts.

1.7 Coordination of Marine Management, Research, and Academic Programs - Fishery programs at all levels of government are interdependent. Because fish populations recognize no jurisdictional boundaries, the Division will encourage coordiantion and nonduplication of fishery related programs conducted by federal, state, and local government agencies, the academic community, and private industry. The Division will actively participate in and/or advise regional, interstate, and local management entities so that the interests of Massachusetts fisheries are represented and protected.

1.7 Proposed Actions

The Division will:

A. provide information to the Washington, D.C. staff of the Office of State-Federal Relations so that they can properly address fisheries issues of concern to Massachusetts fishermen;

B. promote the rational protection of marine mammals and endangered species through the National Marine Fisheries Service and the U.S. Fish and Wildlife Service;

C. support Massachusetts Maritime Academy's fishermen's Navigation and Safety Certification Program;

D. coordinate with the Division of Fisheries and Wildlife in the management of diadromous fish to provide consistency of regulations and programs;

E. propose legislation to give the Division of Marine Fisheries and the Division of Fisheries and Wildlife joint authority in determining the boundary of fresh and salt water in the Commonwealth's rivers and streams;

F. recommend the coordination of the Commonwealth's various marine related research, management, and educational programs into a Massachusetts Marine Fisheries Research and Educational Consortium. This consortium should be composed of the Division of Marine Fisheries, Massachusetts Maritime Academy, Massachusetts Institute of Technology Sea Grant, University of Massachusetts (Amherst) Cooperative Fisheries Research Unit, Southeastern Massachusetts University, and Massachusetts Cooperative Extension Service. These agencies and academic institutions are already linked individually by various grants and agreements. The Division shall develop cooperative programs and shall share facilities and information to improve fishery knowledge at no increase in Commonwealth spending. The following is a partial list of resources that may be useful to other institutions, and is not intended to describe all available resources:

(1) Division of Marine Fisheries - research lab, research

vessels, and professional fisheries personnel;

(2) Massachusetts Maritime Academy - fisheries library, dormitory facilities, and fisheries education program;

(3) MIT Sea Grant - Sea Grant funds for fisheries research, information and education programs, research vessel;

(4) University of Massachusetts (Amherst) Cooperative Fisheries Research Unit - fisheries research faculty, facilities, and graduate students;

(5) Massachusetts Cooperative Extension Service - fisheries information distribution system, printing capabilities, and editorial expertise;

(6) Southeastern Massachusetts University - fisheries courses, research vessel.

2.0 Research and Development

2.1 Fisheries Development - The Commonwealth will participate actively in development of commercial and recreational fisheries utilized by its citizens. Although increased fishing effort will not be encouraged in fully utilized fisheries where it will lead to over-exploitation and overcapitalization, expanded fishing opportunities in non-traditional fisheries will be carefully explored.

The Commonwealth will support the development and implementation of innovative techniques to improve fish quality, reduce fishing costs, modernize existing port facilities, and improve services to the existing fleet. For fishery development and other purposes, the Commonwealth will recognize party and charter boats as commercial vessels. In recreational fisheries, the Commonwealth will promote opportunities available in sportfisheries, while working to reopen, maintain, and construct points of public access to the fisheries.

The Division will assume a lead role in marine fisheries development in the Commonwealth, coordinating publicly funded activities by federal, state, and regional development programs at the state level, while recognizing the New England Fisheries Development Foundation as the lead fisheries development agency in the New England Region.

2.1 Proposed Actions

A. The Executive Office of Environmental Affairs should establish and coordinate a multiagency port development task force consisting of members from appropriate agencies. DMF will serve in a technical and advisory role. At a minimum this task force shall adhere to the following criteria:

Criteria

(1) programs will be directed at rehabilitating facilities in existing fishing ports;

(2) no program should be approved with the sole intent of increasing fishing effort on the fully utilized fisheries;

(3) conversely, programs should be aimed at developing non-traditional fisheries, improving fish quality, and reducing fishing costs.

Priorities

(1) new docking facilities for ports where existing dockage is inadequate, causes damage to vessels, or presents danger of personal injury;

(2) maintenance dredging of fishing port harbors and channels;

(3) offloading facilities and equipment that improve fish quality and reduce costs;

(4) support facilities such as ice, fuel, cold storage, and marine railways that improve fish quality or reduce costs;

(5) processing plants that improve fish quality, reduce product costs, and increase product diversity and markets.

B. The Division will assist the fishing industry in development of new or improved techniques for harvesting, handling, and processing fish. The following areas will receive high priority:

(1) techniques for improving fish quality at all stages from harvesting to sales;

(2) techniques for reducing fuel consumption, insurance, or other operating costs;

(3) techniques that will establish fisheries for under-utilized species;

(4) techniques that will promote vessel and personal safety;

(5) distribution of technical information on any of the above.

C. The Division will encourage, advise, and assist commercial fishermen in the following areas:

(1) establishing fisheries co-operatives to create more favorable market conditions for seafood products;

(2) formation of fishermen's associations to promote improved communications between fishermen and federal, state, and local government agencies that affect their livelihood;

(3) acquiring information on regulatory, biological, economic, and gear conflict developments in the fisheries;

(4) establishing short-term joint marketing ventures with foreign buyers, unless or until U.S processing capabilities exist for a particular species.

D. The Public Access Board should receive adequate funding to maintain and improve public access to recreational fisheries. The

Board's activities should center on the following objectives:

(1) continuing to develop criteria for siting, estimating size, and setting priorities for construction of boat ramps, fishing piers, and parking facilities;

(2) recognizing that undeveloped coastal land is rapidly diminishing, acquire available land for future use as public access sites;

(3) construct and maintain boat ramps and fish piers for public access to fisheries;

(4) oppose unreasonable restrictions on public access to bridges, piers, and beaches for recreational fishing;

(5) obtain additional funding by re-establishing a dedicated fund and acquiring federal monies.

2.2 Marketing and Promotion - Much of Massachusetts fishing industry is composed of many small, independently owned units within the harvesting, processing, and distribution sectors. The diversity of small units makes it unprofitable for individual companies to promote and advertise fishery products. As a result, consumers are often not well informed about value and characteristics of Massachusetts seafood. Whereas the Commonwealth derives substantial benefit from industry in the form of taxes, employment, and valuable consumer products, it will benefit the Commonwealth to assist industry to improve quality, marketing and utilization of fishery products. It is the responsibility (M.G.L. C. 130, s. 17), of the Division to aid industry in finding new markets, improving fish quality, and fostering industry's ability to assume this role.

2.2 Proposed Actions

A. The Commonwealth will assist the fishing industry in improving both foreign and domestic markets in the following ways:

(1) expand the Division's existing marketing program to increase promotion of all Massachusetts seafood products in local, regional, and international markets. Through cooking demonstrations, media promotions, and marketing literature distribution, this program will increase utilization of traditional and non-traditional species. It will educate consumers and the seafood industry as to the value, characteristics, and proper handling of Massachusetts seafood products;

(2) state operated institutions will make every effort to purchase Massachusetts harvested and processed fishery products when available;

(3) Massport's European and Japanese offices will encourage the development of foreign markets for Massachusetts fish products;

(4) work toward reducing U.S. dependence on foreign imports by encouraging development of competitive domestic frozen fish processing capabilities;

(5) work towards establishing industry marketing capabilities through an industry sponsored regional marketing and promotion program.

B. The Commonwealth will assist the fishing industry in improving fish quality in the following ways:

(1) the Commonwealth will adopt the Federal Fish Quality Standards as criteria for seafood purchases by state institutions. This would eliminate the duplicative and

arbitrary method now employed by the State, simplify purchasing procedures, and provide incentives to the processor to adopt the federal inspection program;

(2) the Division will work towards improving fish quality through voluntary incentives. By promoting higher sales value of quality fish, clarifying fish nomenclature, educating the consumer to recognize fish quality, and informing industry personnel of improved fish handling techniques, imposition of government quality regulations can be avoided;

(3) the Division's Extension Service will promote the use of gear and product handling methods that will improve seafood quality onboard fishing vessels;

(4) the Division will consider the possible effects on fish quality of any proposed management regulation.

2.3 Fisheries Assistance - Assistance to the fishing industry can be in the form of financial, technical, tax regulatory, or planning programs. It is to the Commonwealth's benefit to maintain a strong and vital fishing industry by assisting it in overcoming hardships or improving its economic potential. Due to its diversity and its dependence on a fluctuating resource base, the industry may encounter various economic impediments.

If it will benefit the Commonwealth, the State may consider assisting the fisheries. Examples might include: for economic hardship from natural or man caused resource disasters; for common needs that the industry cannot provide for itself; for developing non-traditional fisheries; or for technical assistance. State assistance should not be provided if it duplicates a federal or other assistance program, if it competes with a service provided by private enterprise, or if it attracts more fishing units into a fully utilized fishery.

2.3 Proposed Actions

A. The Commonwealth should consider the following assistance programs for the fishing industry:

(1) seek support and alternate programs for fishermen deprived of harvesting a resource due to natural (e.g. paralytic shellfish poisoning) or chemical contamination (e.g. oil spill, toxic chemicals, etc.), provided the DMF can document the individuals' historic catch value through statistical reports;

(2) give the fishing industry equal priority with the agriculture industry in emergency fuel allocation plans where harvest or revenue would be lost;

(3) expand or implement the Commonwealth's;

(a) port and harbor development programs (see sec. 2.1);

(b) fisheries marketing program (see sec. 2.2);

(c) fisheries technical assistance programs (see sec. 2.1);

B. The Commonwealth should not consider the following assistance programs:

(1) vessel construction and loan programs. This would duplicate a federal program and possibly increase effort on overexploited fish stocks;

(2) vessel insurance program. This is a role more appropriate to private enterprise. The fishing industry could decrease its high insurance rates through organization to obtain group rates and by instituting self-imposed safety requirements.

C. The Division shall investigate, develop, and propose legislative tax changes to provide tax incentives to the commercial and recreational fishing industry with the following conditions:

(1) fisheries tax revenue at local and state levels should benefit the fisheries by funding port development, marketing, and other programs directed to improving the commercial fishing industry;

(2) commercially licensed fishermen should remain exempt from sales tax on fishery related purchases;

(3) party and charter boats should be considered commercial fishing enterprises;

(4) excise tax revenues on recreational boats should be directed to improving public access.

2.4 Research - The basis for sound fishery management is a strong and continuing research program. Since the Division's statutory mandate to conduct fisheries research is very broad and funds are limited, it is necessary to prioritize research efforts.

The Division will emphasize applied research leading to improved management of marine fishery resources and development of the commercial and recreational industries. Research will include stock assessments, developing new and improved assessment methodology, and ecological studies leading to a better understanding of the marine ecosystem.

Marine environmental impact studies involving coastal alteration and development projects will be considered and undertaken on a case-by-case basis. The Division supports basic marine biological research resulting in a better understanding of interactions and factors controlling marine ecosystems, but believes this research is more appropriate for the academic community.

2.4 Proposed Actions

The Division will:

A. with the ultimate goal of developing a long range predictive capability;

(1) continue to conduct resource assessments on demersal species and expand capabilities to conduct resource assessment on crustaceans, shellfish, and other commercial and recreational species. These assessments are basic to developing management plans for species in State territorial waters;

(2) attempt to develop and implement techniques for resource assessment of lobster, pelagic finfish, recreational species, and anadromous fish in State territorial waters;

B. perform commercial fisheries research as needed to judge effects of management plans and regulations;

C. conduct marine environmental impact assessment studies on marine situated power generating or other facilities when requested. Research on alternative impacts will be performed under the direction of committees composed of agencies having either an interest or regulatory authority for marine environmental impact;

D. perform only those socio-economic studies necessary to provide information for developing management plans and conducting fishery programs.

E. increase support facilities for conducting research by:

(1) constructing a research station on the South Shore as originally proposed in 1964 by the Marine Fisheries Advisory Commission;

(2) purchasing an adequate coastal research vessel;

(3) utilize the potential of Cat Cove Marine Laboratory to conduct applied laboratory research to complement Division field research capabilities;

(4) improving lobster hatchery research capabilities.

F. continue to partially fund the University of Massachusetts (Amherst) Cooperative Fisheries Research Unit in conducting basic fisheries research. Support the Unit's efforts to obtain research funds, and construct a coastal research facility. Share existing Division research facilities with the Unit.

3.0 Information and Education

3.1 Statistics - The Division advocates collection of complete, accurate fisheries statistics necessary for resource management, guidance for state and local programs, assistance in private investment decisions, substantiating disaster relief needs, providing data to evaluate environmental alterations, and for general public information. Resource harvesters are obligated to take an active part in management by contributing accurate statistical information as a requisite for continued resource use.

While statistics are public information, the Division maintains a policy of confidentiality to protect individuals and businesses. Statistics shall not be used for tax or law enforcement purposes except that mis-reporting or non-reporting of statistics will be subject to administrative action. Statistics shall be publicly available in an anonymous-grouped format (minimum of three reports). Individual data shall not be released without written consent.

3.1 Proposed Actions

The Division will:

A. propose legislation for approval of a statistics confidentiality system mutually acceptable to the Division, National Marine Fisheries Service, and New England Regional Fisheries Management Council to allow reciprocal access to fisheries statistics;

B. propose legislation providing penalties ranging from fines to license suspension or non-renewal for not reporting or misreporting existing statistical reporting requirements. Legislation will require submission of statistics for species under local control.

C. implement an expanded Statistics Program to collect data on fisheries primarily conducted within state waters or managed by either the Division or local communities. This will encompass most commercial fisheries for finfish, shellfish, and lobsters within state territorial waters. To accomplish this increase in workload a computerized reporting and distributing system will be adopted.

3.2 Information/Education - Informed and enlightened users of fishery resources tend to be more conservation oriented, possess an appreciation of the resource base, and provide constructive input to the management process. Management regimes developed in concert with a knowledgeable and cooperative public are more widely accepted, voluntarily complied with, and hence require minimal enforcement. Informed fishermen are also better able to avail themselves of fishing opportunities, thereby maximizing utilization of the resource and benefits derived therefrom.

It shall be the policy of the Division to inform and educate the public on all aspects of utilization, development, management, and appreciation of marine resources.

3.2 Proposed Actions

The Division will:

A. continue to encourage public participation in the management process by soliciting input through well publicized meetings and hearings;

B. develop staff and funding necessary to prepare and distribute printed material in the form of periodicals, newsletters, leaflets, and guides and to otherwise disseminate information on fishery resources, marine fisheries and related matters;

C. solicit guidance and advice regarding recreational fisheries issues through an informal committee to be comprised of knowledgeable sportfishermen, charter boat operators, and tackle-shop owners;

D. coordinate the printing and distribution through the University of Mass. (Amherst), Cooperative Extension Unit, of information on fishing gear, recreational fishing, fish cookery, fish species, and other educational material of public information.

3.3 Licensing - In accordance with the principle that those deriving benefit from a public resource must contribute to its management, it shall be the Division's policy to require licenses for all fisheries for which the state provides management, research, or other services. Licensing is necessary for management, enforcement, statistical and informational purposes, and to offset state expenditures for fishery programs.

The Division may at times restrict the number of licenses issued to reduce fishing effort in fully utilized fisheries. Licenses may be suspended or not renewed for violations of fishing regulations or statistical reporting requirements. Licenses provide a source listing of fishery utilizers necessary to obtain statistical data and to inform fishermen of regulatory changes.

3.3 Proposed Actions

The Division will:

A. integrate the statistics and licensing functions into a single computerized system;

B. propose the elimination of the rod and reel ($5) license;

C. initiate a legislative study resolve on the feasibility of establishing a marine recreational fishing license in Massachusetts;

D. effect the necessary legislation to allow the issuance of licenses solely for the commercial harvest of edible crabs.

VII. Program Recommendations

A. Division of Marine Fisheries Programs

1. Construct a research station in the vicinity of the Cape Cod Canal [2.4, E., (1)].

2. Purchase an adequate coastal research vessel [2.4, E., (2)].

3. Integrate the systems for issuing licenses and gather statistical data into a unified computerized system [3.3, A.].

4. Expand capabilities to gather biological, sociological, and economic data necessary for fisheries management, including:

   a. obtaining adequate funding for New England Fisheries Management Council liaison position to review fisheries management plans [1.1, B., (1)];

   b. establishing staff with capabilities to develop state management plans for species predominantly under Massachusetts jurisdiction [1.1, B., (2)];

   c. establishing staff to implement a sea sampling program aboard Massachusetts commercial fishing vessels [1.1, B., (3)];

   d. expanding resource assessment studies to include crustaceans, shellfish, and other species [2.4, A., (1)];

   e. develop resource assessment techniques for lobster, pelagic finfish, recreational species, and anadromous fish [2.4, A., (2)].

5. Increase the ability of marketing programs to promote seafood in the local, regional, and international markets [2.2, A., (1)].

6. Implement an Information and Education Program to prepare and distribute commercial and recreational fisheries information [3.2, B.].

7. Determine feasibility of restoring or creating discrete populations of striped bass in Massachusetts [1.4, C.].

8. Establish state fish and shellfish pathological capabilities [1.5, D.].

9. Prepare a Massachusetts Mariculture Plan [1.5, A.].

10. Expand Anadromous Fish Restoration and Enhancement Program to increase the number and size of native anadromous fish runs [1.4, A.].

B. State Programs

1. Establish a task force to modernize and improve fishing port and harbor facilities [2.1, A.].

2. Improve the enforcement capabilities of the Division of Law Enforcement by:

   a. transferring DLE into the Department of Fisheries, Wildlife and Recreational Vehicles [1.3, B. (1)];

   b. establishing a DLE counsel (lawyer) position to prosecute resource violations [1.3, B., (6)];

   c. establishing a separate marine enforcement unit within the Division of Law Enforcement [1.3, B., (3)];

   d. creating a Law Enforcement Policy Board [1.3, B., (2)];

   e. initiating a marine fisheries enforcement training program [1.3, B., (4)].

3. Examine the eel resources to determine the appropriate management and jurisdictional responsibilities [1.1, G.].

4. Establish or assign staff within the Washington, D.C. office of Massachusetts State-Federal Relations to address fishery issues [1.7, A.].

5. Create the Massachusetts Marine Fisheries Research and Educational Consortium [1.7, F.].

6. Develop a Navigation and Equipment Safety certification program at Massachusetts Maritime Academy [1.7, C.].

C. Recommended Legislation

1. Amend M.G.L. c. 130, s. 83 to eliminate the Rod and Reel - Unlimited license ($5.00) for the sale of more than 100 lbs plus one fish. Elimination of this license would require a rod and reel fisherman to purchase an individual Commercial Fisherman's license ($25.00) to sell any fish [3.3, B.].

2. Petition the Legislature for study resolve funds to explore feasibility, format, benefits, and costs of establishing a recreational fishing license [3.3, C.].

3. Amend M.G.L. c. 130 to increase the fines and penalties for violations of laws and regulations pertaining to resource harvesting, pollution, licensing, gear, and statistical reporting [3.1, A. and 3.1, B.].

4. Amend M.G.L. c. 130, s. 21 to:

   a. provide for a confidential statistics reporting system mutually acceptable to the Division, National Marine Fisheries Service, and New England Regional Council to allow reciprocal access to fisheries statistics [3.1, A.];

   b. provide penalties for misreporting or non-reporting of statistics ranging from fines to suspension or non-renewal of license [3.1, B.].

5. Amend M.G.L. c. 130, s. 20A to change the present shellfish local aid reimbursement fund system to a grant system [1.1, E.].

6. Amend M.G.L. c. 130, s. 52 to:

   a. require local communities to collect and submit statistics to the Division for species under local control [3.1, B.];

   b. propose legislation to eliminate local control of surf clams, sea scallops, and ocean quahogs [1.1, D.].

7. Develop and submit for legislation recommendations for changes in taxation to provide incentives to the fishing industry and secure funds for fishery related construction programs [2.3, C. (1-4)].

8. Amend M.G.L. c. 130, s. 16 to allow the Division of Marine Fisheries and Division of Fisheries and Wildlife to define boundaries between fresh and salt water for fisheries management purposes [1.7, E.].

9. Propose enabling legislation to adopt Amendment I of the Atlantic State Marine Fisheries Commission charter [1.1, J.].

10. Amend M.G.L. c. 130, s. 37, 38, 38A, and 83 to allow the Division to issue a permit for commercial harvesting of edible crabs separate from any lobster permit [3.3, D.].

11. Develop and propose legislation to streamline the mariculture permit process [1.5, B.].

12. Propose legislation to integrate all aspects of the Shellfish Sanitation Program into a single agency [1.1, F.].

GLOSSARY OF TERMS AND ABBREVIATIONS

A. Terms

Allocation - the setting apart and apportionment of a resource amongst its users.

Anadromous - fish that leave the ocean and enter rivers and streams to spawn (e.g. salmon, alewives, and shad).

Catadromous - fish that leave fresh water to spawn in the ocean (e.g. eels).

Commonwealth - the Commonwealth of Massachusetts, also referred to as the "State".

Crustaceans - primarily marine animals, usually having the body covered with a hard shell or crust, e.g. lobsters, shrimp, crabs, barnacles.

Demersal - fish that live on or near the bottom.

Diadromous - fish that migrate between fresh and saltwater (i.e. anadromous and catadromous fish).

Division - the Massachusetts Division of Marine Fisheries, Department of Fisheries, Wildlife and Recreational Vehicles.

Enhancement - adding to the numbers or improving the habitat and environmental conditions of an existing natural population. In this report enhancement is used to distinguish public funded from private funded mariculture.

Fish - any animal life inhabiting the ocean or its connecting waters including any marine fish, whether free-swimming or free-moving, and any shellfish or sea worms, whether or not imbedded in the soil.

Fish stock - a part (usually estimated by weight) of a fish population that can be treated as a management unit. A stock is differentiated from other stock of the same species by separate spawning grounds and migratory patterns.

Living marine resources - any marine animal or plant with existing or potential commercial, recreational, or aesthetic value.

Mollusks - primarily marine invertebrates with one shell (periwinkle, welk, conch); two shells (oyster, scallop, soft-shelled clam); or no shell (squid, octopus).

Overcapitalization - when the value of the boats and gear used in a fishery exceeds the amount necessary to fully utilize the resource.

Overexploitation - when the amount of resource havested exceeds the amount replaced by growth and recruitment to the fish population.

Pelagic - organisms which inhabit the water column.

Utilized fish stock - utilization is the degree to which a fish stock is harvested compared to its rate of replacement. Replacement occurs through growth of small fish and spawning success. In a fully utilized fishery, the harvesting and replacement rates are about equal. In an overutilized fishery, more fish are removed than replaced and the stock size may decline, whereas an underutilized fishery is not exploited to its full potential and fish that could be harvested die from natural causes.

B. Abbreviations

ASMFC - Atlantic States Marine Fisheries Commission.

CZMA - Coastal Zone Management Act implemented by the Office of Coastal Zone Management, Washington, D.C. and the Massachusetts Coastal Zone Management Program.

DEM - Massachusetts Department of Environmental Management.

DEQE - Massachusetts Department of Environmental Quality Engineering.

DLE - Massachusetts Division of Law Enforcement.

DMF - Massachusetts Division of Marine Fisheries.

DPH - Massachusetts Department of Public Health.

EIS - Environmental Impact Statement.

FCZ - Fisheries Conservation Zone (i.e. 200 mile limit).

MCZM - Massachusetts Coastal Zone Management

MEPA - Massachusetts Environmental Protection Act.

MFAC - Massachusetts Marine Fisheries Advisory Commission.

MFCMA - Magnuson Fisheries Conservation and Management Act.

MGL - Massachusetts General Laws.

MGLA - Massachusetts General Laws Annotated.

MMA - Massachusetts Maritime Academy.

NEPA - National Environmental Policy Act.

NEFMC - New England Fisheries Management Council.

GLOSSARY (continued)

NMFS - National Marine Fisheries Service.

NOAA - National Oceanographic and Atmospheric Administration.

OCS - Outer Continental Shelf Lands Act.

OCZM - Office of Coastal Zone Management.

PCB's - Polychlorinated biphenyls.

PSP - Paralytic shellfish poisoning.

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APPENDIX I

The Division of Marine Fisheries developed commercial and recreational fisheries questionnaires to identify areas of concern affecting the fisheries. These questionnaires, distributed at 25 public meetings and mailed to various commercial fishery organizations and recreational fishing clubs, allowed fishermen to rate the relative severity of problems and issues they deemed important. While most of the responses reflected a true picture of conditions in the fisheries, the validity of some responses must be tempered by the fishermen's background, specific fishing techniques, and species sought. For example, on the commercial questionnaire the "quality of catch" is known to be a major limiting factor to export sales. However, the fishermen did not rate this a major problem (47% responded as no problem; 36%, minor problem; 17%, major problem) because the majority of responders were inshore draggermen and lobstermen who have no fish quality problems.

The recreational questionnaire was completed primarily by knowledgeable sportfishermen. As a result, the "availability of information" question drew a high percentage of "no problem" responses. However, tourists and occasional fishermen may have rated this a serious problem. Although the questionnaires are not a statistically precise sample of Massachusetts fishermen, after qualifying the results based on the Division's knowledge of the fisheries and fishermen we obtained a clearer view of fishery issues. The questionnaire results are presented below.

A. The commercial fisheries questionnaire dealt with gear technology, fisheries development, fisheries management, port and harbor facilities, and other topics the Division felt were of concern. Both an English and Portuguese translated version were distributed. Participants were first asked general information such as name, telephone number, gear used, vessel length, and port. Then fishermen were asked to rate how serious a list of possible problems in the fisheries were by circling "no problem", "minor problem", or "serious problem" for each item. The third section of the questionnaire was separated into three groups with items specifically refering to the lobster, finfish, and shellfish fisheries. Percentages were calculated and areas of concern derived. A final section asked for additional comments.

Although not every questionnaire was completed in full, the following list and percentage totals were the result of 266 responses to the commercial fisheries questionnaire. The issues that the fishermen felt needed the most attention were: price stability for catch (77%, a serious problem), future effects of oil exploration on fishing grounds and ports (72% and 65%), adequate markets for underutilized species (72%), price of fishing gear (68%), berthing and offloading space (60%), cost of vessel insurance (59%), and adequate representation of fishermen's views (55%).

Items of concern that were expressed by the lobster, finfish, and

shellfish fishermen were: competition from Canadian and out-of-state lobsters (76% and 67%, a serious problem), competition from Canadian and frozen European fish (85% and 72%), adequate long-term management planning (57%), availability of shellfish grants (48%), area restrictions (45%), and regulations restricting amount of fish caught (65%). These items are discussed in more detail in the Public Concerns section of the report.

In the items below, fish refers to finfish, lobsters, and/or shellfish.

	no problem	minor problem	serious problem	number responding
Condition of the fish stocks	17%	42%	41%	238
Competition for fish between vessel size categories	25	39	36	241
Competition for fishing grounds	14	41	45	240
Lack of experienced crew members	57	31	12	236
Gear conflict with stationary gear	33	35	32	239
Gear conflict with mobile gear	41	30	29	234
Price of fishing gear	10	22	68	242
Competition with recreational fishermen...				
... over dock space	34	29	37	244
... over fish	42	32	26	238
... over fishing grounds	35	28	37	243
Adequate enforcement of state fisheries laws	31	23	46	246
Adequate number of state law enforcement officers	36	19	45	242
LE officers with adequate knowledge of fishing	27	45	30	231
Timely processing of state fishing license	67	23	10	239
Accurate catch statistics	39	33	28	233
Accurate stock size estimates	27	28	45	227
Availability of information...				
... on state fishing regulations	51	34	15	233
... on fish abundance and distribution	32	35	33	223
... on council/federal fishing regulations	38	34	28	218
... on vessel safety	63	28	09	227

	no problem	minor problem	serious problem	number responding
... on gear technology	48%	33%	19%	220
... in another language	76	14	10	198
Clarity of state fishing regulations	44	38	18	217
Adequate representation of fishermen's views	17	28	55	239
Availability of...				
... DMF biologists	65	22	13	197
... DMF administrators	69	21	10	191
... DMF extension agents	61	25	14	193
Adequate markets for underutilized species	09	19	72	230
Price stability for catch	05	18	77	244
Quality of catch	47	36	17	233
Sheltered mooring facilities	27	24	49	238
Berthing space	18	22	60	240
Harbor channel improvements	28	22	50	241
Offloading space	14	26	60	240
Gear storage facilities	28	26	46	238
Ice facilities	32	30	38	224
Marine railway facilities	48	30	22	218
Availability of vessel construction loans	25	29	46	209
Availability of vessel improvement loans	25	28	47	210
Cost of vessel insurance	17	24	59	223
Ocean dumping of dredge spoils	26	32	42	217
Pollution by toxic chemicals	23	21	56	222
Future effects of oil exploration on fishing areas	14	14	72	217
Future effects of oil exploration on ports	16	19	65	216

LOBSTER FISHERY

	no problem	minor problem	serious problem	number responding
Interaction with noncommercial lobstermen	20%	45%	35%	124
Gradual increase in minimum carapace length	44	36	20	117
Compliance with escape vent regulation	75	21	04	116
Number of pots used in fishery	29	26	45	121
Number of fishermen in lobster fishery	24	34	42	121
Verification of student eligibility	39	35	26	114
Compliance with mandatory catch reporting	56	30	14	120
Competition from Canadian lobsters	07	17	76	125
Competition from out-of-state lobsters	20	13	67	114
Availability of bait	19	37	44	121

FINFISH FISHERY

Competition from Canadian fish	03%	12%	85%	155
Competition from frozen European fish	07	21	72	147
Regulations restricting amount of fish caught	13	22	65	159
Amount of small fish discarded	35	28	37	156
Fish discarded because of regulations	29	21	50	163
Adequate aid in starting joint ventures	31	27	42	132
Possibility of management by limited entry	15	26	59	152

SHELLFISH FISHERY

Gear restrictions	53%	21%	26%	80
Area restrictions	30	25	45	87
Availability of shellfish grants	28	24	48	64

	no problem	minor problem	serious problem	number responding
Adequate long-term management	16%	27%	57%	77
Cost of local licenses	49	30	21	79
Adequate local regulations	38	20	42	81

B. On the recreational fisheries questionnaire, the public was asked to comment on such topics as public access, availability of fisheries information, fisheries management, and other issues which would aid the Division in formulating policies. Participants were asked their name, principal areas fished, and most common method used. Similar to the commercial fisheries questionnaire, a list of items were presented asking for a response of "no problem", "minor problem", or a "serious problem". A second part of the questionnaire was separated into the specific fishing activities, i.e. rod and reel, party and charter boat operators, recreational lobster, and recreational shellfish. Respondants were asked to answer the sections that applied to their fishing activities. Percentages were then calculated based on the total number of persons responding to a particular question.

A third section asked if the Division should increase, decrease, or not alter their activities in recreational fisheries. In conjunction with this, the public was asked if they would also favor the establishment of a saltwater fishing license to fund additional programs.

The ensuing list and percentage totals were the result of 125 responses to the recreational fisheries questionnaire. Concern was expressed over the effects of pollution by toxic chemicals and sewage waste (65% and 60% a serious problem), loss of fish habitat (57%), availability of docking facilities and boat ramps (44% and 39%), and adequate stocks of fish to catch (43%). The specific fishing activities showed that access to fishing sites (40%) and availability of fishing piers (38%) were serious problems experienced by rod and reel fishermen. Availability of bank financing (47%) and fuel (38%) by party and charter boat operators, and adequate enforcement of lobster regulations (39%) by recreational lobstermen were also rated high.

In the items below, fish refers to finfish, lobsters, and/or shellfish.

	no problem	minor problem	serious problem	number responding
Adequate stocks of fish to catch	15%	42%	43%	115
Catching and keeping undersized fish	40	43	17	106
Understanding state regulations	46	35	19	108

	no problem	minor problem	serious problem	number responding
Availability of information on...				
... charter and party boat activity	76%	21%	03%	102
... location of boat ramps	40	33	27	111
... location of bait and tackle shops	76	21	03	107
... location of shore fishing sites	39	35	26	103
... fishing techniques and gear	73	22	05	101
... cleaning and cooking catch	79	11	10	103
... where the fish are	44	41	15	106
Availability of boat ramps	37	24	39	102
Availability of bait	64	30	06	107
Availability of docking facilities	22	34	44	98
Competition with commercial fishermen ...				
... over gear	61	21	18	88
... over fish	46	31	23	94
... over prey/forage species	53	35	12	81
... over docking space	50	31	19	84
... over fishing grounds	43	22	35	97
Loss of fish habitat	22	21	57	100
Effects of pollution by toxic chemicals	12	23	65	106
Effects of pollution by sewage waste	14	26	60	111

ROD AND REEL

	no problem	minor problem	serious problem	number responding
Access to beach fishing sites	25%	35%	40%	113
Availability of fishing piers	24	38	38	105
Competition with bathers over fishing sites	55	37	08	100

	no problem	minor problem	serious problem	number responding
Fair advertising by charter and party boats ..				
... regarding the price of a fishing trip	68%	25%	07%	87
... regarding who keeps the catch	43	34	23	91

PARTY AND CHARTER BOAT OPERATORS

	no problem	minor problem	serious problem	number responding
Availability of bank financing	21%	32%	47%	19
Availability of ...				
... boat insurance	40	40	20	20
... fuel	38	24	38	21
... liability insurance	56	22	22	18
Availability of vessel safety information	65	22	13	19

RECREATIONAL LOBSTER

	no problem	minor problem	serious problem	number responding
Interaction with commercial lobstermen	44%	33%	23%	39
Timely processing of license applications	70	22	08	40
Compliance with escape vent regulations	84	11	05	37
Compliance with mandatory catch reporting	59	30	11	37
Adequate enforcement of lobster regulations	45	16	39	38

RECREATIONAL SHELLFISH

	no problem	minor problem	seriour problem	number responding
Alternate fee rates for non-resident permits	38%	24%	38%	63
Adequate shellfish size limit regulations	74	20	06	68
Adequate maximum catch limit regulations	67	23	10	66

	no problem	minor problem	serious problem	number responding
Adequate local shellfish regulations	57%	28%	15%	67
Adequate local long-term management planning	31	41	28	64

It was felt that the Division should increase all of its sportfishing programs with studies of sportfish, i.e. striped bass, flounder (88%), restoring river herring and smelt runs (82%), and construction of artificial reefs (80%) drawing the highest priorities. When asked if implementation of a saltwater license to help defray the costs of increasing these programs, the results with 117 responding were 32% "yes", 48% "no", 18% "maybe", and 2% "no opinion". However, additional comments showed that if license funds were dedicated to sportfishing programs, 55% indicated they would favor a saltwater recreational license.

	decrease	no change	increase	number responding
Studies of sportfish (striped bass, flounder)	06%	06%	88%	110
Studies of prey/forage fish (menhaden, squid)	07	26	67	101
Restoring river herring and smelt runs	08	10	82	106
Gather statistics on sportfishing	07	24	69	106
Propagation of coho salmon	16	30	54	105
Promotion of salt water fishing	10	37	51	106
Informative literature on sportfishing	09	29	62	101
Interaction with sportfishing organizations	03	24	73	100
Construction of ramps and fishing piers	06	22	72	104
Construction of artificial reefs	04	16	80	98

DIVISION OF MARINE FISHERIES POLICY PROGRAM
18 HERITAGE PROF. BLDG., SANDWICH, MA. 02563

COMMERCIAL FISHERIES QUESTIONNAIRE

Name _____ Vessel length _____

Telephone No. _____ Port _____

Gear used _____ Captain _____ Owner _____

_____ Crew _____ Other _____

The Massachusetts Division of Marine Fisheries (DMF) is examining its policies towards the commercial fisheries. These policies will be statements on how the Division stands on certain issues and will be used as guidelines for fisheries development and protection. The problems and needs of commercial fisheries have changed, particularly since the 200 mile limit. Therefore, the Division is seeking advice on how we can better serve the fisheries in such areas as gear technology, fisheries development, fisheries management, and harbor facilities. To accomplish this we must first identify the areas of concern and then propose solutions.

The following list of items are provided to get your opinions. By circling a number for each of the items you can let us know your problems and what areas need the most attention.

(In the items below, fish refers to finfish, lobsters or shellfish).

	no problem	minor problem	serious problem
Condition of the fish stocks	1	2	3
Competition for fish between vessel size categories	1	2	3
Competition for fishing grounds	1	2	3
Lack of experienced crew members	1	2	3
Gear conflict with stationary gear	1	2	3
Gear conflict with mobile gear	1	2	3
Price of fishing gear	1	2	3
Competition with recreational fisherman •			
... over dock space	1	2	3
... over fish	1	2	3
... over fishing grounds	1	2	3

	no problem	minor problem	serious problem
Adequate enforcement of state fisheries laws	1	2	3
Adequate number of state law enforcement officers	1	2	3
LE officers with adequate knowledge of fishing	1	2	3
Timely processing of state fishing license	1	2	3
Accurate catch statistics	1	2	3
Accurate stock size estimates	1	2	3
Availability of information..			
... on state fishing regulations	1	2	3
... on council/federal fishing regulations	1	2	3
... on fish abundance and distribution	1	2	3
... on vessel safety	1	2	3
... on gear technology	1	2	3
... in another language	1	2	3
Clarity of state fishing regulations	1	2	3
Adequate representation of fishermens' view	1	2	3
Availability of..			
... DMF biologists	1	2	3
... DMF administrators	1	2	3
... DMF extension agents	1	2	3
Adequate markets for underutilized species	1	2	3
Price stability for catch	1	2	3
Quality of catch	1	2	3
Sheltered mooring facilities	1	2	3
Berthing space	1	2	3
Harbor channel improvements	1	2	3
Offloading space	1	2	3
Gear storage facilities	1	2	3

	no problem	minor problem	serious problem
Ice facilities	1	2	3
Marine railway facilities	1	2	3
Availability of vessel construction loans	1	2	3
Availability of vessel improvement loans	1	2	3
Cost of vessel insurance	1	2	3
Ocean dumping of dredge spoils	1	2	3
Pollution by toxic chemicals	1	2	3
Future effects of oil exploration on fishing grounds	1	2	3
Future effects of oil exploration on ports	1	2	3

The following items are separated into three groups. Please circle the items in the group(s) that pertain to your fishery and ignore the other group(s).

LOBSTER FISHERY

Interaction with noncommercial lobsterman	1	2	3
Gradual increase in minimum carapace length	1	2	3
Compliance with escape vent regulation	1	2	3
Number of pots used in fishery	1	2	3
Number of fishermen in lobster fishery	1	2	3
Verification of student eligibility	1	2	3
Compliance with mandatory catch reporting	1	2	3
Competition from Canadian lobsters	1	2	3
Competition from out-of-state lobsters	1	2	3
Availability of bait	1	2	3

FINFISH FISHERY

Competition from Canadian fish	1	2	3
Competition from frozen European fish	1	2	3
Regulations restricting amount of fish caught	1	2	3

	no problem	minor problem	serious problem
Amount of small fish discarded	1	2	3
Fish discarded because of regulations	1	2	3
Adequate aid in starting joint ventures	1	2	3
Possibility of management by limited entry	1	2	3
SHELLFISH FISHERY			
Gear restrictions	1	2	3
Area restrictions	1	2	3
Availability of shellfish grants	1	2	3
Adequate long-term management planning	1	2	3
Cost of local licenses	1	2	3
Adequate local regulations	1	2	3
Other problems...			
..._____	1	2	3
..._____	1	2	3

Comments: _____

_____

_____

_____

DIVISION OF MARINE FISHERIES POLICY PROGRAM

Recreational Fisheries Questionnaire

Name _____ Telephone No. _____

Principal areas fished _____

Town where boat (if any) is moored _____

Please note the two most common types and methods of recreational fishing you engage in. For example: shellfishing from a boat; rod and reel from shore; party boat operator; diving for lobsters, etc.

_____ _____

_____ _____

The Massachusetts Division of Marine Fisheries (DMF) is formulating a set of policies for the recreational fisheries. These policies will be statements on how the Division stands on certain issues and will be used as guidelines for fisheries development and protection. The problem and needs of recreational fisheries change; therefore, the Division is seeking advice on how we can better serve the fisheries in such areas as public access, availability of information, and fisheries management. To accomplish this we must first identify the areas of concern and then propose solutions.

The following list of items is provided to solicit your opinions. By circling a number for each of the items you can let us know your problems and what areas need the most attention. If an item does not apply to you or you have no opinion, then do not circle a number.

(In the items below, fish refers to finfish, lobsters, and/or shellfish).

	no problem	minor problem	serious problem
Adequate stocks of fish to catch	1	2	3
Catching and keeping undersized fish	1	2	3
Understanding state regulations	1	2	3

	no problem	minor problem	serious problem
Availability of information on ...			
... charter and party boat activity	1	2	3
... location of boat ramps	1	2	3
... location of bait and tackle shops	1	2	3
... location of shore fishing sites	1	2	3
... fishing techniques and gear	1	2	3
... cleaning and cooking catch	1	2	3
... where the fish are	1	2	3
Availability of boat ramps	1	2	3
Availability of bait	1	2	3
Availability of docking facilities	1	2	3
Competition with commercial fishermen ...			
... over gear	1	2	3
... over fish	1	2	3
... over prey/forage species	1	2	3
... over docking space	1	2	3
... over fishing grounds	1	2	3
Loss of fish habitat	1	2	3
Effects of pollution by toxic chemicals	1	2	3
Effects of pollution by sewage waste	1	2	3

The following items are separated into specific fishing activities. Please circle the items in the group(s) that refer to your situation. For example, party and charter boat operators should also fill out the Rod and Reel section.

Rod and Reel

	no problem	minor problem	serious problem
Access to beach fishing sites	1	2	3
Availability of fishing piers	1	2	3
Competition with bathers over fishing sites	1	2	3
Fair advertising by charter and party boats ...			
... regarding the price of a fishing trip	1	2	3
... regarding who keeps the catch	1	2	3

Party and Charter Boat Operators

Availability of bank financing	1	2	3
Availability of ...			
... boat insurance	1	2	3
... fuel	1	2	3
... liability insurance	1	2	3
Availability of vessel safety information	1	2	3

Recreational Lobster

Interaction with commercial lobstermen	1	2	3
Timely processing of license applications	1	2	3
Compliance with escape vent regulation	1	2	3
Compliance with mandatory catch reporting	1	2	3
Adequate enforcement of lobster regulations	1	2	3

Recreational Shellfish

Alternate fee rates for non-resident permits	1	2	3

	no problem	minor problem	serious problem
Adequate shellfish size limit regulations	1	2	3
Adequate maximum catch limit regulations	1	2	3
Adequate local shellfish regulations	1	2	3
Adequate local long-term management planning	1	2	3

Do you feel the DMF should increase, decrease or not change the amount of work done in the following areas. Circle one number for each item.

	Increase	Decrease	No Change
Studies of sportfish (striped bass, flounder)	1	2	3
Studies of prey/forage fish (menhaden, squid)	1	2	3
Restoring river herring and smelt runs	1	2	3
Gather statistics on sportfishing	1	2	3
Propagation of coho salmon	1	2	3
Promotion of salt water fishing	1	2	3
Informative literature on sportfishing	1	2	3
Interaction with sportfishing organizations	1	2	3
Construction of ramps and fishing piers	1	2	3
Construction of artificial reefs	1	2	3
Other areas that need work ...			
... _____	1	2	3
... _____	1	2	3

If you favor increasing some of the above programs would you also favor the establishment of a saltwater license to pay for the programs. (Check one).

Yes _____ No _____ Maybe _____ No opinion _____

Comments: _____

_____

_____

Appendix II.

SPORTFISHING CLUBS AND COMMERCIAL FISHING ASSOCIATIONS, COMMISSIONS, AND UNIONS

Sportfish

Barnstable Co. League of Sportsmen's Clubs
c/o C.A. Van Dusen
17 Playground Lane
Yarmouth, MA 02675

Bristol Co. League of Sportsmen's Clubs
c/o Edward Cobbett
123 Grant St.
No. Attleboro, MA 02760

Broad Sound Tuna Club
545 North Shore Rd.
Rt. 1-A
Revere, MA 02151

Cape Ann Tuna Club
Gloucester
MA 01930

Cape Cod Charter Boat Association
c/o Bob Bolduc
72 South St.
Bass River, MA 02664

Cape Cod Salties
c/o Larry Genander
P.O. Box 222
2 Lakewood Rd.
Sagamore, MA 02562

Essex Co. League of Sportsmen's Clubs
c/o Russ Gibson
6 South Pond Rd.
Newbury, MA 01950

Fairhaven Saltwater Fishing Club
c/o Ralph Hall
Union Wharf
Fairhaven, MA 02719

Green Harbor Tuna Club
c/o Peter Robinsion
70 Pleasant St.
Dedham, MA 02026

Harvey's Saltwater Fishing Club
Harvey's Wharf
Sea St., Hough's Neck
Quincy, MA

Linesiders
c/o Charles Soares
2 Pleasant View
Swansea, MA 02777

Mass. Beach Buggy Association
c/o Lloyd Hebb
8 Lyndon Lane
Ashland, MA 01721

Mass. Sportsmen's Council, Inc.
c/o Russ Gibson
6 South Pond Rd.
Newbury, MA 01950

Mass. Striped Bass Association
c/o John Cherico
1370 Broadway
Somerville, MA 02144

Merrimack Valley Striper Club
c/o Woody Woodcock
130 Rea Street
No. Andover, MA 01845

Middlesex Co. League of Sportsmen's Club
c/o Red Chaplin
Box 248
Littleton, MA

Norfolk Co. League of Sportsmen's Club
c/o Marston Green
402 Partridge St.
Franklin, MA 02038

Pasque Fishing Club
c/o Richard Gonsalves
J.B. Lumber Co.
23 St. John St.
So. Dartmouth, MA 02748

Sportfish

Plum Island Lightliners
c/o Howie Fernald
11 Maple Terrace
Newbury, MA

Plymouth Co. League of Sportsmen's Clubs
c/o Dick Barzelay
251 Ferry St.
Marshfield, MA 02050

So. Grafton Sportsmen's Club
c/o Walter Banock
P.O. Box 204
Millbury, MA 01527

Stripers Unlimited
c/o Avis Boyd
P.O. Box 45
So. Attleboro, MA 02703

Upper Cape Anglers Club
c/o Robert L. Whelden
6 Stoners Rd.
E. Falmouth, MA

Appendix II.

Commercial

Barnstable Shellfish Association
c/o Pat Stegner
240 Oak St.
West Barnstable, MA 02668

Boat Owners United, Inc.
Harry Swain
58 Lombard St.
New Bedford, MA 02740
Tel: (617) 999-3881

Boston Fisheries Association, Inc.
Hugh O'Rourke
253 Northern Ave., Rm. 205
Boston, MA 02210

Boston Fish Exchange
Robert G. Dunn
Administration Bldg.
Fish Pier
Boston, MA 02210

Cape Cod Planning and Economic
Development Commission
Robert Robes
1st District Court House
Barnstable, MA 02630

Cohasset Fishermen's Association
Box 409
Cohasset, MA 02025

Gloucester Fisheries Assoc., Inc.
Founded 1922; 70 members
Sam Parisi, President
P.O. Box 539
Gloucester, MA 01930
Tel: (617) 281-1600

Gloucester Fisheries Commission
Founded 1956; 13 members
Joe Brancaleone, Exec. Director
City Hall, Dole Ave.
Gloucester, MA 01930
Tel: (617) 283-0857

Gloucester Fishermen's Wives Assoc.
Founded 1967; 130 members
Angela Sanfilippo
3 Beaufort Ave.
Gloucester, MA 01930
Tel: (617) 281-0650

Martha's Vineyard Commission
Michael Wild
P.O. Box 1447
Oak Bluffs, MA 02557

Mass. Inshore Draggermen's Assoc.
Dan Arnold
460 Main St.
Marshfield, MA 02050
Tel: (617) 827-5159

Mass. Lobsterman's Association, Inc.
Robert S. Barlow
Box 276 Cove Creek Lane
Marshfield Hills, MA 02051

Mass. Marine Trades Assoc.
Founded 1953; 150 members
Frank Farrell, Exec. Director
P.O. Box 272
Milton, MA 02186

Mass. Shellfish Officers Association
Katherine S. Abreu, Secretary-Treasurer
Chatham Town Hall
Chatham, MA

Nantucket Planning and Economic
Development Commission
William Kline
Town Hall
Nantucket, MA

New Bedford Fishermen's Union
Founded 1958; 914 members
Joe Piver, Secretary-Treasurer
62 No. Water St.
New Bedford, MA 02748
Tel: (617) 994-9601

Appendix II (continued)

Commercial

New Bedford Seafood Dealers Assoc.
Harvey B. Nickelson, Director
26 Seventh St.
New Bedford, MA 02740
Tel: (617) 994-6414

New Bedford Seafood Producers Assoc.
Founded 1928; 76 members
James Costakes, General Manager
60 No. Water St.
New Bedford, MA 02740
Tel: (617) 999-5258

Sandwich-Bourne Shellfish Assoc.
Galen Barlow
Box 576
Buzzards Bay, MA 02532

South Shore Lobstermen's Assoc.
Robert S. Barlow
Box 276 Cove Creek Lane
Marshfield Hills, MA 02051

United Fishermen's Wives Organization
150 Hudson Street
New Bedford, MA 02744

SOURCE: Gloucester Fisheries Association, 1977.

APPENDIX III

Comments and responses to draft Marine Fisheries Policy Report

Written Commentors

CFRU - Cooperative Fisheries Research Unit
MLA - Massachusetts' Lobstermen's Association
MMA - Massachusetts Maritime Academy
MSOA - Massachusetts Shellfish Officers Association
MSBA - Massachusetts Striped Bass Association
J. Grace - Recreational Shellfisherman, Gloucester
NEFC - Northeast Fisheries Center, National Fisheries Service
MCZM - Massachusetts Coastal Zone Management
WHOI - Woods Hole Oceanographic Institute, Sea Grant Program
MIT - Massachusetts Institute of Technology, Sea Grant Program
OCZM-NMFS - Combined comments from Office of Coastal Zone Management (Washington, D.C.) and Northeast Regional Director, National Marine Fisheries Service

Meeting Commentors	Meeting Attended
D. Arnold - Commercial draggerman, Massachusetts Inshore Draggermen's Association	Hyannis
R. Nelson - Cotuit Oyster Company	"
S. Nelson - Cotuit Oyster Company	"
G. Barlow - Commercial Shellfisherman, Bourne - Sandwich Shellfishermen's Association	"
R. Courtemanche - Mashpee Shellfish Officer	"
R. Ross - Commercial draggerman	"
G. Brown - Cape Cod Salties	"
W. Banach - So. Grafton Sportsmen's Club	"
J. Costakes - New Bedford Seafood Producers Association	New Bedford
R. Batchelder - Labor Education Center, Southeastern Massachusetts University	"
J. Linehan - National Marine Fisheries Service	"
C. Connors - Massachusetts Lobstermen's Association	"
J. Grace - Recreational shellfisherman	Gloucester
R. Muse - Commercial shellfisherman	"
B. Amero - Gloucester	"
G. Gleason - Bait shop owner	"

Comments were made in two formats: at public meetings and written response. Five public meetings were held in June, 1981, in Gloucester, Boston, Plymouth, Hyannis and New Bedford. Eleven written comments were received from government agencies, educational institutions, fisheries organizations and the general public. Comments were presented to the Marine Fisheries Advisory Commission for their response. Only those comments that pertained to the draft report have been included. In addition, editorial comments on the informational sections on the report are not included, although changes in the text have been made.

Finally, some comments have been abridged or edited, but they retain their original meanings.

Comment	Response
General	
1. The problems addressed in the Public Concerns Section (V) do not correspond to the public's rating of problems as expressed in the questionnaires. Specifically in regard to port and harbor facilities, docking space and gear conflict. (WHOI)	The issues addressed in Section V were based on comments from public meetings, MFAC and DMF's expertise as well as from questionnaire results. The questionnaire was not a scientific sample and contains many areas of bias. For example, lobstermen rated mobile gear a problem and fixed gear no problem; trawlermen did the opposite, effectively cancelling out each other.
2. Sec. IV. Fisheries Related Agencies and Organizations, understates the research capability within Massachusetts by omitting such institutions as the Marine Biological Laboratory and only considering the Sea Grant programs of MIT and WHOI. (WHOI)	While Massachusetts has many fine marine-related institutions, those mentioned in the report were limited to those directly affecting Massachusetts fisheries or those with a working relationship with DMF.
3. MIT and WHOI Sea Grant Programs should be listed and more fully described under E. Educational Institutions. (MIT)	The final report reflects this change.
4. We feel that this is a very important document, long needed in Massachusetts, whereby the present and future function, aims, and goals of the DMF is clearly spelled out in print. (MLA)	No response necessary.
You have the full support of the Massachusetts Lobstermen's Association for these policies, and we hope that Governor King accepts and implements this policy as printed in the final draft. (MLA)	No response necessary.
5. In general, I find the report to be very comprehensive and most commendable. The priorities of the various programs were not apparent in my reading. Perhaps priorities cannot, and should not, be set in the report, but it will probably be an important exercise. (NEFC)	Priority will be assessed on the basis of available funds, legislative viability, public interest, and changing fishery situations.

Comment	Response
6. The report should be more comprehensive in its' description of the resources and industry. More information is needed on the fishing grounds, fishing methods, marine mammals, birds, and reptiles. (MCZM)	A balance was struck between having a very long comprehensive report and one that was easily accessible and readable. Additional information has been added to the final report but other data, available elsewhere, has not.
7. While we are pleased with the report, there are three general areas where we believe some additional work will move the state closer to complete development of a Comprehensive Living Marine Resources Strategy (CLMRS). These include (1) negotiating with all agencies of the Commonwealth whose programs and responsibilities affect coastal fishery resources, ... (2) increasing the specificity of the policies; and (3) broadening the scope of the policies in selected areas. (OCZM-NMFS)	The fisheries policy was originally developed as a state policy. Only after the first draft was completed were the CLMRS guidelines issued. The increased effort involved in satisfying CLMRS requirements can not be met in light of recent budget cuts and project curtailment.
Policy 1.1	
1. The state regulation of non-commercial shellfish that are not polluted should be non-existent and left to the city or town, except...(J. Grace)	State regulations pertaining to non-commercial shellfish exist only to provide consistent coast-wide size and season regulations. Otherwise all regulations are issued by the city or towns.
2. The state should establish the policy that recreational fishing for home use has the highest priority, and that a fishery is only commercially viable if there is an excess beyond that required for the taking for home use. (J. Grace)	The MFAC believes that neither recreational nor commercial fishing should be given a higher priority. Decisions involving conflicts between the two would be based on the biological, social and economic factors of the particular case.
3. Limited entry is a somewhat contentious and ambiguous phrase, and you seem to have passed over the middle ground of limiting effort (fishing mortality) without the inference of limiting the number of fishermen or vessels employed. (NEFC)	Limited entry as used in this report does refer to limiting the number of fishermen or vessels employed.

Comment	Response
4. This proposed action (1.1B) should be the development and conduct of a program to gather and analyze biological, sociological, and economic data. The implementing steps should include the staff expertise and resources, financial and otherwise, required.... (MCZM)	The proposed actions listed are examples of the types of programs needed and do not constitute all statistical and research programs necessary to collect biological, sociological, and economic data. More detailed implementation information more properly belongs in program proposals.
5. "Traditional inshore shellfish harvesting areas" (1.1D) must be defined. (MCZM)	The changes in 1.1D should clarify this phrase.
6. Many shellfish species are distributed among two or more political jurisdictions. CZM believes that the state must assume some of the responsibility for developing shellfish management plans. (MCZM)	The changes in 1.1D should satisfy this request.
7. Proposed action 1.1D endorsed by Massachusetts Inshore Draggermen's Association.	No response necessary.
8. Proposed action 1.1F endorsed by Cotuit Oyster Company.	No response necessary.
9. Proposed action 1.1F endorsed by Bourne-Sandwich Shellfish Organization.	No response necessary.
10. Proposed action 1.1G MSOA recommends that the DMF set mesh size (no less than 1/2" x 1/2") and buoy and pot marking regulations, but otherwise eel management should remain the responsibility of the cities and towns. (MSOA)	These proposed regulations are too specific to be included in a policy report. These suggestions will be evaluated under proposed actions 1.1G.
11. Proposed action 1.1G endorsed by R. Courtemanche.	No response necessary.
12. Proposed action 1.1H endorsed by J. Costakes.	No response necessary.

Comment	Response
13. Proposed action 1.1H endorsed by Massachusetts Inshore Draggermen's Association.	No response necessary.
Policy 1.2	
1. Fuel and energy conservation are of national importance. CZM believes the Division should examine restriction or allocation proposals in management plans in terms of energy use, as well as in a social, biological and economic context. (CZM)	Energy conservation is of major concern and a goal of Policy 2.1. However, it would be inappropriate to consider energy use on an equal par with social, biological and other economic factors when developing management plans. (See 1.3).
Policy 1.3	
1. I support the development of a trained marine fisheries law enforcement unit but recommend that DLE remain a separate and independent division under the Executive Office of Environmental Affairs. (MIT)	If the DLE is returned to the Department of Fisheries, Wildlife and Recreational Vehicles, it will remain a separate Division under the Commissioner but will be closer to the agencies it primarily serves, DMF and DF&W.
2. CZM agrees that effective resource management is impossible without enforcement. This policy and its' implementation is as critical to the success of good fisheries management as the establishment of a good statistical data base. CZM believes EOEA must begin work immediately on implementing some of the recommendations outlined in the draft policy...(MCZM)	No written response necessary.
3. The Division should examine expansion of the State's sea and air capability for enforcement surveillance and fisheries management. (MCZM)	It would be expected that proper enforcement measures would be adopted by the DLE as a matter of course.
4. Proposed action 1.3B endorsed by C. Connors.	No response necessary.
5. Proposed action 1.3D. The DMF should consider implementing a modified training course on law enforcement involving marine subjects and marine law specifically geared toward shellfish constables. (MSOA).	This may not be appropriate since DMF has no law enforcement powers. However, this may be accomplished in an informal basis.

Comment	Responses
Policy 1.4	
1. The language concerning artificial reefs is contradictory. CZM recommends it to be stated as "Artificial reef construction will be supported where substantial natural cover is absent, hydrographic conditions, materials used and construction methods employed will insure long-term usefulness, and the physical and biological oceanographic conditions will support reef type fish.	The final report reflects the recommended changes.
2. Reef policy should also consider the conflicts the reef may impose on fishing activities in the immediate area. (CZM)	This has been added.
3. CZM believes this policy should contain specific proposed actions concerning habitat protection and shellfish contamination. (MCZM)	Habitat protection policies were developed by MCZM and DMF must follow these guidelines. Otherwise, decisions are made on a case by case basis. (See also 1.6F).
4. Proposed action 1.4A should discuss city/town involvement in anadromous fishery management as well as the State's oversight role to insure consistency and protection of the resource. (MCZM)	Local-State interaction with anadromous fish is discussed in Section IV, F. Local. However, changes have been made to clarify proposed action 1.4A.
5. Proposed actions 1.4C and D may be more appropriate in the Mariculture section. (MCZM)	Proposed actions C and D deal with government-funded husbandry programs for striped bass and shellfish. In Section II, F. Mariculture we have defined such government-funded operations as fisheries enhancement to differentiate it from privately funded mariculture.
6. Proposed action 1.4D - would this be State or town run hatchery? Who would say if it is cost-effective and how would that be judged? (R. Nelson)	At what level of government any future hatchery would be run depends on the need and funding situation at that time. The cost-effectiveness would be studied by an independent consultant and be judged on the basis of private vs. public cost and availability of seed.

Comment	Response
Policy 1.5	
1. Opposed to any mariculture on areas presently used for recreational shellfishing and proven to be productive. (J. Grace)	This is in line with existing state/local regulations and practices.
2. In preparing the state Mariculture plan, consideration should be given to the existing U.S. Department of Agriculture Aquaculture Plan and to the Mariculture plan being developed by NOAA for the U.S. Department of Commerce. (MIT)	These will be investigated if a mariculture plan is prepared in the future.
3. Mariculture, "The Division will support mariculture operations when they do not adversely impact on local marine resources, etc." MSOA would like a clarification on the definition of adversely impact in this context. (MSOA)	This is a value judgement dependant on the situation and can not, and should not, be quantified. Species and the supporting habitat will differ from place to place. A quantified "impact" may be too restrictive in some areas and too lenient in others.
Policy 1.6	
1. The testing of shellfish for "red tide" should not include the bellys of those species where the belly is not eaten, as in the case of sea clams. (J. Grace)	The DMF supports this practice in regard to scallops. However, sea clam bellys are used in some cases for food preparation, therefore the whole animal is tested.
2. The Division should review the problems surrounding the disposal of contaminated dredged materials with respect to Proposed Action 1.6D. (MCZM)	Proposed action 1.6F addresses this.
Policy 1.7	
1. This is a reasonable statement of cooperation with the Northeast Fisheries Center in the Policies Section (VI). However, there are several proposed scientific activities which would seem to be particularly good candidates for close coordination -- the sea sampling program, and fish quality to name two. (NEFC)	No response necessary.

Comment	Response
2. The Draft Report does not appear to take full cognizance of Mass. Maritime Academy's statutory role. Therefore, I recommend that the report be revised to reflect the broad, important capabilities and facilities of the Academy. (MIT)	The report has been altered to reflect this recommendation.
3. Proposed Action 1.7C. What good is a program like this when you can learn everything on the job? This is not necessary. (R. Ross)	Many safety problems are caused by people learning on the job. This program may eventually reduce accidents and decrease fishing insurance costs.
4. Proposed action 1.7C. What is this program? Why require another license for fishermen? (J. Costakes)	This proposed action has been clarified to remove the impression that program certification is required to become a fisherman.
5. Proposed action 1.7D. Cities and towns with approved management authority must also be included here. (MCZM)	The particular problems pertaining to this action only occur between DMF and DFW. This action refers to stocking of certain species, varying fishing seasons, and size limits, etc.
6. I am particularly impressed with proposed action 1.7F which recommends coordination of the State's various education and extension activities. This is an important activity and your approach is admirable. (NEFC)	No response necessary.
7. The recommendation 1.7F, to form a Massachusetts Marine Fisheries Research and Educational Consortium has considerable merit in concept and one which MIT Sea Grant would be willing to develop further. However, as presented here, the listing of potential participants and their available resources or functions are incomplete and inaccurate or unclear. Other institutions or programs should be included. (MIT)	New language has been inserted to clarify and make accurate the description of resources available at the institutions named. However, the resource list is primarily meant to describe those resources that other institutions may need and was not meant to be a complete list. As stated in the proposed action heading, the purpose of the consortium would be to assist primarily state-sponsored institutions in conducting their programs in the face of dwindling budgets. By sharing resources each may expand their capabilities without increasing their

Comment	Response
	budgets. While MIT Sea Grant and Mass. Cooperative Extension Service are not state-funded programs, they interact closely with some of the other instituions named. Any additional institutions would probably make the consortium unmanageable.
8. Proposed action 1.7F. The Sea Grant Program at the Woods Hole Oceanographic Institution should be considered. Salem State College and the Division have had cooperative agreements in the past. (MCZM)	See response 7 above.
9. The proposals would be enhanced if there was a formal recognition of the organized workers of the fishing industry and their participation wherever it might be...Some instances talk about fishermen's views - how do you get them? I am suggesting that in where you want fishermen's input you specifically state that you want to work with the organizations of those workers. (R. Batchelder)	Mentioning specific organization names would enhance the proposed actions. However, the fishing industry speaks with many voices through many organizations (See Appendices II and III). Mentioning every organization in appropriate proposals would be cumbersome. Mentioning only a few would be discriminatory.
Policy 2.1	
1. Under Proposed Action 2.1A, I recommend that the rebuilding of port and support facilities be based on studies of possible consolidation and optimization of use to achieve the greatest improvement benefits for the least cost. (MIT)	Consolidation implies that the major portion of port development funds would be spent on the larger ports. Advisory commission members believed that conditions in the smaller ports are poorer than in larger ports and therefore do not want to commit port development to any direction without studying the statewide needs.
2. CZM believes this policy statement should include a definition of the role the DMF will play in port development. While other agencies may be more appropriate for funding or overseeing port development projects, the Division's participation is key. (MCZM)	Changes in proposed action 2.1A address this comment.

Comment	Response
3. Proposed action 2.1A endorsed by R. Ross.	No response necessary.
4. Proposed action 2.1D. The Public Access Board should be given more power so they don't have to waste time and money dealing with local conservation boards. (G. Barlow)	Most delays in building public access facilities are due to the Wetlands Protection Act and/or lack of funds. The DMF supports the building of more access facilities but not at the cost of lifting protection on wetlands.
5. Why not a single state seasonal license to cover the use of all state ramps? Presently it costs me $30.00 to launch in Sesuit and $30.00 in Sandwich. (G. Brown)	Ramps built by the State are turned over to the towns to run and maintain. The fees collected are used for maintenance. Although a single state fee for all ramps might be a convenience, it is more efficient and cost-effective to allow town ramp management.
Policy 2.2	
1. The implementing stages within each proposed action should be "will" rather than "should", in particular A(1), A(2), and B(1). (MCZM)	Done.
2. Proposed action 2.2A should be more specific to indicate that Massachusetts caught and Massachusetts processed fish should be bought by state institutions. (G. Brown)	Done.
Policy 2.3	
1. CZM recommends the Division consider amending city and town residence differential shellfish fees in times of natural or man-induced disaster to provide the fishermen an opportunity to continue fishing. (MCZM)	This may result in overharvesting in addition to the severe social conflict and confusion that would occur from an influx of out-of-town fishermen.
2. Proposed action 2.3C. CZM believes a more comprehensive approach should be taken to the whole tax structure affecting the fishing industry, as a means of providing funds for fishery programs. (MCZM)	While this is a worthy project, time does not allow for a proper in-depth study to be included in this report.

Comment	Response
Policy 2.4	
1. CZM believes the Division should make known what it believes are the areas of basic marine biological research which will provide the state with more information which can help in improving resource management and protection. (MCZM)	See Policy 2.3, response 2 above.
2. Proposed action 2.4B. CZM believes that fishery regulations effect more than just catch and effort. CZM recommends that the wording be changed to "perform commercial fisheries research as needed..." (MCZM)	Done.
3. Proposed action 2.4D. This contradicts Policy 1.1 and Proposed action 1.1B. (MCZM)	No contradiction is seen.
4. Proposed action 2.4E. CZM believes that the Division must modernize its methods of data collection, synthesis and analysis, and its administrative management. CZM also recommends that the Division also commit the State to integrate computer technology into its operations. (CZM)	This is being done.
5. Proposed action 2.4F, the action for "obtaining Sea Grant research funds" is unclear. Will this be through the existing MIT and WHOI Sea Grant Program, or are direct applications to the NOAA Office of Sea Grant planned. (MIT)	This has been clarified.
6. Proposed action 2.4E (2) endorsed by R. Ross.	No response necessary.
Policy 3.1	
1. Statistics are a very touchy subject. Statistic takers come around and you essentially tell them what they want to know with no resemblance to the real situation. Most statistics, especially Federal, are grossly understated. How do you go about getting proper numbers? (R. Nelson)	The Division is aware of the realities of collecting statistics. Statistics can be improved by keeping statistics confidential, using them for management and public information purposes only, and implementing penalties for non-reporting.

Comment	Response
Policy 3.3	
1. Regarding the permit process the DMF should continuously analyze and update the licensing procedures in order to streamline licensing commercial, family, seed permits, etc. (MSOA)	This is being done.
2. Proposed action 3.3B. If the rod and reel license ($5.00) is repealed and an individual license ($25.00) is required, then the price should be raised for selling fish. (G. Brown)	No response necessary.
3. A $25.00 license will not do any good at all because fishermen would rather have the fish rot than pay $25.00 to sell a $10.00 fish. (W. Banach)	No response necessary.
4. Proposed action 3.3C. How much for a recreational license. Would this be an individual or family license? (W. Banach)	Detail of any proposed recreational license would be established only after a study is conducted and public hearings held.
5. Any state regulation of non-commercial finfish should be limited to such species as striped bass and salmon (if not federally done) and then only to size and season. (J. Grace)	For many recreational species the DMF is the only agency with management authority. The DMF does not believe it wise to relinquish any management and protection options.
6. Opposed to any saltwater recreational license of any kind. (J. Grace)	No response necessary.
7. We would like to let you know we go along with everything but part 3.3 on page 99. (MSBA)	No response necessary.
8. Commercial sportsfishermen are more than willing to pay upwards to $200.00 for a license, but don't hurt the little person and the tourist who just wants to catch a couple of fish on their vacation. (G. Brown)	No response necessary.

Appendix IV.

SCIENTIFIC AND COMMON NAMES OF IMPORTANT
FINFISH, SHELLFISH, AND SEAWORMS

Finfish

Mustelus canis
Smooth dogfish
Smooth dog
Grayfish

Squalus acanthias
Spiny dogfish
Dogfish
Grayfish

Clupea harengus
Atlantic herring
Sea herring
English herring
Sardine

Alosa pseudoharengus
Alewife
Bucky
River herring
Freshwater herring
Grayback

Alosa aestivalis
Blueback
River herring
Summer herring
Blackbelly

Alosa mediocris
Hickory shad
Fall shad
Shad herring

Alosa sapidissima
American shad
Shad

Brevoortia tyrannus
Mossbunker
Atlantic menhaden
Menhaden
Pogy

Oncorhynchus kisutch
Silver salmon
Coho salmon
Coho

Salmo salar
Atlantic salmon

Osmerus mordax
Smelt
Rainbow smelt
Saltwater smelt

Anguilla rostrata
American eel
Yellow eel
Silver eel
Freshwater eel
Elver (young)

Merluccius bilinearis
Silver hake
Whiting

Gadus morhua
Atlantic cod
Rock cod
Cod

Melanogrammus aeglefinus
Haddock

Pollachius virens
Pollock
Boston bluefish

Urophycis tenuis
Mud hake
White hake
Ling

Urophycis chuss
Red hake
Ling
Squirrel hake

Hippoglossoides platessoides
American dab
American plaice (Canadian)
Dab

Paralichthys dentatus
Summer flounder
Fluke

Limanda ferruginea
Yellowtail flounder

Glyptocephalus cynoglossus
Witch flounder
Grey sole

Pseudopleuronectes americanus
Winter flounder
Blackback
Lemon sole
Sole

Scomber scombrus
Tinker mackerel (small)
Atlantic mackerel

Thunnus thynnus
Bluefin tuna
Horse mackerel
Tunny

Xiphias gladius
Swordfish
Broadbill

Pomatomus saltatrix
Bluefish
Snapper blue (young)

Morone saxatilis
Striped bass
Striper
Rockfish

Centropristis striata
Sea bass
Black sea bass
Blackfish

Stenotomus chrysops
Scup
Porgy

Cynoscion regalis
Weakfish
Squeteague
Sea trout

Tautoga onitis
Tautog
Blackfish
Whitechin

Lophius americanus
Goosefish
Monkfish
Angler

Tautogolabrus adspersus
Choggy
Cunner
Sea perch

Salvelinus fontinalis
Salters
Searun trout
Brown trout
Rainbow trout

Arctica islandica
Ocean quahog
Mahogany quahog
Blackshell quahog

Busycon canaliculatum
Conch
Channeled whelk
Whelk

Busycon carica
Knobbed whelk
Conch

Mercenaria mercenaria
Quahog
Chowder
Littleneck clam
Cherrystone clam
Hardshell clam

Mya arenaria
Softshell clam
Steamer

Crassostrea virginica
Eastern oyster
Oyster
American oyster

Mytilus edulis
Edible mussel
Smooth mussel
Blue mussel

Callinectes sapidus
Blue crab
Blueclaw crab

Geryon quinquedons
Red crab

Homarus americanus
Lobster
American lobster

Padalus borealis
Northern shrimp

Loligo pealei
Longfin squid
Squid
Bone squid

Illex illacebrosus
Shortfinned squid

Spisula solidissima
Surf clam
Sand clam
Bar clam
Sea clam

Ensis directus
Razor clam

Argopecten irradians
Bay scallop
Scallop

Placopecten magellanicus
Sea scallop
Giant scallop
Smoothshell scallop
Scallop

Seaworms

Goldfingia gouldii
Peanut worm

Arencola marina
Lug worm

Nereis virens
Clam worm
Blood worm

Lineus ruber
Ribbon worm

Appendix V. Policy Program public meeting dates and town or city.

Date	Fisheries Subject	Town or City
Feb. 2, 1980	Lobster	Hyannis
Feb. 5, 1980	Commercial	Chatham
Feb. 5, 1980	Recreational	Chatham
Feb. 8, 1980	Commercial	Provincetown
Feb. 10, 1980	Recreational	Auburn
Feb. 12, 1980	Shellfish	Westport
Feb. 14, 1980	Commercial	New Bedford
Feb. 14, 1980	Recreational	Fairhaven
Feb. 19, 1980	Commercial/ Recreational	Nantucket
Feb. 21, 1980	Commercial	Marshfield
Feb. 23, 1980	Commercial/ Recreational	Martha's Vineyard
Feb. 25, 1980	Shellfish/ Recreational	Bourne
Feb. 28, 1980	Commercial	Sandwich
Mar. 4, 1980	Commercial	Boston
Mar. 6, 1980	Commercial	Newburyport
Mar. 6, 1980	Recreational	Newburyport
Mar. 7, 1980	Shellfish	Ipswich
Mar. 10, 1980	Commercial	Gloucester
Mar. 11, 1980	Lobster	Marshfield
Mar. 12, 1980	Recreational	Gloucester
Mar. 13, 1980	Commercial	Salem
Mar. 19, 1980	Recreational	Marshfield
Mar. 21, 1980	Shellfish	Hyannis
Mar. 24, 1980	Recreational	Braintree
May 6, 1980	Recreaional	Yarmouth
June 18, 1980	Shellfish	Hyannis

Appendix VI. Agency Policy Meetings

Date	Agency or Group	City
July 24, 1980	Dept. of Environmental Quality Engineering	Boston
Aug. 6, 1980	Div. of Marine Fisheries - Mariculture Policies	Hingham
Aug. 7, 1980	Division of Law Enforcement	Boston
Aug. 21, 1980	Mass. Maritime Academy, MIT, WHOI	Buzzards Bay
Sept. 2, 1980	Div. of Fisheries and Wildlife	Boston
Sept. 8, 1980	Mass. Coastal Zone Management	Boston
Nov. 12, 1980	Div. of Fisheries and Wildlife	Hingham
Nov. 20, 1980	U. Mass. Coop. Extension Unit	Amherst
Nov. 20, 1980	U. Mass. Coop. Fisheries Reserach Unit	Amherst
Dec. 18, 1980	Dept. of Environmental Management	Boston
Apr. 15, 1981	Dept. of Food and Agriculture	Boston
Apr. 22, 1981	Division of Food and Drug	Boston
Apr. 22, 1981	Dept. of Commerce and Development	Boston

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