1.0 INTRODUCTION

1.1 DOCUMENT ORGANIZATION

This document is divided into four volumes:

Volume I contains the proposed amendment language and other sections required by Section 303 of the FCMA (Magnuson Act) in chapters 2.0 through 7.0. Chapter 8.0, Relationship to Applicable Law, is divided between Volume I and Volume IV. In the first volume, Section 8.1 contains the materials required under NEPA in the form of a Final Supplemental Environmental Impact Statement (FSEIS). This section is contained within Volume I because wherever possible and to avoid duplication of analyses or descriptions the two documents (FMP amendment and FSEIS) are integrated by cross referencing relevant sections. This approach is consistent with the Operational Guidelines issued by NMFS in October, 1992.

Volume II contains Appendices for Volume I, including:

Appendix I "Conceptual Basis of the Management Plan" describes the terms and concepts of fishery management;

Appendix II "Special Advisories on Groundfish Stock Status" contains the initial and final versions of the report which prompted the Council to begin the development of this amendment;

Appendix III contains references cited in the SEIS, some references which were included late in the document preparation are listed following the appropriate sections in the main body of the document, Volume I;

Appendix IV contains updated mesh selectivity data for 6-inch mesh from the Massachusetts Division of Marine Fisheries and the Canadian Department of Fisheries and Oceans;

Appendix V contains a list of acronyms and abbreviations used in the document;

Appendix VI "Analysis of Proposed Recreational Fishing Measures: Status Quo and Amendment 7 Changes" describes the projected impacts of recreational fishing management alternatives including the proposed action;

Appendix VII "Projections of Landings, Spawning Stock Biomass and Recruitment under the Status Quo and Amendment 7 for Georges Bank and Gulf of Maine Cod, Georges Bank Haddock and Georges Bank and Southern New England Yellowtail Flounder" provides input parameters and results of the projection analysis;

Appendix VIII Reports on the haddock possession limit and its impact on discards, 1995;

Appendix IX Reports on the 1994 and 1995 Nantucket Shoals Dogfish Experimental Fishery;

Appendix X "Economic Impacts of the Proposed Action", Section E.7.2 of the FSEIS.

Volume III contains public hearing summaries and written comments submitted during the formal comment period, August 25-October 18, 1995. The volume also contains a brief summary of the principal comments and the Council's response. Due to the large volume of comments contained in this section, an abridged version has also been prepared that contains only the summary comments and responses.

Volume IV contains the remaining sections of Chapter 8.0, Relationship to Applicable Law, not contained in the first volume. Each part of this volume contains the materials needed to meet federal regulatory requirements other than the MFCMA and NEPA. These are:

8.2 Executive Order 12866- including the "major rule" determination and the regulatory impact review (RIR);
8.3 Regulatory Flexibility Act (RFA)- including the determination of "significant" impact and the initial regulatory flexibility analysis (IRFA);
8.4 Endangered Species Act (ESA)- including the consultation procedures, record of correspondences and the biological opinion;
8.5 Coastal Zone Management Act (CZMA)- including the determination of consistency with state coastal zone management plans and the record of correspondences;
8.6 Paperwork Reduction Act (PRA) analysis;
8.7 Marine Mammal Protection Act (MMPA).

1.2 EXECUTIVE SUMMARY

Amendment 7 is the latest in a ten-year-long sequence of actions designed to conserve and manage the northeast multispecies (groundfish) fishery. The Council is responding to the advice of scientists that the principal stocks of the multispecies fishery (cod, haddock and yellowtail flounder) are at record-low levels of abundance and at or near the point where they may not have sufficient spawning stock to maintain themselves over the long term.

In 1994 the Council implemented Amendment 5 which was designed to reduce the level of fishing effort on the multispecies fishery by fifty percent over a five-to-seven-year period. Soon after the amendment took effect, the scientists warned that it would not prevent continued decline in the key stocks. The Council responded with some immediate action while it worked on the development of a comprehensive stock-rebuilding program.

In September, 1995, after a year of deliberation, the Council held public hearings on a range of alternatives to rebuild the stocks. The alternatives included a complete closure of directed and bycatch fisheries, large area closures, accelerated effort-reduction (days-at-sea) schedules, and quotas. Based on analyses contained in the Draft Supplemental Environmental Impact Statement, public comment and its own knowledge of the fishery, the Council adopted the measures contained in Section 4.0 of this amendment document.

Amendment 7 builds on the current management system with controls on the number and size of vessels that may fish for species regulated under this plan, the number of days a vessel may fish for those species, and size of fish that can be caught. The plan also includes area closures, both year-round and seasonal, designed to protect concentrations of fish, particularly juveniles and spawning adults. The amendment continues current mesh regulations but provides incentives, in the form of additional days-at-sea, for vessels to fish exclusively with mesh larger than the minimum regulated size.

This amendment eliminates significant exemptions from current effort controls, for hook-gear and gillnet vessels and those under 45 feet in length by including them in the days-at-sea reduction program. Vessels 30 feet and under may elect to operate under a catch limit rather than a limit on days, since they are already somewhat limited by weather. The days-at-sea reduction schedule already in place under Amendment 5 is accelerated so that a fifty-percent reduction will be achieved by 1997, instead of 1998 or 1999.

Of significant importance to this plan is the monitoring of catches relative to catch targets (Total Allowable Catch, TAC) based on the target exploitation rates, and the adjustment mechanism that facilitates continually meeting the plan objectives. The framework adjustment procedure provides the Council with the flexibility to modify any of the management measures in the event that target TACs are exceeded or as stock conditions improve and restrictions can be relaxed. The framework procedure can also be used to address other issues such as controlling the fishery's interaction with harbor porpoise or other protected species.

The ultimate purpose of this amendment is to rebuild the spawning stocks of the principal groundfish stocks (Georges Bank cod, haddock and yellowtail flounder, and Southern New England yellowtail flounder) to above minimum levels, and to rebuild the Gulf of Maine cod stock, for which a threshold cannot be determined at this time. The conceptual basis for this approach is that long-term stability and sustainability of the fishery is significantly more certain when a minimum spawning stock size is maintained. This concept extends the current approach of maintaining a certain percentage of the theoretical maximum spawning potential which is the

basis of the definition of overfishing.

The projections for rebuilding contained in the amendment document indicate that under a median probability, the thresholds for the key stocks will be reached over periods ranging from three years for yellowtail flounder stocks to more than ten years for haddock. The realization of these projections depends greatly on successful spawning and recruitment (survival of fish to adult size) in line with assumed rates. The monitoring and adjustment procedure established by this amendment provides the Council with the ability to respond in a timely way to observed, changing conditions rather than relying on long-term projections.

Landings of the ten large-mesh groundfish species are expected to decline over the first four years of the effort-reduction program compared to what they would be if not action were taken. In the fifth and following years, landings are expected to increase by about 30 percent, and the risk of future declines in the stock is expected to decrease. The cost-benefit analysis, which does not include additional monitoring and enforcement costs, projects that the program will reduce the gross revenues and profits of fishing vessels and the amount of crew shares over the short run. Over the long term, however, net economic impacts are expected to be positive. This conclusion is controversial for at least two reasons. First, in a cost-benefit analysis, reductions in costs, including labor costs, increase net economic benefits. A large part of the calculated benefit of the proposed action results from a reduction in labor costs. Fishing communities, however, understandably view the reduction in labor costs, (in other words crew shares), as a negative economic impact, not as a benefit. Second, the costs of administration and enforcement are uncertain and, based on some estimates, could the exceed the projected net economic benefits. Ont the other hand, the proposed action had the least unfavorable economic impacts compared to the other alternatives to taking no action which were considered by the Council.

The Council recognizes this action will have significant negative short-term social and economic impacts. The Council is now considering mitigating action, particularly with respect to the low allocations of days-at-sea available to individual vessels. Many in the industry have commented that the allocations are insufficient to enable them to survive, and some have urged the Council to consider a mechanism whereby they can, through some sort of consolidation program, accumulate sufficient effort allocations to enable them to remain in business, and to provide compensation to those vessels which exit the fishery. Others have asked the Council to consider further gear restrictions as a substitute for further reductions in days-at-sea. Due to the controversy around, and complexity of this issue, the Council could not undertake to include such a program in this amendment without unacceptably delaying the conservation program which is the amendment's principal purpose. The Council has, however, begun discussions on consolidation and intends to continue these in a public forum in the near future.

2.0 HISTORY AND PURPOSE OF AMENDMENT 7

2.1 BRIEF HISTORY OF THE FISHERY MANAGEMENT PLAN

The history of the Multispecies Fishery Management Plan through Amendment 4 is summarized in Section 2.1 of the Amendment 5 document. The following is a summary of events since Amendment 4.

Amendment 5

In Amendment #4, the Council stated that it recognized the need to develop and implement rebuilding strategies for the principal stocks of groundfish that were overfished as part of its next amendment. In the spring of 1991, the Council began development of Amendment 5 which it intended to be a comprehensive amendment to accomplish several objectives, namely:

1. To reduce fishing mortality to a level that will increase the percent maximum spawning potential (%MSP) for cod and yellowtail to 20% in five years and to 30% for haddock in ten years, the levels prescribed by the overfishing definition;

2. To rebuild the haddock spawning stock biomass, in addition to reducing the rate at which haddock are fished, by preventing an increase in the fishing effort directed at haddock;

3. To improve and enhance enforcement and administration of management measures;

4. To protect concentrations of fish below the minimum legal size from capture and excessive discard mortality;

5. To reduce the annual take of harbor porpoise in the sink gillnet fishery by the end of year four after implementation to a level not to exceed two percent of the population based on the best available estimates of abundance and bycatch.

The Council spent nearly a year on the development of the first draft of Amendment 5 due to the broad scope and the controversial nature of many of the proposed measures such as a moratorium on new permits and limits on days at sea for individual vessels. During public hearings, the Council identified several issues which it needed to address before submitting the amendment. The most notable of these issues were significant deficiencies in the data base which formed the foundation of the days-at-sea proposal.

In the spring of 1993 the Council held a second round of public hearings on Amendment 5, and it submitted the amendment on September 30. In June, 1993, the Secretary of Commerce implemented emergency rules intended to protect haddock and cod and promote stock rebuilding prior to the implementation of the Council's plan. The Secretary determined that an emergency existed in the haddock and cod fisheries due to the record-high fishing mortality rates being placed on the record-low stock sizes. The Secretary implemented measures which the Council indicated it was considering for submission in the amendment, namely a 2,500-pound haddock possession limit, a prohibition on pair trawling, and an expansion of Area 2 (to its current size) for the month of June.

When the Council submitted Amendment 5, the plan contained a 5,000-pound haddock possession limit which the Secretary of Commerce immediately disapproved. While the Council was deliberating options for a resubmission of the haddock possession limit, NMFS expressed growing concern for the deteriorating condition of Georges Bank haddock. On January 3, 1994, the Secretary of Commerce approved Amendment 5 and again implemented emergency rules to protect depleted haddock and cod stocks. The emergency rules contained a 500-pound haddock possession limit, an expansion of Area II and its immediate closure, a prohibition on the possession of haddock by scallop dredge vessels, a ban on pair trawling, a prohibition on transfer of fish at sea, and a suspension of the Area I closure scheduled for February 1.

Amendment 6

Amendment 5 took effect beginning March 1, 1994, although some provisions were not implemented until May 1. The Secretary of Commerce announced on February 1 that he was preparing a secretarial amendment to implement the same haddock protection measures contained in the emergency rules in the event that the Council did not submit an appropriate amendment in sufficient time for it to take effect upon the expiration of the emergency action on June 30. The Secretary implemented Amendment 6, containing the 500-pound haddock possession limit, on June 22, 1994.

1994-1995 Emergency Actions and Framework Adjustments

At the August, 1994 Council meeting, the Stock Assessment Workshop presented assessments of Georges Bank cod and yellowtail flounder. These assessments paralleled earlier assessments of haddock and southern New England yellowtail flounder which indicated that these stocks were at or near the point of collapse. The NEFSC issued a special advisory indicating that the measures implemented in Amendment 5 were insufficient to forestall a continued decline in the spawning stocks of these principal groundfish stocks. The original Special Advisory Report to which the Council reacted, and a revised version issued several months later are contained in Appendix II.

At the September meeting, the Council voted to proceed with the development of an amendment to address the crisis identified in the advisory report. At the October meeting, the Council recognized that the development of an amendment to address these issues would require more time than it was willing to let pass while the stocks continued to decline. On that basis, the Council recommended that the Secretary of Commerce implement emergency rules to slow the decline of those critically low stocks while it developed the comprehensive rebuilding plan represented by this amendment.

On December 12, the Secretary of commerce implemented the emergency rules recommended by the Council. Under the emergency rules, areas defined in Amendment 5 for seasonal or occasional closure (Area I, Area II and the Nantucket Lightship Area) were closed to all fishing including scallop dredging. The emergency action also prohibited all fishing with mesh smaller than the regulated minimum size except in fisheries determined by the Regional Director to have a regulated groundfish bycatch of less than 5 percent. Vessels in certified small-mesh fisheries were prohibited from possessing regulated groundfish.

The Council recognized that the duration of the emergency action, which could be extended to a maximum of 180 days, would not provide sufficient time for the development, review and implementation of Amendment 7. The Council, therefore, used the framework for abbreviated rulemaking established under Amendment 5 to implement the emergency rules as a permanent

adjustment to the regulations. The Council included several changes to the emergency rules in Framework 9 which would relieve some of the economic and regulatory burden on the industry while not compromising the conservation impact. For example, the Council allowed transit through closed areas by groundfish vessels provided the gear was not available for immediate use. The Council, nevertheless, stated that it viewed these rules only as interim rules which could be superseded by Amendment 7.

At the June 28-29 meeting, the Council agreed on the range of options to take to public hearings on Amendment 7. The Council held nine public hearings September 19-29, 1995 in Gloucester, Hyannis and Fairhaven, MA, South Kingston, RI, Toms River, NJ, Riverhead, NY, Portsmouth, NH, and Ellsworth and Portland, ME. At Council and Groundfish Committee (meeting as a committee of the whole Council) meetings from October,1995 to January, 1996, the Council developed the package of measure contained in this proposed amendment.

Harbor porpoise bycatch reduction

One of the objectives of Amendment 5 was "to reduce the bycatch of harbor porpoise in the Gulf of Maine sink gillnet fishery to a level not to exceed two percent of the population, based on the best estimates of abundance and bycatch by the end of year 4 of implementation of the amendment". Porpoise abundance is estimated at 39,500 animals, and estimated bycatch prior to Amendment 5 was 1,200 (3.04%) in 1992, and 1,400 (3.54%) in 1993. The 1994 total estimate o f bycatch is not yet available, but bycatch rates were more than three times higher than in previous years, chiefly in the Mid-coast area, suggesting an increase in total bycatch from 1993. A new estimate of abundance will be available in early 1996.

In Amendment 5 the Council implemented a program to enable management measures to be adjusted in a framework procedure to meet the year-4 bycatch objectives. The first adjustment, Framework 4, called for a 20 percent reduction in porpoise bycatch in 1994 using time/area closures of three general areas: Northeast, Mid-coast and Massachusetts Bay. A Harbor Porpoise Review Team was appointed by the Council and charged with evaluating the effectiveness of the measures in place and making recommendations for additional measures to achieve the bycatch reduction targets. Based on the increased bycatch rates for 1994, the Council implemented a one-month extension and area expansion of the Mid-coast area for 1995 with Framework 12, and is developing adjustments to the other areas. Meanwhile, the Marine Mammal Protection Act (MMPA) was reauthorized in 1994 which, as discussed in the following section, greatly affects the Council's bycatch reduction plan and objectives under Amendment 5. The MMPA requires bycatch to be reduced to a significantly lower rate than the Council's plan, and requires NMFS to implement Take Reduction Plans for strategic stocks (of which harbor porpoise is one) by spring, 1997.

2.2 PURPOSE AND NEED FOR THIS ACTION

As discussed in Section 2.1, the Council prepared Amendment 5 to address the overfishing of principal groundfish that occurred in the late 1980's and early 1990's. While the Council was preparing that amendment, overfishing continued and stock sizes declined. In February 1992, assessment scientists warned that haddock stocks in the Gulf of Maine and on Georges Bank were at record-low levels. In 1993, NMFS scientists urged the Council to consider emergency measures to protect haddock while Amendment 5 was in development because the decline was continuing. The Secretary of Commerce developed and implemented Amendment 6 to protect Georges Bank haddock in response the dire condition of that stock.

In mid-1994, as Amendment 5 was being implemented, assessment scientists announced that Southern New England yellowtail flounder and Georges Bank yellowtail flounder had collapsed. The scientists also asserted that the Georges Bank cod stock, the mainstay of the New England fishing industry, was at a record-low level of abundance and being fished at a record-high rate of exploitation. Indications that incoming year classes were below average combined with those findings to suggest that the collapse of this important resource was imminent.

The Northeast Fisheries Science Center issued a Special Advisory Report in conjunction with the plenary session of the 18th Stock Assessment Workshop (see Volume II, Appendix II of the SEIS). The scientists warned that even under the Amendment 5 final-year fishing mortality rates some stocks would continue to decline and advised that, to avert a collapse of cod and to improve prospects for rebuilding of yellowtail, fishing mortality rates "should be reduced to as low a level as possible, approaching zero". The Council responded immediately by starting Amendment 7 to address the crisis identified in the Special Advisory. Meanwhile, NMFS indicated through both formal reports, such as *Status of the Fishery Resources, 1994*, and in public statements that the status of other stocks in the multispecies complex is also depressed, with many of the stocks being overexploited and/or at low levels of abundance.

The purpose of this amendment, therefore, is to rebuild the spawning stock biomass of cod, haddock and yellowtail stocks and to prevent other groundfish stocks from being overfished. This amendment is primarily a conservation action aimed at rebuilding fish stocks, although management considerations and the relative impacts of different alternatives form the basis for the selection of specific management measures. The Council is not using this amendment to implement long-term allocation policies, although it recognizes that in the short term allocations may directly or indirectly result from its decisions.

Harbor porpoise bycatch reduction

The Marine Mammal Protection Act (MMPA), reauthorized in 1994, includes an objective for reducing the bycatch to levels that are less than the potential biological removal level (PBR) specified for the stock. Based on current population and life history information, the PBR is 403 animals for Gulf of Maine harbor porpoise, about one percent of the current abundance estimate, and about half of the bycatch rate objective set by the Council in Amendment 5. Furthermore, the date for compliance is identified in the MMPA as April 1, 1997, one year earlier than the Council's Amendment 5 bycatch reduction schedule. The Council has revised its objectives, as indicated in Section 3.3, to make them consistent with the requirements of the MMPA.

3.0 OBJECTIVES AND MANAGEMENT APPROACH

The Council's objective with this action is to reduce fishing mortality on Georges Bank cod, haddock and yellowtail flounder and Southern New England yellowtail flounder to as close to zero as practicable, and also to reduce fishing mortality for Gulf of Maine cod to rebuild the spawning stock biomass of the identified stocks.

3.1 FISHING MORTALITY REDUCTION

In developing this amendment, the Council adopted a fishing mortality rate that reflected its conservation objectives while considering the practicability of reaching zero. A fishing mortality rate goal is necessary to provide a measurable standard for developing management alternatives and for monitoring their effectiveness. The proposed goal will allow stock rebuilding while at the same time allow some fishing to occur, although very little, if any directed fishing in the early years of the plan.

For measurement purposes the Council has identified the biological reference point known as $F_{0.1}$ as the objective for Georges Bank stocks of cod, haddock and yellowtail flounder and Southern New England yellowtail flounder. At this level 15 percent of Georges Bank cod, and 22-25 percent of haddock and yellowtail flounder stocks could be removed by fishing each year. Because the Gulf of Maine cod stock is not in as bad condition as the Georges Bank stock, its target would allow about 23 percent of the stock to be removed by fishing annually.

3.2 SPAWNING STOCK BIOMASS REBUILDING AND THRESHOLDS

The goal of the rebuilding plan is to increase the spawning stock of cod, haddock and yellowtail flounder stocks above minimum threshold levels. Below the threshold levels, stocks are much less likely to produce enough new fish (recruitment) to sustain themselves at long-term levels. These are minimum acceptable stock sizes, and will not produce maximum sustainable yields.

The spawning stock thresholds and the most recently calculated spawning stock levels are shown in the table below. For Gulf of Maine haddock and Gulf of Maine cod, a spawning stock threshold cannot be determined from the available data. The spawning stocks of both of these stocks, however, are at record-low levels. These stocks would be managed under the same rebuilding schedule as the other critically low groundfish stocks although a different rate of fishing would be allowed.

STOCK	SPAWNING STOCK THRESHOLD (metric tons)	SPAWNING STOCK (year) (metric tons)
Georges Bank cod	70,000	25,400 (1994) 37,200 (1993)
Georges Bank haddock	80,000	21,000 (1995)
Georges Bank yellowtail flounder	10,000	4,400 (1994) 3,000 (1993)
Gulf of Maine cod	NA	8,100 (1994) 9,400 (1993)
Southern New England yellowtail flounder	10,000	1,052 (1993) 1,300 (1992)

Output from stochastic projections indicated the time required to reach the threshold at different levels of probability under the fishing mortality objectives for the principal stocks. The model is described in Section E.7.0, Environmental Consequences. Summary results for two levels of probability, 50 and 90 percent are provided in the following table while more complete results are provided in Appendix VII.

STOCK	YEARS TO THRESHOLD	
	P=50%	**P=90%**
Georges Bank cod	6	8
Georges Bank haddock	(see Note)	
Georges Bank yellowtail flounder	2	5
Gulf of Maine cod	NA (no threshold)	
Southern New England yellowtail flounder	2	6

NOTE: At the target exploitation rate, Georges Bank haddock the probability of reaching the threshold within the ten years projected in the model is 22 percent.

Once the thresholds for the key stocks have been reached, the Council may allow an increase in the exploitation rates and, therefore, landings. Any future plan still would control the exploitation rates so they do not exceed the overfishing level. The level of fishing will determine how fast stocks continue to rebuild above the minimum threshold levels and also the long-term yields from the fishery.

3.3 HARBOR PORPOISE BYCATCH REDUCTION

The objective for harbor porpoise bycatch reduction is:

> to reduce proportionately, consistent with the MFCMA and MMPA, the incidental mortality and serious injury of harbor porpoise in the Gulf of Maine sink gillnet fishery to the potential biological removal (PBR) level identified for this stock through the process described in Section 117 of the MMPA by April 1, 1997, the date required for compliance with Section 118(f)(5)(A) of the MMPA.

4.0 PROPOSED MANAGEMENT ACTION SUMMARY

4.1 CHANGES TO THE PERMIT MORATORIUM

Vessels other than private recreational vessels must have a limited-access permit or one of two newly established open-access permits, either a rod-and-reel/handline only permit or a party/charter permit to possess any of the 13 species in the multispecies management unit. Under this option, existing open-access permits that meet criteria specified below could become limited-access permits, or they could become either rod-and-reel/handline or party/charter permits.

4.1.1 Open-access Permits

4.1.1.1 Rod-and-reel/handline only,

Vessels may obtain a rod-and-reel/handline permit without meeting any qualification criteria. Vessels fishing under this permit are prohibited from fishing for multispecies with gear other than rod-and-reel or handline. Automated jigging machines, tub trawls and longlines are prohibited. Vessels in this category would be subject to a multispecies possession limit (0 to 500 pounds maximum, see Section 4.7.3) and any closures that apply to limited access hook vessels.

4.1.1.2 Party/charter permit

Any vessel that does not have a limited-access permit and that carries anglers for a fee who are fishing for multispecies must obtain a party/charter permit. The permit may be obtained without meeting any qualification criteria. Vessels fishing under this permit are prohibited from selling any multispecies catch and are subject to all other restrictions that apply to party/charter vessels described in Section 4.11.

4.1.2 Limited-access permits

Existing limited-access permits are not changed. Open-access vessels meeting the criteria outlined below may qualify for a limited-access permit.

4.1.2.1 Hook-gear-only permit

A vessel qualifying for this permit may only fish for multispecies with hook gear. To qualify a vessel must have held a hook-gear-only open-access permit and must have submitted timely vessel logbook reports showing landings between June 1, 1994 and June 1, 1995, of at least 500 pounds (singly or combined) of cod, haddock, pollock, yellowtail flounder, winter flounder, witch flounder, American plaice, windowpane flounder, white hake, redfish, whiting, red hake or ocean pout.

If an application for a permit under this section is denied, a vessel may appeal the denial permit within 30 days on the following grounds:

1) the information used by the Regional Director was based on mistaken or incorrect data;

2) the applicant was prevented by circumstances beyond his/her control from meeting the relevant criteria; or

3) the applicant has new or additional information.

4.1.2.2 Possession-limit-only permit

A vessel may qualify for a limited-access possession-limit-only permit if it meets the criteria outlined below. Vessels fishing under this permit may only possess multispecies in accordance with the limits described in Section 4.7 (Possession Limits). To qualify for a limited-access possession-limit-only permit a vessel must meet the qualification criteria for the limited-access multispecies permit established in Amendment 5. Under this measure, vessels that would have qualified, but chose not to during the first year of Amendment 5, would be given an opportunity to reconsider that decision and enter the limited access fishery but restricted by a possession limit. A vessel must meet one of the following criteria:

A) the vessel had been issued a federal multispecies permit as of February 21, 1991, or renewed a permit in 1991 that was issued before February 21, 1991, and that vessel landed multispecies finfish on at least one trip completed between January 1, 1990 and February 21, 1991, inclusive; or

B) the vessel was under written agreement for construction or re-rigging, or was under written contract for purchase as of February 21, 1991, and the vessel was issued a federal multispecies permit and landed multispecies finfish on at least one trip between February 21, 1991 and February 21, 1992; or

C) the vessel is replacing, or has replaced a vessel that meets any of the criteria in paragraphs A or B above, and the vessel conforms to the restrictions on upgrading of vessels in the multispecies plan.

A vessel may appeal the denial of a permit within 30 days of the notice of denial on the following grounds:

1) the information used by the Regional Director was based on mistaken or incorrect data;

2) the applicant was prevented by circumstances beyond his/her control from meeting the relevant criteria; or

3) the applicant has new or additional information.

4.1.2.3 Multispecies permit for limited-access sea scallop vessels

A vessel issued a limited-access permit under the Atlantic Sea Scallop FMP (50 CFR 650), must have a Scallop Vessel Multispecies Permit in order to retain any of the multispecies. The only qualification criterion to obtain this permit is that the vessel has a limited-access scallop permit. The possession limit for vessels fishing under this permit is discussed in Section 4.7.3.3. Combination vessels fishing under their scallop DAS are not required to obtain the Scallop Vessel Multispecies Permit but are subject to the same possession limit.

4.2 TARGET TOTAL ALLOWABLE CATCH LEVELS (TAC)

4.2.1 General description of TACs

The Council will set total allowable catch (TAC) targets for the commercial sector for specific cod, haddock and yellowtail flounder stocks, (Georges bank cod, haddock and yellowtail flounder, Southern New England yellowtail flounder, and Gulf of Maine cod) and an aggregate TAC for the combined stocks of the other regulated species (pollock, redfish, white hake, witch flounder, American plaice, winter flounder and windowpane flounder). The cod, haddock and yellowtail flounder TACs will provide a measure by which to evaluate the effectiveness of the rebuilding program, and the aggregate TAC for the other regulated species will enable the Council to monitor shifts in effort. The TACs will also provide the Council with a benchmark with which it can make measured adjustments to the regulations as stocks rebuild. If the individual stock or aggregated TAC is reached in any period (year or other period to be determined), the Council would take action to restrict catches in the next time period in a manner that is fair and equitable to different user groups.

4.2.2 TAC-setting procedure

The basis for setting the target TACs for Georges bank cod, haddock and yellowtail flounder, Southern New England yellowtail flounder is $F_{0.1}$, which corresponds to annual exploitation rates ranging from 15-25 percent. The basis for the Gulf of Maine target TAC is F_{max} or an annual removal rate of 23 percent. The methodology for calculation of the TACs is described in detail in Section E.7.1.1.1.1. The target TACs for 1996 are provided in the following table, and the TACs for following years will be set during the annual review and framework adjustment process described in Section 4.12.

At this time, landings data is only available at the species level (that is, cannot be attributed to specific stocks) in a timely enough manner that it can be used to make adjustments to management measures. Wherever possible, the Council will consider all available information to determine more specifically the sources of fishing mortality in order to make appropriate management adjustments. The aggregate target TAC for the seven other regulated species will be based on calculations of the current potential yield from each stock. Current potential yield is based on the application of a fishing mortality rate for each species component of the aggregation that will stabilize the stock at current levels.

4.2.3 TACs in the first year of the plan

Target total allowable catch levels (TACs) corresponding to the exploitation rate objectives have been calculated for the first year of the plan, May 1, 1996 April 30, 1997. The following table shows the first-year target TACs and also provides the recorded landings for 1993, the most recent year for which data is available for individual stocks. The aggregate target TAC is 25,500 mt (56.2 million pounds).

STOCK	1996 TARGET TACs (metric tons/ approx. pounds)	1993 LANDINGS (metric tons/ approx. pounds)
Georges Bank cod	1,851/4.1 million*	14,600/32 million

Georges Bank haddock	2,801/6.2 million*	700/1.5 million
Georges Bank yellowtail flounder	385/849,000*	2,200/4.8 million
Gulf of Maine cod	2,761/6.1 million	8,300/18.2 million
Southern New England yellowtail flounder	150/331,000	500/1.1 million

* After subtracting assumed Canadian catch based on a carry over of 1995 Canadian TACs (1,000, 2,500, and 435 mt for Georges Bank stocks of cod, haddock and yellowtail flounder, respectively).

4.3 CERTIFICATION OF BYCATCH FISHERIES

Fishing by any vessel will only be allowed in a fishery certified by the Regional Director to have a bycatch of regulated species which is less than five percent of the total catch, or while under the vessel's DAS allocation (regardless of whether such DAS allocation is under the Multispecies FMP or another FMP). Vessels fishing with gears listed in Section 4.9.1 are not required to be in a certified fishery. For certification purposes, the area in which a fishery could operate would be no less than thirty minutes (one-half of a degree) on a side. "Fishery" in this context may be defined by gear and/or area and/or season. In certifying fisheries, the Regional Director will consider that the 5-percent standard is a maximum acceptable level, and will also consider other relevant factors (for example, juvenile mortality or the impact on and interaction with other fisheries). The Regional Director will consult with the Council prior to certifying any new programs.

Unless otherwise specified, possession of any or all of the ten regulated species will be prohibited while a vessel is fishing in a certified fishery (see Section 4.7.2). Possession of species other than those directly managed by this plan (for example, monkfish, lobsters and skates) could also be limited or prohibited on the basis of the bycatch of regulated species when fishing for those species. The operation of a fishery also may be conditional upon restrictions intended to maintain regulated species bycatch below the 5-percent maximum acceptable level (for example, the requirement to use a separator grate).

Any fishery with mesh smaller than the regulated minimum size is subject to certification under this section, however, currently exempted small-mesh fisheries are considered to meet the certification standard at this time. Any vessel fishing with gears identified in Section 4.9.1 (Generally Exempted Gears) are considered to be in fisheries exempt from the certification requirement at this time.

4.3.1 Certification of fisheries in the Mid-Atlantic area

Fisheries that occur in the Mid-Atlantic Regulated Mesh Area are exempt from the certification requirement. With the exception of winter flounder, however, vessels not fishing under their allocation of DAS will be prohibited from possessing regulated species. Vessels fishing in the Mid-Atlantic Regulated Mesh Area and not fishing under their DAS allocation will be allowed to possess winter flounder but in an amount not to exceed 10 percent of the total weight of fish on board or 200 pounds, whichever is less.

The Mid-Atlantic Regulated Mesh Area, currently defined as west of 72°30', is redefined as west

of line extending south along 71°51' from the coast (at Watch Hill Point, approximately the Rhode Island-Connecticut border) to the intersection with a line describing an arc three miles around Montauk Point, Long Island, then approximately southeast along that line to its intersection with the territorial sea boundary of New York off Montauk Point, along the territorial sea boundary to the intersection with 72°30 and then south along 72°30'. This change will result in the inclusion of Long Island Sound and the state waters of New York and Connecticut in the Mid-Atlantic Regulated Mesh Area (see Map 1).

4.3.2 Certification of a white hake fishery

The Regional Director may certify, after consultation with the Council, a white hake fishery based on a 5-percent regulated species bycatch standard exclusive of the catch of white hake. Vessels fishing in this fishery are subject to the possession limits for certified fisheries, as described in Section 4.7.2, except that they may retain white hake. A condition of this fishery is that vessels must use either regulated mesh or hook gear.

4.3.3 Certification of current small-mesh fisheries

Based on action taken under the December 1994 Emergency Action, and Framework 9, a number of fisheries with mesh smaller than the regulated minimum size have already been certified. Those fisheries will continue to be allowed.

4.3.4 Certification of a Nantucket Shoals Dogfish fishery

The Council recommends that the Regional Director certify a fishery for dogfish using mesh smaller than the regulated minimum size in the area of Nantucket Shoals. The basis for this recommendation is the results of two years under the experimental fishery program which indicated that the bycatch of regulated species is below the maximum 5-percent standard. The restrictions, area and season are described in Section 4.9.4.1.

4.4 EFFORT REDUCTION PROGRAM (DAYS AT SEA)

The proposed action will accelerate the days-at-sea (DAS) reduction program established in Amendment 5 in 1994. Under current regulations, 1996 would be the third year of the effort-reduction program. Under the proposed amendment, the effort-reduction schedule is accelerated such that the fifty-percent reduction is achieved in two equal increments. The reduction in DAS will not exceed 50 percent from the Amendment 5 baseline except by future Council action, either framework or amendment. Under current regulations, vessels were provided only one opportunity to switch between Fleet and Individual DAS categories (at the end of the first year of the Amendment 5 DAS reduction program), but under the proposed action the restriction on one-time switching is removed. Vessels that are currently exempt from the DAS program and that are being incorporated into it under the proposed action will be able to choose either the Fleet DAS or Individual DAS program (with the right of appeal of individual DAS allocations).

Days-at-sea are counted on a 24-hour basis, and, therefore, vessels fishing less than 24 hours on a trip (day boats) will effectively have more *days* (but not more *hours*) than a vessel with the same allocation of days that fishes on trips longer than 24 hours. For vessels fishing with sink gillnet gear, DAS will be counted from the time the vessels calls in that it is leaving port (with its gear on board) to the time the vessel removes its gear from the water and calls in that it has returned to port. A vessel that leaves its gear in the water and returns to port will continue to have the time counted against its allocation of DAS and will not be required to call in.

All vessels in either DAS program, are required to take a twenty-day block of time out of groundfishing during the March-May spawning season. Vessels fishing under the exceptions described in Sections 4.9.2.1 and .2 (30-feet-and-under and rod-and-reel/handline, respectively) are prohibited from possessing regulated species from March 1 through March 20 each year, corresponding to the 20-day block out of groundfishing required of vessels in the DAS program.

4.4.1 Individual days-at-sea

Under current regulations, on May 1, 1996, the allocation to vessels in the Individual DAS category would be based on a 30-percent reduction from their historical baseline, and the 1997 and 1998 allocations would be based on 40-percent and 50-percent reductions, respectively. Under the proposed amendment, the allocation will be based on reaching the 50-percent reduction in 1997 in two equal increments. That schedule results in a 35-percent from the historical baseline in 1996 and a 50-percent reduction in 1997 (reductions of 15 percent in each year from the current year).

4.4.2 Fleet days-at-sea

Under current regulations beginning in May, 1996, vessels in the Fleet DAS category would operate under the second 10-percent incremental reduction because 1995 was a scheduled pause year in the reduction schedule. The 50-percent reduction in DAS was scheduled over a six-year period with the final reduction beginning in 1999. Under the proposed action the reduction in DAS is taken over two years.

The current system is based on requiring vessels to take a certain amount of time out of fishing for regulated species (in twenty-day blocks) and to layover in port one day for each two days at sea while fishing for regulated species. Vessels are not currently allocated DAS but have a certain number of "opportunity days" on which they can fish for regulated species depending on the amount of layover time the vessel is required to take. In the current year Fleet DAS vessels have 190 opportunity days, and by the final year will have 88 days.

Under the proposed action, the Council is modifying the Fleet DAS program such that vessels will be allocated a specific number of days on which they may fish for regulated species, and they will not be required to layover in port between trips. The reduction from the current level to the final level is to be taken over two years in equal increments as calculated by the following: (190 - 88) days=102 days, 102/2=51, 190-51=139 days. Vessels will no longer be required to declare out of groundfishing in 20-day blocks (except during the March-May spawning period), but may take their groundfish days at any time.

The following table presents the current Fleet DAS system and as proposed under this amendment.

	AMENDMENT 5 (current regulations)			**AMENDMENT 7 (proposed)**
YEAR	**Required days out**	**"Opportunity days" w/ layover**	**"Opportunity days" w/o layover**	**Allocated Fleet DAS**
1995	80	190	285	NA

1996	128	158	237	139
1997	165	133	200	88
1998	200	110	165	*
1999	233	88	132	*

*NOTE: Allocations of DAS after 1996 will be based on the evaluation of the total fishing mortality reduction program relative to the amendment objectives and will be set through the framework adjustment procedure.

Vessels currently exempt from the DAS program, will be included in the proposed action unless specifically exempt under Section 4.9.2. Unless otherwise restricted by other measures in this plan, these vessels will have the option of entering either the Individual or Fleet DAS program under the same terms and conditions as applied to vessels under Amendment 5, including the right to appeal an allocation of Individual DAS. The Individual DAS will be calculated based on the total number of the vessel's multispecies DAS for the years 1988, 1989 and 1990 based on data, information, or other credible evidence available to the Regional Director at the time of election to participate in the Individual DAS program. "Multispecies DAS" are the total number of days the vessel was absent for a trip where greater than ten percent of the vessel's total landings were comprised of regulated species, minus any days in which a scallop dredge was used. The allocation will be the average of the two years of highest multispecies DAS, excluding any year in which there was no multispecies DAS. Vessels which qualify for choosing between the DAS allocation systems may switch categories upon renewal of the vessel permit at the beginning of the fishing year.

All vessels holding a multispecies permit must take a block of twenty days out of fishing for regulated species during the March-May spawning season. Unless otherwise specified, all vessels fishing for or possessing regulated species must be enrolled in a DAS program. Vessels thirty feet and under that possess a limited access multispecies permit may be exempt from the DAS program (see Section 4.9.2.1). Vessels fishing under a rod-and-reel/handline permit (Sections 4.1.1.1 and 4.9.2.2) are also exempt from the DAS program. Fleet DAS gillnet vessels fishing with 7-inch or larger mesh, and mobile-gear vessels fishing with 8-inch or larger mesh, throughout the year will be allocated 155 DAS in year one of this amendment, and 120 DAS in year two, while Individual DAS vessels using the larger mesh will be allocated and additional 12 percent and 36 percent DAS in the first and second years, respectively (Section 4.9.2.3) The Council will make future allocations of DAS and modifications to the various exemptions through the framework adjustment procedure.

4.5 GEAR RESTRICTIONS

Gear restrictions include minimum mesh size requirements, requirements to use specific gear (for example, square mesh or separator grate), or limits on the size and/or amount of gear a vessel may use. Gear restrictions may be applied throughout the range of species managed under this FMP, or in specific areas. The current prohibition on groundfish pair trawling will continue. Map 1 shows the areas where gear restrictions (primarily minimum mesh) are applied.

4.5.1 Minimum mesh size

Current minimum mesh size regulations will continue. The Council is providing incentives for

using larger mesh in the form of additional DAS (Section 4.9.2.3).

4.5.2 Square-mesh requirements

Current square-mesh requirement for Stellwagen Bank and Jeffreys Ledge will continue.

4.5.3 Trawl gear restrictions

The Council does not propose any trawl-gear restrictions (for example, restrictions on the size of rollers or rock-hoppers) at this time but it may implement such restrictions in the future under the framework adjustment procedure.

4.5.4 Gillnet gear restrictions

The Council may implement, through the framework adjustment procedure, restrictions on the height, length, mesh size and number of gillnets a vessel may fish. These restrictions may be applied in addition to or in substitution for other effort controls such as DAS.

4.5.5 Hook gear restrictions

The current regulation limiting the number of hooks a vessel not fishing under DAS may set per day to 4,500 continues. This applies to vessels fishing under a hook-gear-only permit.

4.5.6 Rod-and-reel/handline only vessels

Vessels fishing under a rod-and-reel/handline permit issued under the provisions of Section 4.1.1.1, are prohibited from having on board automated gear, such as jigging machines and electric or hydraulic reels and are prohibited from fishing with more than three hooks per line.

MAP 1- Gear (Mesh) Management Areas

4.6 AREA CLOSURES

The current regulation that allows vessels to transit closed areas provided the gear is properly stowed and not available for immediate use will remain in effect. Area closures are shown on Map 2.

4.6.1 Year-round closures

The current closures of Area I, Area II and the Nantucket Lightship will remain in effect. Exempted gears, that is, those that are currently allowed to fish in these areas, are the only gears allowed to fish in these areas at this time.

4.6.2 Seasonal/spawning closures

Unless otherwise specified, until such time as the Council implements additional time/area closures by framework action, the closures to sink gillnets implemented as of November 29, 1995 to protect harbor porpoise will apply to all gears. The Council may, at any time, modify, add or delete area closures to achieve the fishing mortality objectives of the amendment. The Council will make the regulatory changes using the framework adjustment procedure described in Section 4.12.

The harbor porpoise closures in effect as of November 29, 1995 are as follows:

NORTHEAST CLOSURE AREA August 15 through September 13				
Point	**Latitude**	**Longitude**	**Approximate Loran Bearings**	
NE1	Maine shoreline	68º55.0'W		
NE2	43º29.6'N	68º55.0'W	25680	12881
NE3	44º04.4'N	67º48.7'W	25680	12320
NE4	44º06.9'N	67º52.8'W	25700	12320
NE5	44º31.2'N	67º02.7'W	25700	11957
NE6	Maine shoreline	67º02.7'W		

MID-COAST CLOSURE AREA November 1 through December 31		
Point	**Latitude**	**Longitude**
MC1	42°30.0'N	Massachusetts shoreline
MC2	42°30.0'N	70°15.0'W
MC3	42°40.0'N	70°15.0'W
MC4	42°40.0'N	70°00.0'W
MC5	43°00.0'N	70°00.0'W
MC6	43°00.0'N	69°30.0'W
MC7	43°15.0'N	69°30.0'W
MC8	43°15.0'N	69°00.0'W
MC9	Maine shoreline	69°00.0'W

Massachusetts Bay Closure Area March 1 through March 30		
Point	**Latitude**	**Longitude**
MB1	42°30.0'N	Massachusetts shoreline
MB2	42°30.0'N	70°30.0'W
MB3	42°12.0'N	70°30.0'W
MB4	42°12.0'N	70°00.0'W
MB5	Cape Cod shoreline	70°00.0'W
MB6	42°00.0'N	Cape Cod shoreline
MB7	42°00.0'N	Massachusetts shoreline

4.6.3 Closures to protect harbor porpoise

The Council may, at any time, modify, add or delete closures to sink gillnet gear to achieve the amendment objectives for protecting harbor porpoise using the framework adjustment procedure described in Section 4.12.

4.6.4 Closures to protect endangered whales

The Council has expanded the scope of the framework adjustment procedure to include area closures or other measures to enhance or protect those marine mammals with documented interaction with multispecies fishing gear (Section 4.12).

MAP 2 Area Closures

4.7 POSSESSION LIMITS

A commercial fishing vessel fishing in the EEZ must have a permit issued under the provisions of either Section 4.1.2 (limited-access permits) or Section 4.1.1.1 (Rod-and-reel/handline only, open access) to possess any of the 13 species managed under this plan. The current provision of the regulations that establishes a volumetric measure alternative for determining compliance with the possession limit (five standard totes) is eliminated, and compliance will be based solely on weight. Any species for which a possession limit is established must be segregated from other species on board to enable enforcement officers to determine compliance with the possession limit. A table at the end of this section outlines the possession limits pertaining to various vessel categories.

4.7.1 Haddock possession limit

Unless other restrictions apply, vessels may possess up to 1,000 pounds of haddock. Other restrictions may include, but are not limited to the regulated species possession limits under certified fisheries, possession-limit-only permits, and possession limits for scallop dredge vessels.

4.7.2 Possession limits in certified fisheries

Unless specifically excepted, possession of any or all of the ten regulated species is prohibited on vessels fishing in a fishery certified under the provisions of Section 4.3. Possession of non-regulated multispecies (silver hake, red hake or ocean pout) and any other species which are fished with mesh smaller than the regulated minimum size depends on a determination by the Regional Director of the bycatch of regulated species associated with fishing for such species. Possession of monkfish or monkfish parts is limited to ten percent of the total weight of fish on board. Possession of lobsters is limited to ten percent of the total weight of fish on board or two hundred lobsters, whichever is less. Possession of skates or skate parts in the Southern New England Regulated Mesh Area will be limited to ten percent of the total weight of fish on board.

4.7.2.1 Winter flounder exceptions for the Mid-Atlantic Regulated Mesh Area and for state waters

In the Mid-Atlantic Regulated Mesh Area, which is exempt from the requirement for fishery certification, permitted vessels may possess winter flounder up to ten percent of the total weight of fish on board, to a maximum of 200 pounds, when not fishing under their allocation of DAS. The current exemption program for vessels fishing in state waters with mesh smaller than the regulated minimum remains in effect and is not subject to the 200 pound possession limit.

4.7.2.2 White hake exception

Under the provisions of Section 4.3.2, the Regional Director may certify a white hake fishery, in which case the prohibition on possession of regulated species in certified fisheries will apply exclusive of white hake.

4.7.2.3 Exception for vessels fishing with 8-inch mesh or larger

Vessels fishing in fisheries certified under the provisions of Section 4.3.2, and fishing with 8-inch or larger mesh, may possess up to 300 pounds of regulated species. Mesh smaller than 8 inches must be properly stowed and not available for immediate use.

4.7.2.4 Exception for vessels 30-feet and under

Limited-access vessels 30-feet and under in total length that have elected not to enroll in the DAS program will be allowed to possess not more than 300 pounds of cod, haddock or yellowtail flounder combined. Possession of the seven other regulated species will not be limited at this time. Vessels fishing under the open-access rod-and-reel/handline permit are subject to the possession limit for that vessel category regardless of length (see Section 4.7.3.1). Vessels fishing under this exception are prohibited from possessing regulated species from March 1 through March 20 each year, corresponding to the 20-day block out of groundfishing required of vessels in the DAS program (to protect spawning fish).

4.7.3 Possession limits for exempted gears

4.7.3.1 Rod-and-reel/handline open-access permits

Vessels fishing under an open-access rod-and-reel/handline permit (Section 4.1.1.1) may possess up to 300 pounds of cod, haddock or yellowtail flounder. Possession of the seven other regulated species will not be limited at this time. Vessels fishing under this exception are prohibited from possessing regulated species from March 1 through March 20 each year, corresponding to the 20-day block out of groundfishing required of vessels in the DAS program (to protect spawning fish).

4.7.3.2 Possession limits for gears exempted under Section 4.9

Vessels fishing with gears which are exempt from the regulations of this FMP under the provisions of Section 4.9, are prohibited from possessing regulated species.

4.7.3.3 Scallop vessels fishing under their allocation of DAS

This section applies to combination vessels and vessels issued a Scallop Vessel Multispecies Permit issued under Section 4.1.2.3. Scallop vessels fishing under their allocation of DAS under the Atlantic Sea Scallop FMP (50 CFR 650) that are not otherwise prohibited may possess up to 300 pounds of regulated species. Scallop vessels (other than combination vessels fishing under their multispecies DAS) may not possess any haddock from January 1 through June 30.

VESSEL CATEGORY	POSSESSION LIMIT
A) Vessels not holding a limited-access permit, a rod-and-reel/handline permit, or a party/charter permit, other than recreational vessels	No possession of multispecies allowed
B) Exempt gears: pelagic hook and line; pelagic longline; hand gear (spears, rakes, diving gear, cast nets and tongs); harpoons; weirs; dipnets, stop nets, pound nets and other similar nets not used to catch groundfish; pelagic (drift) gillnets; pots and traps (includes lobster pots); purse seine; shrimp trawl (with a separator grate); clam dredge; midwater trawl	- No possession of regulated species allowed; - See category E for other multispecies limits
C) Limited-access vessels under days-at-sea	- Unlimited multispecies, except haddock (limited to 1,000 pounds)
D) Vessels exempt from days-at-sea (rod-and-reel/handline permits, and vessels 30 feet and under electing to not fish under days-at-sea)	- Cod, haddock and yellowtail limited to 300 pounds combined; - No limit on other multispecies, except during March 1 through March 20 when regulated species possession limit is zero;
E) Limited-access vessels not fishing under days-at-sea (must be in a certified fishery where regulated species bycatch is under 5%); includes vessels with Possession-limit-only permit	- No possession of regulated species allowed; - Possession of other multispecies may be allowed pending certification of fishery (under 5% bycatch); - Possession of monkfish or monkfish parts limited to 10% of total weight of fish on board; - Possession of lobsters limited to 10% of total weight of fish on board, maximum of 200 lobsters; - Possession of skates or skate parts in Southern New England Regulated Mesh Area limited to 10% of total weight of fish on board; EXCEPTIONS: - White hake may be allowed pending fishery certification; - Winter flounder: 200 pounds in Mid-Atlantic Regulated Mesh Area when vessel is not under days-at-sea (no certification of fisheries in this area); - Winter flounder under state waters exemption program possession limit determined by state regulations; - Regulated species: 300 pounds on vessels in certified fisheries using 8-inch or larger mesh;

VESSEL CATEGORY	POSSESSION LIMIT
F) Scallop vessels fishing under days-at-sea	- 300 pounds of regulated species; - No possession of haddock allowed January 1 through June 30;

4.8 MINIMUM FISH SIZE

No changes are proposed at this time.

4.9 EXEMPTIONS AND EXCEPTIONS

4.9.1 Generally exempted gears

Unless otherwise specified, vessels fishing with the following gears are exempt from the provisions of this FMP but they may only possess multispecies in accordance with the provisions of Section 4.7.3.2. These exemptions are subject to review and modification as necessary through the framework adjustment procedure described in Section 4.12. The exempted gears are: pelagic hook and line; pelagic longline; hand gear (spears, rakes, diving gear, cast nets and tongs); harpoons; weirs; dipnets, stop nets, pound nets and other similar nets not used to catch groundfish; pelagic (drift) gillnets; pots and traps (includes lobster pots); purse seine; shrimp trawls (with a separator grate); clam dredges; and midwater trawls. Midwater trawls are not exempt from the closed areas described in Section 4.6, but may be at some future time pending the analysis of observer data. The current prohibition fishing with on shrimp trawls in Area I, Area II and the Nantucket Lightship Area will continue.

4.9.2 Exceptions to the days-at-sea program

4.9.2.1 Vessels 30 feet and under in length

A limited-access vessel 30-feet and under in total length may be exempt from the requirement to enroll in a DAS program. If a vessel elects to participate in this exemption, it will be subject to the possession limit for regulated species described in Section 4.7.2.4. Vessels fishing under this exception are prohibited from possessing regulated species from March 1 through March 20 each year, corresponding to the 20-day block out of groundfishing required of vessels in the DAS program (to protect spawning fish).

4.9.2.2 Rod-and-reel/handline only vessels

Vessels fishing under a rod-and-reel/handline permit are exempt from the DAS program, however, they are subject to possession limits (Section 4.7.3.1) and gear restrictions (Section 4.5.6). Vessels fishing under this exception are prohibited from possessing regulated species from March 1 through March 20 each year, corresponding to the 20-day block out of groundfishing required of vessels in the DAS program (to protect spawning fish).

4.9.2.3 Large-mesh vessels

A vessel fishing with gillnets whose mesh is seven inches or larger throughout the year, or a mobile-gear vessel fishing with 8-inch-minimum diamond mesh throughout the year, will be allocated additional DAS. In the first year of this plan, Fleet DAS vessels will be allocated 155 DAS and in the second year 120 DAS. Individuals DAS vessels will be allocated an additional 12 percent of their DAS in the first year and 36 percent in the second year, equivalent to the increases allocated to Fleet DAS vessels. Allocations in future years will be established through the framework adjustment procedure. The Council recognizes the difference in selectivity characteristics between trawl and gillnet gear in setting different minimum mesh sizes to qualify

for this exemption. Vessels fishing under this exception are still required to take a 20-day block out of groundfishing during the March-May spawning period. Mobile-gear vessels fishing under this exception are prohibited from having on board mesh smaller than the required 8-inch diamond.

4.9.2.4 Possession-limit-only permit

A vessel fishing under a possession-limit-only permit (Section 4.1.2.2) is exempt from the DAS program.

4.9.3 Exemptions from area closures

With the exception of midwater trawl vessels, vessels fishing with the gears listed in Section 4.9.1 are exempt from the area closures (see Map 2). Recreational vessels fishing for groundfish, including party/charter vessels are exempt from the Nantucket Lightship area closure and the three proposed closures in the Gulf of Maine (Section 4.6.2), but are prohibited from fishing in Area I and Area II. In the future, the Council will consider the application of area closures to recreational fishing on a case-by-case basis.

4.9.4 Exemptions from mesh regulations

Current small-mesh exemptions remain in effect, see Map 1. Modifications and additional exemptions are listed below.

4.9.4.1 Nantucket Shoals Dogfish fishery

Based on the results of experimental fisheries conducted in 1994 and 1995 (see Appendix IX) vessels will be allowed to fish for dogfish in the vicinity of Nantucket Shoals with mesh smaller than the regulated minimum size under the following conditions:

Gear: Vessels will use no ground cables; the upper and lower trawl legs (bridles) will be less than 60-feet long and composed of bare wire linking the trawl wings directly to the door; vessels will use 10-inch or smaller rockhopper-style rollers on the footrope without chain (to minimize digging); vessels may make extensive use of floats on the headrope to increase the vertical rise of the net;

Season: June 1 through October 31

Species: Vessels may only fish for dogfish. The vessel, if in possession of the appropriate federal and/or state permits is allowed to retain and land a bycatch of longhorn sculpin, monkfish or monkfish parts (provided the weight of the monkfish does not exceed ten percent of the total weight of fish possessed on board), lobster (provided the weight of the lobster does not exceed ten percent of the total weight of fish on board or two hundred lobsters, whichever is less), and/or skates or skate parts (provided the weight of skates does not exceed ten percent of the total weight of fish possessed on board).

Area: (see Map 1) within the area bounded by lines connecting the following points (the area that overlaps the Area I closure remains closed) :

	Latitude	Longitude
NS1	41°45'N	69°20'W
NS2	41°30'N	69°20'W
NS3	41°30'N	69°23'W
NS4	41°26.5'N	69°20'W
NS5	40°50'N	69°20'W
NS6	40°50'N	70°00'W
NS7	41°45'N	70°00'W

(NOTE: The boundary intersects the southern shore of Nantucket Island at 70°00'W and continues northward from the northern shore of Nantucket to Monomoy, the boundary begins again where the line, 41°45'N intersects the shore of Cape Cod)

4.9.4.2 Skates in the Southern New England Regulated Mesh Area

Vessels fishing with mesh smaller than the regulated minimum size in the Southern New England Regulated Mesh Area (Map 1) may possess skates or skate parts up to ten percent of the total weight of fish on board.

4.9.4.3 Small-mesh Area 1 season

Small-mesh exemption Area 1 (Map 1, in the vicinity of Ipswich Bay) is currently open through November 30. Under the provisions of this amendment, the closure of the Mid-coast area (Map 2) begins November 1. This closure supersedes the opening of Area 1, which will now extend through October 31.

4.10 MANDATORY DATA REPORTING

4.10.1 Catch/landings data

Continue current regulations.

4.10.2 Effort data

Continue current regulations.

4.11 RECREATIONAL FISHERY MANAGEMENT

4.11.1 Statement of objectives for management of recreational fishing

The Council intends to provide reasonable and regulated access to the groundfish species covered in this plan to all citizens of the United States for personal use and recreational purposes during the stock-rebuilding period without compromising the Amendment 7 objectives or timetable. If necessary, these provisions could be modified in the future to insure that the overall plan objectives are met.

4.11.2 Declaration into the fishery by party and charter vessels

A vessel will be required to declare into and out of the party/charter fishery. Upon declaring into the party/charter fishery, a vessel will be considered a party/charter vessel until it declares out of the fishery. Declaration will be for a minimum of one full day and be accomplished by using the

current call-in system used by commercial vessels in the DAS program. While in the fishery, the vessel would be subject to the rules for the party/charter category, including the no-sale provision.

4.11.3 Recreational fishery management measures

4.11.3.1 Minimum fish size

The minimum fish size for cod and haddock will be 20 inches in the first year of the plan and 21 inches in the second year for all recreational fishermen, including anglers on party/charter vessels. Minimum fish sizes for other species will be the same as for commercial vessels.

4.11.3.2 Bag limit for cod and haddock

Private recreational anglers, that is, those not fishing on party/charter vessels, will be limited to a possession of not more than ten fish (cod and haddock combined).

4.11.3.3 Prohibition on sale of recreational caught fish

The sale of fish caught by recreational anglers (private or party/charter) is prohibited at any time, and by party/charter crew and vessels when declared into the party/charter category under the provisions of Section 4.11.2.

4.11.3.4 Gear restrictions

Recreational anglers, including those on party/charter vessels will be limited to two hooks per line and one line per angler.

4.11.3.5 Area closures

Current area closures and exemptions for recreational vessels fishing for regulated species will continue (prohibited in Area I and Area II, exempt from Nantucket Lightship Closed Area, see Map 2). Recreational vessels will be exempt from the area closures proposed in Section 4.6.2 for the Gulf of Maine. In the future, the Council will consider the application of area closures to recreational fishing on a case-by-case basis.

4.11.3.6 Framework adjustment procedure

The Council may modify, add or delete recreational fishery management measures using the framework adjustment procedure described in Section 4.12. The measures that may be adjusted include, but are not limited to bag limits, time/area closures, minimum fish size, and gear restrictions.

4.12 FRAMEWORK ADJUSTMENT PROCEDURE

The existing framework adjustment procedure will remain in effect with the following modifications. The modifications pertain to the setting and review of the target TAC and management measures to achieve the conservation objectives of the plan, and to the procedure for evaluating controlling harbor porpoise bycatch. The framework procedure is also expanded to include area closures or other appropriate measures to enhance or protect those marine mammals with documented interaction with multispecies fishing gear.

4.12.1 Multispecies Monitoring Committee

The Council will establish a Multispecies Monitoring Committee (MMC) consisting of technical staff from the New England and Mid-Atlantic Fishery Management Councils, the NMFS Northeast Regional Office, the Northeast Fisheries Science Center, the United States Coast Guard, a representative of the fishing industry selected by the Council chairman, and representatives from affected coastal states appointed by the Atlantic States Marine Fisheries Service. Affected coastal states include the five New England states as well as New York and New Jersey. The staff of the New England Council will chair the meetings. The MMC will meet at least annually, but may meet more frequently or as needed. References in the regulatory language to the PDT will be replaced with the "Multispecies Monitoring Committee" whose function is to monitor the current plan and develop options for framework adjustments such that the plan continues to meet its objectives. The role of the PDT is to provide technical support to the Groundfish Committee in the development of fishery management plans or amendments, such as proposed actions to develop a management plan for whiting or to allow consolidation of DAS.

4.12.2 Annual review and adjustment

The annual review and adjustment procedure will involve four steps as outlined below.

<u>STEP 1</u> Development of target TACs and adjustment options

The MMC will meet on or before November 15 of each year to develop options for Council consideration on the target TACs, DAS allocations and other measures for the upcoming fishing year (which begins on May 1). The MMC will review available data pertaining to: catch and landings; DAS and other measures of fishing effort; stock status and fishing mortality rates; enforcement of and compliance with management measures; and any other relevant information. Data will be provided primarily by NMFS, but the MMC may also consider data provided by the states, ASMFC, the USCG and other sources.

The target TACs will be based on the fishing mortality rate objectives of the FMP for cod, haddock and yellowtail flounder, and to maintain current potential yield for the seven other regulated species. Current potential yield is based on the application of a fishing mortality rate for each species component of the aggregation that will stabilize the stock at current levels.

The MMC will review the data and develop options, which may include a preferred option, to achieve the plan objectives. The range of options may include any of the management measures in the plan including, but not limited to: DAS, possession limits, area closures, gear restrictions including limits on the numbers of gillnets per vessel, permitting restrictions, minimum fish sizes, recreational fishery management, exemptions, and monitoring and reporting requirements. The MMC may review the performance of different user groups or fleet sectors in developing recommendations. The MMC must demonstrate through analysis and documentation that the options it develops are expected to meet the plan objectives

<u>STEP 2</u> Council review and recommendation

The Council will meet as soon as practicable after the MMC recommendations are distributed. The Council may delegate the Groundfish Committee to conduct an initial

review of the options developed by the MMC. The committee will review the all of the options developed by the MMC and any other relevant information, consider public comment and make a recommendation to the Council. The Council will review the options developed by the MMC and, if applicable, committee recommendations and consider public comment.

STEP 3 Submission of the recommendation

If the Council submits a recommendation to the Regional Director after one meeting, and the public has been given sufficient opportunity to review and comment on the proposals, the Regional Director will publish the adjustments in the Federal Register as a proposed rule. In this case, the Council will submit its recommendation to the Regional Director by January 7 of each year (provided the fishing year remains on a May 1 start basis). Included in the recommendation will be supporting documents, as required, concerning the environmental and economic impacts of the proposed action. The *Federal Register* notification of proposed action will provide for a 30-day public comment period.

If two meetings are needed to finalize a proposed action, the second meeting will be held in sufficient time to complete the documentation and submit a framework adjustment by February 1. In this case, the Council will submit the document with a recommendation and justification to publish the adjustment as a Final Rule (consistent with the current framework adjustment process). If the Regional Director determines that a Proposed Rule is needed and as a result the effectiveness date of the rule falls after May 1, any DAS used after May 1 will be counted against the next year's allocations.

STEP 4 Regional Director review and publication of the rule

The Regional Director will review the Council's recommendations, including the supporting analysis, and publish the appropriate proposed or final rule within 30 days of the Council's submission. In either case, the notice of final rule including target TACs, DAS allocations and other measures shall be published in the *Federal Register* on or about April 1 with the exception noted in Step 3. The Regional Director may accept or reject the Council's recommendation, including the recommendation to publish as a final rule. If the Council fails to submit a recommendation to the Regional Director by February 1 that meets the FMP objectives, the Regional Director may publish as a proposed rule one of the MMC options put forth by the Council.

4.12.3 Harbor porpoise bycatch monitoring and adjustment

The Harbor Porpoise Review Team (HPRT) established by Amendment 5 will perform the functions of both the Plan Development Team (PDT) and the Multispecies Monitoring Committee (MMC) with respect to issues related to the bycatch of harbor porpoise. The following language modifies the HPRT procedures contained in the current regulations.

50 CFR 651.32(b): Framework adjustment (1) At least annually the Regional Director will provide the Council with the best available information on the status of Gulf of Maine harbor porpoise including estimates of abundance and estimates of bycatch in the sink gillnet fishery. Within 60 days of receipt of that information, the Council's Harbor Porpoise Review Team shall complete a review of the data, assess the adequacy of existing regulations, evaluate the impacts of other measures that reduce harbor porpoise take and, if necessary, recommend additional measures in light of the Council's harbor porpoise mortality reduction goals. In addition, the

HPRT shall make a determination on whether other conservation issues exist that require a management response to meet the goals and objectives outlined in the FMP. The HPRT shall report its findings and recommendations to the Council.

(2) After receiving and reviewing the HPRT's findings and recommendations, the Council shall determine whether adjustments or additional management measures are necessary to meet the goals and objectives of the FMP. If the Council determines that adjustments or additional management measures are necessary, or at any other time upon consultation with the HPRT, it shall develop and analyze appropriate management actions over the span of at least two Council meetings.

(3) The Council may request at any time that the HPRT review and make recommendations on any harbor porpoise take reduction measures or develop additional take reduction proposals.

(4) The Council shall provide the public with advance notice of the availability of the proposals, appropriate rationale, economic and biological analyses and opportunity to comment on them prior to and at the second Council meeting. The Council's recommendation on adjustments or additions to management measures must come from one or more of the categories listed in Section 4.12.2.

5.0 UPDATED DESCRIPTION OF THE RESOURCE

5.1 Description of the stocks under the FMP

See Section E.6.3.2.

5.1.1 Life histories and habitat requirements

See Section E.6.3.2.1.

5.1.2 Stock status

See Section E.6.3.2.2.

5.2 Description of the habitat

5.2.1 Habitat requirements

See Section E.6.3.2.1.

5.2.2 Habitat conditions

See Section E.6.0., "Affected Environment", generally,

5.2.3 Habitat threats

See Sections E.6.4.4 and E.6.4.5 for a discussion of the impacts of human activity, fishing and other activity, respectively, on the environment.

5.2.4 Habitat information needs

The Council proposes no change to this section as discussed under Amendment 5.

5.2.5 Habitat conservation policy and programs

The Council proposes no change to this section as discussed under Amendment 5.

5.2.6 Habitat recommendations

The following section contains a revised version of the habitat recommendations contained in Amendment 5.

Under the MFCMA, the Regional Fishery Management Councils have the responsibility not only to prepare fishery management plans, but to address habitat requirements, describe potential threats to habitat and recommend measures to conserve those habitats critical to the survival and continued optimal production of managed species. The National Marine Fisheries Service (NMFS) Habitat Conservation Policy (48 CFR 53142-53147), and specifically Implementation Strategy 3, provides the basis for a partnership between NMFS and the Councils to assess habitat issues.

The Magnuson Act, however, limits the Council's role to commenting on proposals that would affect fishery resources and their habitats, although that role may expand considerably with the 1996 reauthorization of the Act. Decisions on such projects rest principally with the Army Corps of Engineers (ACOE), the Environmental Protection Agency (EPA) and NMFS. Other federal agencies, including the U.S. Fish and Wildlife Service and the U.S. Coast Guard are also involved in this process. For the Council to effectively manage fishery resources, more cooperative relationships should be fostered between managers and other habitat protection agencies.

In addition to habitat protection in the EEZ, protection for coastal habitats also is essential because of its role at some point in the life cycle of all inshore and most offshore species. For

example, the condition of offshore resources may be compromised when forage species (which may depend on coastal habitats) are reduced as a consequence of degradation of the inshore environment. Because of the link between habitat quantity and quality and fishery production, the Council is concerned about impaired habitat quality and committed to assuming an active role in habitat protection.

Specifically with respect to Northeast groundfish resources, the following recommendations address habitat loss and degradation as mandated under federal law, including the Magnuson Act, Fish and Wildlife Coordination Act, Clean Water Act, Endangered Species Act, Marine Mammal Protection Act, Marine Protection, Research and Sanctuaries Act, Section 10 of the Rivers and Harbors Act, Oil Pollution and Control Act, Comprehensive Environmental Resources Compensation and Liability Act, Coastal Zone Management Act, Federal Power Act and others.

The recommendations are listed in the order in which each issue appears in Section E.6.4, Affected Environment, of the DSEIS.

1) Impacts of Mobile Fishing Gear

No systematic studies exist of definitive scale or over a series of bottom types to evaluate their consequences. The Council recommends that studies be undertaken which focus on the scale of trawling activities and the potential cumulative impacts on fisheries habitat, especially as it affects the early life stages of groundfish species.

The best available information indicates loss of vital bottom ecosystems in specific seabed areas. This may place an unnecessary burden on the normal life functions of many species and their food base, and could threaten the recovery of managed stocks. These areas of critical concern should be identified and the use of intrusive gear investigated, and if necessary, restricted or prohibited.

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2) Contaminants

Contaminants can impact the feeding ecology of groundfish by diminishing food species abundance and availability. Accumulations of some contaminants can also impair groundfish reproductive capability, growth and survival thereby reducing population fitness. The Council requests EPA to consider the impacts of contaminants on groundfish production, both in terms of effects on physiological processes and feeding ecology (e.g. impairments to forage species).

a) The EPA's Water Quality Criteria Series should be used as guidelines for determining concentration levels of toxic substances in wastewater discharges harmful to groundfish stocks prior to permitting or renewing a permit for any potential discharge. Project proponents should be required to address the full range of impacts through the preparation of an Environmental Impact Statement.

b) The Council requests that EPA re-evaluate their water quality criteria to specifically consider impacts to groundfish resources and to the marine ecosystem.

c) The Council strongly urges EPA to evaluate and monitor the effects of the expected accumulation of toxins and sedimentation from the effluent at the Massachusetts Water Resources Authority Boston Harbor outfall project to determine whether there may be

impacts to groundfish resources in Massachusetts Bay, Stellwagen Bank and other sites.

d) Because of the numerous discharges in the Gulf of Maine and coastal water bodies, the Council suggests that EPA undertake a study to determine the cumulative impacts of ocean discharges and disposal on groundfish resources. All discharges should meet Clean Water Act criteria.

3) Effects of Nutrient Over-Enrichment

a) The Council urges the EPA and the ACOE to continue to evaluate the effluent from the discharge at the MWRA outfall location and the added effects of existing discharges in the Gulf of Maine to determine the potential for causing red tide or other toxic algal blooms.

b) Because the dumping of fish waste can provide enrichment that could trigger the growth of undesirable organisms such as those which cause paralytic shellfish poisoning (PSP), the Council recommends that EPA not allow the disposal of fish waste in any area, including state waters, that are actively fished. In those areas where disposal may be permitted, the proponent should be required to comply with conditions already developed by the EPA, NMFS and through state regulations.

4) Dredging and Ocean Disposal

a) The Council recommends that EPA/ACOE continue to review their present management practices of permit by permit review for determining the disposition of dredged material disposal and consider the broader issue of regional dredged material disposal management. This requires an examination of alternatives to open water disposal of contaminated dredged materials which would isolate or neutralize the effects of such materials. The Council recognizes that some of the possible dredged material management alternatives will require considerable studies and finances. Nonetheless, an effort to start airing questions of feasibility and public acceptance should begin immediately.

b) The Council strongly urges that EPA/ACOE utilize the most environmentally productive dredging techniques available and practical. This, at a minimum, should include no barge overflow, closed bucket clamshell (unless a more protective dredging system is used) and consideration of both seasonal and current (tidal) influences to minimize both the extent of the contaminated plume and exposure of the groundfish resources which could be at risk.

c) The Council recommends that EPA/ACOE control the selection of dredge disposal sites to protect vital fish habitats and to ensure both marine and estuarine water quality.

d) The Council recommends that EPA/ACOE impose time of year restrictions on dredging and disposal operations to avoid/minimize impacts to groundfish species. Specifically, restrictions should be imposed in areas utilized for migration, spawning, feeding or other activities critical to the continued survival of groundfish species.

e) The Council recommends allowing ocean disposal only if it is demonstrated that there is no practicable alternative with less impact on the total environment.

5) Coastal Habitat Loss

a) The Council recommends that all appropriate federal resource regulatory agencies

aggressively discourage filling of wetlands and shallow water habitats. Mitigation or compensation measures should be employed where filling is unavoidable. In such cases we recommend that EPA/ACOE require that proponents employ sequencing methods to determine the need to fill aquatic habitat. Filling should be permitted only for water dependent projects found to be in the public interest where no feasible alternative is available. Project proponents should be required to address the full range of impacts on groundfish stocks, their habitats, or food sources which may be associated with project implementation. Project proponents also must demonstrate that project implementation will not negatively affect groundfish resources, their habitats or their food sources.

b) The Council recommends that the ACOE establish a compliance program to monitor coastal construction projects to ensure that they are completed as specified, and that mitigation is successfully completed or adjusted to prevent the occurrence of net habitat loss and related loss of vital wetland functions.

6) Research to Support Fishery Habitat Protection

Research projects will provide the information on natural and altered ecosystems necessary to manage important aquatic habitats and will establish appropriate water quality criteria that considers the viability of groundfish resources. Objectives should be:

a) To develop a basic understanding of the status of groundfish populations and their habitat requirements. In order to establish this, research needs to be conducted to determine which habitats are most important to support groundfish stocks throughout their life history stages and to understand factors essential for sustained fisheries production. In addition, the relationship between offshore groundfish stocks and inshore coastal resources needs to be determined. This would include linking spawning strategies to benthic habitat that support juvenile stages of major groundfish species and identifying food chain connections.

b) To determine the biological and chemical effects of habitat degradation on groundfish populations and associated habitats and provide a sound scientific basis for habitat management and environmental impact assessments, (e.g. the effects of physical and chemical modifications of the habitat on groundfish resources).

c) To investigate the individual and cumulative impact of specific human activities on the viability of groundfish stocks and make recommendations on how to avoid or minimize the impact of these actions.

d) To identify key geographical areas of critical importance in the life cycle of groundfish stocks or their prey for special protection and consideration by regulatory agencies.

e) To assess the effects of closed areas on benthic habitat absent the effects of mobile fishing gear.

6.0 UPDATED DESCRIPTION OF THE FISHERY

6.1 The northeast multispecies fishery

See generally Section E.6.0, Affected Environment.

6.2 The harvesting sector

See Section E.6.4.1.1.

6.3 The processing sector

See Section E.6.4.2.

6.4 The recreational sector

See Section E.6.4.1.2.

6.5 The social and cultural framework of the fisheries

See Section E.6.4.3.

6.6 Safety considerations

See Section E.6.4.3.4.

6.7 Existing management framework

6.7.1 Applicable federal laws and regulations

The Council's authority and responsibility to develop fishery management plans (FMPs) is established by the Magnuson Fishery Conservation and Management Act (MFCMA). Section 303 (a) (1) of the MFCMA requires the FMP to contain the conservation and management measures which are necessary and appropriate to prevent overfishing, and to protect, restore, and promote the long-term health and stability of the fishery, consistent with the national standards (described in Section 301), other provisions of the MFCMA, regulations implementing recommendations by international organizations in which the United States participates, and any other applicable laws. The conservation and management measures proposed in this amendment are described in Section 4.0 while the following section describes and discusses other applicable law.

6.7.1.1 Other applicable laws

A number of federal statues and executive orders apply to the development of FMPs, including the following:

APA- Administrative Procedures Act
CZMA- Coastal Zone Management Act
E.O. 12866- determination of "significant" rules
ESA- Endangered Species Act
MMPA- Marine Mammal Protection Act
NEPA- National Environmental Policy Act
PRA- Paperwork Reduction Act
RFA- Regulatory Flexibility Act
E.O. 12612- executive order on federalism
E.O. 12630- order on interference with constitutionally protected property rights
E.O 12498- order on regulatory planning process
E.O. 12778- order on civil justice reform.

The requirements of these laws with respect to analysis or other action in the development or implementation of the amendment are discussed in Section 8.0 (NEPA) and Volume IV. The relationship of this FMP to state laws is discussed in Section 6.7.2. The relationship to international treaties and agreements is discussed in Section 6.7.3.

6.7.1.2 Other Fishery Management Plans

In addition to the Northeast Multispecies FMP, there are currently twenty one management plans for fisheries in the northeast which may directly or indirectly be affected by the measures proposed in this plan. The New England Fishery Management Council (NEFMC), Mid-Atlantic Fishery Management Council (MAFMC), National Marine Fisheries Service (NMFS) and Atlantic States Marine Fisheries Commission (ASMFC) are the management bodies with regulatory authority of these fisheries. In addition to the managed fisheries, a number of unregulated fisheries exist in the region although management plans are in development for some of these. A complete list and status of all commercial fisheries in the region is provided in the Environmental Impact Statement, section E.6.3.3 , "Other Stocks", and a discussion of the impacts in section E.7.1.1.2, "Impacts on other fisheries."

The following management plans are in effect in the northeast:

NEFMC:
Atlantic sea scallops
American lobster
Atlantic sea herring
Atlantic salmon

MAFMC:
Squid-mackerel-butterfish
Surf clam-ocean quahogs
Bluefish (joint with ASMFC)
Summer flounder (joint with ASMFC)

ASMFC:
Striped Bass
Northern Shrimp
Winter flounder (vessels not holding federal permits)
Summer flounder (joint with MAFMC)
Bluefish (joint with MAFMC)
Weakfish
Shad-river herring
Spanish mackerel (joint with SAFMC)

NMFS:
Atlantic swordfish
Atlantic billfish
Atlantic sharks
Atlantic bluefin tuna (not an FMP but managed by NMFS under the Atlantic Tunas Convention Act, PL 96-339)

For most of the plans listed above, the relationship to this FMP is indirect and is based on the potential displacement of fishing from groundfish to another fishery. This relationship is discussed in the SEIS under section E.7.1.1. The proposed action also contains measures which directly affect vessels fishing under other FMPs. Vessels fishing for other species may be affected by the regulations in this plan if there is a significant (>5%) bycatch of regulated species. In such cases, vessels may be prohibited from fishing, or may be required to use specific gear to reduce the groundfish bycatch, such as the shrimp separator grate.

6.7.1.3 National standards

Consistency with the national standards are discussed below:

1) *Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.*

   The definitions of overfishing adopted by the Council establish harvest levels consistent with federal guidelines (50 CFR 602.11). Overfishing definitions are based on the minimum spawning stock biomass per recruit needed for the stock to maintain itself at long-term average levels (see Appendix I, Conceptual Basis of the Management Plan). In other words, the definitions set minimum levels below which the risk of recruitment failure is high. As

discussed in Section 2.2, current spawning stock sizes are at or near record-low levels, and considerable uncertainty exists with respect to the ability of the stocks to produce sufficient recruitment to sustain themselves at current rates of fishing, or even at the level of the overfishing definition.

The fishing mortality rate at the level of the overfishing definition is higher than that which will produce the maximum sustainable yield from the stocks. Under this management approach, optimum yield is not a specific harvest level but a range of acceptable harvest levels between the maximum sustainable yield and the yield generated at the threshold level defined by the overfishing definitions. With the proposed action, the Council intends to increase spawning stock sizes, and to increase the yields at given fishing mortality rates. The Council views optimum yield, therefore, as a level significantly above the yield from the current stock sizes fished at the maintenance level prescribed by the overfishing definition. Furthermore, increasing spawning stock sizes to minimum acceptable levels will improve the long-term stability of the stocks and the long-term sustainability of the fishery.

Federal guidelines provide that in the case of a mixed fishery, some minor components may be fished at a rate which exceeds the overfishing threshold if the major components are fished at an optimum level. In the northeast multispecies fishery, all the major components (the stocks of cod, haddock and yellowtail flounder) are overfished. The remaining stocks are also overfished or fully exploited. The proposed action is based primarily on a days-at-sea program which treats the multispecies complex as a unit, and applies specific measures to each stock as needed. The Council will use multispecies target TACs to monitor shifts in effort as a result of the proposed action.

2) *Conservation and management measures shall be based upon the best scientific information available.*

In developing this amendment, the Council used information provided by the Stock Assessment Workshops (SAW) as well as analyses conducted by the Council staff and the Groundfish Plan Development Team using data collected by NMFS. See section E.6.1.1, Data Considerations, for a discussion of the databases that were used, and more generally, section E.6.0, Affected Environment, for the scientific information that formed the basis of the plan. Wherever appropriate, published scientific literature was referenced. Appendix III contains a complete list of references.

This amendment is based on information provided to the Council by the SAW following the submission of Amendment 5 in 1994, and particularly the Special Advisory issued after SAW 18 (Appendix II). From the fall, 1993 to the present, the SAW reviewed the following multispecies stocks:

SAW 17	Fall 1993	Southern New England yellowtail flounder silver hake
SAW 18	Spring 1994	Georges Bank cod Georges Bank yellowtail flounder witch flounder
SAW 19	Fall 1994	Gulf of Maine cod white hake
SAW 20	Spring 1995	Georges Bank haddock
SAW 21	Fall 1995	winter flounder

(plenary 1/96) multispecies complex.

As indicated in Section E.3.3, data quality and whether the data used by the Council is sufficiently up-to-date are controversial subjects. Some explanation for the data-availability situation is provided in Section E.6.1.1. Public criticism notwithstanding, the Council is acting on the best scientific information available which indicates long-term declining trends in abundance and yields and record-low abundance levels for the most important stocks in the multispecies fishery.

Efforts are underway to improve the data collection and analytical capabilities of the scientific component of the management system. Amendment 5 established a mandatory logbook system for landings and effort data collection. This system relies on the participation and compliance of the dealers and vessel owners. The Northeast Fisheries Science Center initiated a winter bottom trawl survey, now in its fourth year, designed specifically to improve the fishery-independent data for flounders over that which is obtained in the regular spring and fall surveys.

3) *To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or inclose coordination.*

The regulations proposed in this amendment apply throughout the range of the stocks managed under the FMP. In some cases, however, the NEFMC has considered regional differences (for example, mesh-size regulations in the Mid-Atlantic region and in state waters when fishing for winter flounder under certain conditions) in applying regulations.

The ranges of some of the stocks managed under this FMP extend across the U.S.-Canada maritime boundary. See Section 6.7.3 for a discussion of Canadian management and U.S.-Canada cooperation.

4) *Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.*

The measures in the Multispecies FMP or in this amendment do not explicitly or directly discriminate among residents of different states. Indirectly, however, some measures might result in regional differences of fishing privileges or have short-term effects on specific areas (for example, near-shore area closures). The Council is applying these measures on the basis of the overriding conservation objectives of the plan, and not with the intent of allocating among regions.

The amendment does allocate fishing privileges among different groups of vessels in ways other than by region. The moratorium allocates fishing privileges to those individuals who currently own qualifying vessels, although it does not prohibit any individual from purchasing a qualifying vessel (and its permit). The effort reduction program allocates fishing time to vessels in one of two ways: either based on the individual history or based on the average fleet history. Those vessels with more groundfishing time during the effort-allocation baseline period will have larger individual allocations. The Fleet DAS system results in an allocation of impacts proportional to a vessels actual history of fishing for groundfish. The Council has spent considerable effort to develop alternatives that are fair and equitable under the circumstances mandated by the conservation objectives of the plan.

5) *Conservation and management measures shall, where practicable, promote efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.*

The overfished and depressed condition of the multispecies fishery addressed by this amendment is to a great extent caused by an excess of fishing capacity relative to the capability of the resource to sustain that level of effort. The overcapacity and declining resource trend represent an inefficient utilization of the nation's fishery resources. Generally, the rebuilding of the stocks under this amendment and the moratorium on new vessel permits will work together to address this situation and result in a more sustainable fishery.

Specific measures have been designed to promote efficiency where possible under the conservation objectives of the plan, while in other cases, the conservation objectives override. Gear restrictions, such as large mesh or square mesh, and possession limits arguably do not promote vessel efficiency, but are necessary to control juvenile mortality or to discourage effort directed on a specific species but they may promote overall, long-run economic efficiency by improving the balance between fishing power and fish stocks. On the other hand, the Council's decision to eliminate the layover-day requirement, for example, will promote efficiency in the use of groundfish effort allocations by individual vessels.

6) *Conservation and management measures shall take into account and allow for variations among, and contingencies in fisheries, fishery resources, and catches.*

Each specific measure designed to meet the extremely restrictive conservation objectives of this amendment results in disproportional impacts on different fisheries. Wherever practicable, the Council has considered differences in fisheries and gear types in the development of proposed regulations. However, the Council has had to balance these considerations with the "fair and equitable" standard. The Council has indicated that under the target TAC/framework system it will consider the performance of different gear groups or fisheries in making adjustments.

7) *Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.*

The Council has considered the costs of and need for the regulations in this amendment consistent with its long-standing policy of minimizing the burden of regulation on the industry. Nevertheless, the Council cites the extremely dire condition of the resource as justification for the measures proposed in this amendment. To the extent they are predictable, the costs and benefits, including the administrative costs, have been provided to the Council for consideration in the development of the final proposals. The analyses and discussion of impacts relevant to this standard are contained in Sections E.7.2 (economic impacts) and E.7.3 (social impacts), and 8.3 (regulatory flexibility analysis).

6.7.2 Federal-state relationships

Federal fisheries permit holders fishing in state waters must adhere to federal fisheries regulations unless the state regulations are more restrictive or unless the vessels are explicitly exempted. Under this FMP, federally permitted vessels may fish in state waters with mesh smaller than the regulated minimum size and retain more than the possession limit of winter flounder if certain conditions are met. Most important of those conditions is that the state has a Winter Flounder management plan that is consistent with, and approved by ASMFC. The

rationale for this exemption is that, although specific state regulations (mesh size, for example) may be less restrictive than the corresponding federal regulation, the overall set of regulations are designed to meet a more restrictive fishing mortality objective. Currently, the states of Connecticut, New York and New Jersey participate in this exemption program. The compliance criteria in the ASMFC Winter Flounder FMP are that states must (1) implement and approved plan to achieve a minimum 30%MSP, and (2) to report to ASMFC concerning habitat protection efforts with other in-state agencies. All states are currently in compliance with the ASMFC Winter Flounder FMP.

6.7.2.1 State Laws for Groundfish and Groundfish Gear

MAINE

Gear restrictions: There is a 6-inch minimum mesh size for trawls, Scottish seines, sink gillnets and midwater trawls. Regulations exist regarding the placement of stop seines and fish weirs. Additional gear/season restrictions for specific locations are detailed in Department of Marine Resources regulations.

Area closures: There is a groundfish spawning closure in Booth Bay and Sheepscot Bay from May 1 - June 30.

Seasons: See above.

Licenses: A commercial license is required for the harvest, transport and sale of fish that are not for personal use: $33 for individual, resident operators; $89 for resident operator with crew; and $334 for nonresident operator and crew. No license is required for fish taken with hook and line for personal use. There is no recreational license except for Atlantic salmon.

Other: Nonresidents are required by law to report to the Bureau of Marine Patrol when fishing for groundfish in territorial waters, and to provide information on gear and catch.

NEW HAMPSHIRE

Gear restrictions: The minimum mesh size for gillnets and mobile gear is 6 inches to take, transport or possess cod, haddock, or yellowtail flounder. No mobile gear may be used to take finfish in New Hampshire state waters.

Area closures: See above.

Seasons: See above.

Licenses: Resident commercial saltwater fishing license ($26) is required. There is no sport fishing license. A $200 minimum commercial license fee is required for nonresidents.

MASSACHUSETTS

Gear restrictions: The following minimum mesh sizes apply for mobile gear:
In all state waters north 6-inch mesh is required for otter trawls. Regulations pertaining to small-mesh trawl fisheries for whiting and dogfish have been adopted that complement federal rules, especially north of Cape Cod in Gulf of Maine waters.

South of Cape Cod to the Rhode Island border, seasonal exemptions apply to the 6-inch mesh requirement. Trawlers permitted to fish for *Loligo* squid during April 23 - May 31 are allowed to use unrestricted mesh. From June 1 - October 31 vessels targeting scup may use small mesh measuring at least 4½ inches. For either of these fisheries vessels may not possess more than 100 pounds of flounders (any species in combination).

Footrope roller gear may not exceed 18-inch diameter.

Gillnets may not exceed 2,400 feet and the mesh used must be not less than 6 inches (stretched measure).

Area closures: All waters closed to night trawling (November 1 - end of February: 6 PM - 6 AM; March 1 - October 31: half hour after sunset to a half hour before sunrise). Buzzards Bay is closed to netting year round. All nearshore bays, estuaries and salt ponds are closed to netting year round. Gillnetting is prohibited in all waters south of Cape Cod April 1 - November 15. There are numerous specific seasons and locations where trawl and/or other net gear is prohibited. State waters gillnet closures have been adopted that complement federal closures to protect harbor porpoise.

Seasons: See above.

Licenses: Mobile gear fishing licenses limited to those vessels that held a permit in 1994 and are 72 feet or less in total length. Sink gillnet licenses are limited to those who held a permit during 1992.

Resident Commercial: vessel license ranges from $130 - $260 depending on length; a license for individuals is $65. Nonresident commercial: vessel license ranges from $260 - $520 depending on length; a license for individuals is $130. There is no sport license for fish caught for personal use. A license to sell fish with hook and line is $35 for residents ($100 for nonresidents), and applies to any individual selling fish.

RHODE ISLAND

Gear restrictions: Trawling is prohibited in the upper portion of Narragansett Bay from November 1 - July 1. The minimum cod end mesh size is 5 inches in the upper one-half of Narragansett Bay and the entire Sakonnet River during the period November 1 - February 28. There are numerous gillnet

regulations by geographic area, including the requirement that al l bottom tending gillnets have a mesh size of at least five inches stretched. In the waters between one-half nautical mile and three nautical miles of the Rhode Island coast during the period November 1 through March 1, the minimum mesh size for bottom tending gillnets shall be 5 1/2 inches stretched. Gillnets set in Narragansett Bay may not exceed a total length of three hundred feet, and those set within three miles of the coast may not exceed a total length of 600 feet. There are also trap and fyke net regulations regarding seasons, leaders, distance from shore and distance between traps.

Area closures: The fishing for or the possession of winter flounder is prohibited north of the a running between Point Judith Light and Sakonnet Point and the south shore coastal ponds including Little Narragansett and the Pawcatuck River. Numerous restrictions on the location of traps off the Island of Rhode Island, the Sakonnet River, and in Narragansett Bay. It is prohibited to set, haul, and/or maintain a seine within 0.5 mile of the seaward entrance of several ponds/rivers. A significant portion of the State is closed to various forms of netting.

Seasons: Fish traps must be out of the water January 1 - February 28. The use of fyke nets in two coastal salt ponds is prohibited between June 15 and September 15. During April of any year, fishermen may take and possess not more than four winter flounder in Rhode Island waters shall not be offered for sale. This limit does not apply to fishermen harvesting flounder seaward of the closed area described above.

Licenses: Resident multipurpose commercial licenses ($300) allow for the harvest and sale of fish. Other license categories include a rod-and-reel license to sell finfish ($200), diving, other nets, gillnet and fish trap ($200). Rhode Island also provides non-resident commercial licenses for rod-and-reel, diving and other nets ($200); a non-resident trawling license ($ 10/foot); a non-resident finfish landing license ($200); and a non-resident multi-purpose landing license ($300).

CONNECTICUT

Gear restrictions: Codend minimum mesh size of 5½ inches (6 inch square mesh) in trawls for November 15 - June 30, and 4 inches (4 1/2 inch square mesh) from July 1 - November 14, except that: 1) from May 15 - July 31, smaller mesh may be used to take squid provided not more that 100 pounds of winter flounder are retained; 2) from November 1 - April 30 a flynet may be used to take Atlantic herring provided not more than 100 pounds of winter flounder are retained. The minimum mesh size for gillnets is 3 inches. The minimum mesh sizes for pound, fyke and weirs is 2 inches.

Area closures: Fish traps and pound nets may not be set in an area off the mouth of the Connecticut River; pound nets must be set at least one mile apart; trawling is prohibited within an "inshore trawl line"; numerous specific area are closed to trawl and/or other forms of net gear.

Seasons: State waters are closed to commercial fishing for winter flounder from March 1 - April 14.

Licenses: A variety of commercial resident and nonresident licenses are available allowing for the harvest and sale of fish. Fees are typically in the $25 - 150 range. Marine angling with hook and line does not require a license if fish are for personal use only. Personal use fishing with trawls and other specific gear will require a commercial license.

NEW YORK

Gear restrictions: Minimum codend mesh size of 5 inches (5 1/2 square) when in possession of more than 100 pounds of winter flounder.

Area closures: There are numerous specific locations where trawl and/or other net gear are restricted.

Seasons: Commercial season for winter flounder depends on gear: pound and trap nets, July 26 - June 14; fyke nets October 1 - March 22; all other gear, December 1 - June 13. Recreational fishing is allowed between March 17 and July 31 on Long Island Sound, and March 17 - June 30 and September 15 - November 30 in all other state waters. and September 30.

Bag limit: There is a 15 fish winter flounder bag limit for recreational fishing.

Licenses: A commercial license is required for harvest and sale of fish (Resident: $100, Nonresident: $1000). The nonresident harvest license may only be purchased in January. A nonresident license which allows landing only is $250. There is no sport license for fish caught for personal use.

NEW JERSEY

Gear restrictions: Trawls fishing for winter flounder (in possession of more than 100 pounds) must have a 5-inch minimum mesh in the codend. Gillnets are restricted by various length and mesh regulations.

Area closures: Trawling is prohibited within two miles of the coast; gillnetting is limited to the Atlantic Ocean and Delaware Bay.

Seasons: Winter flounder can be harvested by otter trawl from December 1 through May 31. Winter flounder can be harvested by fyke net from November 1 through February 19. Winter flounder can be harvested by hook-and line from March 1 through May 31, and September 15 through December 31.

Licenses: Commercial gears are licensed with fees dependent on the gear type. There is no sport fishing license for hook and line gear and no license is required to sell hook and line caught fish.

Note: Regulations listed above are as of November 1992. Other regulations may apply and copies of complete regulations should be obtained from the appropriate State.

Source: Mid-Atlantic Fishery Management Council (Amendment 3 to the Fishery Management Plan for the Summer Flounder Fishery)and personal communication from: Col. Joseph Fessenden (Maine Department of Marine Resources), John Nelson (New Hampshire Fish and Game Department), Dan McKiernan (Massachusetts Division of Marine Fisheries), Richard Sisson (Rhode Island Division of Fish and Wildlife), David Simpson (Connecticut Department of Environmental Protection), John Mason (New York Department of Environmental Protection), and Rob Winkel (New Jersey Department of Environmental Protection).

MINIMUM FISH SIZES

SPECIES	EEZ	ME	NH	MA	RI	CT	NY	NJ
COD	19	19	19	19	19	19	19	19
HADDOCK	19	19	19	19	19	19	-	19
POLLOCK	19	19/0	19/0	19/0	19	19	19	19
REDFISH	9	-	9	9	-	9	-	-
WHITE HAKE	-	-	-	-	-	-	-	-
OCEAN POUT	-	-	-	-	-	-	-	-
RED HAKE	-	-	-	-	-	-	-	-
SILVER HAKE	-	-	-	-	-	-	-	-
AMERICAN PLAICE	14	14	14	14	14	14	-	-
WINDOWPANE FLOUNDER	-	-	-	12	-	-	-	-
WINTER FLOUNDER	12	11	12	12	12	12	12/11	12/10
WITCH FLOUNDER	14	14	-	14	14	14	-	-
YELLOWTAIL FLOUNDER	13	13	13	13	13	13	13	-

Note: If two minimum sizes are listed, the first is the commercial size and the second is the recreational size.

6.7.2.2 Atlantic Coastal Fisheries Cooperative Management Act

The Atlantic Coastal Fisheries Cooperative Management Act (PL 103-206, or ACFCMA), signed into law in 1993, was written to support and encourage the development, implementation and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources. The law, modeled after the Atlantic Striped Bass Conservation Act, requires that states implement and enforce the measures contained in ASMFC fishery management plans. The plan measures, called "compliance criteria", are specific actions that states must take to remain in compliance with the ASMFC plan. States failing to implement and enforce plan measures, as determined by ASMFC are subject to a moratorium on fishing for the species in question, imposed by the Secretary of Commerce. ASMFC reviews state compliance with its plans at least annually.

Section 804 (b) of the ACFCMA allows the Secretary of Commerce, in the absence of an approved and implemented FMP under the Magnuson Act (MFCMA) to implement regulations to govern fishing in the EEZ that are (1) necessary to support the effective implementation of an ASMFC FMP, and (2) consistent with the national standards contained in Section 301 of the MFCMA. Section 804 (b) also states that such EEZ regulations should be developed in consultation with the appropriate Councils and will be superseded by FMPs developed by the appropriate Council or Secretary of Commerce.

6.7.3 International fisheries treaties, agreements and policies

6.7.3.1 Fishery specific agreements and policies

Title II of the FCMA establishes the system for the regulation of foreign fishing within the EEZ. Those regulations are published in 50 CFR 611. The regulations provide for the setting of a TALFF (total allowable level of foreign fishing) for specific species based on the portion of the optimum yield which will not be caught by U.S. vessels. There is currently no TALFF nor are there any international fishery agreements or treaties which specifically or directly affect stocks managed under this FMP.

While no formal or explicit bilateral agreements exist with Canada with respect to the management or allocation of the transboundary groundfish stocks, managers have opened a dialogue which enables them to discuss the conservation issues facing the region. Through regular informal meetings over the past two years, fishery managers from the two countries have improved lines of communication which enable each side to consider, in a timely way, the policies and practices of the other in the development of management and stock-rebuilding plans. Maintaining these dialogues will become even more important in the future as stocks rebuild and each side's perception of the extent of the conservation problem change differentially.

In early 1995, NMFS and Canada's Department of Fisheries and Oceans (DFO) signed a Memorandum of Understanding titled "Framework for Cooperation on Fisheries Scientific Research and Advice in the Northwest Atlantic". The text follows:

> Canada and the United States share interest in the conservation of transboundary stocks of fish and shellfish of commercial and recreational importance to each country.
>
> The Department of Fisheries and Oceans, Canada, and the National Marine Fisheries Service, United States of America, each have separate management and distinct approaches to managing these stocks.

The two Agencies will strive to improve the understanding of each other's fishery management objectives, regulations, and scientific information.

The two Agencies will share and cooperate in the development of scientific information by:

1) annually convening a joint assessment workshop at which the scientists of the two Agencies will share information on catch, population parameters, fishing mortality, assessment methodologies, forecasting, and other information on transboundary stocks which is required to manage such stocks rationally, and

2) participating in each other's process for the assessment of stock status.

Cooperation in science and stock assessment is an important component in rational management of the shared fishery resource and should improve the flow of information between managers.

6.7.3.2 Trade policies, agreements and tariffs

(see Amendment 5)

6.7.3.3 Canadian fisheries management

The Canadians use a variety of measures to manage its groundfish generally using a fishing mortality rate target of $F_{0.1}$. The Canadian Georges Bank fishery (Statistical Area 5Y and 5Z) operates through a combination of quotas and trip limits, mesh size and bycatch standards for small fish. Catch is monitored through an industry-funded mandatory landing program supplemented by government observation and sampling.

The overall quota is broken down by vessel size and gear class. Gear sectors submit harvest plans within the sector allocation prior to fishing. In 1995 fishing on Georges Bank did not begin until June 18th because of a spawning closure (until June 1) and the requirement to submit harvest plans based on an overall quota that was not established until mid-May. Some sectors, gillnet and longline, were closed in early September.

The Canadians define the stock boundaries for the purposes of management on the basis of statistical areas established under ICNAF, namely Area 5Z which covers the eastern portion of Georges Bank. For this reason the calculated quota or TAC under an $F_{0.1}$ exploitation target is different than that calculated for the same rate on the U.S. side. In 1995, the quotas for 5Z cod and haddock were 1,000 mt and 2,500 mt, respectively. This represents a reduction from the 1994 quotas of 10,000 mt (cod) and 3,000 mt (haddock). Out of concern for the status of 5Z cod, the 1995 quota was set at less than half of the $F_{0.1}$ catch level.

Canadian catches of yellowtail flounder on Georges Bank increased rapidly from zero prior to 1993 to 1,000 mt in 1994. In 1995 the quota was set at 400 mt, and as of November 15 had been exceeded by 74 mt. Canadian scientists concur with their U.S. colleagues that the stock is overexploited and at a low level of abundance.

Other areas of the Canadian fishery are subject to species quotas or individual quotas on vessels. Quotas on cod for several areas were attained during 1992 causing the closure of the fishery in those areas. The closure receiving the greatest attention was the closure of the northern cod fishery off of Labrador and Newfoundland. This extensive closure (moratorium on fishing) began in July, 1992, and continues today. Despite the moratorium, groundfish stocks in Atlantic

Canada continue to be depressed and do not show signs of rebuilding.

7.0 CONCEPTUAL BASIS OF THE MANAGEMENT PLAN

See Appendix I.

8.0 RELATIONSHIP TO OTHER APPLICABLE LAW

8.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS)

E.1.0 SEIS COVER SHEET

FINAL

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

FOR

AMENDMENT #7 TO THE

NORTHEAST MULTISPECIES FISHERY MANAGEMENT PLAN

Prepared by

New England Fishery Management Council

in consultation with

National Marine Fisheries Service

Mid-Atlantic Fishery Management Council

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Draft SEIS submitted by NEFMC: August 15, 1995

E.2.0 TABLE OF CONTENTS

See Table of Contents for Volume I, page 2.

E.3.0 SUMMARY

E.3.1 BACKGROUND

The background of this amendment is discussed in Section 2.0 of this document.

E.3.2 MAJOR CONCLUSIONS

The environmental assessment indicates that the impacts of the proposed measures include both positive and negative impacts on the physical, biological and human environments. In many cases, the availability of appropriate data, analysis techniques or our basic knowledge of the system inter-relationships prohibits conclusive analysis. The majority of physical, biological, and economic impacts relate to the reduction in fishing effort and the subsequent rebuilding of groundfish stocks. In addition to the consequences of reduced overall effort, the amendment includes measures which specifically address and reduce the fishery`s interaction with protected species.

The fishing industry is expected to experience a short-term reduction in landings and revenues, and a significant increase in long-term economic benefits over taking no action. The breadth and scope of the measures being proposed is expected to cause some element of social change which will be distributed across individuals, families and communities proportional to their dependence on groundfishing. These social impacts are partially linked to the economic impacts, and, as such, could be negative in the short term and positive in the long term, although some fundamental changes will probably occur. One significant element of this amendment is the framework measure which enables the Council to adjust the management measures during the stock rebuilding period.

E.3.3 AREAS OF CONTROVERSY

NOAA Administrative Order 216-6, which outlines the requirements of the NEPA with respect to fishery management plans and amendments, states that controversy "refers to a substantial dispute which may concern the nature, size or environmental effects, but not the propriety of a proposed action. In this context, the Council recognizes three main areas of controversy over the proposed action:

1) the lack of current fishery data, and the measurement and consideration of the full impact of the current management plan in developing the measures for the proposed amendment;

2) the inability or failure of the management system to incorporate an ecosystems perspective that considers parameters other than fishing mortality rates into the model for analyzing and developing management measures; and

3) the estimation of and contingency for biological, economic and social effects of the displacement of significant amounts of fishing effort (vessels and fishermen).

The greatest controversy over the proposed action centers around the data and analysis that has been used to justify specific management measures and objectives. Specifically, numerous public

comments raise the issue that the Council developed specific measures (days-at-sea, area closures, TACs, etc.) using data from 1993 or earlier, and that the projections did not take into account any measured benefit of regulations implemented, or other changes that have occurred since 1993, including mesh-size increases, prohibition of high-bycatch small-mesh fisheries, permanent area closures, square-mesh requirements, fish-excluder grates in the shrimp fishery, and the reduction in numbers of vessels fishing for, or permitted to fish for groundfish since the implementation of Amendment 5.

Consistent with National Standard 2, however, the Council bases its actions on the best scientific information available. This information includes recent trawl survey data that indicates the stocks of cod and yellowtail flounder are still at record-low levels of abundance, and that haddock stocks are near record-low levels and consisting primarily of one or two moderate year classes. The reduction in landings observed under Amendment 5 do not necessarily reflect any real reduction in fishing mortality rates and may be attributable to measurement error or declining availability. Finally, the Council is not reducing the days-at-sea component of the plan by the total amount of effort reduction that would be required to meet the fishing mortality objectives of the plan in the first year. Instead, it is phasing in the days-at-sea reduction and will monitor and evaluate the plan on a regular and frequent basis so that the management system will continually be updated as new information, reflecting the impact of management measures, becomes available.

The second area of controversy is raised by different groups for different reasons but which has a common theme that calls for a greater incorporation of ecosystems approaches to management in the formulation of the rebuilding plan. These groups contend that the current model for management based solely on population dynamics calculations fails to consider a number of parameters relevant to the productivity of the marine ecosystem and, therefore, yield from the fishery resource. The current basis for management is to control outputs (i.e. catch), while nominal "input parameters", such as days-at-sea and mesh size, are developed on the basis of projected impacts on catch.

Proponents of the ecosystems model argue for greater consideration of real inputs at the appropriate scale in the context of a broader system rather than relying on measuring and controlling outputs. Fishing is one of many inputs into the ecosystem, and it impacts different components at different scales. Ecosystems management would consider, for example, such factors as the following: the species-selectivity characteristics of different gear types; predator-prey relationships and the impact of fishing on important prey or predator species; habitat requirements for different life-cycle stages and the impact of different gear types on important habitat; and the impact of fishing not only on total biomass but on species diversity.

Scientists on both sides of the controversy recognize the uncertainty inherent in each approach. The sources of uncertainty, and the methods for dealing with it, however, are markedly different in the ecosystems approach than in the conventional population-dynamics model. The population-dynamics approach, nevertheless, is the conventional model, and the methods for dealing with its uncertainty are more widely accepted in the scientific community. As such the Council continues to base its decisions primarily on calculations of the impacts on catch (fishing mortality rate), and estimations of stock size and recruitment expectations. NMFS guidelines for National Standard 1 (50 CFR 602.11) require the Council to have measurable standards for monitoring the status of the resource, however, there are no methods currently available for quantifying the parameters of the ecosystems model, for example a valuation system for important habitat. While the Council has expressed an interest in alternative approaches, it has indicated by its continued reliance on the population dynamics approach that at this time the

ecosystems model is not sufficiently well developed to be applied to a management plan, and with the stocks at or near the point of collapse, the risks of substituting it for the current model are considered too great.

The third area of controversy centers on the magnitude of impacts of effort displacement caused by the drastic reduction in opportunity for vessels to fish for traditional groundfish stocks. The Council recognizes that effort displacement is the issue of greatest concern after the conservation needs directly addressed by this amendment. As discussed in the following section (E.3.4 Issues to be Resolved), this issue is made up of a number of components. Despite the Council's desire to design a management plan that minimizes effort-displacement impacts while still achieving the conservation goals, and its open support of a vessel buyback program to reduce fleet capacity, members of the public have stated that the problem is not adequately addressed. They feel that the impacts of the groundfish plan will extend well outside the scope of directly affected vessels and fish stocks.

E.3.4 ISSUES TO BE RESOLVED

The Council published a Notice of Intent to Prepare a Supplemental Environmental Impact Statement for Amendment 7 on October 21, 1994 (59 FR 53133). This action formally initiated the process of determining the scope of issues to be addressed and for identifying the significant issues related to the proposed amendment affecting the human environment. Based on public comment, both written and at Council and Groundfish Committee meetings, the Council identified the following issues which it considered in developing the alternatives. These issues will also factor into the Council's decision on which alternative to submit as a plan amendment. The issues are:

1) effort displacement which includes:

- increased effort (fishing pressure) on other stocks or parts of critical stocks in open areas;

- competition among user groups for available resources or bottom, especially between "traditional" or earlier users and new, displaced vessels;

- gear conflicts arising from a greatly increased level and variety of fishing activity in a reduced area;

- habitat impacts of greatly increased fishing activity in open areas;

Discussion and mitigation: Effort displacement is the issue of greatest concern to the Council besides the conservation problem being addressed by this amendment. Each of the proposed alternatives deals with the effort-displacement problem in a different manner. While the alternatives offer some mitigating effects, they cannot completely solve the problems that result from implementing measures to achieve the extremely restrictive biological objectives.

The simplest and most obvious solution to this problem is to reduce the overall capacity of the industry to a sustainable level. This solution, however, can only come in one of three ways: 1) externally funded capacity reduction (for example, a federal purchase of vessels and permits); 2) internally funded capacity reduction (for example, individual transferable quotas or shares); or 3) unfunded capacity reduction (for example, bankruptcy). The first

option is outside of the Council's authority (see section E.5.2.3). The second option requires an initial allocation of shares and the establishment of a market-based transfer system both of which are too complex and controversial to be implemented in the short time available to address the resource crisis. The third option will precipitate from the economic hardship incurred by affected businesses, and although the Council recognizes that this form of contraction is likely to occur, it has attempted to minimize this impact and to design options which distribute the available resource among all current participants.

2) lack of control of Canadian catch and its impact on rebuilding of transboundary stocks;

Discussion and mitigation: This issue is limited to the stocks on Georges Bank. Since the Council began the development of this amendment, it and the National Marine Fisheries Service have engaged in discussions with Canadian industry and Department of Fisheries And Oceans representatives. These discussions have served to inform both sides of each other's management and conservation objectives and policies. Both sides also cooperate in the collection of scientific information and assessment of stock status, and have recently signed a memorandum of understanding establishing a Framework for Cooperation on Fisheries Scientific Research and Advice in the Northwest Atlantic." Thus, while the U.S. has no control over Canadian fishing on Georges Bank, and vice versa, both sides are maintaining open communication lines and cooperating in scientific research. At this time, both the U.S. and Canada have set the same fishing mortality targets for Georges Bank stocks although some differences exist in the translation of those goals into allowable catch limits.

3) impact of recreational catch on rebuilding schedule;

Discussion and mitigation: This issue was raised by commercial fishermen who felt that, under the restrictive allowable catch levels which the Council was setting, the catches by recreational sector could impede the rebuilding program if left uncontrolled. They also argued that unrestricted recreational fishing amounted to an unfair or unjustified allocation. Consequently, the Council adopted management objectives that included the recreational sector in the conservation program while preserving public access to the resource.

4) the impact of predator species on rebuilding, especially dogfish and mackerel but also including other species;

Discussion and mitigation: Scientific research has documented the predation of commercially important species by such abundant stocks as spiny dogfish and mackerel but has not established the relationship of predation to stock recovery. While selective harvesting of low-value predator species could prove beneficial, the benefits of reducing fishing mortality rates are more directly measurable. The National Marine Fisheries Service has proposed, in its Coastal Ocean Program, to develop a harvesting strategy for some of these species in an adaptive management framework which would offer a formal way to understand the effects of predation on groundfish as the biomass of the predators is reduced.

5) the high marginal cost of approaching zero mortality levels by restrictions on "bycatch fisheries", that is, effort or gear directed at other species but with a known catch of groundfish, especially scallop dredge, lobster pot, and some small-mesh fisheries, for example whiting, shrimp, and squid;

Discussion and mitigation: The Council has in effect defined the general goal of reducing

fishing mortality rates to "as close to zero as practicable" as some level above zero, in large part out of consideration of the cost of reaching absolute zero fishing mortality rates, although Alternative 1 still offers that possibility. The Council has developed alternatives which allow as much fishing as possible within the constraints of the total allowable catch limits. Nevertheless, each choice involves the allocation of a limited resource either to those vessels who traditionally depend on a particular stock (directed fisheries) or to those who catch it incidental to fishing for another target species (bycatch fisheries). The bycatch fisheries generate a much higher economic yield per pound, in this case of cod, haddock or yellowtail flounder, because they are catching primarily other species. The Council is aware of the allocation impacts of its decisions and is seeking additional public input on the future allocation of available resources.

6) the socio-economic impact of severely restricting small-scale fisheries or those with selective gear (such as the tub-trawl/handline fisheries) relative to their impact on the stocks and habitat;

Discussion and mitigation: The Council has considered potential impacts of the different alternatives on small-scale fisheries, and, to the extent possible without directing allocating available resources to that sector, has developed alternatives that may enable more small-scale fisheries to continue fishing. The alternatives include measures such as trip or possession limits, days-at-sea allocations and gear restriction measures that are intended to distribute available catch over a large number of vessels. These measures tend to be more restrictive on larger vessels that depend on a bigger catch or on more days at sea than smaller vessels. The Council is proposing to retain an open access permit category for small-scale handline/rod-and-reel fishing. The Council has also communicated to Congress its support for financial assistance to affected vessels and communities which includes both small-scale and large-scale fisheries.

7) the ability to monitor stock status and rebuilding progress under a zero or near-zero mortality/large area closure scenario;

Discussion and mitigation: The National Marine Fisheries Service is the agency responsible for monitoring the status of the stocks and the effects of the conservation and management plan. NMFS has urged the Council to adopt the near-zero objectives and has worked with the Council on the development of the alternatives in this rebuilding plan. NMFS has indicated that it will be able to monitor the rebuilding plan and provide information to the Council to make plan adjustments as needed. NMFS has also indicated where it expects the limitations on data to be, namely that landings data will be available with a one-quarter lag, and that it will only be discernable at the species level of resolution, not at the stock level. The Council has considered this information in the development of its monitoring and adjustment procedure.

8) the ability to administer and enforce regulations with current budget constraints under conditions in the fishing industry of desperation and conflict that will exist with the extremely restrictive rebuilding program;

Discussion and mitigation: NMFS is the administrative agency, and NMFS and the Coast Guard share enforcement responsibilities. Both agencies actively provide guidance to the Council in the development and refinement of alternatives. The Council has rejected several proposed alternatives based on comments from these agencies on their ability to enforce and administer them. These agencies have not indicated that the Council's proposed action is

unenforceable.

9) the restriction of public access to the resource for recreational use;

Discussion and mitigation: The Council has adopted management objectives that aim to preserve public access to the resource provided such access does not compromise the conservation objectives of the amendment.

10) under the very restrictive allocation of DAS, many vessels will not be able to survive financially without a program to enable some form of effort consolidation;

Discussion and mitigation: Several Council members have indicated that they intend to bring the issue of consolidation to the table for discussion immediately upon submission of the amendment. This is a complicated and controversial issue and attempting to resolve it prior to submitting the amendment could result in unacceptable delays in implementing a conservation program.

E.4.0 PURPOSE AND NEED FOR ACTION

The purpose and need for this action are discussed in Section 2.0, particularly Section 2.2, of the amendment document. The goals and objectives are described in Section 3.0.

E.5.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

E.5.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is described in Section 4.0 of the amendment document.

E.5.2 ALTERNATIVES TO THE PREFERRED ALTERNATIVE

E.5.2.1 No Action (status quo)

The following section contains a summary of the regulations currently in effect under the Multispecies FMP and reflects Council action through July, 1995 including framework adjustments through Framework 11. The no-action alternative will not achieve the Council's objectives for this plan with an acceptable degree of certainty.

- Moratorium on new entrants into the multispecies fishery, with the exception of recreational vessels, hook-gear vessels using fewer than 4,500 hooks or vessels fishing under a possession limit (500 lb). See Permitting System (below);
- Permitting System as follows:

  Limited-Access Permit Categories:
  - Individual DAS
  - Fleet DAS
  - Vessels 45 ft or less in length
  - Hook Only-Limited Access
  - Combination Vessels (scallop, dredge and multispecies gear)
  - Gillnet Vessels

  Open-Access Permit Categories:
  - Hook-Only Open Access
  - Possession Limit Only;
- Fishing year of May 1 through April 30;
- Limitations on up-grading of vessel size and engine horsepower;
- Effort-reduction program involving blocks of time out of the multispecies fishery and time spent at the dock (layover days), or an allocation of individual multispecies days-at-sea based on historical performance; designed to reduce fishing effort to below the overfishing level in five to seven years;
- Exceptions to the effort reduction program for vessels 45 ft (13.7 m) and less in length, vessels fishing fewer than 4,500 hooks, vessels fishing sink gillnet gear and an exception to the layover requirement for vessels at sea for less than a day;
- Requirement to purchase and install a Vessel Tracking System (VTS) unit for vessels fishing Individual DAS and Combination Vessels (this system is not operational at this time);
- Call-in system for vessels fishing under the Fleet DAS program (and as a fall-back system for vessels fishing with an Individual DAS and Combination permit category);
- Minimum mesh size requirements as follows:

  Mid-Atlantic Regulated Mesh Area (west of 72º30' west longitude) -
  5-1/2 inch diamond mesh or 6 inch square mesh applied throughout the codend for at least 75 continuous meshes forward of the terminus of the net, or for codends with less than 75 meshes, a minimum of one-third of the net, measured by overall length

Southern New England Regulated Mesh Area -
6 inch diamond or square mesh throughout the net

Gulf of Maine/Georges Bank Regulated Mesh Area -
6 inch diamond or square mesh throughout the net ;

- Minimum fish sizes as follows:

SPECIES	INCHES
Cod	19 (48.3 cm)
Haddock	19 (48.3 cm)
Pollock	19 (48.3 cm)
Witch flounder (grey sole)	14 (35.6 cm)
Yellowtail flounder	13 (33.0 cm)
American plaice (dab)	14 (35.6 cm)
Winter flounder (blackback)	12 (30.48 cm)
Redfish	9 (22.9 cm);

- Limit on possession of multispecies (500 lb) for scallop dredge vessels when fishing under a scallop DAS and a prohibition on possession of regulated species when not fishing under a scallop DAS program;
- Haddock possession limit (500 lb) for all vessels except for those fishing exclusively in state waters and not permitted under the Multispecies FMP;
- Prohibition on possession or landing haddock by scallop dredge vessels January through June;
- Year-round closure of Area I, Area II and the Nantucket Lightship Closed Area except for pelagic fisheries, lobster and hagfish pot fisheries, and for recreational fishing in the Nantucket Lightship Area;
- Prohibition on scallop vessels fishing in the closed areas;
- Time and area closures for sink gillnet gear to reduce bycatch of harbor porpoise;
- Minimum mesh of 3 inches in the Cultivator Shoal whiting fishery;
- Stellwagen Bank/Jeffreys Ledge (SB/JL) juvenile protection area square mesh restrictions as follows:
  6 inch square mesh in the last 50 bars of the codend and extension piece for vessels 45 ft in length or less; and
  6 inch square mesh in the last 100 bars of the codend and extension piece for vessels greater than 45 ft;
- Prohibition on fishing with small mesh except in fisheries that have been determined by the NMFS Regional Director to have a catch of less than 5 percent by weight of regulated species and a prohibition on possession of regulated species while fishing with small mesh;
- An exception to the prohibition on possession of winter flounder by federally permitted vessels fishing with small mesh when in state waters, under certain conditions;
- Exemptions for purse seine and mid-water trawl vessels from mesh-size restrictions;
- A prohibition on pair-trawling;
- Required use a finfish excluder grate on vessels fishing for Northern shrimp;
- Permit requirements for vessel operators and dealers;
- Mandatory reporting (logbooks) for permitted vessels and dealers;
- Mandatory observer requirements for vessels if requested by the Regional Director;
- Framework Mechanism to adjust the effort-control program (by up to ten percent per year) and other measures.

E.5.2.2 Alternatives considered and rejected

E.5.2.2.1 Summary of the alternatives taken to public hearings

The public hearing document contained four distinct alternatives designed to meet the rebuilding objectives of this amendment, in addition to the no-action alternative. At the time of the public hearings, the Council indicated that the final proposal to be submitted as Amendment 7 could include components of each general alternative. In many cases specific measures, such as mesh size options were the same for more than one alternative. The following summary briefly describes the alternatives taken to public hearings and analyzed in the DSEIS and, where appropriate, the Council's reasons for not adopting them.

Alternative 1, the most restrictive of the four proposals, would have prohibited fishing with any gear capable of catching groundfish throughout the region. This alternative would directly impact other important fisheries that have a groundfish bycatch. Under this alternative, however, stocks would rebuild faster than under any of the other alternatives. Based on the severity of projected economic and social impacts compared with the benefits to stock rebuilding, and in comparison to the other alternatives, the Council rejected this alternative without significant discussion.

Alternative 2 proposed to close up to half of the area and to regulate fishing in the open areas with possession limits and gear restrictions. The target TAC would be used to monitor the effectiveness of the plan and make adjustments as appropriate, but would become an absolute quota in the third year if the plan failed to meet its goals in the first two years. This alternative would have protected vast areas of habitat important to groundfish species.

The Council rejected Alternative 2 for several reasons including the following. For one, there were the allocation issues associated with specifying the location of large closures of indefinite duration. Secondly, the increased intensity of fishing in the remaining open areas would result in conflicts among gear groups and unpredictable impacts on the stocks. Thirdly, little support existed among managers and the industry for the alternative that relied heavily on possession limits to control catch in the open areas because of the recognized problems of discarding, high-grading and monitoring of real mortality rates.

Alternative 3 would extend management measures currently in effect, such as the days-at-sea controls, to achieve the rebuilding objectives. Allowable days-at-sea fishing for groundfish would be reduced and measures such as possession limits, area closures and gear restrictions would be imposed. Under this alternative, vessels could engage fisheries other than groundfish for the time they are required to declare out of groundfishing, other than the required layover time at the dock. While the proposed action closely resembles this alternative, and there are some differences, the Council never explicitly stated that it was adopting this alternative. In particular, the Council rejected both specific DAS options in this alternative, the immediate reduction in DAS to the Amendment 5 levels with a possession limit, or an 80-percent reduction in DAS with no possession limit, based on concerns over the projected economic and social impacts of the immediate reduction in effort compared to the projected effects on stock rebuilding as described in the DSEIS and expressed by many public comments.

Alternative 4 would have divided the TAC into regional, quarterly quotas and applied measures, such as possession limits and gear restrictions, that distribute the available catch to as many vessels as possible. If the TAC for a species/area/quarter were reached, possession of that species would be prohibited and measures would be implemented to minimize discarded fish. This alternative would also have closed areas important to juvenile and spawning fish, including a January-June closure of Georges Bank and Nantucket Shoals. The Council rejected this alternative primarily for the widely recognized problems with a quota-based multispecies management system. These problems include quota-setting and catch monitoring difficulties,

forced discarding and high-grading, unstable market supply cycles, and the disadvantaged position of smaller and less-efficient vessels in a quota system.

The Council took two alternatives for the recreational fishery to public hearings, the only difference being that the rejected alternative included a target TAC based on a historical recreational landings reduced by an amount equivalent to the reduction being applied to the commercial sector. The Council felt that the management measures proposed for the recreational sector would meet the objectives of allowing free and open access to the resource without compromising the conservation objectives of the amendment, and that the framework adjustment procedure enabled it to respond in the event recreational fishing presented a threat to the stock rebuilding program.

Regionalization of the TACs

All alternatives proposed for this amendment contained either a TAC or target TAC for the principal stocks which are the focus of this action. Alternatives 2 and 4 in the pubic hearing document divided the TACs into three regions, and Alternative 4 further divided the TACs into quarterly quotas based on the historical distribution of landings throughout the year. The proposed alternatives also contained an aggregate TAC for other regulated species (pollock, redfish, white hake, witch flounder, American plaice, winter flounder and windowpane flounder) for monitoring effort shifts onto those other species which are not specifically managed under the proposed action. Alternatives 2 and 4 also subdivided the aggregate TAC into three regions.

The Council did not regionalize the target TAC for several reasons. Principally, the regionalization of the TACs would have intensified the allocation issues associated with TACs. Dividing the TACs also would have further complicated the monitoring of catches and the adjustment procedure based on an evaluation of catches relative to the target.

E.5.2.2.2 Other alternatives considered and rejected by the Council

During the development of the proposed alternatives contained in the public hearing document, a number of individuals and industry groups submitted proposals to the Council. In some cases, the proposals were too limited in scope to adequately address the amendment objectives, although the Council incorporated some of these proposals into the broader alternatives that it considered in the public hearing document. In other cases, the Council rejected proposals because they involved direct allocations that were perceived as unfair or unjustified. Furthermore, for this amendment the Council did not want to pursue development of proposals that involve direct allocations, such as individual transferable quotas (ITQs) because they are so complex and controversial. The Council felt that urgency of the resource conservation issue precluded taking the time that would be required to develop a ITQ alternative. The Council has indicated that it will take up discussion of consolidation issues immediately upon the submission of this amendment.

The following sections includes specific proposals submitted by individuals and associations as well as a summary of proposals compiled from the general comments submitted to the Council during the development of this amendment. Sections E.5.2.2.2.1-E.5.2.2.2.9 describe alternatives considered and rejected by the Council prior to public hearings.

E.5.2.2.2.1 Various inshore closures

The Council received a number of proposals for inshore closures based on vessel size, gear type,

and day/night or seasonal periods. In most cases, the Council rejected these proposals on allocation, equity or fairness grounds, although it has incorporated some of the ideas in the proposed alternatives, particularly to protect spawning fish or juvenile concentrations.

E.5.2.2.2.2 Cape Cod Hook Fishermen's Association proposals

Initial proposal: Hook only fishery, 4,500 hooks set per day, 125 days at sea, no haddock possession, 23-inch minimum size for cod. The Groundfish Industry Advisory Committee did not support this proposal but their response provided the Association with a basis on which to revise and improve their proposal.

Revised proposal: Establish a Marine Protected Area on Georges Bank and Nantucket Shoals by closing the area to towed groundfish gear and gillnets (i.e. hooks only); 4,000 hooks/day on vessels under 65 feet in length, 6,000 hooks/day on larger vessels; 100-pound haddock trip limit; 125 days at sea for all vessels; 23-inch minimum size for cod, haddock and pollack; mandatory training and/or apprenticeship for individuals fishing in the Marine Protected Area; federal assistance to mobile-gear vessels re-rigging to hook gear; and government assistance to find ways to reduce insurance costs. The Council rejected this alternative for several reasons, but primarily because it lacked measurable objectives, covered only part of the region and had direct allocation effects to a limited sector of the industry.

E.5.2.2.2.3 Gear prohibitions

A number of individuals suggested that the solution to the resource problem would be to prohibit or greatly restrict specific gear types. While most of these comments focused on eliminating mobile (trawl) gear on the basis of habitat impacts and selectivity, some individuals also called for the elimination of gillnets. The Council has proposed measures that would reduce the amount or size of mobile gear and gillnets in use (for example, through gear restrictions, area closures, mesh size, and limits on the number of gillnets nets in use) but it has not proposed completely prohibiting any gear (other than pair trawls which it prohibited in Amendment 5).

E.5.2.2.2.4 Exempt recreational fishing from Amendment 7

A large number of recreational fishermen submitted comments that, since they did not perceive themselves to be a cause of the resource crisis, they should not be restricted by the rebuilding plan and specifically any area closures. They argued that they should not be forced to pay for the excesses of the commercial sector. They also argued that the public's access to the resource should not be restricted, particularly as long as any commercial fishing is allowed to continue. The Council considered that since the recreational sector accounts for a significant part of the catch of some stocks and since it would benefit from the rebuilt stocks that it should participate in the rebuilding program in some manner. However, the Council also adopted recreational fishing objectives that explicitly preserved public access within the constraints of the conservation objectives of this amendment.

E.5.2.2.2.5 Cape Ann Gillnetters Association proposals

Initial proposal: West of 70º00' in the Gulf of Maine: prohibit rollers and rock-hopper gear on trawl vessels; 22-inch minimum size for cod, pollock and haddock; 6.5-inch minimum mesh size for gillnets; limits on the number of gillnets per vessel (100 for groundfish, 150 for flounder fishing); a total allowable catch quota for vessels other than gillnet, hook and

under-65-foot trawl vessels; support for a federal buyback of large vessels;

Second proposal: In May, 1995, the association submitted a proposal that included a number of measures which the Council incorporated into current alternatives. The association proposed: minimum size of 24 inches for cod, haddock and pollock; an effort reduction program for gillnet vessels based on varying days-at-sea, numbers of nets and mesh size; seasonal and permanent closures to protect spawning and juvenile fish (no specific areas identified); and no total allowable catch quota or individual transferable quotas.

E.5.2.2.2.6 Seafarer's International Union proposals

The SIU suggested that the Council should consider raising the fishing mortality goals of the amendment. The SIU also proposed that all fish that are caught be landed (no discards) and that observers be required on all vessels. The SIU supported the concept of permanent closed areas but did not provide any specific suggestions.

The SIU also submitted a proposal to exempt vessels fishing with small mesh in the Mid-Atlantic region from the prohibition on possession of winter flounder and to allow them to retain up to 500 pounds. The Council initiated a framework action (Framework 10) to implement this adjustment to current regulations on the condition that supporting data and documentation be provided by the Mid-Atlantic Council. The supporting data has not been provided and, in consideration of the proposed restrictions on fishing in other areas, the Council has not advanced this exemption under the current action. The Council has proposed, however, that vessels fishing in the Mid-Atlantic and not fishing under DAS be allowed to retain up to 200 pounds of winter flounder, and that non-DAS fisheries in that area are exempt from the requirement to be certified with respect to the groundfish bycatch.

E.5.2.2.2.7 Northeast Fishing Industry Consensus proposal

In May, 1995, a number of fishing industry associations submitted a proposal to the Council which was identified as a "consensus" proposal, although only four groups submitted supporting letters (Cape Cod Hook Fishermen's Association, Maine Gillnetters' Association, Massachusetts Netters Association and the Associated Fisheries of Maine). The basic approach of this alternative was to eliminate the use of total allowable catch quotas, trip limits or other measures that rely on counting catch. The proposal contained several measures which formed the basis for Alternative 2 in the current proposed action (closure of 50 percent of the area, regionalization of management, and controls on the size and selectivity of fishing gear), but the Council did not adopt the no-TAC approach in its entirety. In order to satisfy the necessity of having measurable objectives for the amendment, the Council retained the TAC as a target for the first two years of the plan which could revert to an absolute quota if stock rebuilding is not evident and the target TAC is regularly exceeded.

E.5.2.2.2.8 Revenue optimization time/area closures (formerly Alternative 2)

The Council spent considerable time developing an alternative that sought to maximize total fishery revenues per pound of cod, haddock and yellowtail flounder (CHY) within the total allowable catch constraints set by the fishing mortality goals. The general approach was to rank fisheries by the their revenues per pound of CHY and accumulate the total CHY catch by each fishery until the TAC was reached. Any fishery not "in" the solution was closed. Initially, a fishery was defined by area and a combination of gear, catch and species association or geographical co-occurrence. Using 10-minute squares and 38 distinct fisheries, the number of

fishery/area units approached an unmanageable 2,000.

Through open dialogue between technical staff and the managers and several revisions, the number of possibilities was dramatically reduced. The number of areas was reduced to nine and the number of fishery/gear categories was reduced to six plus an excluded group that had no measurable interaction with the CHY stocks. This effort produced an array of open and closed areas where fishing by different gears could be allowed in specified quarters of the year. The efficacy of this approach, however, depended on preserving the catch in each area/fishery/quarter unit at the level of the data baseline. The Council recognized that the effort displacement into the open areas by vessels which historically fished in the fisheries that were now to be closed would be significant and difficult to control without making some direct allocation decisions. After several attempts to develop a solution to this problem, the Council formally abandoned this alternative.

E.5.2.2.2.9 Regional co-management system

Several industry representatives proposed that the Council divide the plan development process into local or sub-regional groups that would involve more fishermen and address local issues at an appropriate scale. The approach would result in increase compliance by fishermen who were responsible for the development of the plan. An initial attempt by the Groundfish Committee to adopt this strategy failed because it was started late in the amendment development process, only a few of the local areas responded, and the problem of integrating different local strategies on stocks that cover wider areas and are shared by different local groups became unmanageable in the short time available for completing this amendment.

E.5.2.2.2.10 Four-year fishing mortality reduction schedule

Based on comments at the public hearings, the Groundfish Committee recommended that the Council design Amendment 7 on the basis of a four-year, equal-increment reduction schedule to reach the $F_{0.1}$ fishing mortality target. The Council rejected this proposal on the grounds that it would allow the stocks to be fished at unacceptably high rates for too long, and thereby jeopardize the stock-rebuilding program. The Council has retained the $F_{0.1}$ target for the first year of the plan but is implementing DAS reductions over two years, and will make additional adjustments as necessary each year to meet the plan objectives.

E.5.2.2.2.11 Require all vessels to take layover days

During the development of the final effort-reduction program, the Council considered a Groundfish Committee recommendation that all vessels, in both Fleet DAS and Individual DAS programs, be required to layover in port one day for each two DAS. The committee made the proposal to address a perceived inequity between Fleet DAS vessels (which currently are required to layover) and Individual DAS vessels (which are not required to layover). The Council rejected this proposal because it would be inefficient and impose unnecessary economic hardship on vessels by reducing the time they could pursue other fisheries. The impact of requiring layovers is particularly acute since it would come at a time when vessels need to become more efficient and have greater flexibility to pursue other fishing activity. In order to address the fairness issue, the Council eliminated the layover requirement for Fleet DAS vessels. The Council felt that the justification for the layover requirement in the early stages of Amendment 5, when Fleet DAS vessels were only required to take 80 days out of groundfishing, was less important at the later stages in the effort-reduction program when vessels have fewer DAS (therefore, fewer layover days).

E.5.2.2.2.12 Regulation of gillnet effort primarily by regulating the number of nets

Based on public comments on the management of gillnet effort with DAS, the Council delegated a subcommittee of the Groundfish Committee to work with industry representatives to develop an alternative management system based on controlling the numbers of nets a gillnet vessel can fish. The subcommittee met twice and developed some proposals, but the Council did not adopt them for inclusion in this amendment. The Council is concerned that enforcement of a number-of-nets rule will be difficult and costly. The Council also cannot evaluate with any degree of certainty what the relative effort reduction impacts of specific proposals are (for example, 80 nets compared to 60 or 100 nets). The problem of measuring impacts is compounded by the fact that gillnetters fish a range of numbers of nets depending on area fished, target species, vessel size and personal preference. The Council has specified, however, that under the framework adjustment procedure, it may consider limits on the number of gillnets as an option.

E.5.2.2.2.13 Counting gillnet vessel DAS as time away from port

The Council considered a proposal under which gillnet vessel DAS would be counted in the same way as trawl vessel DAS, namely, when the vessel leaves and returns to port. The Council rejected this option primarily because since the gear continues to fish whether the vessel is in port or not, counting and regulating the time the gear is in the water is a more direct method of controlling fishing effort.

E.5.2.3 Alternatives outside of the Council's authority

In the course of developing alternatives for this amendment, the Council received a number of ideas from interested members of the industry that involve areas of management that are outside of the Council's authority. These proposals included financial assistance programs, federally-funded capacity reduction programs (vessel buyback) or industry-funded programs using fees on landings or fuel use and used to fund capacity reduction, enforcement, monitoring and/or research programs. The Council is not proposing any alternatives in this amendment that depend on action by Congress or another agency to meet the amendment objectives or mitigate the impacts of its own action. The Council has supported such efforts, however, by Congress and the Department of Commerce.

In November, 1994, the Council sent a letter to the New England Congressional delegation explaining the scope and objectives of Amendment 7 and asking for federal support in the way of direct financial assistance or a vessel buyback program. Financial assistance has been provided primarily through a $30-million supplemental appropriation to the California earthquake relief bill. Additional funding has been available from the Northwest Atlantic Ocean Fisheries Reinvestment Program and the Department of Labor. Future sources of funding for financial assistance and capacity-reduction programs are uncertain at this time. However, the House draft of the Magnuson Act Reauthorization Bill contains a program to create a national capacity-reduction program. Under the current draft of this proposal, funding for the buyback would come solely from the affected industry.

The Department of Commerce initiated a $2-million vessel-buyback demonstration program under the direction of the Office of Sustainable Development in early 1995. On August 3, 1995, Secretary Brown announced that an additional $25 million in disaster assistance funds would be used to expand and extend the vessel and permit buyout program. Changes to the Interjurisdictional Fisheries Act are required, however, to lift the $100,000 cap on grants in order to make this program feasible and effective. The Council is providing comment to the Office of

Sustainable Development so that the design of the second phase of the capacity reduction program is consistent with the Council's intent and the FMP objectives.

Current financial assistance programs fall into two general categories:

1) retraining programs for people choosing to leave the industry; and

2) economic assistance through loans and grants for people pursuing activities other than groundfishing within the industry such as aquaculture and underutilized species, and for the development of selective gear that will reduce the bycatch of groundfish.

During the scoping process on this amendment, a large number of individuals and the following industry associations expressed support for, or urged the Council to support federal financial assistance and vessel buyback programs. The organizations that submitted written support include:

- Associated Fisheries of Maine
- Cape Ann Gillnetters Association
- Cape Cod Commercial Hook Fishermen's Association
- East Coast Fisheries Federation and
- Seafarer's International Union.

The Cape Ann Gillnetters Association also asked the Council to request that Congress exempt small vessels from provisions of the Jones Act which prohibit foreign-built vessels from enrollment in document and engaging in coastwide trade, thereby permitting owners of those vessels to engage in alternative commercial enterprises. The Association forwarded this request to members of the Massachusetts Congressional delegation.

E.6.0 AFFECTED ENVIRONMENT

E.6.1 INTRODUCTION

This section is intended to provide the background information for assessing the impacts of the proposed alternatives on the physical, biological and human environment. This section supplements or updates information provided in the SEIS prepared for Amendment 5.

E.6.1.1 Data considerations

The data system used in the management of fisheries is generally described in the SEIS for Amendment 5 and in the *Status of the Stocks* report published annually by the NEFSC. One change to the Amendment 5 SEIS description is noteworthy, and is the result of that amendment. The fisheries data collection system was changed from a voluntary dealer participation program to a mandatory dealer and vessel logbook program.

This change has significant implications for the utility of data since the two programs require standardization or correlation. Secondly, the administrative work of shifting systems, including initiating a new data entry program caused some delays in data being available for review. As a result, catch data for 1994, the year in which this shift took place, is not yet available. Stock assessments and management decisions in the preparation of this action are based primarily on data through 1993 with projections for 1994 and 1995. In some cases, aggregate landings data (by species rather than by stock or age) and effort data (total DAS used rather than by permit category or vessel group) for 1994 and part of 1995 have become available. NMFS has indicated that in the near future, landings data will not be discernable at the stock level, and that landings and effort data will be available with a one-quarter, that is, three month lag period for the purpose of monitoring the plan and making adjustments.

The most recent assessments the principal stocks which are the focus of this amendment are:

SAW 17- February, 1994	Southern New England yellowtail flounder
SAW 18- June, 1994	Georges Bank yellowtail flounder
	Georges Bank cod
SAW 19- January, 1995	Gulf of Maine cod
SAW 20- August, 1995	Georges Bank haddock.
SAW 21- January, 1996	Winter flounder
	Multispecies complex

E.6.2 PHYSICAL ENVIRONMENT

A complete description of the physical environment of the fishery, including the habitat and the weather, is contained in the SEIS for Amendment 5.

E.6.3 BIOLOGICAL ENVIRONMENT

E.6.3.1 Geographic species assemblages and the multispecies fishery

See Amendment 5.

E.6.3.2 Stocks under the Multispecies FMP

E.6.3.2.1 Life histories and habitat requirements

The life histories and habitat requirements for the thirteen species in the multispecies complex are contained in the Final EIS for Amendment 5. The following figures, E.6.3.2.1 a-m, contain updated stock distribution information from the NEFSC bottom trawl survey for the most recent five years.

Figure E.6.3.2.1.a **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.b **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.c **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.d **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.e **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.f **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.g **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.h **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.i **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.j **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.k **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.l **Source: NEFSC Bottom Trawl Survey**

Figure E.6.3.2.1.m **Source: NEFSC Bottom Trawl Survey**

E.6.3.2.2 Stock Assessment

NOTE: The following discussion uses the terms "over-exploited", "fully exploited" and "under-exploited" to describe the stock condition relative to historical patterns and fishing effort. These terms are distinct from the term "overfished" as defined by the overfishing definition. Secondly, for stocks which cross the U.S.-Canada boundary, Canadian landings and survey information are incorporated into the assessment.

Cod

Figure E.6.3.2.2.1 (end of this section) shows the cod stock boundaries used the Stock Assessment Workshop.

Gulf of Maine Stock

During the past 30 years, USA commercial landings have ranged between 2,600 and 17,800 mt. Between 1960 and 1975 annual landings never exceeded 9,000 mt and averaged 5,500 mt per year, while during 1976-1985 annual landings were never less than 10,000 mt and averaged 12,200 mt per year. USA catches declined below 10,000 mt during 1986-1988 but subsequently increased, doubling between 1987 and 1990 (7,500 to 15,200 mt), and were a record-high 17,800 mt in 1991. USA commercial landings from this stock have since declined to 8,300 mt in 1993 (Table E.6.3.2.2.1).

The NMFS research vessel abundance and biomass indices declined to record low levels in both the autumn 1993 and spring 1994 surveys. Survey catch-at-age data indicate that the strong 1987 year class is no longer predominant, having now been replaced by a series of average to below average year classes from 1988 through 1991.

Fishing mortality in 1993 remained at a relatively high level (F = 0.93) and was far above F_{max} (F = 0.27) and well in excess of the F needed to attain 20 percent maximum spawning potential ($F_{20\%}$ = 0.35), the management target established for this stock. The 1987 year class (17.8 million fish at age 2) is the highest in the 1982-1993 series and about twice the size of the above average 1980 and 1986 year classes. Recent recruitment, however, has been poor as the 1988-1991 year classes (all $\leq$ 4.5 million fish) are among the poorest on record.

Spawning stock biomass (SSB) peaked in 1989 at 26,100 mt, following recruitment of the strong 1987 year class to the spawning stock. However, SSB subsequently declined to 9,400 mt in 1993 and is projected to decline further in 1994 and 1995 to about 8,000 mt as the 1987 cohort is fished out. If fishing mortality remains at the current level in 1995, SSB will continue to decline to unprecedented record low levels (between 6,000 mt and 7,000 mt) as the much weaker 1988-1991 year classes dominate the spawning stock.

At the current level of fishing mortality, commercial landings are expected to decline to about 7,000 mt in 1994 and are likely to remain at or below that level in 1995. By the end of 1994, the 1987 year class will be only a minor component of the stock.
The Gulf of Maine cod stock is at a low biomass level and is overexploited (U.S. Dept of Commerce 1994).

Georges Bank and South Stock

Since 1960, total commercial landings of Georges Bank cod have ranged between 11,000 (1960)

and 57,000 mt (1982). USA landings increased four-fold between 1960 and 1980 (10,800 to 40,000 mt) but declined to 17,500 mt in 1986. USA catches ranged from 24,000 to 28,000 mt between 1988 and 1991 but declined sharply in 1992 and 1993. The 1993 USA catch (14,600 mt) was about one-half of the 1974-1983 average of 27,900 mt (Table E.6.3.2.2.1).

The NMFS research vessel survey indices in autumn 1993 and in spring 1994 were the second lowest and lowest, respectively, in the survey time series, and continue to indicate that the stock is at an extremely low level. The 1990 year class dominates the stock, with older fish almost nonexistent and incoming year classes relatively weak.

Fishing mortality in 1993 (F=0.91) was the highest on record, and far in excess of the F needed to attain 20 percent maximum spawning potential ($F_{20\%}$ = 0.36), the management target established for this stock. The 1990 year class (22.2 million fish at age 1) was estimated to be slightly above average. Recent recruitment, however, has been extremely poor as 4 out of the last 5 year classes were well below average. The 1991, 1992 and 1993 year classes are the lowest on record.

Spawning stock biomass increased from 55,000 to 72,000 mt between 1985 and 1990 due to the strong 1983, 1985, and 1987 year classes entering the spawning stock. However, SSB has since declined and in 1993 fell to a record low 37,000 mt. Spawning stock biomass is expected to decline to unprecedented low levels in 1994 and 1995 as the 1990 year class is fished down and the much weaker 1991, 1992 and 1993 cohorts recruit to the spawning stock. The Georges Bank cod stock is at a very low biomass level and is overexploited (U.S. Dept. of Commerce 1994).

Haddock

Figure E.6.3.2.2.2 (end of this section) shows the haddock stock boundaries used the Stock Assessment Workshop.

Gulf of Maine Stock

USA landings of Gulf of Maine haddock declined from about 5,000 mt annually in the early 1960s to less than 1,000 mt in 1972. Landings increased sharply between 1974 and 1980, reaching 7,300 mt in 1980. Since 1983, catches have declined to record-low levels (500 mt or less since 1988). Recreational catches have also declined and have been at insignificant levels since 1981 (Table E.6.3.2.2.1). Virtually all landings from this stock are now taken in the U.S. fishery.

The NEFSC autumn survey biomass index (adjusted for changes in survey gear) has declined steadily since 1978 and between 1989 and 1992 fell to a new record low every year, reaching 0.09 in 1992. This value is less than 1 percent of the peak 1963 survey index. Although the index increased in 1993, it was still the fourth lowest in the 30-year series. Survey catch at age data continue to indicate that recruitment has been poor since 1982.

The sharp decline in landings observed since 1983 (7,600 to 200 mt) and the corresponding decline in the autumn research index are indicative of the status of this stock. Abundance remains at an historic low and recruitment has been insufficient to support landings, resulting in recruitment overfishing and continued stock depletion. Preliminary estimates of fishing mortality on this stock are greater than $F_{30\%}$ (Hayes and Buxton 1991). Spawning stock biomass is below maintenance level and is likely to remain so in the near future (U.S. Dept of Commerce 1994).

Georges Bank Stock

Total commercial landings of Georges Bank haddock increased from about 50,000 mt annually prior to 1965 to nearly triple that amount in 1965 and 1966 due to intense fishing by the distant-water fleets. Following the high levels of landings during the mid-1960s, landings declined through 1976. Catches increased between 1977 and 1980, reaching about 28,000 mt, but catches declined after 1980, dropping to 4,500 mt in 1989 Since 1989, landings have ranged between 4,400 and 6,900 mt. In 1993, landings were 4,400 mt, the second lowest ever and 28% less than the 6,100 mt landed in 1992. Of the 1993 total, U.S. landings accounted for only 16 percent (700 mt) (Table E.6.3.2.2.1), while Canadian landings accounted for the remainder (3,700 mt).

The NEFSC spring and autumn bottom trawl surveys indicate that the biomass of haddock has declined markedly since the late 1970s. The 1992 and 1993 autumn survey indices (3.2 and 4.3 kg per tow, respectively) are higher than the time series minimum of 0.94 kg per tow in 1991, but are extremely low relative to historic levels. Population estimates derived from virtual population analysis indicate that this stock has collapsed. Total stock size declined from 132 million fish in 1979 to 17 million in 1991 (the last year for which a full assessment of this stock was conducted). Spawning stock biomass declined from 78,200 mt in 1978 to 18,700 mt by 1990.

Recruitment was poor during most of the 1980s. The 1989 and 1990 year classes continued this trend, each producing only about 4 million fish at age 1. The strongest year classes were those of 1983, 1985 and 1987, each contributing between 14 to 17 million fish; although these year classes appear relatively strong compared to the intervening year classes, they are weak compared to the dominant year classes of the 1970s. Fishing mortality on age 4 and older haddock was estimated to be 0.51 in 1990 and is now likely to be at or above that level. The most recent assessment of the Eastern portion of this stock suggests that F in 1993 was close to 1.0, a value well above $F_{30\%}$.

Population projections suggest that, if recruitment and fishing mortality remain at current levels, abundance and biomass of this stock will continue to decline. Because of the low level of spawning stock biomass, poor recruitment is expected in the near future, perpetuating the severely depleted condition of the stock (U.S. Dept of Commerce 1994).

Pollock

Traditionally, pollock were mainly taken as bycatch in the USA demersal otter trawl fishery, but, during the 1980s, directed effort increased substantially. Much of this increase in effort has occurred in the winter gillnet fishery. USA landings increased from an average of 9,700 mt during 1973-1977 to more than 18,000 mt annually between 1984 and 1987, peaking at 24,500 mt in 1986. Since then, annual landings have steadily declined totalling 5,700 mt in 1993 (Table E.6.3.2.2.1), a 77% decrease compared to the 1986 level. Estimated annual recreational catches have fluctuated between 100 and 1,300 mt since 1979. USA catches have generally accounted for between 20 and 30% of the total harvest from this stock, and since 1984, the USA fishery has been restricted only to that fraction of the stock occurring in areas of the Gulf of Maine and Georges Bank west of the line delimiting the USA and Canadian fishery zones. The total nominal catch from the stock, including recreational, after declining for four consecutive years, remained relatively stable at 47,400 mt in 1991, but declined sharply in 1992 and 1993 (U.S. Dept. of Commerce 1994). Most of the decline since 1986 was due to sharp reductions in USA landings in 1987, 1988, and 1989 followed by substantial declines in Canadian landings in 1990

and 1993.

Total stock size, after increasing throughout the late 1970s and early 1980s, has since markedly declined. Biomass indices for the Gulf of Maine-Georges Bank portion of the stock, derived from NEFSC autumn bottom trawl surveys, increased during the mid-1970s but declined sharply during the early 1980s and have remained relatively low since 1984. Indices derived from Canadian bottom trawl surveys conducted on the Scotian Shelf increased during the 1980s but declined sharply during the early 1990s. Commercial catch per unit effort (CPUE) indices for U.S. trawlers fishing predominantly in the Gulf of Maine increased during the late 1970s, but declined after 1983 and have remained consistently low since 1987 at less than one-half the 1977-1983 average. Canadian commercial CPUE indices from the Scotian Shelf also increased during the late 1970s-early 1980s, but have declined steadily since 1985; recent CPUE indices for both fleets remain well below historic levels.

Spawning stock biomass increased from 90,000 mt in 1974 to over 200,000 mt in 1985. Between 1986 and 1991, however, SSB declined by 36 percent. The increases in stock biomass during the 1970s resulted from recruitment and growth of several relatively strong year classes, notably those of 1971, 1975, and 1979. Recruitment conditions were favorable throughout the 1970s and early 1980s, with moderate to strong year classes appearing regularly every three to four years. Year classes produced between 1983 and 1986 were all average or below average, but the 1987 and 1988 year classes were well above the long-term mean. The most recent strong year class was produced in 1988 and is expected to become fully recruited to the fishery in 1995. The 1989 through 1991 year classes, however, appear to be below average.

The record high landings during the mid-1980s (in excess of 63,000 mt per year between 1985 and 1987) resulted in relatively high fishing mortality rates ranging from 0.62 to 0.85 during the latter part of the decade. Fishing mortality in 1992 declined slightly from the 1991 level (0.85 to 0.72). Projections have indicated a substantial reduction in F in 1993 to about 0.3-0.4 due to the combined effect of reduced catch and effort in the Canadian sector, and the continued strong recruitment of the 1987 and 1988 year classes to the fishable stock. The 1991 and 1992 levels of F, however, were well above $F_{0.1}$ (0.20), considerably greater than F_{med} (0.47) and slightly above $F_{20\%}$ (0.65). As such, the stock is considered to be fully exploited (U.S. Dept of Commerce 1994).

Redfish

During the development phase of the Gulf of Maine redfish fishery, USA landings rapidly rose to a peak level of about 60,000 mt in 1942 followed by a gradual decline to less than 10,000 mt during the mid-1960s. USA landings ranged from 10,000-16,000 mt during the 1970s but have declined continuously throughout the 1980s, reaching historic low levels of between 500 and 600 mt per year during 1989-1991. Landings in 1992 and 1993 increased slightly to 800 mt (Table E.6.3.2.2.1).

The NEFSC autumn survey biomass index declined from 40.4 kg per tow in 1968 to an average of 3.8 kg per tow during 1982-84. The autumn biomass index subsequently increased to an average of 6.5 kg per tow during 1985-89 and has averaged 10.0 kg per tow during 1990-93. Average biomass levels evident since 1990 represents a 2.5-fold increase over the early 1980s but are still well below average levels of the 1960s and early 1970s.
The increase in biomass in 1990-93 is consistent with incremental increases in survey abundance indices (mean number per tow) during the past two to three years, and reflects accumulated recruitment and growth of one or more recent year classes.

Estimates of exploitable biomass (ages 5 and older) from virtual population analysis declined by 75 percent, from 136,000 mt in 1969 to 32,000 mt in 1985. Projections are not available for 1993 because the virtual population analysis was discontinued in 1986. Average fishing mortality during the 1970s was slightly greater than F_{max} (0.13) and twice the $F_{0.1}$ (0.06) level. During the late 1970s, the combination of declining stock size and increased fishing effort on the 1971 year class produced fishing mortality rates that were 50 percent greater than F_{max} and three times higher than $F_{0.1}$. Fishing mortality has declined in recent years to a level less than or equal to $F_{0.1}$, and well below F_{max}. Equilibrium surplus production models have indicated that the long-term potential catch from the stock is about 14,000 mt. Given the low population abundance and poor recruitment during most of the 1980s, surplus production in the near future will remain considerably less than that, as indicated by the continued low level of nominal catches.

Landings since 1989 have been extremely low (<900 mt/yr), reflecting low levels of stock abundance and fishing mortality. Given the present pattern of exploitation, the fishery remains extremely dependent on recruiting year classes. Recruitment has been poor since 1971, except for the moderate 1978 year class and some modest recruitment from the mid-1980s. Stock biomass has slowly been increasing in the 1990s but remains low relative to the 1960s and 1970s. Unless recruitment markedly improves, biomass and yield are not expected to increase substantially; the population remains in an overexploited condition due to the truncated age structure and relatively low biomass level (U.S. Dept. of Commerce 1994).

White hake

USA landings of white hake have primarily come from the western Gulf of Maine, both incidentally to directed operations for other demersal species and as an intended component in mixed-species fisheries. Since 1968, the USA fishery has accounted for approximately 90 percent of the Gulf of Maine-Georges Bank white hake catch. Canadian landings, however, increased markedly in 1992 (1,100 mt) and 1993 (1,700 mt).

Total landings of white hake increased from about 1,000 mt during the late 1960s to 8,300 mt in 1985. Landings declined during 1986 to 1989, but have since sharply risen, reaching a record-high of 9,600 mt in 1992. USA landings declined from 8,500 mt in 1992 to 7,400 mt in 1993 (Table E.6.3.2.2.1). The increase evident throughout the 1970s and early 1980s reflects both a general increase in incidental catches associated with the greater fishing power of the expanded New England otter trawl fleet and an increase in directed fishing effort toward white hake.

NEFSC autumn survey biomass indices were relatively high during the 1970s, declined during the early 1980s, but have since shown a steady increase. The most recent 3-year average of the NEFSC autumn biomass index (11.7 kg/tow) is above the current overfishing definition (25th percentile of a 3-year moving average of NEFSC autumn biomass indices: 8.4).

Fishing mortality peaked in 1988 at F=0.56, declined to 0.34 in 1989, and has since fluctuated around the 1985-1993 average of F=0.40. Fishing mortality throughout the 1985-1993 period has exceeded F_{max} (F=0.22). Exploitable biomass has remained relatively stable since 1985, ranging from 11,600 mt in 1987 to a peak of 17,300 mt in 1993. Recruitment has varied considerably from 1.9 million (1985) to 9.6 million (1992) fish, with the 1994 level (5.7 million) being about average. The Gulf of Maine-Georges Bank white hake stock is at a medium biomass level and is considered to be fully exploited (U.S. Dept. of Commerce 1994).

Red hake

Gulf of Maine - Northern Georges Bank Stock

Landings from the Northern red hake stock in 1993 were 700 mt, the lowest annual catch during the 1960-1993 period. Trends in landings from this stock have shown three distinct periods. The first period, from the early 1960s through 1971, was characterized by relatively low landings ranging from about 1,000 to 5,600 mt. The second period, from 1972 to 1976, showed a sharp increase, with landings ranging from 6,300 to 15,300 mt. During this period approximately 93 percent of the total annual landings were taken by the distant-water fishery (DWF) on northern Georges Bank. Following implementation of the Magnuson Fisheries Conservation and Management Act (MFCMA) in 1977 and the exclusion of the distant water fleets, total landings dropped sharply. From 1977 to the present, annual landings from this stock have averaged only 1,100 mt and have been 900 mt or less since 1988 (Table E.6.3.2.2.1).

NEFSC autumn bottom trawl survey indices increased from the early 1970s until 1990. The survey index declined during the past three years, but this decline does not appear to be due to the fishery given the low level of landings. Survey data indicate that most year classes of red hake have been moderate in strength since 1985. The combination of low landings and modest year classes has allowed the stock to maintain itself at moderate to high levels of biomass. This stock is underexploited and could support substantially higher catches (U.S. Dept of Commerce 1994).

Southern Georges Bank-Middle Atlantic Stock

Nominal 1993 landings from the Southern red hake stock were 900 mt, slightly lower than in 1992 when 1,300 mt were taken. Total landings from this stock peaked in the mid-1960s (108,000 mt in 1966) due to development of the DWF. Annual landings averaged 35,000 mt from 1967-1972 but declined markedly after DWF landings were reduced. From 1978 to 1984, the DWF landings averaged 10 percent of the total annual landings (compared to 83 percent from 1965-1976) due to restrictions placed on foreign fishing after the implementation of the MFCMA. Since 1985, landings of red hake have been exclusively domestic. USA commercial landings increased from 4,300 mt in 1960 to a high of 32,600 mt in 1964, but declined sharply to 4,000 mt in 1966. USA landings ranged between 2,000 and 7,000 mt during 1967 to 1979. Since 1985 commercial landings from this stock have been very low, varying between 600 and 1,300 mt per year (Table E.6.3.2.2.1).

The NEFSC autumn bottom trawl survey index was relatively constant between 1968 and 1982. Subsequently, the survey indices declined, reaching a record low in 1987. From 1988 to 1991, the survey index increased, but has since dropped sharply to historically low levels. However, the declining trend in survey values from 1983 onward does not appear to be fishery related; landings during the past decade have been low (less than 2,000 mt per year) compared with the late 1960s and early 1970s (more than 20,000 mt in most years) when the survey index was stable. As such, the stock is considered to be underexploited U.S. Dept of Commerce 1994).

Silver hake

Gulf of Maine-Northern Georges Bank Stock

Following the introduction of distant-water fleets in 1962, total landings increased rapidly to a peak of 94,500 mt in 1964, dropped sharply in 1965, and declined for 13 years, reaching the lowest level in the series (3,400 mt) in 1979. Prior to the inception of the Magnuson Fishery Conservation and Management Act (MFCMA), distant-water fleet landings averaged about 49

percent of the total catches. Activity by distant-water fleets diminished after 1977.

Domestic landings from this stock exhibit three major trends. From 1955 through 1968, landings were high (averaging 41,500 mt annually), but showed a declining trend. Landings dropped sharply in 1969 to 15,900 mt, and remained at approximately that level (averaging 12,100 mt) until 1978. From 1979 to the present, annual landings have been less than 10,000 mt per year. Commercial landings in 1993 were 4,400 mt, the lowest since 1981 (Table E.6.3.2.2.1).

The NEFSC autumn bottom-trawl survey biomass index declined during the period of heavy exploitation by distant-water fleets reaching a minimum in 1968-69. With the appearance of the strong 1973 and 1974 year classes, biomass indices increased during the mid-1970s, but declined during the late 1970s. Biomass indices have subsequently increased significantly (with fluctuation), and recent recruitment levels appear to be at or above those of the mid-1970s.

During 1973-1982, fishing mortality rates (F) for fully recruited fish (age 3+) fluctuated between 0.38 and 1.1 and generally increased from 1982 (0.45) through 1988 (0.70). Although VPA estimates are not available for the 1989-1993 period, estimates of mortality based on spring and autumn NEFSC survey abundance indices suggest recent Fs may be about 0.4.

Substantial mortality of age 1 and 2 (<25 cm) fish occurs through discarding in the large mesh (>5.5 inch mesh) and small mesh (<3.5 inch mesh) otter trawl fisheries and in the northern shrimp fishery. Discard estimates over the 1989-1992 period range from 1,700 mt to 7,200 mt. In terms of numbers of fish, the quantities of discarded silver hake have been quite large; ranging from 17 million fish in 1990 to 76 million in fish 1989. The high discard mortality on juvenile fish results in a substantial loss in the long term yield from the adult component of the stock and a reduction in spawning biomass per recruit. significant Stock biomass levels have declined substantially compared with the pre-1975 period despite the rather low level of landings. Further, substantial increases in recruitment in recent years have not yet translated into an increase in mature fish biomass (age 3+). Since it is not likely that F will decline substantially below 0.4 to 0.5 in the near future (i.e., decline below the overfishing level of F = 0.36) and given the rapid removal of recruits from the stock in recent years, it appears that this stock cannot support increased fishing and must be considered fully exploited (U.S. Dept of Commerce 1994).

Southern Georges Bank - Middle Atlantic Stock

From 1955 to 1965, USA landings from this stock averaged 15,200 mt per year. During this time, foreign landings greatly exceeded domestic landings, with over 280,000 mt being taken in 1965. From 1966 to 1971, both USA landings (averaging 7,900 mt) and foreign landings (averaging 80,200 mt) declined. After 1971, domestic landings steadily increased from a low of 5,200 mt to 11,400 mt in 1978; a level which has been maintained since that time. High distant water catches were observed from 1971 to 1977 (greater than 40,000 mt annually), but since 1982 have diminished to negligible amounts. USA landings during the past five years have varied between 10,100 and 13,600 mt and averaged 12,000 mt (Table E.6.3.2.2.1). In 1993, commercial landings were 12,800 mt. Recreational landings have been insignificant since 1986.

The NEFSC autumn trawl survey biomass index has shown a declining trend since 1985. Survey indices in the past three years have been at near record low levels.

Fishing mortality (F) was relatively low between 1955 and 1962, ranging from 0.09 to 0.41 (average = 0.24). With increased fishing effort on the stock beginning in 1963, F rose rapidly

and reached 0.98 in 1965. Fishing mortality decreased to 0.5 during 1978-1980 but increased to over 1.0 during 1983-1987. Although VPA estimates of fishing mortality and stock size are not available from 1988 onward, NEFSC survey data suggest that F has been close to 1.2 in recent years.

Significant mortality of age 1 and 2 (<25 cm) fish occurs through discarding in the large mesh (>5.5 inch mesh) and small mesh (<3.5 inch) otter trawl fisheries. Discard estimates over the 1989-1992 period range from 1,300 mt to 10,000 mt. The estimated numbers of fish discarded has been quite large; ranging from 10 million in 1991 to 81 million fish in 1989. The high discard mortality on juvenile fish results in a substantial loss in long term yield from the adult component of the stock and a reduction in spawning biomass per recruit.

Bottom trawl survey results indicate that the stock abundance of silver hake is low and continues to decline. The age structure of the population is severely truncated with few fish older than age 4. Although landings are relatively low compared to historical levels, F appears to be high (>1.0) and far in excess of the F associated with the overfishing definition (i.e., 42% MSP, F = 0.34). The stock is over exploited and will continue to be so until the exploitation pattern is improved (i.e., catches of juveniles are minimized), and fishing mortality markedly reduced (U.S. Dept of Commerce 1994). Recently, a "juvenile" whiting fishery has developed in response to an export market for small silver hake that have traditionally have been discarded.

Ocean pout

Commercial interest in ocean pout has fluctuated widely. Ocean pout were marketed as a food fish during World War II, and landings peaked at 4,500 mt in 1943. However, an outbreak of a protozoan parasite that caused lesions on ocean pout eliminated consumer demand for this species as food. From 1964 to 1974, an industrial fishery developed, and nominal catches by the U.S. fleet averaged 4,700 mt. Soviet vessels began harvesting ocean pout in large quantities in 1966 and total nominal catches peaked at 27,000 mt in 1969. Foreign catches declined substantially afterward, and none have been reported since 1974. United States nominal catches declined to an average of 600 mt annually during 1975 to 1983.

Catches increased in 1984 and 1985 to 1,300 mt and 1,500 mt respectively, due to the development of a small directed fishery in Cape Cod Bay supplying the fresh fillet market. Landings remained relatively constant through 1991, averaging about 1,450 mt annually; however, due to declining market demands, landings in 1992 and 1993 dropped to 500 mt and 225 mt, respectively (Table E.6.3.2.2.1). Landings from Southern New England continue to dominate the catch, accounting for 65 percent of the total 1993 U.S. harvest, reversing landing patterns observed in 1986-87 when the Cape Cod Bay fishery was dominant.

From 1968 to 1975 (encompassing peak levels of foreign fishing and the domestic industrial fishery), commercial landings and NEFSC spring survey biomass indices declined from very high levels in 1968-69 to lows of 300 mt and 1.6 kg per tow, respectively, in 1975. Between 1975 and 1985, survey indices increased to record high levels, peaking in 1981 and 1985. Since 1985, survey biomass indices have generally declined, and are presently below the long-term survey average (4.0 kg per tow); the spring 1993 index was 3.1 kg per tow. Survey length composition data suggest that the 1987 year class was a relatively strong one, but subsequent cohorts appear weak. The population appears to be fully exploited and at a medium biomass level (U.S. Dept of Commerce 1994).

Yellowtail flounder

Figure E.6.3.2.2.3 (end of this section) shows the yellowtail flounder stock boundaries used in the Stock Assessment Workshop.

Georges Bank

Total landings of yellowtail from Georges Bank averaged 16,300 mt during 1962-1976 but declined to an average of 5,800 mt between 1978 and 1981. Strong recruitment from the 1977 and 1980 year classes and high fishing effort allowed landings to exceed 10,500 mt in 1982 and 1983. Since 1985, landings have been 3,000 mt or less. Landings fell to a record low of 1,100 mt in 1989, increased to 2,900 mt in 1992 but declined to 2,300 mt in 1993 (Table E.6.3.2.2.1).

Abundance indices for yellowtail flounder from both the NEFSC autumn and spring surveys have declined at average rates of about 10% per year since 1963. Several large year classes have temporarily reversed the overall rate of decline but the general trend has persisted. Between 1963 and 1969, autumn survey indices averaged 26 fish per tow; in the last five years the average was less than 3 yellowtail per tow. Declines in average weight per tow have been less pronounced but suggest that current biomass levels are about 10% of levels observed in the 1960s.

Instantaneous fishing mortality rates have exceeded 1.0 (58% exploitation rate) in 16 of the past 21 years. The current minimum size limit (13 inches) and mesh regulations delay full recruitment to the fishery until age 4. Discarding of small yellowtail is an important source of mortality owing to intense fishing pressure and the discrepancy between minimum size limits and trawl selectivity properties. The average fishing mortality rate during the last 10 years has exceeded 1.3 (67% exploitation rate), four times greater than $F_{0.1}$ (0.28) and twice as large as the fishery mortality rate associated with the overfishing definition for this stock (i.e., $F_{20\%} = 0.58$).

Spawning stock biomass levels of more than 5,000 mt in 1989-1990 and in 1992 were due entirely to recruitment of moderate year classes (1987 and 1990, respectively). These levels are less than a third of those observed as recently as 1982 (17,300 mt), a fifth of the 1973 biomass (25,000 mt), and most likely, a much smaller fraction of earlier levels.

The stock is overexploited and at a low level of abundance with few age groups present. Rebuilding of the stock will require reduction in fishing mortality to near zero and several years of improved recruitment. It has been concluded that this stock has collapsed (U.S. Dept. of Commerce 1994).

Southern New England

Total landings of yellowtail flounder from the Southern New England stock averaged 20,000 mt during 1963-1968 but declined abruptly after 33,000 mt were landed in 1969. Landings fell by 75% to 8,900 mt in 1971 and have exceeded that level only three times in the past 24 years. USA landings increased rapidly between 1981 and 1983 to 17,000 mt due to strong recruitment of the 1980 year class. Landing subsequently declined to a low of only 900 mt in 1988. Another short-lived recovery occurred in 1990 when the strong 1987 year class became fully recruited. The apparent recoveries in 1983 and 1990 have produced landings roughly one-half of the preceding maximum values. In 1993, landings totaled only 500 mt, a record low (Table E.6.3.2.2.1).

NEFSC autumn survey abundance and biomass indices were at historically high levels between 1963 and 1972, but declined sharply in 1973. Since then, the low level of survey indices has been briefly punctuated by the recruitment of the strong 1980 and 1987 year classes. Survey

catches in the intervening years were among the lowest on record. Recruitment of the 1987 year class boosted the 1989 index to its highest level since 1983 but this increase was ephemeral. By 1992 the index had fallen to the lowest level in the 30-year series. The average rates of decline in the spring and autumn surveys are statistically identical and indicate an average rate of decline of 11% per year. Current stock size is about 5% of levels observed in the late 1960s.

Instantaneous fishing mortality rates on the fully recruited ages fluctuated between 0.6 and 1.1 between 1973 and 1979. Since then fishing mortality rates have averaged 1.6 per year (74% exploitation rate). In the last 5 years yellowtail older than 4 years have virtually disappeared from both the commercial landings and trawl surveys. During this same period fishing mortality has removed nearly 80% of population biomass each year. Under prevailing levels of depressed abundance and extremely high fishing mortality, any increases in future landings will depend totally on strong year classes. Spawning stock biomass in 1993, however, was at its lowest level on record (1,000 mt compared to 22,000 mt in 1989, and a long term average of 9,000 mt). Thus even favorable environmental conditions for recruitment may not be sufficient to begin a recovery.

Discarding of undersized yellowtail flounder in Southern New England is a more serious problem than on Georges Bank. Recent estimates suggest that the discarded biomass per recruit exceeds the average landings per recruit by a factor of two. This stock is overexploited and at an extremely low level of abundance. Fishing mortality during 1990-1992 averaged 2.2 (83% exploitation rate), four times greater than fishing mortality corresponding to the overfishing definition for the stock (i.e., $F_{20\%} = 0.49$). It has been concluded that this stock has collapsed and that measures should be taken to reduce fishing mortality to levels approaching zero (U.S. Dept. of Commerce 1994).

Cape Cod

Traditionally, landings of yellowtail flounder from the Cape Cod stock have been a small fraction of the landings from Southern New England and Georges Bank. In 1993, for the first time, landings from the Cape Cod stock (800 mt) exceeded those from Southern New England. Landings of Cape Cod yellowtail fluctuated between 1,500 and 2,000 mt in the 1960s, increased during the 1970s and attained a record-high of 5,000 mt in 1980, and then declined reaching a record low level of 800 mt in 1992 and 1993 (Table E.6.3.2.2.1).

The NEFSC autumn survey indices have been highly variable, but have reflected the general pattern of landings. As observed for Southern New England and Georges Bank stocks the relatively strong 1987 dominated index values in 1989. Survey values in 1992 were similar to 1989 levels but declined in 1993. Recent declines in landings and relatively low survey indices (compared to those in the mid 1970s) suggest that stock biomass has been reduced by the high catches of the late 1970s and early 1980s. Given these factors, the stock is considered to be over-exploited (U.S. Dept. of Commerce 1994).

Winter flounder

Gulf of Maine

Commercial landings from the Gulf of Maine increased from a steady 1,000 mt for the period 1961 to 1975 to nearly 3,000 mt in 1982. Recreational landings estimates, first available in 1979, combined to produce a total catch of 7,100 mt in that year. Total landings dropped precipitously in 1983 to 3,400 mt primarily due to a 70 percent reduction in recreational landings

and a 25 percent reduction in commercial landings. Since 1988, landings in both fisheries have continued to trend downward. Combined landings in 1993 were only 700 mt, a record low for the 1979-1993 time series. Estimated recreational catches in 1993 (<100 mt) were the lowest observed. Commercial landings of 600 mt were the lowest in the 1964-1993 time period (Table E.6.3.2.2.1).

Bottom trawl survey abundance indices from the Massachusetts Division of Marine Fisheries spring survey of the Massachusetts Bay-Cape Cod Bay areas decreased after 1983, and reached a record-low in 1988. Since 1989, the survey indices have remained stable but at a low level. Commercial catch per unit effort (CPUE) indices (tonnage class 2 otter trawlers) peaked in the late 1960s to early 1970s, averaging 3.0 mt per day fished (df) between 1968 and 1971. CPUE has since declined steadily, with the 1992-1993 values (0.7 mt per df) the lowest in the 30-year time series.

The continuing low level of landings, CPUE indices, and survey indices indicate that winter flounder abundance in the Gulf of Maine has been reduced substantially. Future improvements in the condition of the stock will depend on decreases in exploitation in both the recreational and commercial fisheries, and on improved recruitment. The stock is considered to be overexploited and at a low biomass level (U.S. Dept. of Commerce 1994).

Georges Bank

Commercial landings from the Georges Bank region increased from 1,900 mt in 1976 to near record high levels during 1980-84 (average of 3,800 mt per yr). Between 1985 and 1988, landings averaged 2,400 mt per year; but in recent years (1991-1992) averaged 1,800 mt per year. No recreational catches have been reported from this stock. Landings in 1993 (1,700 mt) remained near the lowest on record (Table E.6.3.2.2.1). Catch per unit effort indices in 1993 were also among the lowest ever observed. The NEFSC autumn survey stock biomass index has generally trended downward since 1977. Survey indices increased slightly in 1992-1993 but were still among the lowest in the 30-year survey time series. Commercial and survey data both indicate that the stock has declined to record low levels, and is overexploited (U.S. Dept. of Commerce 1994).

Southern New England-Middle Atlantic

Commercial landings from the southern New England to Mid-Atlantic area increased from roughly 4,000 mt in the mid-1970s to nearly 12,000 mt in 1981. Recreational catches are unknown for that period. Commercial landings have declined steadily from their early 1980s level, while recreational catches increased from 1980 to 1985, and then declined. The combined recreational and commercial landings decreased slightly between 1992 and 1993, from 3,800 mt to a record low of 3,600 mt in the 1979-1993 time series. Commercial landings in 1993 (3,000 mt) reached a new record low (Table E.6.3.2.2.1), compared to historical averages of 6,800 mt (1964-1991). Recreational landings declined from 2,000 mt in 1989 to approximately 600 mt in 1993, a near record low level.

NEFSC spring survey indices show trends similar to those of commercial catches since about 1975, increasing through 1981 and thereafter declining. The 1993 survey index was the lowest level in the 30-year time series. Commercial CPUE indices (tonnage class 3 otter trawlers) show a continuous decline from the 1964-1983 average of 2.7 mt per df to a record low 1993 value of 0.6 mt per df.

Continued record low commercial and survey indices in the recent years indicate substantial reductions in stock abundance. There are uncertainties, however, in the stock structure in this region with suggestions of many localized groups. Thus, local fluctuations in catches might be expected since fishing pressure is not applied uniformly throughout the region. However, all of the data available indicate that the stocks are overexploited and at a low biomass level (U.S. Dept of Commerce 1994).

American plaice

Landings of American plaice increased from an average of 2,300 mt during 1972-1976 to an average of 12,700 mt per year during 1979-1984. Subsequently, annual landings declined and since 1985 have ranged between 2,300 mt and 7,000 mt. Landings declined from 6,600 mt in 1992 to 5,800 mt in 1993 (Table E.6.3.2.2.1). Between 1960 and 1974, 67% of USA landings were from deepwater areas on Georges Bank. Since then, Gulf of Maine landings have greatly exceeded those from Georges Bank. The USA 1993 Gulf of Maine catch (3,900 mt) was more than twice as large as that from Georges Bank (1,800 mt).

USA commercial CPUE indices were relatively stable between 1964 and 1969, declined in the early 1970s, and sharply increased to a record-high in 1977 when total landings doubled. Subsequently, annual CPUE indices steadily declined reaching a record-low in 1988. The index has since remained relatively stable at low values.

Abundance and biomass indices from autumn NEFSC surveys reached record-low values in 1987 but increased through 1990 as the strong 1987 year class recruited to the survey gear. The indices declined in 1991 and 1992, but markedly increased in 1993 due to improved recruitment from the 1989 and 1990 year classes.

Fishing mortality on fully recruited ages (6-9+) more than doubled between 1981 (F=0 .36) and 1987 (F=0.87), but declined to F=0.47 in 1990. Fishing mortality in 1991 was estimated to be 0.58, which is well above F_{max}=0.29 and the F needed to attain 20% maximum spawning potential ($F_{20\%}$=0.49), the overfishing definition established for this stock. Based on landings data, fishing mortality in 1992 and 1993 was projected to have been above 0.70.

Spawning stock biomass declined from 41,400 mt in 1980-1982 to 7,700 mt in 1987-1989. In 1991, the spawning stock biomass increased to 13,400 mt as the strong 1987 year class began to recruit to the spawning stock. Spawning stock biomass was projected to remain relatively stable in 1992 and 1993.

Discard estimates of American plaice indicate that discarding has been highest on age 2 and 3 fish in the northern shrimp fishery and on age 3 and 4 fish in the large mesh otter trawl fishery. Estimates of discarded plaice in the northern shrimp fishery using sea sampling data indicated that by 1991, 40% of the total cumulative catch (in numbers) of the 1987 year class had been discarded. Similarly, in the large mesh fishery, estimates of discarding of plaice indicated that 41% of the total cumulative catch of the 1987 year class had been discarded by 1991.

The decline in landings that occurred between 1983 and 1989 reflected a declining trend in harvestable biomass, as indicated by both catch per unit effort and survey indices. Fishing effort has increased in recent years and levels of both fishing and discard mortality are likely to remain high. Given these conditions, abundance of American plaice is expected to remain at medium levels and the stock will remain over exploited U.S. Dept. of Commerce 1994).

Witch flounder

The USA nominal catch has fluctuated between Georges Bank and Gulf of Maine. In recent years most of the U.S. catch has come from the Gulf of Maine area. Canadian nominal catches from both areas have been minor (never more than 68 mt annually). Distant-water fleet catches averaged 2,700 mt in 1971-1972, but subsequently declined sharply and have been negligible since 1976. After averaging 2,800 mt during 1973-1981, total nominal catches increased sharply during the early 1980s and peaked at 6,500 mt in 1984. Landings then steadily declined through 1990 reaching 1,500 mt, the lowest level since 1964. Landings have since increased slightly to 2,600 mt in 1993 (Table E.6.3.2.2.1).

The NEFSC autumn survey catches seem to accurately reflect trends in biomass. Heavy exploitation by distant-water fleets in 1971-1972 was followed by a decline in the autumn index from an average of 3.6 kg per tow in 1966-1970 to 0.9 kg per tow in 1976. Biomass increased in 1977-78 but subsequent indices have declined steadily to the lowest levels on record. The 1993 value of 0.5 kg per tow represents only a slight increase over the record low 1992 value of 0.2 kg per tow.

Between 1982 and 1993, a total of 8.7 million witch flounder were discarded in the northern shrimp fishery and large-mesh otter trawl fisheries. Discards in the northern shrimp fishery consisted primarily of ages 1-4 witch flounder, while discards in the large mesh otter trawl fishery are largely comprised of fish age 3 and older. At age 6 and older almost all fishing mortality is generated by the landings.

Fishing mortality on fully-recruited ages (7 to 9+) increased from F=0.19 (16% exploitation rate) in 1982 to F=0.55 (40% exploitation rate) in 1985, declined to 0.24 (20% exploitation rate) in 1990 and 1991 and increased to 0.45 (34% exploitation rate) in 1993. The current F exceeds the overfishing reference level of $F_{20\%} = 0.39$. Spawning stock biomass (SSB) sharply declined from 26,000 mt in 1982 to about 6,300 mt in 1990 and has fluctuated at about 7,000 mt through 1993. Due to continued growth and maturation of the strong 1990 year class, SSB is expected to increase in the short term (1995 and 1996), but will thereafter decline unless fishing mortality is reduced.

Since the mid-1980s, the age structure of the stock has become severely truncated. The 1980 autumn survey indicated that 34% of the witch flounder population was age 11 or older. In 1984, 14% of the population was age 11 or older, and by 1993, only 1% of the population was 11 years or older. This trend is also reflected in the commercial landings; 16% of the 1984 landings were age 11 or older, while by 1993, landings of fish age 11 or older had dropped to 8 percent. The stock is at a low biomass level and is overexploited (U.S. Dept. of Commerce 1994).

Windowpane flounder

Windowpane were first commercially exploited in 1943-45 during the end of World War II. Between then and 1975, windowpane were harvested as part of an industrial fishery. Separate commercial landings data for this species have only been available since 1975. Total landings declined from 2,000 mt in 1975 to a low of 900 mt in 1980. Annual landings increased to a peak of 4,200 mt in 1985 and have since declined to 1,600 mt in 1993 (Table E.6.3.2.2.1). Total landings in 1993 were 24 percent lower than in 1992 (2,100 mt), and were about 40 percent lower than the 1988-1992 average (2,600 mt).

Because no stock structure information is presently available, a provisional summary of

information is given for two areas corresponding to survey strata, based on suggested differences in growth, maturity and abundance trends between fish from Georges Bank and Southern New England. Because the proportion of landings contributed by the Gulf of Maine and Mid-Atlantic areas is low (less than 7%), information from these two areas is combined with that from Georges Bank and Southern New England areas, respectively.

Gulf of Maine-Georges Bank

Annual landings from the Gulf of Maine-Georges Bank area have fluctuated between 400 and 2,900 mt. Landings in 1993 were 1,200 mt, 20% less than in 1992 and 59% less than the record-high 1991 catch (Table E.6.3.2.2.1). No recreational catches have been reported from this area.

Increased landings since the mid-1980s probably reflect an expansion of the fishery offshore, as well as the targeting of windowpane flounder as an alternative to other depleted flatfish stocks. The NEFSC autumn offshore indices, although highly variable, have declined since 1984. Preliminary indices of commercial catch-per-unit-effort (CPUE) show a declining trend since 1975. These data suggest that stock abundance has fallen in recent years and that the stock is presently overexploited (U.S. Dept of Commerce 1994).

Southern New England-Middle Atlantic

Commercial landings from the Southern New England-Middle Atlantic area averaged 700 mt per year during 1975-1983. Landings levels increased during 1984-1989, peaking at 2,100 mt in 1985 and 1,800 mt in 1988. Landings have since declined to a record-low of 400 mt in 1993 (Table E.6.3.2.2.1).

Both NEFSC autumn offshore survey indices and preliminary indices of commercial CPUE have declined since the early 1980s to record low levels. These data imply that the stock is at a low biomass level and is overexploited (U.S. Dept. of Commerce 1994).

Table E.6.3.2.2.1 USA commercial landings (metric tons, live) of 13 species in the Northeast Multi-species Fishery Management Plan.

Species/ Stock	Average 1974-1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Cod											
Gulf of Maine	11.7	10.8	10.7	9.7	7.5	8.0	10.4	15.2	17.8	10.9	8.3
Georges Bank	27.9	32.9	26.8	17.5	19.0	26.3	25.1	28.2	24.2	16.9	14.6
Haddock											
Gulf of Maine	4.4	2.8	2.2	1.6	0.8	0.4	0.3	0.4	0.4	0.3	0.2
Georges Bank	10.2	8.8	4.3	3.3	2.2	2.5	1.4	2.0	1.4	2.0	0.7
Pollock											
Gulf of Maine-Georges Bank	14.0	17.9	19.5	24.5	20.4	14.9	10.5	9.5	7.9	7.2	5.7
Redfish											
Gulf of Maine-Georges Bank	9.9	4.7	4.2	2.9	1.9	1.1	0.6	0.6	0.5	0.8	0.8
White Hake											
Gulf of Maine	4.7	6.5	6.4	5.3	5.5	5.4	5.0	5.0	5.6	8.5	7.4
Red Hake											
Gulf of Maine-N. Georges Bank	0.8	1.1	1.0	1.5	1.0	0.9	0.8	0.8	0.7	0.9	0.7
S. Georges Bank-Mid-Atlantic	3.4	1.2	0.8	0.6	0.9	0.9	0.8	0.8	0.9	1.1	0.9
Silver Hake											
Gulf of Maine-N. Georges Bank	6.6	8.3	8.3	8.5	5.7	6.8	4.6	6.4	6.1	5.3	4.4
S. Georges Bank-Mid-Atlantic	12.0	12.7	11.8	9.4	9.8	9.2	13.2	13.8	10.5	10.3	12.8

Ocean Pout	0.8	1.3	1.5	0.8	2.2	1.8	1.3	1.3	1.4	0.5	0.2

Table E.6.3.2.2.1 (Continued)

Species/ Stock	Average 1974-1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Yellowtail Flounder											
Georges Bank	9.3	5.8	2.5	3.0	2.7	1.9	1.1	2.7	1.8	2.9	2.1
Southern New England	6.0	7.9	2.7	3.3	1.6	0.9	2.5	8.0	3.9	1.5	0.5
Cape Cod	3.2	1.1	1.0	1.0	1.2	1.1	0.9	3.0	1.5	0.8	0.8
Winter Flounder											
Gulf of Maine	2.0	1.7	1.6	1.3	1.2	1.3	1.2	1.1	1.0	0.8	0.6
Georges Bank	3.1	3.9	2.2	1.8	2.6	2.8	1.9	1.9	1.8	1.8	1.7
Southern New England	7.0	8.9	6.6	4.9	5.2	4.5	3.7	3.6	4.7	3.4	3.0
American Plaice											
Gulf of Maine-Georges Bank	9.1	10.1	7.0	4.1	3.8	3.3	2.3	2.5	4.3	6.6	5.8
Witch Flounder											
Gulf of Maine-Georges Bank	3.2	6.5	6.1	4.2	3.5	3.4	2.1	1.5	1.8	2.2	2.6
Windowpane Flounder											
Georges Bank	0.8	0.7	2.1	1.8	1.4	0.5	1.6	1.1	2.9	1.5	1.2
Southern New England	0.7	1.1	2.1	1.4	0.9	1.8	1.1	0.9	0.8	0.6	0.4

Notes:

Windowpane flounder: 1975-1983 average used.

References:

U.S. Dept of Commerce. 1994. Status of the Fishery Resources off the Northeastern United States for 1994. NOAA Tech. Memo. NMFS-F/NE-108.

Figure E.6.3.2.2.1

Figure E.6.3.2.2.2

Figure E.6.3.2.2.3

E.6.3.3 Other stocks

In addition to the stocks covered under the multispecies FMP, there are a number of commercially valuable species in the region, some of which are managed by plans developed by the NEFMC, MAFMC, ASMFC or NMFS, some of which are managed by individual states, and others which are not regulated at this time. In some cases the species are caught with the same or similar gear and vessel types as those used to catch multispecies (for example, summer flounder, goosefish and spiny dogfish). In other cases the gear and, frequently, the vessel type used is characteristically different (such as the surf clam dredge). The relative size and value of the fisheries for the principal commercial species is shown in Table E.6.3.3.1. Additional information about the different fisheries can be found in Table E.7.1.1.2.1.

The multispecies fishery interaction with these other fisheries may be direct (through the gear or as a bycatch fishery, for example) or indirect (through some ecosystem relationship). This relationship between the multispecies fishery and the other fisheries is not static as changes occur in abundance, geographical distribution, market conditions and technology. In many cases what was once discarded as unmarketable bycatch is now a high-value, directed species. The impacts of this action on these other fisheries is discussed in Section E.7.1.1, to the extent they can be predicted.

TABLE E.6.3.3.2 Important species landed or raised in the Northeast, their landings (1,000 mt), values ($ million) and prices ($/lb), 1986-1993. (preliminary data, 1993)

Year	Quantity	Value	Price	Quantity	Value	Price	Quantity	Value	Price	Quantity	Value	Price	Quantity	Value	Price
	Am. Lobster			Sea Scallops			Blue Crab			Cod			Hard Clam		
1986	20.8	120.1	2.62	8.3	91.0	4.97	42.9	34.3	0.36	27.6	36.0	0.59	4.7	40.6	3.92
1987	20.8	142.1	3.10	13.2	123.4	4.23	38.9	37.6	0.44	26.8	44.2	0.75	5.0	50.3	4.59
1988	22.2	146.4	2.99	13.0	121.9	4.24	41.8	40.6	0.44	34.6	43.0	0.56	6.8	48.7	3.25
1989	24.0	148.9	2.82	14.4	126.6	3.98	45.6	42.0	0.42	35.6	47.8	0.61	4.2	50.6	5.48
1990	27.6	151.0	2.48	17.2	147.4	3.88	43.9	43.2	0.45	43.6	61.4	0.64	4.6	46.9	4.63
1991	29.1	166.1	2.59	17.2	153.5	4.05	49.5	40.4	0.37	42.2	74.3	0.80	4.4	44.8	4.61
1992	26.0	166.5	2.91	14.2	153.7	4.89	30.1	34.7	0.52	27.9	52.2	0.85	4.3	40.7	4.30
1993	26.3	160.4	2.77	7.4	97.9	6.03	57.1	69.5	0.55	23.0	45.0	0.89	4.3	43.6	4.58
	Atlantic Salmon			Menhaden			Surfclam			Oyster			Squid Loligo		
1986	0.0	0.0	0.00	222.6	24.3	0.05	35.4	42.2	0.54	6.8	37.8	2.51	11.5	9.0	0.35
1987	0.0	0.0	0.00	300.0	32.5	0.05	27.4	27.9	0.46	4.3	29.5	3.11	10.5	9.3	0.40
1988	0.0	0.0	0.00	273.5	29.7	0.05	28.6	28.9	0.46	3.1	26.2	3.81	18.9	15.4	0.37
1989	0.0	0.0	0.00	287.8	31.3	0.05	30.4	30.7	0.46	2.4	22.3	4.16	23.0	21.8	0.43
1990	2.1	16.1	3.50	336.1	37.2	0.05	32.6	32.4	0.45	3.3	40.1	5.54	15.0	14.0	0.43
1991	4.7	30.0	2.89	294.8	33.2	0.05	30.0	29.2	0.44	4.0	40.8	4.67	19.4	22.7	0.53
1992	5.8	45.3	3.52	285.9	31.6	0.05	33.2	34.7	0.47	4.6	55.7	5.44	18.2	23.3	0.58
1993	6.7	42.6	2.86	317.0	41.9	0.06	33.5	38.2	0.52	4.2	35.9	3.90	22.3	29.6	0.60
	Sea Urchins			Goosefish			Ocean Quahog			Bluefin tuna			Soft Clam		
1986	0.0	0.0	0.00	6.7	6.9	0.47	20.6	15.7	0.35	0.9	15.2	7.92	2.9	20.8	3.21
1987	0.7	0.2	0.16	6.9	9.8	0.64	22.8	16.6	0.33	1.0	11.9	5.54	3.4	19.2	2.58
1988	2.8	1.8	0.28	7.6	10.4	0.62	21.0	14.9	0.32	0.8	11.3	6.61	3.5	20.1	2.60
1989	4.3	3.6	0.38	11.3	12.6	0.51	23.1	16.4	0.34	1.1	19.7	8.01	2.9	19.4	2.98
1990	6.1	6.1	0.45	10.1	13.1	0.59	21.2	16.3	0.35	1.0	21.2	9.26	2.4	20.8	3.88
1991	9.3	11.2	0.54	12.1	21.8	0.81	22.3	19.0	0.39	0.9	15.3	7.58	1.9	14.8	3.51
1992	12.0	15.2	0.57	15.8	20.7	0.60	23.0	20.1	0.40	0.9	14.5	7.23	1.9	17.8	4.23
1993	19.2	27.2	0.64	18.5	21.7	0.53	26.2	29.3	0.51	1.0	19.3	8.92	2.1	20.5	4.47
	Summer fl.			Winter fl.			Am. Plaice			Whiting			Yellowtail fl.		
1986	9.5	26.3	1.25	8.0	17.6	1.00	6.1	12.4	0.92	18.0	8.2	0.21	10.4	21.0	0.92
1987	9.9	32.0	1.46	9.0	24.1	1.21	5.1	11.9	1.07	15.7	11.6	0.33	7.6	20.1	1.20
1988	11.6	33.6	1.31	8.4	22.4	1.20	4.7	10.5	1.01	16.1	8.6	0.24	5.0	13.2	1.19
1989	6.2	22.2	1.63	6.6	19.6	1.34	3.5	8.8	1.14	17.8	9.4	0.24	5.6	13.9	1.13
1990	3.0	12.0	1.84	7.0	17.1	1.11	2.5	5.6	1.03	20.0	11.1	0.25	14.4	28.1	0.89
1991	4.6	14.8	1.45	7.6	19.1	1.14	4.3	8.9	0.94	16.1	11.1	0.31	7.6	17.4	1.03
1992	6.4	19.6	1.39	6.5	16.2	1.14	6.6	13.9	0.95	16.2	10.9	0.30	5.7	14.0	1.12
1993	4.4	15.3	1.57	5.3	15.3	1.31	5.8	15.0	1.17	17.3	14.0	0.37	3.6	10.4	1.30
	Swordfish			Witch fl.			Squid Illex			Pollock			White Hake		
1986	2.0	13.1	3.01	5.2	12.9	1.14	4.4	1.5	0.15	24.6	14.0	0.26	6.4	4.8	0.34
1987	2.1	16.0	3.39	3.8	12.2	1.45	7.0	3.1	0.20	20.7	17.9	0.39	5.8	5.2	0.41
1988	2.7	18.1	2.99	3.6	11.6	1.46	2.0	0.6	0.13	15.0	11.0	0.33	4.8	3.2	0.31
1989	2.7	17.2	2.92	2.4	9.0	1.73	6.8	3.2	0.22	10.5	9.9	0.43	5.1	4.4	0.39
1990	2.3	15.1	2.92	1.5	5.8	1.78	11.3	6.5	0.26	9.6	10.6	0.50	4.9	4.3	0.39
1991	1.8	12.0	3.00	1.8	6.1	1.57	11.9	6.9	0.26	7.9	9.9	0.57	5.6	5.4	0.44

1992	1.7	10.8	2.90	2.2	7.0	1.41	17.8	9.7	0.25	7.2	10.5	0.66	8.4	8.0	0.43
1993	1.5	9.9	2.92	2.6	9.0	1.57	18.0	8.5	0.21	5.7	8.4	0.67	7.5	7.3	0.44
	Butterfish			At. Herring			Bigeye Tuna			Scup			Northern Shrimp		
1986	4.5	6.5	0.66	32.0	3.8	0.05	0.6	4.4	3.43	6.7	8.3	0.56	4.7	6.5	0.63
1987	4.6	6.4	0.63	39.4	4.5	0.05	0.6	4.7	3.56	6.0	8.7	0.66	5.0	12.2	1.10
1988	2.1	3.2	0.68	40.9	5.2	0.06	0.5	4.0	3.95	5.6	8.1	0.66	3.1	7.5	1.10
1989	3.0	3.9	0.60	40.7	5.0	0.06	0.4	2.7	3.18	3.5	6.1	0.78	3.6	7.8	0.98
1990	2.3	2.8	0.56	51.3	5.7	0.05	0.4	3.9	4.03	4.2	6.4	0.68	4.4	6.9	0.72
1991	2.1	2.7	0.59	48.5	6.3	0.06	0.7	6.2	3.93	6.8	7.8	0.52	3.4	6.8	0.91
1992	2.8	3.4	0.56	55.8	6.8	0.06	0.5	4.8	4.66	5.9	7.6	0.59	3.4	7.3	0.99
1993	4.5	6.8	0.69	49.5	6.5	0.06	0.8	5.9	3.55	4.4	5.7	0.58	2.3	5.2	1.03
	Tilefish			Spiny Dogfish			Black Sea Bass			Haddock			Yellowfin Tuna		
1986	2.0	5.0	1.17	2.6	0.3	0.06	1.6	3.5	0.99	5.0	10.9	0.99	0.7	1.8	1.16
1987	3.2	7.9	1.11	2.6	0.4	0.07	1.7	3.9	1.02	3.0	8.5	1.28	0.9	2.6	1.25
1988	1.4	5.3	1.76	2.9	0.4	0.07	1.3	3.2	1.08	2.9	7.0	1.09	0.8	2.4	1.46
1989	0.5	2.0	1.81	4.4	0.8	0.09	1.0	2.7	1.20	1.7	4.5	1.19	0.5	1.6	1.33
1990	0.9	3.8	1.97	14.6	3.3	0.10	1.3	3.0	1.06	2.5	6.0	1.10	0.6	2.4	1.71
1991	1.2	4.2	1.61	11.5	2.4	0.09	1.2	3.1	1.20	1.8	4.6	1.13	2.0	3.5	0.80
1992	1.7	5.5	1.51	11.4	2.9	0.11	1.3	2.8	1.00	2.3	5.6	1.09	1.4	3.9	1.23
1993	1.8	5.0	1.23	15.8	4.6	0.13	1.3	2.9	0.99	0.9	2.7	1.38	0.6	2.6	2.06
	Striped Bass			Skates			Windowpane fl.			Mussels			Weakfish		
1986	0.1	0.2	1.06	1.0	0.2	0.07	3.2	3.7	0.52	2.9	2.5	0.39	2.7	2.7	0.45
1987	0.1	0.2	1.32	1.4	0.3	0.08	2.3	3.1	0.61	2.9	2.3	0.36	2.2	2.7	0.55
1988	0.1	0.4	1.39	2.1	0.3	0.07	2.6	3.0	0.53	3.9	2.9	0.33	2.2	2.3	0.48
1989	0.1	0.4	2.12	6.7	0.9	0.06	2.6	3.1	0.55	4.3	3.4	0.35	1.7	2.7	0.73
1990	0.3	1.0	1.48	11.4	2.0	0.08	2.0	1.7	0.38	3.9	2.9	0.34	1.4	2.2	0.69
1991	0.3	1.4	1.75	11.3	1.8	0.07	3.7	4.4	0.54	2.9	2.2	0.33	1.5	2.5	0.77
1992	0.6	2.4	1.73	12.5	2.5	0.09	2.1	3.0	0.64	4.1	3.0	0.34	1.1	1.9	0.79
1993	0.6	2.7	2.05	12.9	3.0	0.11	1.7	2.3	0.63	2.7	2.0	0.34	1.1	1.9	0.78
	Bluefish			At. Mackerel			Red Hake			Redfish			Ocean Pout		
1986	4.6	1.8	0.18	4.0	1.1	0.13	2.1	0.7	0.14	3.0	3.2	0.48	0.8	0.2	0.11
1987	3.8	2.0	0.24	4.3	1.0	0.11	2.0	0.9	0.20	1.9	2.7	0.64	2.2	0.5	0.10
1988	4.3	1.8	0.19	6.4	1.9	0.13	1.7	0.6	0.16	1.1	1.5	0.62	1.8	0.4	0.10
1989	2.7	1.3	0.22	8.1	3.2	0.18	1.6	0.6	0.17	0.6	0.9	0.66	1.3	0.3	0.10
1990	3.6	2.1	0.26	9.9	3.6	0.16	1.6	0.6	0.17	0.6	0.7	0.53	1.3	0.3	0.10
1991	3.5	1.7	0.22	16.5	5.4	0.15	1.6	0.8	0.22	0.5	0.5	0.46	1.4	0.3	0.10
1992	3.4	1.7	0.23	11.8	3.6	0.14	2.2	1.1	0.22	0.8	0.8	0.42	0.5	0.1	0.10
1993	2.8	1.9	0.31	4.7	1.3	0.13	1.7	0.9	0.25	0.8	0.8	0.46	0.2	0.1	0.10

	Total Shellfish*		Total Finfish*		Total *	
1986	170.2	433.3	415.8	268.1	586.0	701.4
1987	167.5	486.3	479.8	323.1	647.3	809.4
1988	178.1	490.0	448.9	289.2	627.0	779.2
1989	197.2	526.9	468.0	260.7	665.2	787.6
1990	201.0	547.2	558.0	321.3	759.0	868.5
1991	216.5	574.5	522.3	352.9	738.8	927.4
1992	199.6	594.7	508.4	351.7	708.0	946.4
1993	210.7	542.6	537.2	344.5	747.9	887.1

* price not meaningful for total figures

E.6.3.4 Endangered species and marine mammals

A number of protected species inhabit the management unit addressed in Amendment 7 to the Northeast Multispecies Fishery Management Plan. Eleven are classified as "endangered" or "threatened" under the Endangered Species Act of 1973; the remainder are protected by provisions of the Marine Mammal Protection Act of 1972. In the Northeast, protected species utilize marine habitats for purposes of feeding, reproduction, as nursery areas and as migratory corridors. Some species occupy the area year round while others use the region only seasonally or move intermittently inshore and offshore.

Endangered and Threatened Species Likely to Occur in the Area Covered by the Multispecies FMP

NMFS has published a detailed discussion of the status of marine mammal populations in *The U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments* (NOAA Technical Memorandum NMFS-SEFSC-363). The species found in New England waters are listed below. Species of particular concern, in that they interact with the groundfish fishery, include harbor porpoise, right whale and humpback whale.

Endangered

Right whale: *Eubalaena glacialis* - With a population of 350 animals, this species is the rarest of the world's great whales. It inhabits the Cape Cod area from December to June and the Lower Bay of Fundy from July to November. It migrates along the entire continental shelf to Florida from November to June. (See discussion of Right Whale critical habitat that follows below.)

Humpback whale: *Megaptera novaeangliae* - Humpbacks can be found along the southern edge of the Gulf of Maine, Georges Bank and off southern New England from April to December. Concentrations of animals feed during the early spring months in the Great South Channel area of Georges Bank.

Fin whale; *Balaenoptera physalus* - The most commonly sighted large whale in the management area, it inhabits all continental shelf waters in all seasons.

Sperm whale: *Physeter macrocephalus* - Sperm whales are distributed along the shelf edge in all seasons, but in summer and fall can range inshore of the 1000 meter contour.

Blue whale: *Balaenoptera musculus* - Only occasionally seen in New England, the blue whale is usually found in open seas and in colder subarctic waters.

Sei whale: *Balaenoptera borealis* - Considered uncommon, sei whales are found along the eastern and southern edges of Georges Bank.

Kemp's ridley: *Lepidochelys kempi* - Although their offshore distribution has not been determined, ridleys are most often found in bays and coastal waters from Cape Cod to Cape Hatteras from summer through fall.

Leatherback turtle: *Dermochelys coriacea* - In the Northeast, they are found in open water throughout the summer. The southern migration occurs in nearshore waters from August to November.

Green sea turtle: *Chelonia mydas* - Generally an inhabitant of the Gulf of Mexico and southeast regions, green turtles are only occasionally seen in nearshore waters from Massachusetts to

Virginia between July to November.

Shortnose sturgeon: *Acipenser brevirostrum* - While it does not occur in the offshore marine environment, the species spawns in the major river systems in the Northeast. Currently NMFS is conducting a status review and is developing a recovery plan.

Threatened

Loggerhead turtle: *Caretta caretta* - The most common turtle in the management area, loggerheads range from Cape Cod to Cape Hatteras from spring through fall.

Species Proposed for ESA Listing

Harbor porpoise: *Phocoena phocoena* - The smallest of the cetaceans found in the Northeast, these animals occur in the Gulf of Maine year round and east and southeast of Cape Cod in spring and summer. The southern limits of their range may extend south to Cape Hatteras.

Atlantic salmon: *Salmo salar* - The NMFS and USFWS determined that the Atlantic salmon populations in the Sheepscot, Ducktrap, Narraguagus, Pleasant, Machias, East Machias and Dennys rivers are, as a group reproductively isolated, and therefore, discrete. These populations are also, as a group, biologically significant. The Services are proposing that these seven populations be listed as one distinct population segment (DPS) but that management be conducted on a watershed basis. Since the persistence of Atlantic salmon in the Kennebec River, Penobscot River, Tunk Stream and the St. Croix River and their link to native populations warrant further study, these populations were designated as a species of concern by USFWS and as a candidate species by NMFS (60 FR 50530, September 29, 1995).

Throughout the past 24 years, the Dennys and Narraguagus rivers have had the best returns relative to available habitat, averaging 20 percent of escapement goal. The Pleasant, Sheepscot and Machias rivers have had returns that averaged between 10 and 12 percent of escapement goal. However, recent downward trends in abundance have put most rivers at less than 10 percent of their respective escapement goals. Only the Narraguagus River has exceeded 10 percent in the past seven years.

Critical Habitat Designation

Right Whale Critical Habitat- The NMFS acted on a petition from the federally appointed Right Whale Recovery Team and designated critical habitat for the northern right whale on June 3, 1994. Two of the areas designated are in the Northeast. The area in Cape Cod Bay is located principally in Massachusetts state waters. The other is in the EEZ, in a region known as the Great South Channel. It has been identified as a spring and early summer feeding and nursery ground for a majority of the population.

Other Protected Species

Other species of marine mammals likely to occur in the groundfish management unit include the minke whale (*Balaenoptera acutorostrata*) white-sided dolphin (*Lagenorhynchus acutus*), white-beaked dolphin (*Lagenorhynchus albirostris*), bottlenose dolphin (*Tusriops truncatus*, coastal stock listed as depleted under the MMPA), pilot whale (*Globicephala melaena*), Risso's dolphin (*Grampus griseus*), common dolphin (*Delphinis delphis*), spotted dolphin (*Stenella* spp.), striped dolphin (*Stenella coeruleoalba*), killer whale (*Orcinus orca*), beluga whale (*Delphinapterus leucas*), Northern bottlenose whale (*Hyperoodon ampullatus*), goosebeaked whale (*Ziphius cavirostris*) and beaked whale (*Mesoplodon* spp.). Pinnipeds species include harbor (*Phoca vitulina*) and gray seals (*Halichoerus grypus*) and less commonly, hooded (*Cystophora cristata*)

harp (*Pagophilus groenlandicus*) and ringed (*Phoca hispida*) seals.

E.6.3.5 Other biota

See Amendment 5.

E.6.3.6 Stellwagen Bank Marine Sanctuary

See Amendment 5.

E.6.4 HUMAN ENVIRONMENT

The human environment encompasses a variety of characteristics of the fishing industry and fishing communities up and down the northeastern Atlantic coast, including the cultural composition, employment history, education, regulatory restrictions on fishing, and economic constraints on community development. This chapter discusses these characteristics so as to give the reader the background information necessary to fully analyze the fisheries management alternatives presented in subsequent chapters.

E.6.4.1 The commercial and recreational groundfish fishery

The profile of the commercial and recreational groundfish fishery has been created by two forces -- the natural distribution of fish and fishing regulations. The location of fish, combined with gear and other regulatory restrictions, work together to determine fishing patterns up and down the coast (see, for example, Murawski et al. 1991). The interaction of co-occurring species, that exhibit overlapping depth and temperature preferences, with fishing technologies that are not species-specific results in mixed-species catches. The exact species mixes of groundfish landings vary by season and sub-area, but are generally persistent from year to year (Overholtz and Tyler 1985).

In the Gulf of Maine, large mesh fisheries are partitioned into trawling that occurs east and west of the 'large mesh only' line. Large mesh trawling, inshore of the line, generates cod, mixed flounders pollock and goosefish (monkfish). Large mesh trawling, east of the line, is in deeper water and has a characteristic species mix of pollock, cod and white hake, and various other species. Other mixed fisheries in the Gulf of Maine historically have included sink gillnet (primarily directed at pollock, cod, white hake and dogfish), shrimp trawling (catching shrimp, cod and mixed flounders), and small mesh fisheries for whiting and various species including red hake and ocean pout. Interactions among these fisheries are important since small mesh fisheries may generate discards of species that are targeted by large mesh fisheries (Murawski et al. 1991). Regulations implemented under Amendment 5 and subsequent framework adjustment have increased species selectivity of some fisheries (for example, the separator grate in the shrimp fishery, and the square-mesh requirement on Stellwagen Bank and Jeffreys Ledge) and have eliminated small-mesh fisheries which have a greater-than-5% bycatch of regulated species.

Mixed-species fisheries on Georges Bank are almost exclusively large mesh trawl fisheries. The shallow-water assemblage yields primarily winter flounder, yellowtail flounder, skates and cod. Deeper water fisheries along the northern edge of the Bank catch a higher proportion of haddock, American plaice, and cod. The summer fishery occurring in the Cultivator Shoals area uses small mesh directed at spawning concentrations of silver hake and has an insignificant bycatch of regulated species. And, in Southern New England, the groundfish fishery is distinctly seasonal, reflecting the movement and aggregation patterns of the principal species: silver hake, cod, yellowtail flounder, and winter flounder.

The next section profiles the commercial fishery, discussing the makeup of the fleet, gear and vessel size distributions, and the various ports used by fisherman up and down the northeastern United States. The discussion centers on cod, haddock and yellowtail flounder effort which is the principal focus of this action. This is followed by a discussion of the recreational fishery, the number of trips taken, the species caught, and the location of the catch.

E.6.4.1.1 The commercial fishery

The Northeast groundfish fishery is the predominant fishery in the region in terms of landed pounds and number of vessels, and currently ranks third in terms of revenue (behind lobsters and sea scallops). Prior to 1987 and again in 1990, combined revenues from regulated groundfish

frequently exceeded revenues from scallops or lobsters. Important species of groundfish, other fish and shellfish landed or raised in the Northeast region are shown in Table E.6.3.3.2 (preceding section) along with their quantity, value, and price for the last eight years.

The groundfish fishery is characterized by a diversity of fishing operations, gear types, vessel sizes, business structures, and target species or species mix. A significant percentage of participants, possibly more than half, are seasonal or part-time. Geographically, the fishery is centered in New England (predominantly in Massachusetts, with a large group in Maine), although approximately one quarter of the identified otter trawl vessels land in the mid-Atlantic. Many mid-Atlantic otter trawl vessels regularly catch species covered by this plan, although they catch predominantly catch other species. To further complicate any descriptive analysis of the "groundfish fishery," some gear types, such as scallop dredges, catch groundfish incidentally, as a bycatch or to supplement the landings of the target species.

"The fishing industry is almost exclusively comprised of small enterprises. Apart from a handful of corporate-owned fishing vessels, most of the New England fleet is individually or family owned. Workers on these vessels never exceed fourteen and most have fewer. [The number of crew members per vessel has declined through the late 1980s and the 1990s, as a cost saving measure due to low stock levels.] In addition, much of the processing and distribution of fresh fish is also conducted by small enterprises" (Doeringer, Moss & Terkla 1986:5).

"Employment in harvesting and processing falls into one of three systems of workplace organization -- kinship capitalism, paternalistic capitalism, and corporate capitalism. Each of these employment systems is staffed according to different criteria, yields different levels of earnings, provides differing degrees of employment security, and takes different approaches to promoting labor productivity (Doeringer & Terkla 1995, in press: V-8). Kinship capitalism is a system where preference is given to hiring relatives. Paternalistic capitalism involves relationships similar to those of apprentice and master. Corporate capitalism is the system usually thought of as capitalist, where labor is hired on the basis of skills possessed and willingness to work for the wage offered.

E.6.4.1.1.1 The vessels and fleets

The following description of the groundfish fishery provides background information for assessing the impacts of the proposed, alternative management actions. Section E.6.1.1, "Data Considerations," explains the data that is used to make the following characterizations. The collection of weighout receipts, coupled with the ability to identify the particular vessel involved, allows landings to be associated with vessel and gear characteristics for federally documented vessels over five gross registered tons (GRT), the "tonnage vessels". "Undertonnage vessels", those vessels under 5 GRT and all state registered vessels, which may be larger than 5 GRT, are not individually identified in the weighout system and are, therefore, not individually associated with gear or landings data. This subsection is broken into two parts. The first focuses primarily on tonnage vessels, while the second focuses on undertonnage ones.

Tonnage Vessels

Table E.6.4.1.1.1 examines identified vessels from the weighout and lists their landings and revenue by gear type as recorded in 1993. These are all identified vessels in the region, not only those landing groundfish. These landings constitute about 61 percent of total landings for all fisheries (except menhaden) in all waters of the region.

TABLE E.6.4.1.1.1 Identified vessels' landings (thousands of metric tons, landed weight) and ex-vessel revenue (millions of dollars) in the Northeast, by gear type, 1993.

Gear Types	Landings		Revenue	
Otter Trawl, Bottom-Fish	121.0	173.2		
Dredge-Sea Scallop	10.7	93.8		
Dredge-Surf Clam & Ocean Quahog	55.8	52.5		
Longline - Bottom and Pelagic	6.5	26.7		
Pots & traps- lobster	3.7	19.9		
Sink Gillnet	14.9	16.8		
Purse Seine-Tuna	0.3		5.8	
Otter Trawl, Bottom-Scallops	0.5		4.3	
Otter Trawl, Bottom-Shrimp	1.7	3.8		
Otter Trawl, Bottom-Paired	1.4	3.1		
Pots and Traps, Crab	1.4	1.5		
Purse Seine- Menhaden	9.4		1.2	
Otter Trawl, Midwater-Paired	0.3		1.1	
Purse Seine-Herring	5.9	0.6		
All Other Gears	8.4		5.4	
	---	---		
Total		241.9		409.7

While the preceding table shows the aggregated performance of all gear types for all vessels identified in the weighout files, Table E.6.4.1.1.2, based on data in the NMFS Permit Files, shows only those vessels holding Multispecies Permits. The number of vessels that are permitted greatly exceeds the number that actually use a specific gear or fish for groundfish in any given year. In 1993, for instance, according to weigh out data there were 1,181 vessels over 5 GRT which caught cod, haddock and yellowtail flounder in some combination in 1993, but 4,210 vessels over 5 GRT held 1993 groundfish permits. This means that only 28 percent of permitted tonnage vessels were active (catching cod, haddock and yellowtail) in 1993. If we apply the same percentage to undertonnage vessels, there would have been 308 active undertonnage vessels out of 1,101 permitted. That would bring the total number of active vessels in 1993 to 1,489. Assuming the same percentages of active vessels for 1995, there would be 1,096 tonnage vessels currently active (out of 3,915 permitted) and 289 undertonnage vessels (out of 1,032), for a total of 1,385. However, as noted under data considerations, larger vessels have better coverage than smaller vessels. If we look only at percentages of tonnage vessels over 49 ft. in the weigh out versus the permit files and assume those percentages should hold for smaller vessels as well, then 48 percent of all permitted vessels are active. This would yield 2,549 active vessels in 1993 (2,021 tonnage and 529 undertonnage) and 2,375 active vessels in 1995 (1,879 tonnage and 495 undertonnage). Thus, the range of active cod, haddock and yellowtail flounder vessels for 1993 would be 1,500-2,500, and for 1995, 1,400-2,400.

Finally, it is important to keep in mind that these numbers capture active vessels that are catching cod, haddock and yellowtail flounder, not those catching other groundfish species. If the number of active vessels included those focusing on cod, haddock and yellowtail flounder as well as ones catching other species, the upper end of the range would be somewhat higher.

The 1,181 identifiable vessels over 5 GRT in the weigh out accounted for 91 percent of all landed pounds of cod, haddock and yellowtail flounder in 1993. The majority was landed by otter trawl vessels (see Table E.6.4.1.1.5 and Table E.6.4.1.1.10), with the next largest percentage being landed by gillnets.

TABLE E.6.4.1.1.2 Number of vessel permits issued in the Northeast by gear and permit category, 1993

For vessels over 5 GRT:

PROPOSED GEAR USE	bluefin tuna	summer flounder	American lobster	NE multi-species	squid ocean quahog	surf-clam	sea scallop	mackerel butterfish	Total
purse seines	16	5	2	12	2	2	2	48	89
beach seines	0	0	1	0	0	1	0	5	7
boat seines	0	4	2	6	2	2	2	17	35
bottom trawls	0	1407	893	1763	186	277	791	1303	6620
midwater trawls	0	21	8	30	2	4	4	228	297
otter trawls	0	92	33	76	13	15	40	71	340
boat dredges	0	150	192	119	753	974	1453	101	3742
gill/entanglement nets	59	147	70	473	11	13	27	390	1190
pots/traps	4	18	2053	81	1	2	9	17	2185
hand line	2161	94	2	224	1	1	2	133	2618
rod and reel	4360	812	35	1065	1	4	3	967	7247
longlines/setlines	549	51	7	571	6	8	8	62	1262
harpoon	298	0	0	1	0	0	0	0	299
other gear	0	17	12	17	14	32	31	38	161
diving gear	0	5	322	4	10	16	47	1	405
Total	7447	2823	3632	4442	1002	1351	2419	3381	26497

For vessels <= 5 GRT:

PROPOSED GEAR USE	bluefin tuna	summer flounder	American lobster	NE multi-species	squid ocean quahog	surf-clam	sea scallop	mackerel butterfish	Total
purse seines	3	0	0	5	0	0	0	15	23
beach seines	0	1	0	0	0	0	0	1	2
boat seines	0	1	0	3	0	0	0	6	10
bottom trawls	0	110	35	178	7	14	49	93	486
midwater trawls	0	3	0	4	1	2	2	12	24
otter trawls	0	10	3	15	2	4	9	9	52
boat dredges	0	0	3	1	106	151	250	0	511
gill/entanglement nets	11	55	20	196	2	3	5	208	500
pots/traps	0	5	818	23	2	3	8	6	865
hand line	2236	85	8	321	0	3	4	120	2777
rod and reel	3869	484	13	872	5	9	6	571	5829
longlines/setlines	12	27	1	322	1	2	2	42	409
harpoon	143	0	0	1	0	0	0	1	145
other gear	0	2	3	12	17	32	19	5	90
diving gear	0	6	163	1	11	17	45	1	244
Total	6274	789	1067	1954	154	240	399	1090	11967

While Table E.6.4.1.1.2 showed total numbers of permits by gear type, Table E.6.4.1.1.3 examines total numbers of gears per permit (i.e., the gear combinations proposed by individual vessels on their permits). As shown, a significant number of multispecies permit holders have the ability to use a variety of gears. This potential flexibility is an important element in analyzing how different management plans will impact the ability to earn a living of both those in the

groundfish fishery and those in other Northeast fisheries, as will be seen in subsequent sections.

This permit data is confirmed by weighout data (Table E.6.4.1.1.4 and preceding text). It shows that otter trawlers and dredges tend to be used exclusively over the course of a year, while vessels fishing with gears such as longline, pots/traps and gillnets tend to fish a combination of these gears in sequence within a year. This reflects the fact that these gears require essentially the same equipment for hauling and setting, whereas the gear used for fishing with trawls and dredges can only be used for those purposes (trawls and dredges are hauled with a large hydraulic drum that can be used for either gear). Vessels fishing with longline, pots/traps and gillnets are also generally smaller than vessels using otter trawls and dredges (see section E.6.4.1.1.1, Vessel Size and Gear Shifting). Vessels 30-45 ft. are the most likely to fish with more than one gear; 43% of these vessels, versus 29% of vessels under 30 ft., 22% of vessels 45-60 ft., 12% of vessels 60-100 ft., and 15% of vessels over 100 ft[1].

TABLE E.6.4.1.1.3 Some Common Gear Combinations Used by Individual Vessels in the Permit Files under Any FMP in 1993

	No. of Multispecies Permit Holders	**Percent of Multispecies Permit Holders**
Otter Trawl Only	605	13
Dredge Only	157	3
Pots/Traps Only	403	9
Rod & Reel Only	711	16
Gillnet Only	99	2
Longline Only	113	3
Dredge & Otter Trawl	288	6
Rod & Reel & Otter Trawl	142	3
Pots/Traps, Dredge & Otter Trawl	311	7
Pots/Traps, Dredge, Otter Trawl & Other Trawl	69	1
Pots/Traps & Longline	122	3
Gillnet & Pots/Traps	142	3
Longline, Dredge & Rod & Reel	58	1
Dredge & Pots/Traps	69	2
Pots/Traps, Gillnet & Dredge	91	2

[1] These figures are calculated from permit file data. All gears claimed by a vessel under any permit (not just groundfish) were examined.

Total Examined	3,258	71

The text and tables which follow present a condensed picture of the activity of known vessels captured by the port data collection system (weighout). It is aggregated across fleets on the basis of gear use, area fished, and tonnage class (tonnage class 2 vessels range from 5 to 50 gross registered tons (GRT); class 3 vessels are 51- 150 GRT; and class 4 vessels are greater than 150 GRT).

Several caveats are in order concerning how vessels were categorized. In general, if a vessel landed at least once in a port in the region, its total activity (i.e., all trips regardless of gear used) was ascribed to that particular region, defined as either New England, Mid-Atlantic and Chesapeake, or the entire Northeast. Hence, a vessel's activity may be represented in more than one table. The same potential for multiple representation exists for gear use. For example, if a vessel fished with gillnets and longline in the same year, its total activity will be represented in the total activity sections of both tables.

Mid-Atlantic Otter Trawl: In 1993, the total revenue for Mid-Atlantic otter trawlers was attributed to Loligo and Illex squid (33%), summer flounder (27%), whiting (9%) and scup (8%). The number of vessels using this gear in the Mid-Atlantic increased to 326 in 1993, the highest number since 1988. Increases in the number of vessels occurred in all three tonnage classes (Table E.6.4.1.1.4a). Tonnage class 2 and 3 vessels exhibited large increases in average landings and revenue per day absent in 1993 despite marked declines in the average number of days absent from port. Tonnage class 4 vessels showed opposite trends; average revenues and catch per day absent declined in 1993, while average days absent increased.

New England Otter Trawl: In 1993, the total revenue for New England otter trawlers was attributed to cod (20%), Loligo squid (12%), winter flounder (8 percent), yellowtail flounder (7%), American plaice (8%), and monkfish (7%). The total number of vessels using this gear in New England has continued to decline since 1988. In 1993, the fleet was comprised of 766 vessels, most of which were class 2 (45%) and class 3 vessels (43%) (Table E.6.4.1.1.4b). Average landings and revenue per day absent decreased in tonnage classes 2 and 4 and remained constant in tonnage class 3. The average number of trips within each vessel class was unchanged between 1992 and 1993, but the average trip length (days absent) decreased.

Otter trawlers, especially the larger vessels, often have extended ranges. They may fish the entire Northeast coast over the course of a year (Clay 1992). Nonetheless, they land about 60 percent of the time in a single port and 30 percent of the time in no more than 2 ports (Pollard-Rountree, pers. com.). Smaller otter trawlers often have highly specialized niches by species and season (Clay 1992). Otter trawlers do not do significant amounts of fishing with other gears (Pollard-Rountree, pers. com.), though they may switch species by season.

Although neither New England nor Mid-Atlantic otter trawlers did a significant amount of fishing with other gears, there was great variability among them in the number of days absent. This reflects, to some extent, the frequency of encounters of some vessels with data collection (port agents) as much as it reflects actual vessel behavior. Standardized otter trawl effort almost doubled in the decade ending 1985, declined about 10 percent between 1986 and 1989, and increased in 1990 and 1991.

Northeast Pair Trawl: In 1993, 26 vessels participated in bottom pair trawling activities in the Northeast region. Of these 26 vessels, 6 were tonnage class 3 and 20 were tonnage class 4. Pair Trawling for multispecies finfish was prohibited in March 1994, when Amendment 5 to the multispecies groundfish management plan was implemented. Since 1990, vessels harvesting multispecies finfish by means of pair trawling activity had been more efficient with significantly

higher revenue per day absent and landings per day absent than otter trawlers which worked singly. Although pair trawling trips occurred during all months of 1993, pair trawling by vessels was an occasional activity, i.e., not their primary means of fishing and was limited by weather and availability of aggregations of fish.

Northeast Shrimp Trawl: The northern shrimp fishery is seasonal (winter/spring), operating in federal waters. Since 1992, these vessels have been required to use a finfish excluder device ("grate"), which virtually eliminates the bycatch of legal-size groundfish but retains some juveniles especially flatfish and whiting. This fishery represents an alternative for some vessels excluded from groundfishing, primarily those who already engage in shrimping as part of an annual round of different fisheries by season. Ninety-five percent of shrimp landings are made by vessels using shrimp trawls, and eighty-five percent of the fleet consists of tonnage class 2 vessels. The principal gears used by shrimp vessels when the shrimp season is closed are otter trawls, gillnets and lobster traps. Many of these vessels also engage in tuna fishing during the summer months. Table E.6.4.1.1.4c shows the activity of the shrimp fleet, as well as its other fishing activity. Shrimp trawl gear was used during 29 percent of the days these vessels spent at sea, and contributed 25 percent to the total revenues of the fleet. For those trips using shrimp trawls, substantial decreases in landings and revenue per day absent occurred in 1993 in both class 2 and 3 vessels.

Northeast Gillnet: This is a broad category of gear (shown in Table 6.4.1.1.4d), but it excludes the large mesh drift net used for large pelagics. Since gillnet vessels tend to be in the smaller size classes and are less centrally distributed, they are not captured by the weighout system as completely as other vessel groups, and their landings are more often aggregated -- making analysis of this sector problematic. Nevertheless, the available data indicate that sink gillnets and small-mesh drift gillnets capture a substantial amount of cod and pollock, and smaller amounts of other groundfish species as well as bluefish. In 1993, the total revenue for small mesh drift and sink gillnets was attributed to cod (33%), pollock (14%), monkfish (10%), and several other species of lesser value.

Like shrimpers, gillnetters fish an annual round, involving a variety of fisheries by season and area. Ninety-five percent of identified gillnet vessels are tonnage class 2 vessels, which employ other gear, usually otter trawls and shrimp trawls, for approximately 20 percent of the year. The specific components of the annual round may vary from year to year, but the overall pattern does not. An independent survey of gillnet fishermen conducted by Lazar and DeAlteris of the University of Rhode Island in 1992 confirms the importance of an annual round by suggesting that the gillnet fleet is comprised primarily of seasonal (78% part time, 22% full time), small boats (80% under 46 feet in length) employing two or three fishermen. This survey suggests that lobstering and tuna fishing (rather than shrimping and otter trawling) are the principal other activities of these vessels (DeAlteris, pers. comm.).

The amount of gear deployed by gillnet fishermen also varies with target species, operational characteristics of the vessel, and the season and area being fished. Nets are deployed in strings of ten to fifteen nets per string; individual vessels may deploy up to 15 strings. The "average" number of nets in use on a typical vessel is currently a matter of some debate among fishermen, fishery scientists and managers but is somewhere between 70 and 100. The difficulty in establishing the baseline characteristics of this fishery provides an element of uncertainty in the development and assessment of management proposals.

The number of vessels in this fishery increased steadily between 1986 and 1989, decreased in 1990, but increased again to 253 vessels in 1991, 258 in 1992, and then decreased again to 244 in 1993. Both revenue per day absent and average landings per day absent increased in 1993. When examined at different temporal and geographical scales, the percentage of the total landings of a given species attributable to gillnets varies significantly due to the regional nature

of the fishery. For example, according to SAW 15 (Stock Assessment Workshop 15) of the Gulf of Maine cod stock, gillnet catches accounted for about 40 percent of the total commercial landings from that stock during 1987-1989 but only about 23 percent in 1991.

Longline and Line Trawl: In 1993, the total revenue from these related gears was attributed to swordfish (31%), tilefish (16%), bigeye tuna (16%), yellowfin tuna (7%), and cod (13%). (see Table E.6.4.1.14e.) Participation in this fleet increased from 208 vessels in 1992 to 229 in 1993. Average revenue for all vessels increased by three percent in 1993. Average landings per day absent were significantly greater in 1993 for class 2 and 3 vessels.

TABLE E.6.4.1.1.4 a,b,c,d,e

a. Mid-Atlantic otter trawl vessels, all gears used.

	Ton Class 2					Ton Class 3					Ton Class 4				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
Vessel Count	44	42	36	51	96	217	189	170	174	189	46	43	34	36	41
Average Age	21	26	24	25	25	15	16	17	18	18	8	11	13	14	12
Average GRT	30	30	28	29	29	103	105	104	104	109	175	175	179	178	176
Average Days Absent	55	63	81	64	37	70	84	99	102	83	99	135	153	125	140
Average Crew Size	2.7	2.7	2.6	2.5	2.4	4.8	4.8	5.1	4.9	4.9	7.4	7.3	7.5	7.3	7.0
Revenue Per Day Absent($)	861	731	763	741	1126	1682	1750	1896	1751	2206	3226	3020	3322	4009	3775
Lbs Per Day Absent	2241	2057	1730	1659	2207	4536	4561	5335	4676	5600	8017	7727	8674	12740	8185
Avg no. Trips per vessel	54	61	74	60	35	22	25	31	30	29	19	28	32	27	32

b. New England otter trawl vessels, all gears used.

	Ton Class 2					Ton Class 3					Ton Class 4				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
Vessel Count	360	373	368	374	341	374	358	339	328	327	112	108	115	93	98
Average Age	24	24	24	22	24	16	17	18	19	20	8	10	11	12	13
Average GRT	28	27	27	26	27	101	102	103	102	102	193	178	177	175	175
Average Days Absent	62	62	61	64	53	123	133	140	149	142	174	173	187	194	188
Average Crew Size	2.8	2.8	2.8	2.7	2.7	5.3	5.3	5.3	5.3	5.2	7.1	7.0	7.1	6.8	6.9
Revenue Per Day Absent ($)	920	944	1072	955	886	1844	1960	2136	1911	1913	3305	3321	3655	3399	3237
Lbs Per Day Absent	1585	2020	1965	1659	1492	2685	3454	3583	3158	3197	5955	6302	6459	6454	5548
Avg no. Trips per Vessel	54	51	50	53	53	35	37	36	38	38	25	28	28	31	30

c. Northeast vessels which used shrimp trawls, all gears used and shrimp gear only.

	Ton Class 2					Ton Class 3				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
All Gears:										
Vessel Count	169	178	165	186	172	49	46	33	38	30
Average Age	20	18	20	18	19	20	20	22	22	21
Average GRT	26	26	25	24	25	81	78	76	73	77
Average Days Absent	63	67	69	66	67	100	115	117	123	116
Average Crew Size	2.4	2.4	2.6	2.4	2.3	4.8	4.8	4.4	4.4	4.6
Revenue Per Day Absent ($)	845	873	1054	984	905	1461	1619	1925	1631	1441
Lbs Per Day Absent	1324	1673	1919	1512	1460	2385	3022	3719	3216	2057
Average number of Trips per Vessel	59	60	61	57	56	64	67	66	58	61

Shrimp Trawl Gear Trips Only:

Average Days Absent	28	27	24	21	21	35	36	34	27	20
Average Crew Size	2.4	2.4	2.6	2.4	2.3	4.8	4.8	4.4	4.4	4.6
Revenue Per Day Absent ($)	902	808	972	957	808	1418	1448	1740	1696	1363
Lbs Per Day Absent	1006	1164	1115	984	794	1712	2271	2120	1738	1247
Average number of Trips per Vessel	27	26	23	21	21	32	30	32	26	20

d. Northeast vessels which used gillnets, all gears used and gillnet trips only.

	Ton Class 2					Ton Class 3				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
All Gears:										
Vessel Count	224	209	240	240	233	23	16	12	18	7
Average Age	14	15	14	15	16	18	14	15	16	14
Average GRT	21	22	22	22	21	81	80	80	83	71
Average Days Absent	67	72	73	75	72	92	110	74	100	103
Average Crew Size	2.6	2.7	2.6	2.7	2.6	4.3	4.3	5.8	4.0	4.0
Revenue Per Day Absent ($)	1117	1031	1173	1163	1169	2247	1959	1743	1821	1997
Lbs Per Day Absent	3429	2407	2263	2244	2479	8963	3875	3339	3601	3872
Average number of Trips per Vessel	61	64	64	62	61	51	58	46	49	57
Gillnet Trips Only:										
Average Days Absent	51	58	57	59	60	45	54	53	34	66
Average Crew Size	2.6	2.7	2.6	2.7	2.6	4.3	4.3	5.8	4.0	4.0
Revenue Per Day Absent ($)	1126	1042	1138	1152	1181	2658	1949	1737	1746	2066
Lbs Per Day Absent	3006	2555	2447	2435	2663	6185	5323	3848	4068	3910
Average number of Trips per Vessel	47	52	49	48	51	21	35	40	19	41

e. Northeast vessels which used longlines or line trawls, all gears used and longline or line trawl trips only.

	Ton Class 2					Ton Class 3					Ton Class 4				
	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993	1989	1990	1991	1992	1993
All Gears:															
Vessel Count	71	90	119	135	148	62	60	76	65	70	16	11	8	8	11
Average Age	15	14	13	14	13	11	12	13	13	14	6	6	7	7	7
Average GRT	23	27	26	24	23	94	91	89	90	95	173	174	177	173	174
Average Days Absent	52	55	59	62	51	85	88	97	104	107	119	111	138	119	141
Average Crew Size	2.4	2.7	3.1	2.8	2.9	4.8	4.4	4.6	4.4	4.5	6.9	6.0	6.1	6.7	6.8
Revenue Per Day Absent($)															

	1217	1334	1719	1577	1681	2382	2516	2567	2563	2789	3395	3709	3440	2890	2597	
Lbs Per Day Absent	1878	1732	1821	1846	1948	1125	1307	1538	1826	3419	1832	1911	2209	3879	2236	
Avg number of Trips per Vessel	40	36	41	41	37	10	12	15	16	18	6	6	8	12	12	

Longline or Line Trawl Trips Only:

Average Days Absent	36	32	32	33	31	65	71	71	84	78	105	103	107	114	105	
Average Crew Size	2.4	2.7	3.1	2.8	2.8	4.8	4.4	4.6	4.4	4.5	6.9	6.0	6.1	6.7	6.7	
Revenue Per Day Absent ($)	1239	1428	1966	1691	1804	2456	2626	2710	2506	2796	3375	3641	3686	2922	2642	
Lbs Per Day Absent	1414	1259	1529	1447	1492	949	1068	1347	1367	1510	1287	1519	1433	1533	1954	
Avg number of Trips per Vessel	25	15	18	16	17	5	7	8	10	8	4	5	5	7	6	

TABLE E.6.4.1.1.5 Percent of landings (by weight) by gear type for selected species in the Northeast, 1993.

GEAR TYPE	yellowtail cod	other flounder	multi- haddock	summer species *	sea menhaden	Atlantic flounder	lobster	scallops	swordfish	herring
Bottom Trawl	71.3%	84.3%	93.5%	84.5%	0.0%	93.1%	2.2%	5.6%	0.4%	5.1%
Midwater Trawl	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.7%	12.5%
Hook Gear	7.3%	0.0%	2.4%	2.2%	0.0%	0.3%	0.0%	0.0%	93.7%	0.0%
Gillnet	19.9%	3.5%	3.6%	8.6%	0.2%	0.1%	0.0%	0.0%	4.8%	0.0%
Pots/Traps	0.0%	0.0%	0.0%	0.0%	0.1%	0.4%	0.1%	0.0%	0.0%	0.0%
Lobster Pot	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	94.1%	0.0%	0.0%	0.0%
Scallop Dredge	0.3%	10.9%	0.6%	1.1%	0.0%	2.7%	0.0%	93.0%	0.0%	0.0%
Other Gear	1.1%	1.4%	0.0%	3.5%	99.7%	3.2%	3.6%	1.4%	0.4%	82.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

GEAR TYPE	Atlantic mackerel	butter- fish	black Loligo	sea bass	scup	northern goosefish	shrimp	bluefin tuna
Bottom Trawl	80.9%	97.7%	98.3%	54.5%	84.9%	39.7%	95.7%	0.6%
Midwater Trawl	10.3%	0.0%	0.1%	0.0%	1.1%	0.0%	0.0%	0.0%
Hook Gear	0.8%	0.0%	0.3%	0.1%	1.5%	0.1%	0.0%	3.1%
Gillnet	2.2%	0.2%	0.0%	0.1%	0.1%	11.7%	0.0%	0.0%
Pots/Traps	3.6%	0.4%	0.4%	39.8%	7.8%	0.0%	4.5%	0.0%
Lobster Pot	0.0%	0.0%	0.0%	1.9%	0.0%	0.1%	0.0%	0.0%
Scallop Dredge	0.0%	0.0%	0.0%	0.5%	0.0%	39.1%	0.0%	0.0%
Other Gear	2.2%	1.7%	0.9%	3.1%	4.6%	9.3%	0.0%	96.3%
Total	100%	100%	100%	100%	100%	100%	100%	100%

* other multispecies include pollock, winter flounder, witch flounder, windowpane flounder, American plaice, redfish, white hake, red hake, whiting, and ocean pout.

Examining revenues by individual tonnage vessels indicates that the majority of vessels earned between $500 and $10,000 from cod, haddock and yellowtail flounder in 1993, followed by those earning $10,000 to $50,000. Those vessels earning over $50,000 were almost exclusively large vessels, especially those over 125-215 GRT. The very largest vessels (>215 tons), however, appear to be earning relatively little from cod, haddock and yellowtail flounder.

TABLE E.6.4.1.1.6 Percent of revenues from cod, haddock and yellowtail flounder by tonnage class for identified vessels (vessels not catching any of the three species are omitted)

n=number of vessels (1993)	**6-60 tons n=622**	**61-125 tons n=245**	**126-215 tons n=311**	**>215 tons n=3***	**All vessels n=1,181**
< $500	19%	18%	12%	100%	17%
$501 - 10,000	38%	29%	30%		34%
$10,001 - 50,000	33%	31%	19%		29%
$50,001 - 100,000	8%	8%	6%		7%
$100,001 - 250,000	3%	11%	20%		9%
$250,001 - 1,000,000	<1%	3%	14%		4%
	100%	100%	100%	100%	100%

* There are only three vessels in this group. For confidentially reasons, revenues cannot be shown for groups containing fewer than three vessels.

Another aspect of flexibility, besides fishing multiple gears, is the ability to switch among different fisheries. This was addressed partially in the gear section. However, in many cases a different permit is required for entry into a fishery. This section shows what permits other than groundfish are held by groundfish permit holders. All of these offer some possibility to fishermen of redirecting their groundfish effort elsewhere. The impact of redirection of effort on other fisheries is discussed in Section E.7.1.1.2.

Of the 4,891 Multispecies permit holders, 823 (17%) hold no other permit. These vessels can fish only in fisheries for which no FMP has yet been implemented. Others possess combinations of permits described in Table E.6.4.1.1.7. The possible fisheries under which a Northeast vessel can be permitted are: Lobster (LO), Sea Scallop (SC) Multispecies (MUL), Squid/Mackerel/Butterfish (SMB), Surf Clam (SF), Ocean Quahog (OQ), and Summer Flounder (FLS) and bluefin tuna. Bluefin permit data is kept in a separate database from other fisheries, and was not included in this analysis.

TABLE E.6.4.1.1.7 Other Fisheries Under Which 1995 Multispecies Permit Holders are Currently Permitted (only categories with 50 or more vessels shown)

	Number of Multispecies Permitted Vessels	**Percent of Multispecies Permitted Vessels**
MUL only	823	17
MUL/LO only	346	7
MUL/SC only	115	2
MUL/SMB only	516	11
MUL/FLS only	117	2
MUL/LO/SC	98	2
MUL/SMB/LO	150	3
MUL/SMB/SC	175	4
MUL/SMB/SC/LO	205	4
MUL/OQ/SF/SMB/SC	154	3
MUL/OQ/SF/SMB/SC/LO	118	2
MUL/FLS/SMB	419	9
MUL/FLS/SMB/LO	75	2
MUL/FLS/SMB/SC	135	3
MUL/FLS/SMB/SC/LO	209	4
MUL/FLS/SF/SMB/SC/LO	102	2
MUL/FLS/OQ/SF/SMB/SC	113	2
MUL/FLS/OQ/SF/SMB/SC/LO	267	6
Combinations with <50 vessels each	754	15

The four most popular fisheries that groundfishermen are also permitted in are: scallop, lobster, summer flounder (fluke), and squid/mackerel/butterfish (see Table E.6.4.1.1.7). Those vessels permitted for both groundfish and scallops primarily involve full-time scallopers with possession-limit-only permits, combination vessels or individual-DAS groundfish vessels with general category scallop permits (see Table E.6.4.1.1.8). General category scallop vessels are subject to a possession limit of 400 lbs. shucked scallops per trip, or 50 bushels of in-shell scallops per trip. Forty four percent of groundfishermen have some form of scallop permit and ninety percent of scallopers have some form of groundfish permit.

Eighty two percent of multispecies permit holders also hold a lobster permit, almost always (98%) a commercial lobster permit. The most popular multispecies categories for these

fishermen are: under 45 feet, open access possession-limit-only, and Fleet DAS. The control date for lobster was March 25, 1991 and a permit moratorium based on that date has been implemented. Seventy one percent of lobster permit holders also hold multispecies permits. Lobster is classified as fully exploited.

Only thirty five percent of multispecies permit holders have some form of summer flounder permit. As with lobster, the only two summer flounder categories are commercial and charter/party. Multispecies permit holders who also have summer flounder permits are almost equally split between the two categories (51% and 49%). The multispecies categories under which they are most commonly qualified are: Fleet DAS and open access possession-limit-only for those with commercial summer flounder licenses, and open access hook-only for those with Charter/Party summer flounder permits. Eighty six percent of summer flounder permit holders also hold multispecies licenses. Summer flounder is currently classified as over-exploited. To qualify for a summer flounder permit, a vessel must have fished the species between 1985 and 1990. To maintain a permit, the vessel must land summer flounder every year.

Squid/Mackerel/Butterfish has three categories: commercial, charter/party, and catcher/processor (for vessels with onboard processing capability). Eighty-eight percent of multispecies permit holders have some type of SMB permit. Of this 88 percent, 82 percent hold commercial licenses and 18 percent hold charter/party licenses. Less than 1 percent of the catcher/processors hold a multispecies permit. For those with commercial SMB permits, the most popular multispecies categories are: open access hook, under 45 feet, and Fleet DAS. Eighty five percent of SMB permit holders also hold a groundfish permit. The control date for squid and butterfish was August of 1993. None of these species is yet at its quota level. Should the TAC be reached, the fishery in question would close for the remainder of the year. While squid and butterfish are somewhat below their TACs, less than 10 percent of the Atlantic mackerel TAC is currently being taken. Should 50 percent of the mackerel TAC be taken in a given year, a control date will be set.

TABLE E.6.4.1.1.8 Numbers of 1995 Multispecies Permit Holders with 1995 Permits in Other Fisheries, by Categories within Fisheries (N.B. Categories with 3 or fewer not shown)

	Limited Access						**Open Access**	
	Ind. DAS	**Fleet DAS**	**<45 Feet**	**Hook Only**	**Combo**	**Gillnet**	**Hook Only**	**Poss. Limit Only**
Scallop - General	180	457	486	29		34	368	334
Scallop- Fulltime Lim. Acc.					32			174
Scallop - Parttime Lim. Acc.					7			32
Scallop - Occ. Lim. Acc.		12						15
Scallop - Fulltime Lim. Acc. Sm. Dredge								
Scallop - Parttime Lim. Acc. Sm. Dredge								5
Lobster - Commercial	168	395	512	47	32	49	419	448
Lobster - Charter/Party							23	23
Fluke - Commercial	124	396	136	15	42	8	65	293
Fluke - Charter/Party			23	26			425	170
SMB - Commercial	185	490	543	60	44	42	708	672
SMB - Charter/Party		11	32				368	177

SMB - Catcher/ Processor		9						8

Undertonnage vessels and vessel length categories

Table E.6.4.1.1.2 compares the number of permitted boats by gear in the undertonnage category with the numbers in the tonnage category by gear type. Since undertonnage boats are not individually identified in the weighout system, the percentage of these boats that are actually fishing cannot be determined -- though estimates are possible, as noted earlier. Table E.6.4.1.1.9(a) shows the total number of multispecies at or below specific lengths. Some of these boats may be "tonnage vessels" while others would fall into the "undertonnage vessel" category. Table E.6.4.1.1.9 (b) shows the number of permits by vessel length that qualified for (in September, 1992) or that held (in November, 1995) limited access permits as well as the total number of permits (including open access permits) as of those dates. Table E.6.4.1.1.10 shows the landings of cod, haddock and yellowtail flounder by tonnage class. Table E.6.4.1.1.11 shows the cod, haddock and yellowtail flounder revenues by tonnage class. Table E.6.4.1.1.12 shows the distribution of lengths across tonnage categories.

TABLE E.6.4.1.1.9 (a) Number and percentage of all vessels with Multispecies permits (both limited and open access), at or below specific lengths

	1993		**June 1995**	
LENGTH (ft)	**NUMBER**	**PERCENT**	**NUMBER**	**PERCENT**
0-30	1431	27	1382	28
31-45	2229	42	2129	43
46-60	560	11	499	10
61-100	1027	19	904	18
>100	64	1	33	1
TOTAL	5311	100	4947	100

Table E.6.4.1.1.9 (b) Numbers of permits at or below specified lengths.

	QUALIFYING FOR MORATORIUM PERMIT (LTD. ACCESS)				TOTAL PERMITS[1]			
Length	Sept. 1992		Nov. 1995		Sept. 1992		Nov. 1995	
(ft.)	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT
20	202	5.1	8	0.5	283	5.3	208	4.4
25	670	16.8	52	3.1	1043	19.4	754	16.0
30	993	24.9	100	5.9	1543	28.7	1196	25.4
35	1549	40.0	325	19.3	2427	45.1	2076	44.1
40	2166	54.3	622	36.9	3205	59.6	2852	60.6
45	2547	63.9	881	52.3	3715	69.0	3303	70.2
50	2738	68.6	999	59.3	3948	73.4	3499	74.4
55	2859	71.7	1096	65.0	4108	76.3	3637	77.4
60	2994	75.1	1186	70.4	4267	79.3	3786	80.5
65	*	*	1276	75.7	*	*	3967	84.4
70	*	*	1358	80.6	*	*	4094	87.1
75	*	*	1490	88.4	*	*	4305	91.6
80	*	*	1580	93.8	*	*	4433	94.3
85	*	*	1640	97.3	*	*	4569	97.2
90	*	*	1655	98.2	*	*	4634	98.6
95	*	*	1663	98.7	*	*	4654	99.0
100	*	*	1667	98.9	*	*	4669	99.3
TOTAL	3989	100.0	1685	100.0	5381	100.0	4702	100.0

NOTES:
1) "Total Permits" in September, 1992, included all vessels regardless of whether they qualified under the moratorium criteria. In November, 1992, the category included permits issued under the moratorium (limited access), possession-limit-only (open access) and hook-gear-only (open access) permits.

*) The incremental breakdown of vessels over 60 feet was not provided in the Amendment 5 SEIS.

TABLE E.6.4.1.1.10 cod, haddock and yellowtail flounder landings by undertonnage and tonnage vessels 1993 (percentages by species)

	UNDERTONNAGE		TONNAGE		TOTAL
SPECIES	**SUM (lbs)**	**PCT**	**SUM (lbs)**	**PCT**	**SUM (lbs)**
YELLOWTAIL	193,612	3	7,704,840	97	7,898,452
HADDOCK	34,248	2	1,666,734	98	1,700,982
COD	4,219,280	10	38,141,972	90	42,361,252
TOTAL	4,447,140	9	47,513,546	91	51,960,686

TABLE E.6.4.1.1.11 cod, haddock and yellowtail flounder revenues by undertonnage and tonnage vessels 1993

	UNDERTONNAGE		TONNAGE		TOTAL
	SUM ($)	**PCT**	**SUM ($)**	**PCT**	**SUM ($)**
COD	4,708,046	11%	39,856,927	89%	44,546,973
HADDOCK	62,710	2%	2,608,823	98%	2,671,533
YELLOWTAIL FLOUNDER	233,024	2%	10,074,289	98%	10,307,313

TABLE E.6.4.1.1.12 Undertonnage and tonnage vessels by length category, 1993 (June 1995), percentages of total number of vessels

	UNDERTONNAGE		TONNAGE		TOTAL
LENGTH (ft)	**No. Vessels**	**PCT**	**No. Vessels**	**PCT**	**No. Vessels**
0-30	1028 (961)	19 (19)	403 (421)	8 (9)	1431 (1382)
31-45	73 (71)	3 (3)	2156 (2058)	41 (42)	2229 (2129)
46-60	0 (0)	0 (0)	560 (499)	11 (10)	560 (499)
61-100	0 (0)	0 (0)	1027 (904)	19 (18)	1027 (904)
>100	0 (0)	0 (0)	64 (33)	1 (1)	64 (33)
TOTAL	1101 (1032)	22 (22)	4210 (3915)	79 (79)	5311 (4947)

The "small boat fleet" is perhaps the most diverse of all the vessel groups in the region in terms of the types of gears used, species targeted, seasonality and level of individual effort. Earlier discussions of the annual round used by gillnetters and shrimpers apply here. The collection of boats comprising this group is also the most difficult to characterize using established databases

and conventional sources of information. This region-wide diversity combined with the lack of systematically collected data makes assessing the impacts of proposed management measures on this segment of the industry tenuous and problematic. "Smaller and independent vessels ... are well-suited to adapting to year-to-year and even month-to-month changes in catch levels. Such vessel have flexible gear, can readily shift among groundfish species and lobsters as biological availability changes, and have established sales channels in markets that can accommodate changes in the mix of species harvested (Doeringer & Terkla 1995: ch.VIII)." One reason for this flexibility is lower cost. Gear switching is often prohibitively expensive for large vessels (Dewar 1983:24). Moreover, vessels which belong to corporate fleets require a long lead time for changes due to their bureaucratic structure and their ties to mass markets (Doeringer & Terkla 1995:VIII-13). Small, undertonnage boats are almost always owner-operated. On the other hand, smaller vessels have a more limited geographical range and are not physically suited to certain kinds of fishing (such as volume fishing for mackerel or menhaden, or dredging).

Limited Access (Moratorium) and Days-at-Sea (DAS)

Amendment 5 to the Multispecies FMP implemented both a moratorium on entry (though there are still two open access categories) and an effort reduction program based on limiting the number of days a vessel spends at sea fishing for groundfish. While not affirming any one-to-one ratio of pounds landed to days spent at sea, the Council nonetheless felt that reducing effort through reduced fishing time would relieve pressure on the stocks. Both the moratorium and the Days-at-Sea (DAS) rules went into effect on May 1, 1994.

One initial effect of the moratorium was a dramatic increase in the total number of groundfish permits. Again, only perhaps a third of these permits are actually in use, but they all represent potential effort. In 1988 the total number of permit holders was 3,410. In 1991, the moratorium qualifying year, that number jumped to 4,484. Only 3,989 of those vessels were initially assumed to qualify for the moratorium, but since new vessels continued to enter the fishery in hopes of qualifying and other vessels which had fished groundfish in the qualifying period but not since continued to apply for qualification, permit numbers continued to rise through 1993 to 5,311. In 1994, however, when fishermen began receiving their moratorium status (with some not qualifying) and as stocks dropped to record low levels, numbers of permits began falling; only 4,379 permits were issued in 1994 -- slightly below the 1991 level. More recently, however, numbers of permits have began a steady month to month increase. A few of these are due to finalizing the status of vessels in appeal over their limited access status, but the vast majority are in the open access categories. In February of 1995 there were 3,010 open access vessels; on May 9, 1995 there were 3,179 (4,891 total); on May 26, 1995 there were 3,235 (4,947 total). This may be due to renewed discussions of extending the duration of the moratorium and hopes of showing participation for any later restrictions. Or it may simply reflect fishermen's realization that the open access categories are a loophole by which they can continue to fish for groundfish even if they are not qualified under the moratorium.

The total number of vessels permitted under the Northeast Multispecies FMP as of May 9, 1995 was 4,891. Of these, 1,712 were limited access permits and 3,179 were open access permits (possession-limit-only or hook-gear-only). Of the 1,712 vessels with limited access permits, 310 were permitted under two limited access categories (i.e., gillnet and fleet DAS, gillnet and individual DAS, gillnet and <45 feet). (See Table E.6.4.1.1.13 for permit categories.) The open access categories are described on the permit application as "appropriate for party/charter vessels", but are actually used by many other fishermen. Further, some party/charter vessels have limited access permits. In developing these permit categories, the Council intended them to provide open access for small-scale directed fishing and hook-only commercial fishing.

The Multispecies fleet is divided among these categories as shown in Table E.6.4.1.1.13, with the largest number of limited access vessels falling under the <45 ft. category and Fleet DAS category (30% each of limited access vessels). The open access categories far outnumber all limited access categories, however: 35 percent of all multispecies permits are limited access and 65 percent open access. See also Table E.6.4.1.1.9 (b), above.

TABLE E.6.4.1.1.13 Numbers of Multispecies Permit Holders by Category (May 9, 1995)

LIMITED ACCESS

Individual Days at Sea		178	
Fleet Days at Sea		499	
Under 45 ft		497	
Hook-gear-only		130	
Combination (scallop and multispecies)		44	
Gillnet		61	
Individual DAS & Gillnet		11	
Fleet DAS & Gillnet		21	
Under 45 ft & Gillnet	272		
Total limited access			1,713

OPEN ACCESS

Hook-gear-only		1,797	
Possession-limit-only		1,381	
Total open access			3,178
Total all permits			4,891

Once having qualified for the moratorium, if documentation was available a vessel was assigned a DAS allocation. Gillnet vessels, those under 45 feet, and those fishing with 4,500 hooks or fewer are exempt from the DAS provisions. For all other vessels, each vessel's owner could accept the individual allocation, appeal it, or choose to enter the Fleet Days-at-Sea category. The average number of individual DAS per vessel in the individual category in Year One (10% reduction from original allocation) was 208 (minimum 1, maximum 295). The fleet DAS system is based on declared blocks of time out of the fishery, plus required layover days, and resulted in vessels being able to fish up to 190 days by fishing year-round on multi-day trips, or up to 285 days on trips of one day or less.

Using the vessel simulator OTTER (developed by Dr. John Gates and Philippe Lallemand at the University of Rhode Island) and 1993 weighout data, the mean break-even days-at-sea for full-time otter trawl vessels ranges from 95 days for Point Judith to 190 days for New Bedford with an average of 112 days across all ports considered in this analysis[2]. The average for the first quarter across ports, is 78 days. For the fourth quarter the average is 142 days, reflecting the limitations of fishing in winter. These averages provide an approximation of the number of days-at-sea per year a full-time Northeast otter trawl vessel requires to break even. The number of break-even days-at-sea for a given vessel, however, depends on a multitude of factors and is unique to that vessel. The average break-even days-at-sea reported here should therefore not be construed as something that can be directly applied at the individual vessel level. For more data and for a description of the specific costs included and excluded and other limitations of this

[2] The ports analyzed here are: Portland, ME; Gloucester, Boston, & New Bedford, MA; and Point Judith, RI.

data, see section E.7.3.5.

E.6.4.1.1.2 The ports

If one word were to be used to characterize the fishing industry in the Northeast, it might be "diverse", both economically and culturally. "Although all New England fishing ports have some elements of production, marketing, and labor relations in common, each has its own identity as an economic system within the fishing industry" (Doeringer, Moss & Terkla 1986:32). Within the region, fisheries have developed which exploit a wide variety of species, using all sorts of gear types, on vessels ranging in size from under thirty to over one hundred feet. There are also ethnic, cultural and philosophical differences among fishermen, which are more difficult to describe systematically with existing databases, but which become evident when fishermen are interviewed or have the opportunity to make public statements (see section E.6.4.3).

The diversity which is characteristic of the fisheries of the Northeast is most evident in the differences among ports in the region. These differences are the product of geography, economics and, cultural tradition. The proximity to fishing grounds abundant in specific species, or the capability of a port to accommodate large vessels, for example, contributes to the evolution of a port's character. The marketing and processing facilities, such as the presence of an auction, a processor/freezer, or long-standing fishermen/dealer relationships, will contribute to a fisherman's choice of where to land the catch, even if the port is not the closest to his home. Wilson (1980), for instance, found that long-term relationships are a positive adaptation to the uncertainty inherent in the fresh fish market. Weighout data show that fishermen tend to land consistently in approximately the same number of ports over time, with gillnetters landing in a single port close to three fourths of the time, scallopers at least two thirds of the time, and clammers about half the time. Draggers land about 60% of the time in a single port and 30% of the time in no more than 2 ports (Pollard-Rountree, pers. com.).

Fishing is important as a way of life, and generates strong attachments to the industry. Among certain ethnic and other groups, there is also a strong attachment to particular ports. "Both Italian [Gloucester] and Portuguese [New Bedford, Provincetown] boat owners sponsor kinsmen in the immigration procedure by guaranteeing them jobs on their vessels. When these immigrants, or their sons, obtain sufficient capital to buy a boat, they continue the tradition by sponsoring more relatives who wish to immigrate. This practice has resulted in entire extended families being dependent on the fishery" (Doeringer et al. 1986:58). These extended families concentrate in ethnic enclaves, and rely on each other for financial, emotional, and social support. Doeringer et al. (ibid., p. 74) also found that "attachment to port and industry is also particularly strong among offshore fishermen" (there are similar findings in Nova Scotia by Binkley 1990).

Some ports are merely a sheltered cove, with a dock at the end of a road, where a few boats unload their catch to be trucked to a market center. Other ports are hubs of activity, offering the full range of services and supplies, and also safe haven for large vessels. "Some of the large ports have diversified economies. The New Bedford area has a substantial manufacturing sector, although much of it consists of relatively low-paying industries such as apparel and food processing, and Portland is a rapidly growing center for transportation, banking, and commerce. In many smaller ports, however, there are often few employment alternatives to tourism and fishing, particularly along the rural coast of eastern Maine" (Doeringer & Terkla 1995: ch. II). Each port has a unique character, marked by vessel sizes, gear types used and species landed, all of which will help to determine the impact of fisheries management alternatives.

The following description of the ports of the region is based on the data in the NMFS weighout

database, the NMFS Multispecies FMP permit file, the Department of Commerce publication, Fisheries of the United States, 1994, and on ethnographic data. The revenue data presented below is from the weighout and includes all state-recorded and federal-recorded landings, with the exception of lobster revenues which do not include state landings. For these weighout data "port" means port of landing for a specific trip. Comments provided to the Council on the DSEIS indicate that some of the weighout data for individual ports may be incorrect, however, no audit of the data has been performed in response to these comments.

Some analyses refer to gear categories as they appear in the weighout, e.g., otter trawl, pair trawl, sink gillnet, bottom line trawl, handline, scallop dredge. Other analyses use grouped gear categories which were defined at a March 21, 1995 meeting of the Groundfish Oversight Committee of the New England Fishery Management Council. Large mesh trawl, for instance, includes otter trawl, pair trawl, scallop trawl, and Danish seine. Gillnet includes both sink and drift gillnet. Hook includes line trawl, troll line with bait, and handline. Dredge is scallop dredge and clam dredge. For data based on permits, "port" means primary port of landing, i.e., the port listed as most frequently used by that permit holder.

All of the differences and similarities among the various databases must be considered in the following review of the ports of the groundfish fishery. Landing and multispecies permit statistics for the ports are presented in Tables E.6.4.1.1.2.1 and E.6.4.1.1.2.2, located after the port descriptions. Table E.4.1.1.2.1 gives percentage information such as the percent of revenue earned from cod, haddock and yellowtail flounder by vessels of specific gear types within specific ports. Actual dollar revenue figures are not included in this table, but dollar revenues for each port as a whole are discussed in the text below. Table E.6.4.1.1.2.2 describes the number of permits per port for the 25 ports having the most permits.

Portland, Maine

Portland depended on cod, haddock and yellowtail flounder landings for about 15 percent of its total revenues from fishing in 1993, $7 million out of a total of $49.6 million. Portland ranked second in both total revenue and cod, haddock and yellowtail flounder revenue out of all Northeastern ports. One hundred twenty two vessels were permitted with Portland/South Portland being identified as the primary port, placing it seventh in the region. Ninety three percent of those permits were for tonnage vessels. One hundred forty three tonnage vessels landed in Portland during 1993, indicating that a number of vessels that do not consider Portland a primary port nonetheless land there, presumably to sell at the fish exchange.

A breakdown by gear for vessels landing in Portland shows that roughly 70 percent of the cod, haddock and yellowtail flounder vessels were otter trawlers, 15 percent were sink gillnet vessels, and 10 percent were line trawls. There is some double counting due to vessels using more than one gear during the course of the year. While there were 143 unique vessels, there were 157 unique vessel-gear records. Using the Groundfish Committee defined categories, large mesh trawlers and gillnetters each earned about one-fourth of their 1993 fishing revenues from cod, haddock and yellowtail flounder, while hook vessels earned about 10 percent of their 1993 fishing revenues from cod, haddock and yellowtail flounder. Portland landings other than groundfish included lobster, shrimp, whiting, and a variety of other species. Lobster from federal waters, for instance, accounted for revenues of $6.7 million. Scallops accounted for $240,000. (As noted above, state lobster revenues were not available for this analysis.) Portland ranked third in the region in dogfish revenues with $494,719.

Stonington, Maine

Stonington is a small, Downeast port. Its total fishing revenues in 1993 were $3.6 million, and its cod, haddock and yellowtail flounder revenues were $419,000. Thirty vessels were permitted to Stonington in 1993 (99% undertonnage), and weighout data show 14 identified tonnage cod, haddock and yellowtail flounder vessels landing in Stonington, generating 21 gear-vessel records. Fifty-seven percent of gear-vessel records were comprised of sink gillnets and 33 percent were line trawls. Gillnets earned 50 percent of their income from cod, haddock and yellowtail flounder and hook vessels 31 percent. In Stonington, lobster revenues from federal waters for 1993 totaled $14,000 and scallops added up to $172,000.

Portsmouth, New Hampshire

Roughly $2.2 million worth of cod, haddock and yellowtail flounder was landed at Portsmouth in 1993, out of total fishing revenues of $4.8 million. There were 85 vessels permitted to Portsmouth (one third undertonnage), and 28 identified cod, haddock and yellowtail flounder tonnage vessels which landed in Portsmouth. Those 28 vessels generated 44 vessel-gear records, showing 39 percent otter trawlers, 27 percent sink gillnetters, and 21 percent shrimp trawlers. Large mesh trawlers earned 37 percent of their income from cod, haddock and yellowtail flounder, and gillnetters earned 57 percent of their income from cod, haddock and yellowtail flounder. No scallops and only $2,500 worth of lobster from federal waters were landed here in 1993. Apart from groundfish, Portsmouth landed significant amounts of dogfish, 1,134,740 lbs valued at $180,301, placing it number 6 in the region for dogfish landings..

Gloucester, Massachusetts

Roughly $11.7 million worth of cod, haddock and yellowtail flounder was landed in Gloucester in 1993, placing it second of all ports in its reliance on cod, haddock and yellowtail flounder. Other commonly caught species include whiting, shrimp and dogfish. Gloucester ranks second in the region in dogfish revenues with $920,307, and second in whiting revenues with $1.1 million. Total revenues from fishing were $32.3 million, fourth in the region. Scallop revenues were only $34,000 and lobster revenues were $440,000. Gloucester is one of the busiest ports, with 205 identified tonnage cod, haddock and yellowtail flounder vessels landing, and it has more vessels permitted in Multispecies than any other with 322 in 1993 (79% tonnage). There were 243 vessel-gear records, showing sixty percent of the identified cod, haddock and yellowtail flounder landing vessels are otter trawlers, 24 percent are sink gillnetters, and 6 percent are line trawlers. Large mesh trawlers earned 54 percent of their income from cod, haddock and yellowtail flounder in 1993, while the figure for gillnetters was 31 percent and for hook vessels was 12 percent.

Boston, Massachusetts

Boston received about 50 percent of its total fishing revenues from cod, haddock and yellowtail flounder, $5.5 million out of $10.8 million. Lobster revenues were low ($64,000), as were scallop revenues ($111,000). With only 49 identified tonnage cod, haddock and yellowtail flounder vessels landing in Boston . It ranks fourth in total cod, haddock and yellowtail flounder revenues. By vessel-gear record, nearly all identified cod, haddock and yellowtail flounder vessels are large mesh otter trawl vessels; 80 percent were single otter trawlers and an additional 19 percent were pair trawlers. There were 59 vessel-gear records. These large mesh trawlers earned one half of their 1993 revenues from cod, haddock and yellowtail flounder. Boston's total fishing revenues of $10.8 million place it seventh in New England and eighth in the Northeast. Boston was primary port to 102 multispecies-permitted vessels in 1993 (99% tonnage).

Chatham, Massachusetts

Chatham had 1993 cod, haddock and yellowtail flounder revenues of $5.1 million, and total fishing revenues of $7.8 million. With 186 total multispecies permits, Chatham ranked fourth in the region. Chatham's geography (narrow inlet, distance from major markets) makes the port less attractive to larger vessels, hence just over 50 percent of the permits are for undertonnage vessels. There were 73 identified tonnage cod, haddock and yellowtail flounder vessels which landed in Chatham in 1993, and 101 vessel-gear records. By gear, 57 percent of vessels were line trawls, 18 percent were handliners 20 percent were sink gillnetters, and only 4 percent were otter trawlers. Hook vessels earned 81 percent of their income from cod, haddock and yellowtail flounder, while gillnets earned 68 percent of their income from cod, haddock and yellowtail flounder and otter trawlers 14 percent. Almost no lobsters and no scallops were landed in Chatham in 1993. However, Chatham ranked fourth in the region in dogfish landings with $351,782.

Scituate, Massachusetts

Scituate is a small port, landing only $235,000 total in 1993, with $146,000 of that from cod, haddock and yellowtail flounder. Sixty eight vessels were permitted to Scituate (82% tonnage), but only 7 cod, haddock and yellowtail flounder tonnage vessels actually landed there indicating that many Scituate vessels may have landed elsewhere. These were otter trawlers and sink gillnetters, who earned 61 percent and 65 percent respectively of their income from cod, haddock and yellowtail flounder. No scallops and only $7,000 of lobster were landed in Scituate in 1993.

New Bedford, Massachusetts

In 1993, New Bedford is ranked first in the nation in total revenues from fishing, with $110 million. Despite the fact that more than two-thirds of that revenue was from species other than groundfish (primarily sea scallops), New Bedford also ranked first in the region in revenues from cod, haddock and yellowtail flounder with $19.6 million. Scallops account for $49.9 million of the total revenue, and Lobsters come in at $2.6 million. New Bedford also ranks first in total dogfish revenues with $1.1 million. There were 307 tonnage cod, haddock and yellowtail flounder vessels identified in the weighout system as landing in New Bedford in 1993, and 315 vessel-gear records. Otter trawlers constituted 55 percent of the cod, haddock and yellowtail flounder vessel-gear records, while sink gillnetters were only 4 percent. Thirty nine percent of the vessels landing cod, haddock and yellowtail flounder were scallop dredges. Large mesh trawlers earned half of their income from cod, haddock and yellowtail flounder, dredges two percent (reflecting the much greater value of scallops), and gillnetters three percent. Additional species caught in New Bedford include other large mesh groundfish, swordfish, lobsters, and conch (whelks). The city of New Bedford ranks second in total multispecies permits with 302 in 1993, 341 if New Bedford and Fairhaven are combined. Of the 341, 97 percent were tonnage vessels. The port of New Bedford incorporates several surrounding towns and also serves as the port of landing for a number of vessels whose principal port of landing is elsewhere. The port area offers one of the widest range of services (shipyards, fuel, ice, dealers and processors) of any of the ports in the region.

Point Judith, Rhode Island

Point Judith is in the town of Narragansett, Rhode Island, and ranks fifth in numbers of groundfish permits with 185 (90% are tonnage vessels). It ranks third in the region in total fishing revenues, $35.5 million, and sixth in cod, haddock and yellowtail flounder revenues,

$811,000. With only 23 percent of its revenues coming from cod, haddock and yellowtail flounder, Point Judith is one of the most diversified fishing ports in the region. Whiting, for instance, accounted for revenues of $4.6 million in 1993. This made Point Judith the largest whiting port in the Northeast. This diversity reflects the port's geographical location, which places it near the southern limits of the range of many groundfish species, the northern limit of many southern species, in close proximity to the continental shelf, and equidistant between the mid-Atlantic Bight and Nantucket Shoals and the Great South Channel, all rich fishing grounds.

A total of 102 identified tonnage cod, haddock and yellowtail flounder vessels landed in Point Judith in 1993, creating 105 vessel-gear records. Eight-one percent were otter trawlers and 12 percent were sink gillnetters. Apart from cod, haddock and yellowtail flounder and other groundfish, many vessels fish for species such as squid, butterfish, whiting. Revenue from these species usually greatly exceeds revenues from groundfish. Large mesh trawlers, for instance, derived only 15 percent of their revenues from cod, haddock and yellowtail flounder in 1993, and gillnetters only 3 percent. All told, Point Judith earned $9.4 million from lobsters and $7,000 from scallops.

Newport, Rhode Island

In 1993, Newport ranked sixth in New England in total revenues, at $11.3 million, but had only $446,000 worth of cod, haddock and yellowtail flounder. Fifty-six cod, haddock and yellowtail flounder tonnage vessels landed in Newport, and 50 vessels are permitted there (92% tonnage). Unlike some smaller ports Newport is primarily a dragger port, with 76 percent of vessel-gear records being otter trawlers. Like Point Judith, Newport is less dependent on groundfish than the ports further north. Large mesh trawlers earned 17 percent of their income from cod, haddock and yellowtail flounder. Nineteen percent of vessel-gear records were scallop dredges, who earned only one percent of their income from cod, haddock and yellowtail flounder. Scallop revenues totaled $742,000, and lobsters summed to $5.3 million.

Proceeding southward along the coast, the importance of groundfish landings to the major ports generally decreases, as the distance to the groundfishing grounds increases. Cape May, New Jersey, for instance, had total fishing revenues of $31.9 million, but earned only $5,000 from a total of 25 tonnage cod, haddock and yellowtail flounder vessels. Scallop revenues were $8.4 million and lobster revenues $626,000. It had 93 groundfish permits, 95 percent of which were for tonnage vessels. For Montauk, New York the figures are $15.4 million and $636,000 (with only 4 tonnage cod, haddock and yellowtail flounder vessels landing there in 1993) and no scallops or lobster. Montauk was, however, the second highest revenue earner from whiting with $2.6 million. Montauk ranked third in the region in number of groundfish permits (223, 84% tonnage). Hampton, Virginia earned $10 million total, but only $12,000 from the 50 vessels which landed cod, haddock and yellowtail flounder in 1993. Scallops accounted for $7.4 million, and lobsters only a couple of thousand dollars. There were 41 groundfish permits in Hampton, all of which were for tonnage vessels.

The vessels that fish out of these southern ports may make trips into the New England region and land their groundfish catch in other ports, such as New Bedford. These ports along Long Island, New York, and in New Jersey, also may catch one or two species of the multispecies group (namely winter flounder and yellowtail) but not the entire range caught in the New England mixed-trawl fisheries. These ports are generally smaller communities with a heavy dependence on fishing.

Besides the major ports, producing the greatest proportion of the groundfish revenues, there are

throughout the region, medium and small ports who depend on groundfishing as a significant part of their fishing revenues. Many of these ports have a significant number of permits even in comparison to the larger ports (Table E.6.4.1.1.2.2). Nevertheless, when aggregated by state, the combined revenues of these smaller ports is far less than the revenues of the larger ports. This may, in part, be due to the fact that these boats will use the market and other services available in the centralized ports, while being based in their home communities. Portland alone accounts for 95 percent of Maine's cod, haddock and yellowtail flounder revenues, though only 22 percent of its total revenues. In Massachusetts, Boston, Gloucester, and New Bedford alone take 86 percent of cod, haddock and yellowtail flounder revenues and 81 percent of total revenues. Portsmouth revenues comprise 40 percent of all fishing revenues for New Hampshire, and 80 percent of cod, haddock and yellowtail flounder revenues. Fifty-one percent of Rhode Island's cod, haddock and yellowtail flounder revenues are generated in Point Judith alone, as are 47 percent of all fishing revenues.

TABLE E.6.4.1.1.2.1 Port of Landing Statistics from 1993 for Selected Ports, by Groundfish Committee defined Gear Categories (CHY=cod, haddock and yellowtail flounder)

		Gear Revenue/ Total Port Revenue	**Gear CHY Revenue/ Gear Revenue**	**Number of Trips**	**Avg. Lbs CHY/Trip**	**Total Days Absent From Port**
Portland, ME	Lg Mesh Trawl	0.48	0.25	2271	2377	10670
	Dredge	0.01	0.01	93	15	160
	Gillnet	0.07	0.26	988	833	2352
	Fluke Trawl	0	0	0	0	0
	Hook	0.06	0.1	140	1690	1203
	Total	0.61	0.14	4571	403	16,074
Stonington, ME	Lg Mesh Trawl	0.01	0.26	22	413	22
	Dredge	0.05	0	167	0	167
	Gillnet	0.36	0.31	610	674	652
	Fluke Trawl	0	0	0	0	0
	Hook	0.07	0.05	52	189	55
	Total	0.48	0.12	925	465	975
Boston, MA	Lg Mesh Trawl	0.98	0.52	845	5430	5045
	Dredge	<0.01	<0.01	10	65	103
	Gillnet	0	0	0	0	0

		Gear Revenue/ Total Port Revenue	Gear CHY Revenue/ Gear Revenue	Number of Trips	Avg. Lbs CHY/Trip	Total Days Absent From Port
	Fluke Trawl	0	0	0	0	0
	Hook	<0.01	0	7	0	47
	Total	1.0	0.51	864	5324	5220
Gloucester, MA	Lg Mesh Trawl	0.53	0.54	4183	2044	8962
	Dredge	<0.01	<0.01	16	1	25
	Gillnet	0.19	0.31	4675	352	5310
	Fluke Trawl	0	0	0	0	0
	Hook	0.09	0.12	870	354	1112
	Total	0.86	0.36	14,861	712	21,041
Chatham, MA	Lg Mesh Trawl	0.03	0.14	158	128	158
	Dredge	0	0	1	0	0
	Gillnet	0.46	0.68	1949	1059	1955
	Fluke Trawl	<0.01	0	1	0	1
	Hook	0.42	0.81	3459	638	3549
	Total	0.95	0.66	6735	640	6742
New Bedford, MA	Lg Mesh Trawl	0.34	0.5	2818	5611	21754
	Dredge	0.52	0.02	2095	337	23391
	Gillnet	0.01	0.03	451	92	526
	Fluke Trawl	0.01	<0.01	951	4	1212
	Hook	<0.01	0.42	14	1138	40
	Total	0.10	0.18	7443	2229	50,674
Scituate, MA	Lg Mesh Trawl	0.74	0.61	158	384	400
	Dredge	0	0	0	0	0

		Gear Revenue/ Total Port Revenue	Gear CHY Revenue/ Gear Revenue	Number of Trips	Avg. Lbs CHY/Trip	Total Days Absent From Port
	Gillnet	0.25	0.65	69	589	73
	Fluke Trawl	0	0	0	0	0
	Hook	<0.01	0	0*	0	0*
	Total	1.0	0.62	227	446	473
Portsmouth, NH	Lg Mesh Trawl	0.14	0.37	745	312	926
	Dredge	0	0	0	0	0
	Gillnet	0.7	0.57	2047	874	263
	Fluke Trawl	0	0	0	0	0
	Hook	<0.01	0	0*	0	0*
	Total	0.88	0.46	3606	567	4256
Cape May, NJ	Lg Mesh Trawl	0.05	<1%	375	13	1115
	Dredge	0.26	<0.01	403	6.3	5015
	Gillnet	0.01	0	326	0	334
	Fluke Trawl	0.07	<0.01	221	1	1079
	Hook	<0.01	0	63	0	67
	Total	0.72	<0.01	4931	1	14,283
Montauk, NY	Lg Mesh Trawl	0.02	0.37	46	746	50
	Dredge	0	0	0	0	0
	Gillnet	<0.01	0	7	0	7
	Fluke Trawl	0.03	<0.01	78	<1	83
	Hook	0.22	0.11	98	2418	125
	Total	0.79	0.04	549	597	617
Newport, RI	Lg Mesh Trawl	0.21	0.17	399	1000	1736

		Gear Revenue/ Total Port Revenue	Gear CHY Revenue/ Gear Revenue	Number of Trips	Avg. Lbs CHY/Trip	Total Days Absent From Port
	Dredge	0.09	0.01	63	8.8	506
	Gillnet	0.01	0.14	28	371	28
	Fluke Trawl	0.03	<0.01	76	7	274
	Hook	0	0	0	0	0
	Total	0.49	0.04	1485	289	5330
Point Judith, RI	Lg Mesh Trawl	0.09	0.15	1353	296	2378
	Dredge	<0.01	0.01	4	7	12
	Gillnet	0.02	0.03	416	266	481
	Fluke Trawl	0.03	<0.01	474	5	778
	Hook	0.01	0.03	22	293	161
	Total	0.68	0.02	6202	112	13,086
Hampton, VA	Lg Mesh Trawl	0.36	<0.01	233	11	2157
	Dredge	0.46	<0.01	179	0	2326
	Gillnet	0	0	0	0	0
	Fluke Trawl	0.15	<0.01	238	<1	1125
	Hook	<0.01	0	188	0	2
	Total	0.98	<0.01	708	4	5872
Norfolk, VA	Lg Mesh Trawl	0.21	0	34	0	147
	Dredge	0.53	<0.01	57	0	0
	Gillnet	0	0	0	0	0
	Fluke Trawl	0.53	<0.01	57	<1	364
	Hook	0.1	0	188	0	188
	Total	0.99	<0.01	317	<1	816

* Caught by vessels of under 5 GRT, for whom individual vessel data such as number of trips and days absent is unavailable.

Table E.6.4.1.1.2.2 shows total permits per town in 1993 and based on the primary divisions of Multispecies permits in 1995 (limited access versus open access). It is instructive to note that, in most ports, only 40-60 percent of vessels permitted in 1993 ultimately qualified for a limited access permit under the moratorium.

TABLE E.6.4.1.1.2.2 The twenty five ports with the most multispecies permits in 1993 & 1995, No. Permits (Ranking)

	1993	1995	
	All Permits	**All Permits**	**Limited Access Permits**
Gloucester, MA	322 (1)	306 (1)	178 (1)
New Bedford, MA	302 (2)	261 (2)	155 (2)
Montauk, NY	223 (3)	193 (3)	55 (6)
Chatham, MA	186 (4)	186 (4)	72 (5)
Point Judith, RI	185 (5)	182 (5)	97 (3)
Portland, ME	122 (6)	134 (6)	87 (4)
Boston, MA	102 (8)	101 (7)	48 (7)
Newburyport, MA	107 (7)	93 (8)	24 (14)
Cape May, NJ	93 (9)	91 (9)	24 (14)
Point Pleasant, NJ	91 (10)	70 (10)	20 (17)
Portsmouth, NH	85 (11)	69 (11)	30 (9)
Provincetown, MA	65 (13)	66 (12)	27 (10)
Hampton, NH	61 (15)	63 (13)	19 (19)
New York, NY	55 (19)	59 (14)	25 (13)
Scituate, MA	68 (12)	58 (15)	31 (8)
Freeport, NY	57 (16)	53 (16)	lower rank than 25
Green Harbor, ME	52 (20)	52 (17)	23 (16)
Seabrook, NH	47 (22)	52 (17)	lower rank than 25
Barnegat, NJ	63 (14)	50 (18)	lower rank than 25
Stonington, ME	lower rank than 25	lower rank than 25	17 (21)
Sandwich, MA	56 (18)	47 (19)	15 (24)
Boothbay, ME	lower rank than 25	46 (20)	20 (17)

Plymouth, MA	57 (16)	45 (21)	lower rank than 25
Newport, RI	50 (21)	43 (22)	26 (12)
Fairhaven, MA	lower rank than 25	42 (23)	15 (24)
Westport, MA	41 (23)	41 (24)	19 (19)
Harwichport, MA	lower rank than 25	38 (25)	16 (22)
Belford, NJ	44 (22)	lower rank than 25	27 (10)
Hampton, VA	41 (23)	lower rank than 25	lower rank than 25
Shinnecock, NY	40 (25)	lower rank than 25	26 (12)
Hampton Bays, NY	lower rank than 25	lower rank than 25	18 (20)

E.6.4.1.1.3 More In-depth Port Profiles

For more specific and detailed information on the ports of New Bedford and Gloucester, MA and Stonington, ME, please refer to the Final Amendment #5 to the Northeast Multispecies Fishery Management Plan Incorporating the Supplemental Environmental Impact Statement, Volume I, pages 219-246.

E.6.4.1.2 The Recreational Fishery

Of the most commonly sought and caught species in the recreational fishery in the Northeast Region, Atlantic cod and winter flounder are the only species that are also in the Multispecies FMP (Table E.6.4.1.2.1). Pollock, other flounder and hakes are also caught, but to a lesser degree. Cod, pollock and hakes are caught predominantly outside of three miles from shore, while the flounder species are caught almost exclusively within three miles within bays and estuaries (Table E.6.4.1.2.2). The catches of the principal recreational species in the multispecies fishery have been declining in recent years, although, with the exception of 1992, catches of cod have remained relatively stable over the past five years (Table E.6.4.1.2.3). As a percentage of total landings of groundfish, the impact of the recreational sector is minor but in some years may exceed 10 percent on an individual species basis for cod or winter flounder (Table E.6.4.1.2.4). Recreational catch of cod in the Gulf of Maine has averaged 20 percent of the commercial catch of that stock over the past five years, although there is significant variation from year to year.

The three modes of recreational fishing are shore, party/charter and private/rental boat (where there is no hired captain). Fishing from shore and on private or rental boats is predominantly conducted by coastal residents, while slightly more party/charter trips are taken by non-coastal and out of state residents (Table E.6.4.1.2.5).

The demand for and value of fishing by anglers in the Northeast Region remains poorly understood in quantitative terms; nor has the economics of charter and party boat fishing been examined. For example, anglers as a group are known to fish for fun, food and, in some cases, income, but the relative importance of these motives among anglers remains unknown in

fisheries throughout the region. Recently, to help fill these gaps in knowledge, NMFS collected marine recreational economic data in conjunction with the MRFSS (Marine Recreational Fisheries Statistics Survey) to begin to answer questions about the costs of two common forms of regulations imposed on anglers, relating to (1) participation and access and (2) changes in catch (e.g., creel limits, catch and release, minimum size).

TABLE E.6.4.1.2.1 Primary species group sought as reported by anglers in the intercept survey.

NORTHEAST REGION				
SPECIES SOUGHT	**1992**		**1993**	
	COUNT	**PCT**	**COUNT**	**PCT**
BLUEFISH	1,986,138	33.40	1,367,852	24.33
NONE	1,200,211	20.18	1,015,802	18.07
STRIPED BASS	1,114,180	18.74	1,402,380	24.94
WINTER FLOUNDER	326,280	5.49	306,885	5.46
TAUTOG	315,822	5.31	260,471	4.63
SUMMER FLOUNDER	224,653	3.78	237,082	4.22
SCUP	220,268	3.70	208,528	3.71
ATLANTIC COD	149,416	2.51	226,602	4.03
ATL. MACKEREL	138,459	2.33	267,590	4.76

Source: Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, US Dept. of Commerce, NOAA/NMFS.

TABLE E.6.4.1.2.2 Estimated numbers (THOUSANDS) of fish caught (all catch types) by marine recreational anglers by species group and primary area of fishing.

Northeast REGION								
SPECIES GROUP	**OCEAN <3 mi.**		**OCEAN >3 mi.**		**INLAND**		**ALL AREAS**	
	1992	**1993**	**1992**	**1993**	**1992**	**1993**	**1992**	**1993**
ATLANTIC COD	-	-	95	261	-	-	850	2,147
POLLOCK	-	-	-	-	-	-	168	339
RED HAKE	69	-	483	187	-	-	559	205
OTHER COD/HAKES	-	-	-	-	-	-	73	111
WINTER FLOUNDER	136	180	-	-	981	1,818	1,544	2,517
OTHER FLOUNDER*	49	-	-	-	231	199	1,252	1,937

*Excluding summer, gulf, and southern flounders
Source: Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, US Dept. of Commerce, NOAA/NMFS.

TABLE E.6.4.1.2.3 Estimated numbers (MILLIONS) of fish of three principal species of multispecies groundfish caught (all catch types) by marine recreational anglers by year in the Northeast Region.

SPECIES	1988	1989	1990	1991	1992	1993
ATLANTIC COD	2.8	2.3	2.3	2.3	0.9	2.1
POLLOCK	1.3	0.6	0.4	0.4	0.2	0.3
WINTER FLOUNDER	11.2	8.1	4.6	4.6	1.5	2.5

Source: Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, US Dept. of Commerce, NOAA/NMFS.

TABLE E.6.4.1.2.4 1991-1993 Comparison of U.S. Commercial (**C**) and Recreational (**R**) Landings of Species covered by the Multispecies FMP in the Northeast Region (**THOUSAND METRIC TONS**).

SPECIES	1991		1992		1993	
	C	R	C	R	C	R
ATLANTIC COD	42.2	4.2	27.9	1.1	22.9	2.6
HADDOCK	1.8	<0.1	2.3	<0.1	0.9	<0.1
POLLOCK	7.9	0.1	7.2	<0.1	5.7	<0.1
WINTER FLOUNDER	7.6	1.3	6.5	0.5	5.3	0.7

Sources: Status of the Fishery Resources off the Northeastern United States for 1994 (In-Press). NOAA Technical Memorandum NMFS-F/NEC-101; Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, US Dept. of Commerce, NOAA/NMFS.

TABLE E.6.4.1.2.5 Estimated number of fishing trips (**THOUSANDS**) by marine recreational anglers in the Northeast Region by mode and area of residence, 1993.

MODE	COASTAL RESIDENTS	NON-COASTAL RESIDENTS	OUT OF STATE RESIDENTS	ALL TRIPS
SHORE	5,132	183	1,435	6,750
PARTY/CHARTER	1,259	64	859	2,182
PRIVATE/RENTAL	7,909	298	1,540	9,747
TOTALS	14,300	545	3,834	18,679

Source: Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, US Dept. of Commerce, NOAA/NMFS.

Some additional data can be garnered from the permit files (Table E.6.4.1.2.6 and Table E.6.4.1.2.7), keeping in mind that these data do not reflect species targeting. In 1993 there were only two Multispecies categories: commercial and recreational. For 1993, there were 5,311 total

permitted vessels. Only 213 of these (4%) were party/charter vessels; however, 711 vessels (13%) listed rod & reel as their only gear. It should be noted that because 19 93 was the first year a party/charter category was introduced, some party/charter boats chose to remain in the commercial category. There is no specific party/charter category in 1995; party/charter vessels can be permitted under either of the open access categories or, if they qualify for the moratorium, under the hook-only limited access category. Four percent of the current total number of permits would be 248 vessels. There are 532 vessels (11%) which list rod & reel as their only gear in 1995, though 1,367 vessels (28%) listed rod & reel as one of the gears they used. Approximately 1,800 vessels in the Northeast called themselves party/charter vessels in 1994, according to an Atlantic States Marine Fisheries Commission workshop on "Charter and Headboat Needs".

TABLE 6.4.1.2.6 Current Recreational Data

	1995 Rod & Reel Permitted Northeast Multispecies Vessels		**Northeast Party/Charter Vessels[3]**
	Number	Percent of that state's vessels	Number
Connecticut	56	57	100
Delaware	10	48	94
Massachusetts	447	22	233
Maryland	4	18	393
Maine	82	10	40
North Carolina	4	4	
New Hampshire	63	27	24 to 73
New Jersey	279	58	285
New York	282	52	276
Rhode Island	122	30	74
Virginia	4	5	164
TOTAL	1367	28	1786 to 1835

[3] Data from "proceedings of the Workshop on Charter and Headboat Data Needs" Atlantic States Marine Fisheries Commission, December 1994.

TABLE 6.4.1.2.7 Recreational Data from the 1993 Permit Files

	Charter/Party		**Commercial**		**List Rod & Reel as their only gear**	
	Number	Percent	Number	Percent	Number	Percent
Connecticut	16	8	93	2	40	6
Delaware	5	2	14	<1	6	1
Florida			25	1	4	1
Louisiana			8	<1		
Massachusetts	22	10	2129	42	191	27
Maryland			28	1		
Maine	7	3	820	16	27	4
North Carolina			126	3	5	1
New Hampshire	4	2	249	5	28	4
New Jersey	95	45	502	10	149	21
New York	46	22	566	11	187	26
Pennsylvania			10	<1		
Rhode Island	12	6	407	8	68	10
Virginia			116	2		
TOTAL	213	100	5098	100	711	100

E.6.4.2 Description of the Atlantic Groundfish Processing Sector

Since the prices for fresh fillets are much higher than those for frozen product, almost all domestic landings of Atlantic groundfish are processed into fresh fillets and sold into the domestic market. Groundfish processing plants almost always specialize in groundfish production; few process other species and even fewer produce both fresh and frozen product. Local landings, whole fish trucked in from other domestic ports, and whole fish trucked in from Canada provide their supply of unprocessed fish. "While frozen processors are largely independent of the rest of the New England fishing industry, they remain in New England because of marketing cachet and, in some cases, to be close to their Canadian owners" (Doeringer & Terkla 1995: ch. III). Almost all groundfish processing plants are located in the major ports of Massachusetts, Gloucester, Boston, and New Bedford, with a few plants in Rhode Island and a growing number in Portland, Maine.

Domestic landings of groundfish have declined since the early 1980's, causing firms which either process or wholesale groundfish to meet a relatively stable demand with increased use of imports. Since 1988, groundfish imports from Canada (25.5% of all 1993 imports[4]) have steadily declined, often making it difficult to obtain fresh supply. Other regulatory changes, such as the 1986 duty on whole fish from Canada, which has since been revoked, also affected the way processors do business (Georgianna, Dirlam, and Townsend 1993).

As a result of changes in both the condition of fishery resources and the business environment, the mix of processing and wholesaling plants in the Northeast has been altered. Figure 6.4.2.1 shows the number of processing and wholesaling plants in the Mid-Atlantic (VA, MD, DC, DE, PA, NJ, NY) and New England (CT, RI, MA, NH, ME) regions that handle all species of fish and shellfish. Since 1983, the number of processing plants in New England has remained steady at about 250. The number of wholesaling plants in New England, however, increased 113 percent from 314 in 1983 to 670 in 1993. The number of Mid-Atlantic processing plants decreased by 41 percent from 274 to 161 while wholesaling plants decreased 10 percent from 387 to 348 over the same period. "Continued low levels of landings may also result in structural changes. Smaller processors and wholesalers may drop out of the industry, shifting the industry away from its current monopolistically competitive structure to a more oligopolistic one" (Doeringer & Terkla 1995: ch.III).

Changes are also reflected in the number of year-round (as opposed to seasonal) employees in these sectors as shown in Figure 6.4.2.2**.** Although the number of New England processing plants remained steady, the number of employees decreased 37 percent from a high of 7,470, in 1984, to 4,727, in 1993. Employment among New England wholesalers increased 80 percent from 1,690 in 1983 to 3,041 in 1993. Mid-Atlantic processing plants decreased their employment 36 percent from a high of 10,015 in 1984 to 6,027 in 1993. Mid-Atlantic wholesaling employment decreased 22 percent from 3,203 in 1983 to 2,490 in 1993.

These workers, however, have better chances than fishermen of finding alternative employment. Fishermen have the potential for very high wages, yet their relative lack of formal education and transferrable skills makes it difficult for them to find new jobs (see section 6.4.3.1.1). "In contrast, processing workers are paid at levels more commensurate with other jobs in their localities requiring similar levels of education and skill, and the manual skills in processing approximate counterparts in semiskilled manufacturing and assembly work" (Doeringer, Moss & Terkla 1986:123).

Figure 6.4.2.3 describes changes in the quantity and value of groundfish[5] processed in the Northeast since 1983 (those landed domestically, transported from other regions, and imported from other countries). Data are not available on wholesale sector activities.

The groundfish processing industry boomed with the sharp increase in landings following the FCMA in 1976 (Georgianna and Ibara 1983). Groundfish processing reached a peak in amount and value in 1986. Both amount and value then declined over the next three years by 52 percent and 30 percent, respectively. However, "declines in the New England catch in the 1980s were

[4] Fisheries of the United States, 1993

[5] This is a biological definition of groundfish and includes more species than those listed under the Northeast Multispecies Plan. Species included are: cod, cusk, all flounders, haddock, pollock, whiting, tilefish, Atlantic wolfish, scup, red hake, white hake, sea basses, and goosefish.

offset by increases in prices as demand for fresh fish increased. Although there was considerable variation in year-to-year values, New England catch values held up in real terms through the catch declines of the 1980s" (Doeringer & Terkla 1995: ch. VII). The year 1990, then saw a near doubling in amount and a 40 percent increase in value. The recent sharp decrease in domestic landings, however, have caused groundfish processing to become an industry in decline.

Figure E.6.4.2.1 Number of Processing and Wholesaling Plants in the Northeast

Figure E.6.4.2.2 Number of Year Round Processing and Wholesaling Employees in Northeast

Figure E.6.4.2.3 Amount and Value of Northeast Groundfish

The industry's decline is reflected in employment trends. Figure E.6.4.2.4 shows processing employment in Massachusetts using data from Fisheries of the United States and from the Massachusetts Division of Employment and Training (DET). Both data series include all fishery products, but interviews and observation indicate that most of these plants in Massachusetts process groundfish (Georgianna 1992). Data from Fisheries of the United States (US DOC Current Fishery Statistics, No. 9100) show a sharp increase in employment from 1976 until 1980 and a steady decline of 5 to 7 percent per year since then. DET data, which is not available before 1982 in the same form, shows a similar steady decline. The difference in the number of employees shown by the two series is due to the inclusion of wholesalers and dealers in the Fisheries of the United States series.

Figures E.6.4.2.6 and E.6.4.2.7 show wholesaling employment and the number of firms respectively. There are two problems with these data. Firstly, the data cover all products and species, and fresh Atlantic groundfish has only a small share of the wholesale fish market. Secondly, wholesaling is an ambiguous term; it could mean selling processed product to retail operations or selling processed or unprocessed product between intermediate firms.

Figure E.6.4.2.6 shows an increase in employment in the wholesale sector in the Fisheries of the United States series, and roughly constant level according to the DET data. These results roughly conform with the rising trend in consumption of seafood. The DET data include distributors as well as wholesalers, which accounts for DET's higher numbers of employees. Figure E.6.4.2.7 shows a sharp increase in the number of wholesaling firms from both data sources. This is a surprise since it does not conform to the drop in landings; however, our interviews have confirmed that many former processors have moved into wholesaling, most often moving whole fish from one firm to another, either within the same port or trucking the product to a different port.

Interviews showed the same trends as the other data. Several firms reported that they have drastically reduced employment due to the shortage of landings. The shortage of landings and subsequent rise in ex-vessel prices has drastically reduced processors' and wholesalers' ability to maintain long-term relationships with their customers. Previously, processors could make up losses from cyclical or periodic shortages of landings and high ex-vessel prices during periods of increased supply. Now, they can no longer supply constant quality within an acceptable price range, and their customers are resisting high prices, since only a few restaurants will dare to reflect wholesale invoice costs of fish in entrée prices.

Processors are also shifting to other species, both domestic and imported. Processors and wholesalers are shifting from Atlantic groundfish to non-North Atlantic species such as Alaska pollock, Pacific cod, orange roughy, and other species. However, larger firms can make this shift more easily than smaller firms, which often rely on a few suppliers and a few customers who supply and demand the same few species of groundfish. Within the North Atlantic, fish is trucked whole between New England ports and from Canada. Most processors are continually looking elsewhere for supply. This pattern is complicated by boats shifting to Portland, preferring to sell at the auction there rather than in New Bedford and other Massachusetts ports.

The declining trend in groundfish landings and the growing consumer demand for quality fresh fish is contributing to the character of the processing sector. "There is strong evidence that U.S. mass markets for fresh fish have high potential for continued expansion (Doeringer & Terkla 1995: ch.III)." However, "instability in supply...remains a barrier to the full-fledged exploitation of mass markets for fresh fish outside the Northeast. Neither the New England harvest, as augmented by that of independent vessels in southwest Nova Scotia, nor the Canadian corporate

sector are able to provide quality fish at predictable process needed to open mass markets in the Midwest" (ibid). Unless stocks rebuild to allow higher landings, it is unlikely that the market for fresh fish can expand. This is an industry in transition, caught between suppliers and consumers, both of which are experiencing significant change.

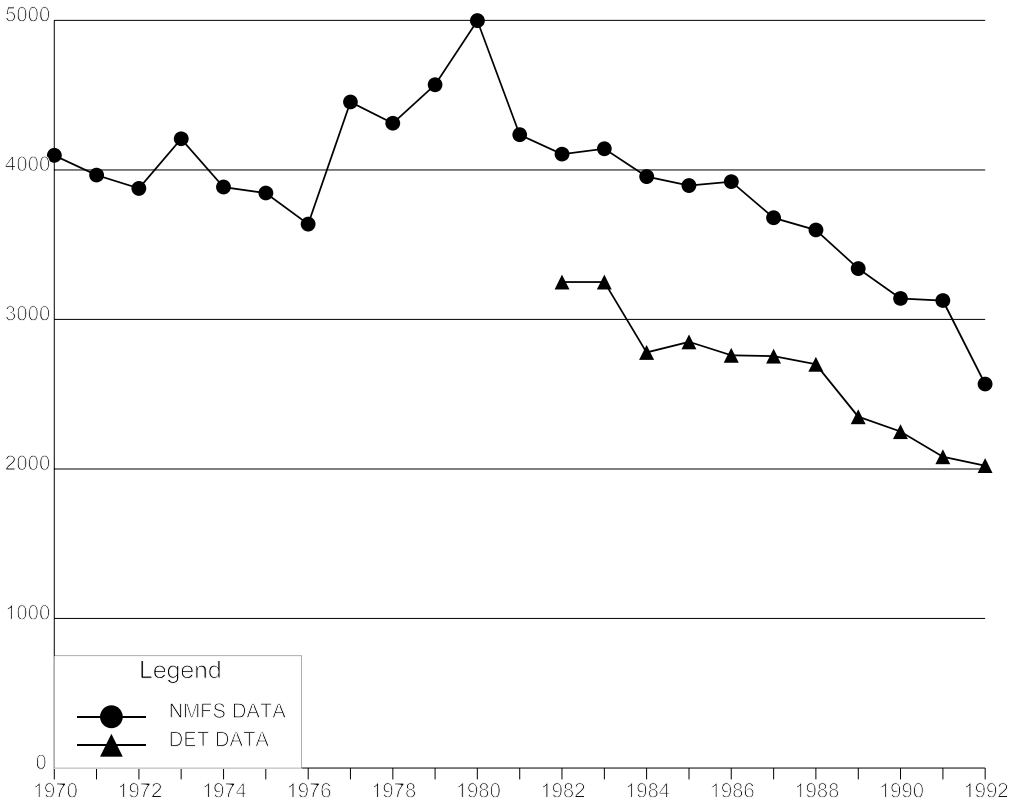

Figure 6.4.2.4 Processing Employment in Massachusetts

Figure E.6.4.2.5 shows the number of processing plants in Massachusetts from 1970 through 1990. The recent trend is not clear from the figure, since Fisheries of the United States shows a slight increase, while the DET data show a slight decline. Once again, the much higher number of plants in Fisheries of the United States is caused by the inclusion of many plants whose primary activity is wholesaling. From 1988 to 1990, the DET data show a sharp decline from 47 to 41 plants. Interviews with port agents and managers of processing plants confirm this trend. Since 1990, according to our interviews, several more firms left the industry in New Bedford, Boston, and Portland. However, a new C.B. Mercer processing plant is planned in Gloucester for 1995 or 1996, and National Fish & Seafood will be moving back to Gloucester after an absence. Sea Watch International has moved their clam and quahog processing from Virginia to New Bedford.

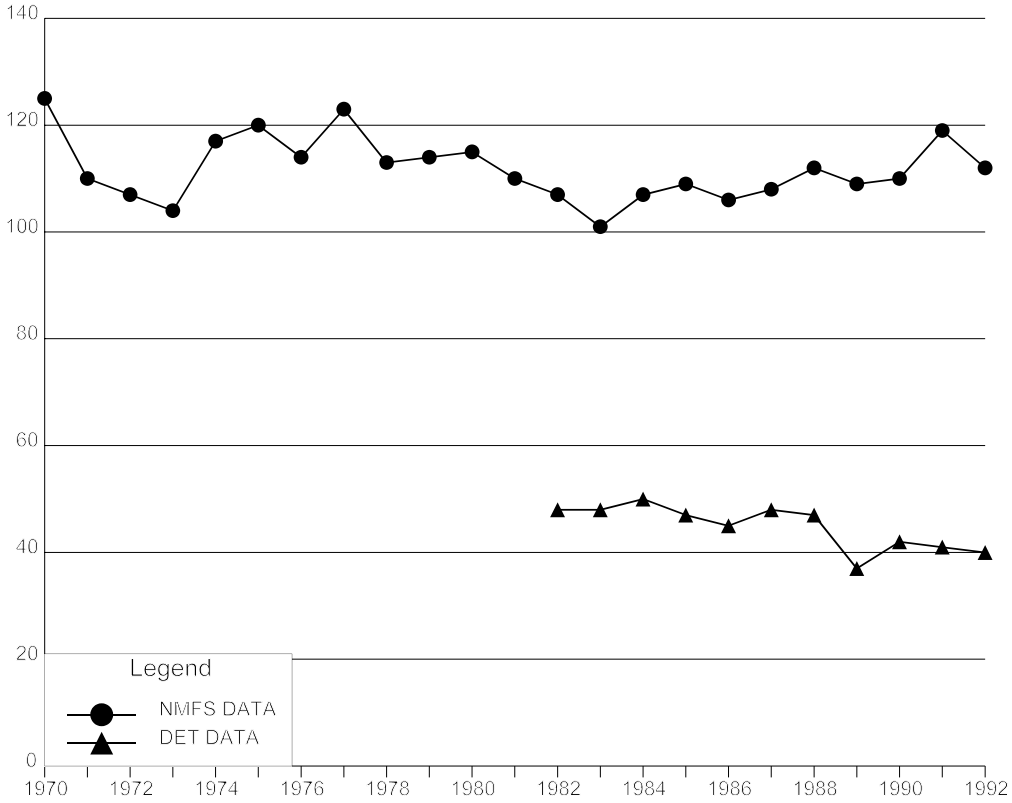

Figure 6.4.2.5 Number of Processing Plants in Massachusetts

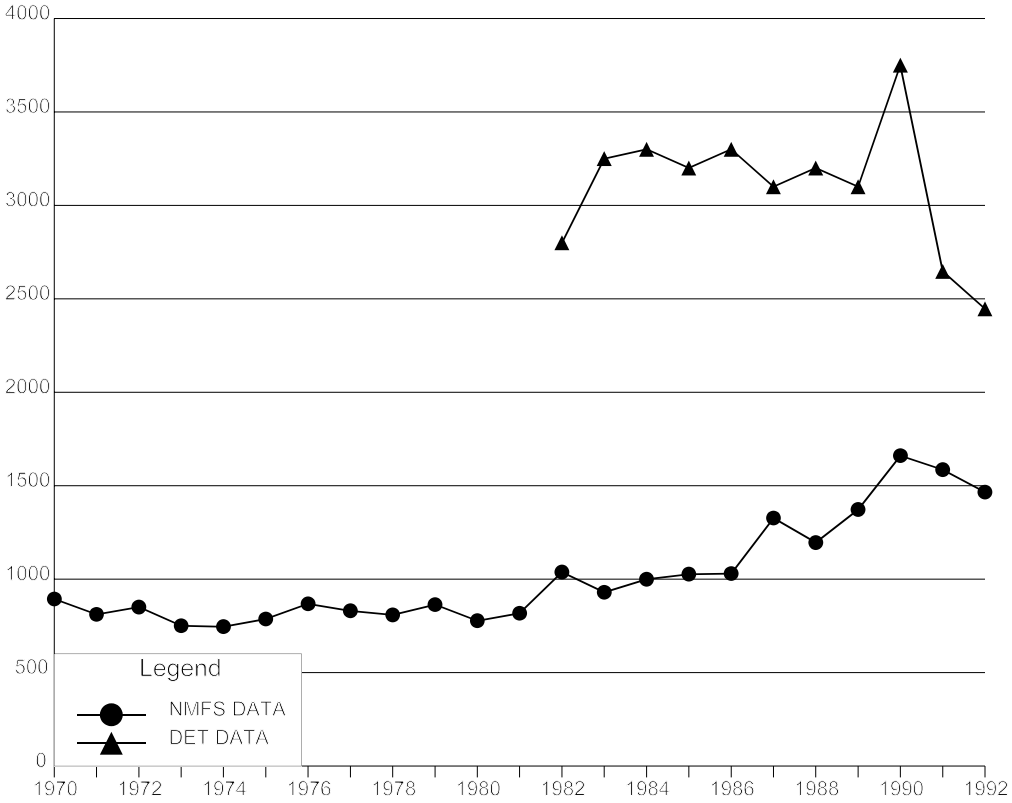

Figure 6.4.2.6 Wholesale Employment in Massachusetts

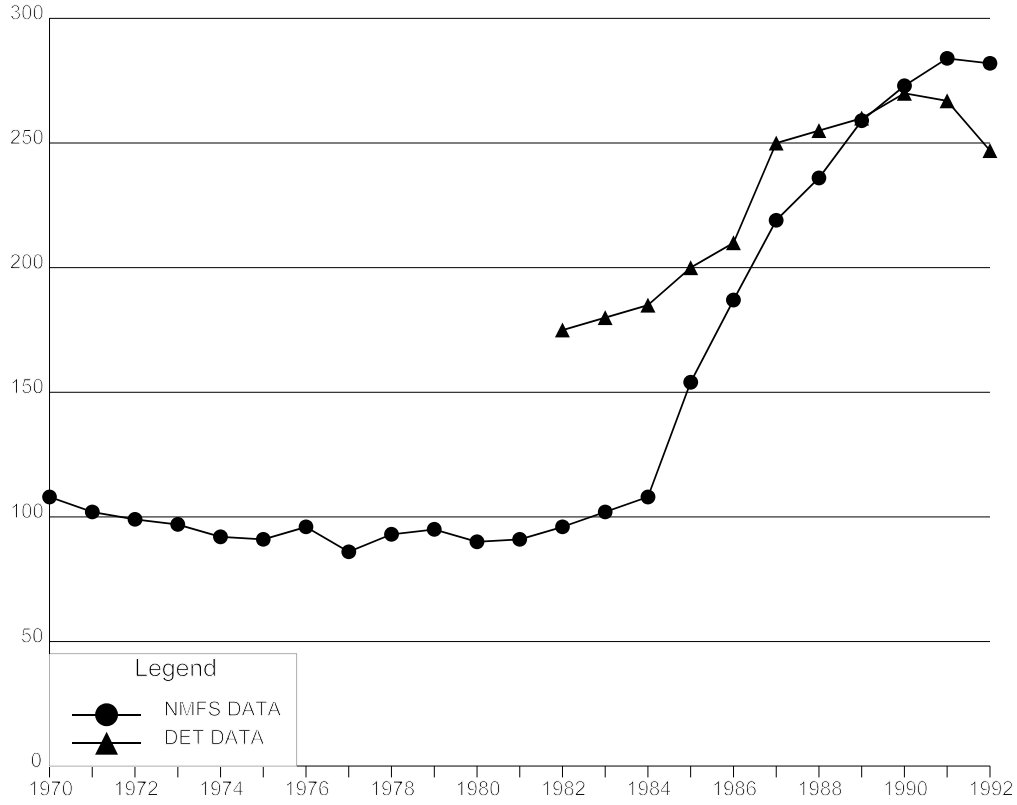

Figure 6.4.2.7 Wholesalers in Massachusetts

E.6.4.3 Social and cultural aspects

This section discusses, in general terms, the importance of fishing and the fishing industry to individuals, families, and communities throughout New England. In addition to the social and cultural aspects of the fishing industry, this section describes native American and subsistence fishing, to the extent that they exist in the area covered by this action, as well as issues of public health and safety as they relate to fishing.

For more in-depth social and cultural profiles of the ports of New Bedford and Gloucester, MA and Stonington, ME, please refer to the Final Amendment #5 to the Northeast Multispecies Fishery Management Plan Incorporating the Supplemental Environmental Impact Statement, Volume I, pages 219-246.

E.6.4.3.1 Introduction

One need only look at the geography of the New England region to make some educated guesses about the fishing industry and the differences that have developed among the various ports. For example, the convoluted coastline of Maine with its hundreds of islands, rocky land and the wealth of the sea life makes it obvious why fishing was a fitting and natural industry to promote since the days of the first settlers.

The richness of sea life is not unique to Maine, of course. The Gulf of Maine, and the Massachusetts, Cape Cod and Narragansett Bays have always been noted for their great abundance of fish, whales and other sea life. Fishing is an historically important and traditional occupation along the entire New England coast.

Take a step away from the shoreline, however, and consider why and where population centers have developed, how the transportation networks connect the population centers, what the migration patterns of people and fish have been; even consider the weather, technological development and the ascendancy of other occupations, to gain a better picture of what the New England fishing industry looks like in all its variety.

Management has also affected the way the industry has developed. Before the Magnuson Act extended federal jurisdiction to 200 miles, management in the prime fishing grounds off New England was the responsibility of the International Commission for the Northwest Atlantic Fisheries (ICNAF). The perceived lack of control over foreign fishing led the United States government to establish various programs to aid domestic fishermen (Peterson and Smith 1981). Among these were programs to supplement vessel construction, loan and marketing programs, development and small business grants, underutilized species development programs, gear research programs and representation on international fishery delegations. Some observers suggest that these aid programs continued too long, causing an inflation of the domestic fleet, and are ultimately responsible for the diminishment of stocks (re. Acheson 1984).

E.6.4.3.1.1 Urban vs rural

Many of the differences among fishing ports (e.g., average vessel size, common gear types) can be attributed to differences associated with urban centers and rural areas. Some of these differences were also alluded to in section E.6.4.1.1, the vessels and the fleets and in section E.6.4.1.1.2, the ports.

Vessel size and gear shifting

The urban centers tend to attract large (over 60 feet long) fishing vessels (see Table E.6.4.3.1 and Table E.6.4.3.2) that take 5- to 10-day trips out to fishing grounds on Georges Bank, return to port for 2 or 3 day layovers, load up on fuel and provisions, visit families, perform maintenance work on engines, and return to the fishing grounds. These large vessels tend to maintain one type of gear and concentrate on a few species. As fish have become scarce, some report that trips have lengthened by two to four days and layovers are briefer. Nonetheless, preferred fishing areas have remained constant in some cases. Murawski (pers. comm.) indicates that certain areas of Georges Bank off the northern New England coast continue to be fished -- especially by Gloucester fishermen -- even though other areas are currently more productive. Historical data and port agents in Gloucester confirm that Georges is a favorite fishing area for Gloucester boats (Goode & Collins, 1887). In addition, Miller & Van Maanen (1981:36) note: "Many of the Gloucester boats have fished the same grounds for years and their charts reflect this fact for they are full of markings indicating safe lanes and alleys."
Ownership varies. Many are owner-operated, but fleets of two or three large vessels operated by hired captains are not uncommon.

TABLE 6.4.3.1 Numbers and Percents of 1995 Permitted Vessels (both open and limited access) in Selected Ports, percents are of total permits in that port (groups of 3 or fewer vessels omitted)

	0-30 ft		**31-45 ft**		**46-60 ft**		**61-100 ft**		**100+ ft**	
	No.	%	No.	%	No.	%	No.	%	No.	%
Portland/ S. Portland, ME	14	10	48	34	37	26	42	30		
Stonington, ME	6	14	27	64	4	10	10	24		
Boston, MA	9	9	58	57	13	13	20	20		
Gloucester, MA	72	24	136	44	37	12	61	20		
Chatham, MA	112	60	72	39						
New Bedford/ Fairhaven, MA	16	5	38	13	21	7	220	73	8	3
Scituate, MA	16	28	33	57	8	14				
Portsmouth, NH	26	35	33	45	12	16				
Cape May, NJ	8	9	31	34	13	14	37	40		
Montauk, NY	60	31	102	53	17	9	13	7		
Newport, RI	5	11	13	29	9	20	18	40		
Point Judith, RI	28	15	75	41	24	13	53	29		
Hampton, VA	35	38	21	23	5	5	31	34		
Norfolk, VA							7	70		

TABLE 6.4.3.1.2 Numbers and Percents of 1995 Limited Access Permitted Vessels in Selected Ports, percents are of total limited access permits (groups of 3 or fewer vessels omitted)

	0-30 ft		**31-45 ft**		**46-60 ft**		**61-100 ft**		**100+ ft**	
	No.	%	No.	%	No.	%	No.	%	No.	%
Portland/ S. Portland, ME			16	18	31	36	38	44		
Stonington, ME			15	88						
Boston, MA			19	40	10	21	18	38		
Gloucester, MA	6	3	83	47	34	19	55	31		
Chatham, MA	15	21	55	76						
New Bedford/ Fairhaven, MA			10	6	14	8	141	83		
Scituate, MA			19	61	8	26				
Portsmouth, NH			17	57	11	37				
Cape May, NJ							18	75		
Montauk, NY	4	7	35	64	9	16	7	13		
Newport, RI			5	19	5	19	13	50		
Point Judith, RI			26	27	19	20	48	50		
Hampton, VA							6	100		
Norfolk, VA										

Rural areas, in contrast, have multitudes of relatively small (under 55 or 60 feet), owner-operated fishing vessels. In the northern part of the region, the small vessels usually take long, single day trips, leaving in the early hours before dawn, and returning in the late afternoon or early evening. These boats fish as close to shore as they productively can, traditionally within 20 miles of shore (Peterson and Smith 1981), though the declines in desirable stocks are forcing them farther and farther out . The small vessels are often opportunistic, frequently shifting gear and fishing grounds to try to capitalize on availability and price changes. Dewar (1983) points out that weather, prices and fish behavior make gear switching a necessity on inshore boats, whereas offshore boats rarely switch gear because of the expense of the conversion.

Many fishermen have very strong feelings about the choice of day versus trip fishing, due to issues such as time spent with family and predictability of schedule (Binkley 1990; Gatewood and McCay 1990; Apostle 1985; Pollnac & Poggie 1988). There is some division by age among the fishermen with respect to day versus trip boats as well, with trip boats being more likely to be crewed by younger men. Said one fisherman in his mid thirties about his decision to leave a freezer boat for a boat which makes 2-4 day trips, "I'm not 25 anymore." Often young men will

begin day fishing, perhaps move to trip fishing in middle age, and then return to day fishing near retirement. Miller & Van Maanen (1981:30-31) note that in Gloucester the most important division among fishermen is between inshore, primarily day boat, and offshore, primarily trip boat, draggermen. Day fishermen often have a strong commitment to day fishing in order to be flexible in spending time with family and being active in the community. Nor is community a factor only for inshore vessels. Doeringer et al. (1986:74) found offshore fishermen in Gloucester and New Bedford also had very strong community ties, due to ethnic group bonds.

In some areas, gear shifting is seasonal. For example, in Maine, a number of small boats gillnet in the summer and longline in the winter. Other small vessels go lobstering in the summer, while longlining, or scalloping, urchining or shrimping in the winter. The choices are very personal, everyone seems to have developed an affinity for one or another type of fishing. Start-up costs and experience also affect the choices. Fishermen may be limited to particular species by their knowledge and/or by compatibility with their gear (for more on this topic, see section E.7.1.1.2, Impacts on Other Fisheries).

In other areas, gear shifting is seasonal by species. Describing the variety of species for which he fishes, the owner-operator of a 60 foot boat out of Point Judith said that, in late summer, when the inshore fishery is in the doldrums, he may make 2-4 trips to below the dumping area, for whiting. In the fall, he may fish for scup, northwest of the closed area. In spring he'll go after winter flounder off the Block Island, and in late spring, it will be whiting (silver hake) and flounder in Block Island Sound. He also designated scattered other areas as "year round" for either, "flounder, squid, scup", "whiting, squid, flounder", "whiting, fluke, scup", or "whiting, flounder" -- indicating the relative prevalence of different species in each location. This species shifting can also occur within the same trip. Point Judith boats often seek yellowtail flounder, but if they hear of a school of whiting, they may switch nets to "top off" their trip. The versatility of the fishermen contributes to their self-esteem as well as benefitting their "bottom-line."

Differences in gear make it difficult to establish equitable management plans, and contribute to some conflict among different gear users, making consensus difficult to achieve. Gillnetters, for example, claim to be victims of draggers who purposefully go through their gear; while draggers complain that the gillnetters usurp bottom that was traditionally available to draggers. Everyone claims that theirs is a "better gear." Gillnetters point out that they don't require bait, they are size selective, use less fuel and don't tear up the bottom. Longliners say their gear does not affect bottom and is selective. Both deride draggers for pounding the bottom with their heavy doors leaving nowhere for fish to hide. Draggers complain about ghost nets fishing and lost lines and hooks fouling the bottom.

Marketing

Market arrangements vary in both urban and rural areas. Urban centers are, of course, more apt to have a wider variety of options for marketing. Notably, the most active auctions are held in Portland, Boston, and until recently, New Bedford. The old New Bedford auction is gone, replaced by a new but as yet not as influential auction. Gloucester is also considering a display auction, though plans are not yet firm. In other areas there are a variety of dealers and trucking options. In some cases there are fishermen's cooperatives and labor unions that affect how fish is handled. Until recently, the Point Judith Fishing Cooperative was influential. However, it went out of business in the summer of 1995. Each place has a reputation and associated pros and cons for individual fishermen.

For example, the Portland display auction appeals to fishermen who want to emphasize quality. The auction also has a reputation for honesty (fair scales and no stealing by employees), but since the catch must be physically present, there are extra handling costs and a broker is needed if the fisherman does not want to spend the time actually selling the fish. The old New Bedford auction, on the other hand, had a reputation for a lot of wheeling and dealing and diverting of fish -- one reason it eventually went out of business. Moreover, it is said that a few processors control the waterfront.

Where there is a publicly-owned pier, fishermen are more apt to be free to select a dealer based on price and/or fair-dealing. Where the waterfront is privately-owned, fishermen are likely to be forced to sell to a particular dealer who in turn provides ice, fuel, bait, and/or credit, in addition to a place to tie-up to unload and/or work on the boat. Long term relationships with a particular dealer can work to the fishermen's advantage, making their catch the first bought and sold in a soft market, when others without such a relationship have to scramble for buyers and a decent price. Wilson (1980) confirms that failure to establish long-term relationships with dealers can be detrimental to fishermen. Nevertheless, it is clear that fishermen everywhere face constraints imposed by the harvest of a highly perishable product with wide daily fluctuations in supply and demand, a circumstance that seems to give dealers more leverage than fishermen.

Marketing naturally affects decisions about the species being sought. Price, availability of the species and proximity to an appropriate market all figure in the decision-making. In rural areas, where the distances to market can be great, prices often reflect the higher transportation costs. Some of the vessels attempt to develop local markets, selling to fish markets and restaurants, particularly in tourist areas, to avoid having to deal with middlemen, or they form cooperative associations for offloading and transporting the catch to market centers. These small cooperatives also enable them to purchase fuel and other supplies at bulk rates.

E.6.4.3.1.2 Demographic issues

Education

Many fishermen started going out in summers with their fathers or other relatives while still in high school. For fisherman now at middle-age or nearing retirement, it was not uncommon to quit school as soon as legally possible to go fishing full-time. As fishermen became more sophisticated, that is, as the boats became more capital-intensive and fishing more technically complex, more fishermen completed high school before going full-time. Now most ports have at least a few college-educated captain/owners, especially among those who entered the fishery in the late 1970s.

Nevertheless, the majority of active fishermen do not have extensive formal educations, but rather are educated "in the school of hard knocks," as one man put it. Consequently, fishermen would generally be at a disadvantage in competition for many alternative occupations. When Peterson and Smith (1981) did their research, they found no correlation between education and income from fishing. In other words, lack of formal education did not interfere with making a good living from fishing. It does, however, interfere with making a good living in many land-based jobs.

Ethnicity

Gloucester and New Bedford are the two large ports with strong ethnic affiliations among their

fishing populations.[6] Probably 80 percent of Gloucester's fishermen are Italian (mostly Sicilian)[7]. Although large immigration flows ended in the mid-1970's, there are at least 26 vessels (out of approximately 200) on which only Italian is spoken. Even among the fishermen who arrived at a very young age, Italian is often the first and virtually only language spoken. Some of these men depend on their wives to communicate with the English-speaking population when necessary. According to U.S. census data for 1990, there are 333 households in Gloucester which are linguistically isolated and whose primary language is not Spanish, or an Asian or Pacific Island language. Many of these are likely to Italian fishing households. These are homes where no one speaks English comfortably. Further, nearly 20 percent of Gloucester's population speaks more than one language. In a city such as Portland, this figure is only 13 percent. Doeringer et al. (1986:6) note with regard to both Gloucester and New Bedford: "[m]any workers are geographically immobile because of close ties to community and family -- ties that are reinforced in some ports by the presence of a large number of recent immigrants, many of whom lack facility in English."

New Bedford has a large Portuguese-dominated offshore dragger fleet and a significant number of Norwegians among their fishermen, particularly captaining scallopers -- though the scallop fleet is much less dominated by Norwegians today than it was in the past. According to 1990 census data, 36 percent of New Bedford's population claims Portuguese as their sole ancestry (35,641 persons), and 4 percent of households are linguistically isolated (excluding households whose primary language is Spanish, or an Asian or Pacific Island language). Less than 1 percent of New Bedford residents claim Norwegian ancestry. Among the smaller ports, Provincetown is notable for its Portuguese fleet, although the majority are third- or even fourth-generation by now (Husing 1980).

The ethnic affiliation is significant primarily because it links the fishermen of these populations through time with fishing communities in Italy, Portugal and the Azores, and Norway. This historical perspective permeates the community and affects the way not only fishing, but all aspects of life are organized. Although individuals do not all behave the same, as a group, particularly in the Portuguese and Italian communities, choices made regarding education, occupation, marriage, leisure time, etc. reflect the sense of continuity and identification with their ethnic heritage.

In contrast to the offshore dragger fleets, small boat fishing in Gloucester and New Bedford is dominated by those who are usually referred to as "Yankees," which includes those from a mixed ethnic heritage, most of whom come from several generations born in the United States or Canada (Peterson and Smith 1981:12). Gloucester has a much larger small boat fleet than New Bedford (see Table E.6.4.3.1).

The ethnic affiliations cause the fishing communities in these large population centers to mimic aspects of life in rural communities. For example, it is still as common to find relatives fishing with relatives on Gloucester boats as it is in Stonington, Maine. One of the consequences of this is that when a boat is "put out of business," for whatever reason, an extended family may be affected, and there may be fewer relatives with jobs outside the fishing industry that can support those affected (re. discussion in section E.6.4.1.1.2, the ports).

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[6] See Miller and Van Manaan's Boats don't fish, People Do(1979), and Poggie and Pollnac (1980) for more discussion of ethnicity in these ports.

[7] Fourteen percent of Gloucester's total 1990 population claimed Italian ancestry, a total of 3,998 persons.

Along the same lines, many fishermen (especially in rural areas and ethnic enclaves) rely on a pooling of family resources for their initial vessel purchase and for upgrades. This "implies a more resilient ability to endure revenue fluctuations than normal business borrowers, but also implies capital will be slow to leave the industry following a more permanent downturn" (Doeringer et al. 1986:47).

Aside from Gloucester, New Bedford and Provincetown, the majority of ports in New England have an ethnic mix typical of any New England town. One exception is Stonington and some other Downeast Maine ports, which have a predominantly "Yankee" fleet including a number of fishermen of French-Canadian extraction.

Owner-operators

Typically, groundfishing requires a variety of skills from crew members ranging from sorting fish according to species and size, to judging quantities for boxing, setting and retrieving gear, and net-mending. Even more specialized skills such as engine, hydraulics and electrical system repairs are handy. In addition, captains must be able to locate productive grounds and avoid obstructions that can cause net damage ("hangs") (Doeringer et al. 1986).

Normally, boys start out fishing on a relative's boat for a half-share in the summer while still in school. Those who are interested can learn many skills by watching and asking questions of other crewmembers. The actual operation of the vessel is directed from the pilothouse, however, and the knowledge of navigation and location of fishing grounds was once a closely guarded secret, controlled by the captain (Doeringer et al. 1986, Van Maanen 1979). Logbooks with hangs and catch notations were often a prized possession handed down from father to son, or between other close relatives.

Though operational issues are still significant, and sons can certainly gain an advantage if they are able to obtain historical catch information from their captain-fathers, recent technological advances have made it much easier to navigate and to return precisely to the desired grounds. Nevertheless, it may be easier for sons of captain-owners to eventually become captain-owners than it is for sons of crewmembers to become captain-owners. Financial considerations may also play a role in that captain-owners may be in a better position to help their son finance the purchase of their vessel, or may pass the boat on as a part of their son's inheritance.

The desire to become a captain also varies by port. Dewar & Smith (1979:31) found that Chatham crew members generally aspired to some day own their own boat but Gloucester crew members -- both because of the larger, more expensive vessels favored in Gloucester and because of the tradition of family owned and crewed vessels -- often did not plan on moving up to the captain-owner position.

E.6.4.3.1.3 Community dependence on fishing:

In many of the rural ports, fishing and related businesses provide the main source of income for a majority of the population. Property taxes on fishermen's houses support the schools, mortgages on boats provide income for banks. Fuel companies, ice companies, trucking firms, dealers and processing firms are often community members as well. Although insurance companies, net manufacturers and electronics firms are more often based outside of fishing communities, their agents or dealers often live in the communities. Dewar (1983:8) noted, "troubles of fisheries affect the welfare of many workers and communities. Fishing-related activities could easily have provided between 15 and 20 percent of a coastal town's jobs in the late 1970s. Certainly

this many jobs were linked to fishing in the early 1980s." In addition, the spouses of fishermen on small vessels often work in support industries, often cottage industries, such as hook-baiting, shrimp peeling or crab-picking. These support industries also provide employment for handicapped individuals.

In the more urban centers, fishing may play a much smaller role in the community as a whole (see Table E.6.4.3.1.3), but may contribute a vital piece of diversity to the economic structure. Primary production can cushion a town when service industries fluctuate.

TABLE 6.4.3.1.3 Relative Size of the Fishing Industry in Selected Port Towns, using NMFS Permit Files and 1990 Census Data[8]

	Number of 1993 Multispecies Permits*	Number of Workers in 1990 Age 16 or Over in Agriculture, Forestry & Fisheries	Total Employed Persons in 1990 Age 16 or Over
Portland, ME	122	449	33,378
Boothbay, ME	40	15	542
Boston, MA	101	1440	288,704
Gloucester, MA	322	548	14,470
Chatham, MA	186	59	860
New Bedford/ Fairhaven, MA	302	1248	40,159
Scituate, MA	68	85	2512
Portsmouth, NH	65	78	12,401
Cape May, NJ	93	25	1593
Montauk, NY	223	139	1673
Newport, RI	50	291	12,899
Point Judith/ Narragansett Pier, RI	185	59	2017
Hampton, VA	41	563	58,561

* This is number of Multispecies Permits only; not all fishing permits.

Declining catches have already caused some consolidation of support industries. Processing plants have closed in Stonington and Gloucester within the last few years . A few new plants are also opening, but often not groundfish plants (see section E.6.4.2, processing). Other service industries are attempting to diversify in order to survive natural and/or management-caused changes in the industry. A Virginia pier is hoping soon to process chickens as well as fish.

[8] The U.S. Census data for 1990 provides information about the populations of the communities where vessels are permitted and groundfish is landed. The census data is aggregated by township or city name, and, therefore, individual census towns may include several ports which are locally identified by separate names (for example, Narragansett, RI includes Point Judith). Conversely, some ports which are referred to by a single name actually incorporate several individual towns identified in the census files (for example, the "port of New Bedford" is the center of activity for vessels registered in Fairhaven, Mattapoisett, Marion, Dartmouth, and also serves as a major port for vessels from more distant places).

The urban centers in general offer more opportunities for alternative employment than do rural areas since they often support various manufacturing processes and construction businesses. "Banging nails" is often referred to as a logical alternative occupation. Of course, such alternatives are less accessible in an economic recession. Other alternative occupations are lacking in many areas because of the limited education of many fishermen and because some employers are reluctant to hire someone who has "been his own boss."

Employment in the tourist industry is seen as unlikely in many instances because the characteristics that make suitable personnel in service positions are perceived as antithetical to values held by many fishermen and their families. Pride and independence, "doing what they want, saying what they want, wearing what they want," so valued in the fishing community are not particularly valued in service jobs. On the other hand, the quaintness added to a community by the presence of the fishing industry often attracts tourists. Most tourists enjoy seeing a working waterfront, especially if they are able to walk up close enough to talk to the fishermen or others working at the docks.

E.6.4.3.1.4 Organizations

There are an array of associations for fishermen, most often based on gear type. Most of these organizations have at least one member who actively lobbies for the group in management fora or even in front of town boards (especially vis á vis waterfront issues). The organizations with higher membership are more apt to have paid staff who can represent them at meetings, and consequently, have had a more active voice in the development of the fisheries management plan. Traditionally, it has been the large vessels that are more frequently represented than the small, but a number of organizations representing small boats or a mixture have been faithful attendees and have commented on the proposed plans. Captain-owners are far better represented than crew members.

However, many active fishermen do not feel well-represented. They comment that it is difficult for someone who is not actually fishing to properly understand the active fisherman's perspective. On the other hand, the sheer numbers of meetings and the distances involved preclude a fisherman attending any but the most important meetings. Unfortunately, some complain, it is impossible to know ahead of time which meetings are going to affect which individuals most.

There are several very active wives associations that cross-cut the fishermen's associations. The most prominent are in Maine, Gloucester and Chatham. These associations lobby in management fora, but also serve social functions of supporting each other and organizing festivals as well as promoting seafood consumption.

A few organizations represent geographically-dispersed fishermen. East Coast Fisheries Federation, Maine Fishermen's Wives, the Maine Gillnetter's Association, and Atlantic Offshore Fishermen's Association are examples of organizations whose membership extends beyond a local community level. Other organizations limit their efforts to their own town and often their own gear type. The following list of commercial fishing industry associations was recently published by Commercial Fisheries News in a cooperative effort with the University of Maine Sea Grant Program and other Sea Grant programs along the East Coast.

Social service outreach

Social agencies that reach out to the fishing community exist in New Bedford, Point Judith and Gloucester. Substance abuse is their primary concern. In some communities, religious organizations also provide social services. Six NOAA Fishing Family Assistance Centers provided some interim assistance in the first 18 months of Amendment 5, primarily in the form of referring fishermen to existing sources of grants and aid (fishing and non-fishing related) with which they may not have been familiar and in helping to write up grant proposals and other forms. These were scheduled to close in mid-1995, but the largest (Gloucester, and New Bedford) will remain open indefinitely.

E.6.4.3.1.5 Lifestyle

Incomes for crew run the gamut from $10,000 to $110,000 per year and even higher for some captains and owners. Even today, a crew member on a highliner, a successful fishing boat, can earn $90,000 or more. Estimates are difficult to make and fishermen are notoriously close-mouthed about their incomes. What is certain, however, is that fishermen take a share of the proceeds of the catch after expenses. This form of profit-sharing (the "lay" system) makes the crewmembers as anxious for a good trip as the captain-owner. It also counterbalances the hierarchical organization of a boat's crew. The crewmember is also rarely on a contract and is able to leave the boat if he is dissatisfied with the income or working conditions. On draggers, the finding of a new site is easiest for skilled netmenders, but good cooks and others with specialized skills are also welcomed.

The greatest differences in income are probably between captain/owners and crewmembers. The owner-operator takes the major risk in the fishing operation, but he can be well compensated since he receives a captain's share and the boat share. Theoretically anyway, a highliner captain-owner among the small vessels can bring home a range of income comparable to that of the captain-owner of a large vessel because the small vessel's costs are much lower than that of a large vessel.

The owner-operators are in a tenuous position, however, from the standpoint of credit. Most middle-aged and young captain-owners have very large mortgages on their vessels with their house as collateral. If they lose their boat, they also lose their house, a source of great anxiety among fishermen and their families.

Crewmembers have a wide range of incomes. One described his as "just below the poverty line." He happened to be joking, but one of the service agencies noted that there are fishermen's families receiving assistance (welfare or food stamps).

Some Maine fishermen comment that earlier in their career they could make a living, even when taking winters off from fishing to work on their gear. However, within the past 10 or 20 years lifestyles have radically changed for fishermen, particularly for those in rural Maine. A decade or two ago it was not unusual to find solid middle-class families living in houses without hot running water or indoor bathrooms. Central heating is still a luxury many live without. For the most part, however, fishing families now want and expect the same level of consumer comfort as the majority of the nation's middle-class. Bathrooms, hot water, trucks, cars, televisions, Nintendo, Pizza Hut, etc. are considered necessities, not luxuries. In consequence, an average, middle-class life style is much more expensive to support than it was in the recent past.

In addition, boats and gear are much more expensive. Almost everyone has more power, safety

equipment, electronic and fishing gear than ever before. All costs have gone up. Nevertheless, there are still fiercely independent individuals and families who pride themselves on limiting their acquisition of goods and comforts, making as much of their gear as they can and being as self-sufficient as possible.

Many fishermen comment that they have been able to make a decent living from the sea, but their wives tend to add that, given the long hours and danger of the work, they are barely compensated, particularly if analyzed as an hourly wage. Most fishermen believe that the industry is unfairly accused of being greedy, and the sacrifices individuals make that truly benefit the nation are not appreciated.

E.6.4.3.1.6 Fishermen's role in management

Due to the expense and difficulty involved in "at-sea" enforcement, fisheries management must frequently rely on an honor system, rather than simply relying on a perception of there being a high potential for an enforcement action. For management to be effective, fishermen must believe that the management regulations are appropriate and just for all, so that the majority will abide by the regulations and help bring pressure to bear on those who try to circumvent the rules. Consequently, fishermen's perceptions about management are significant.

As noted above, despite organizational representation, many fishermen do not feel that they have a voice in the process of fisheries management. Since fisherman's time at sea is contingent upon so many variables including weather, vessel conditions, regulations, not to mention more personal issues such as health and family considerations, and since the product of that time is also unpredictable, given the mobility of their prey, most fishermen feel compelled to fish as much as possible. Many took time off from fishing to attend the public hearings for Amendment 5 because it was clear that their interests were going to be affected by their responses. This level of interest is not the norm for the average council or subcommittee meeting.

Others have actively participated in industry advisory meetings to try to develop alternatives that fishermen can support. Many have found the process discouraging due to the divergence of views on appropriate measures expounded by the various participants, and the slow pace of the consensus-building process.

Many fishermen express frustration with a system that sets up regulations, but does not consistently or strictly enforce them. Again and again, fishermen say that if the regulations were enforced across the board, and if a few violators actually lost their right to fish, everyone would adhere to the regulations. A true fishermen (one who loves his job) would not be willing to risk violating the regulations if he risked losing his right to fish. Fishermen commonly assert that they are conservationists at heart and that they want to see the fisheries continue for their children and grandchildren. Although quite a few disagree with the biologists about the extent of stock depletion, most agree that there is problem that needs to be addressed. However, if violations have no serious consequences and it is obvious that others are violating or pushing the limits, then fishermen feel foolish sticking to the letter of the law and suffering economically.

Some fishermen believe that pressure on groundfish could be relieved if government would help develop domestic and foreign markets for underutilized specie, and provide appropriate information to fishermen and dealers trying to supply these markets. With a few exceptions, prices for underutilized species are, and always have been, too low to cover fishermen's time and expenses (Peterson and Smith 1979). Fishermen argue, however, that government could aid in marketing efforts and in procurement of "underutilized" species for schools, prisons and the

military, or the Food for Peace program. Others who have managed to develop niches in the underutilized species markets fear government-aided competition that might result in a flooding of the market and a reduction of fish stocks.

Fishermen in rural areas, particularly those on small vessels, believe that theirs is a different way of life that is not going to be accommodated by the regional fisheries management system. For example, Stonington fishermen lament when the large 90- to 110-foot, New Bedford scallopers fish out local scallop beds in a few days that would have supported the Maine scallopers all winter. And they feel that the tendency toward economic efficiency, and the manipulation of the management process by larger, wealthier communities will result in regulations that disregard the needs of the small fishermen.

E.6.4.3.2 Native American Fishing

Native American fishing in the Northeast is limited and not directed at those stocks which are the object of this action. In the mid-Atlantic region, there has been no native American fishing since the 19th century, though some tribes are involved in aquaculture. In New England, the native American fishing activity is primarily inshore, focused on riverine or anadromous stocks and on shellfish. This effort is also very localized, being limited to only a few locations. No fishing treaties exist with New England or Mid-Atlantic indigenous groups. (Clay, pers. comm.)

E.6.4.3.3 Subsistence Fisheries

"Subsistence," when used by anthropologists to describe an activity or a level of food production, is generally defined as a system in which people grow, gather, or catch food only for their own use and not recreationally or for sale. Under a subsistence economy, such food is essential since alternative sources of nutrition are limited or not available. By this definition, there are no subsistence fisherman in this region. A broad definition of "subsistence" is sometimes used which includes "small scale, traditional, craft or inshore" as distinguished from "large-scale, industrial, offshore, or company-owned" operations. This type of characterization is discussed in other sections of this document describing the fleet structure. Primarily, however, subsistence fishing in the Northeast consists of individuals who catch fish as part of a pattern of resource exploitation that includes fishing, hunting, and the gathering of wild plants. All of these are used as a necessary supplement to household protein, and/or to acquire species which are not commonly found at the retail level but which may be important to traditional meals or holidays of a particular cultural group. These wild plants and foods are often shared within extended family groups. The precise levels and types of subsistence fishing in Massachusetts are the topic of research scheduled to begin in the summer of 1995 (Clay, pers. comm.)

E.6.4.3.4 Safety Aspects of the Fishery

The following is taken from a recent report published by the National Research Council entitled Fishing Vessel Safety: Blueprint for a National Program. The 260-page book describes in great detail all aspects of fishing vessel safety. For the purposes of this document, to assess the impacts of proposed management alternatives on public health and safety, the following excerpt is particularly relevant.

Fisheries Management Influences on Fishing Industry Safety

Fishing has been romanticized as the last frontier, a natural environment where fishermen

see themselves as hunters who work independently and have life-styles outside of traditional occupational patterns. The implied freedom from outside interference and influences is a myth. While work takes place in relative isolation, harvesting of most fisheries is highly regulated.

Fishery regulations are enforced through vessel-boarding programs conducted by the National Marine Fisheries Service and the U.S. Coast Guard, and in cooperation with state authorities. The eight regional fisheries management councils have had difficulty accommodating effective conservation and conflicts over fishery allocations and safety. The management system's inability to match harvesting capacity to biological productivity of fishery stocks has resulted in a highly competitive operating environment in which fishermen may take unnecessary risks to maintain their livelihood. This practice has resulted in overcapitalization in some fisheries and more marginal operators who find it economically difficult to adequately maintain and equip their vessels to improve safety in a hostile environment. Furthermore, early closures, short seasons, and selective gear allocations have caused many operators to abandon the fisheries their vessels were designed for and enter fisheries far from home port, change to new fishing gear, or enter entirely new fisheries. Under these circumstances the vessel operator and crew may face new risks and potential safety problems.

Under the regional council system established by the MFCMA, comprehensive fisheries management plans (FMPs) are prepared using the concept of optimum yield (OY) as the standard. OY is defined as maximum sustainable yield (MSY) modified by economic, social and political factors. In virtually all cases in which OY was determined to achieve sustainable yield, the target MSY has been subsequently raised to accommodate fishermen's needs. This practice increases pressure on fish stocks and results in short-term overfishing and decline in abundance. There have been few effort-limitation schemes to balance harvesting capacity to biological production in the United States, and they have been narrowly applied.

The management councils (FMCs) are also charged by the MFCMA to consider safety in their FMPs. Section 303(a)(6) of the MFCMA as amended states [that the FMCs] "consider and may provide for temporary adjustments after consultation with the Coast Guard and persons utilizing the fishery regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of vessels." The FMCs clearly have the opportunity to address safety factors related to weather or ocean conditions within each management plan. Yet, in virtually every case, safety has been subordinated in favor of economic interests. Where conservation decisions and use determinations are combined, constituents exert pressure to serve more users. Competition intensifies as returns decrease, fishing time is reduced to achieve quotas, and more fishermen compete for fewer fish. With stiffer competition for dwindling resources, more fishermen take risks and accidents increase. ...The data and anecdotal information are inconclusive about whether the number of incidents for olympic-style fishing {derby-style or pulse fishing] is significantly higher than might have occurred during an extended season.

Thus, the fishery itself impacts public safety, and the management of the fishery for objectives other than safety seems to increase the risk to members of the industry. More importantly, management systems that do not control total harvesting capacity and management systems that increase the competitiveness of fisheries operating at the limits of sustainability create an environment of greater risk. Ultimately, however, the individual decisions made by the vessel owner, captain or fisherman within this framework determine the risk exposure.

Research by Pollnac, Poggie and van Dusen (1995) indicates that fishermen have a tendency to minimize the dangers they are subject to, as a coping mechanism. Those most likely to underestimate their exposure to danger are "fishermen form ports characterized by long trip fishing, numerous deckhands, fishermen who fish with their kin, and fishermen who have been at their work for many years" (p. 158).

The following table provided by the U.S. Coast Guard provides some indication of the casualty rates in the region. According to their communication, these statistics reflect only those casualties that were reported to the Coast Guard or as a result of Coast Guard involvement in search and rescue missions. They cannot be interpreted as a complete picture of the regional fishing vessel casualty picture. Also if a vessel was involved in more that one type of casualty, such as a sinking and a death, it would appear in both columns (Bob Higgins, pers. comm.).

	DEATH	INJURY	SUNK	FIRE	FLOOD	DISABLED	AGROUND
1988	4	22	27	12	28	122	30
1989	13	36	31	17	38	211	42
1990	6	52	26	17	58	52	34
1991	8	51	20	18	46	146	30
1992	13	76	30	10	25	96	28
1993	*DATA NOT AVAILABLE*						
1994							

TABLE E.6.4.3.4.1 FISHING VESSEL CASUALTY REPORTS 1988-1992. First District zones: Portland-Boston-Providence. Source: U.S. Coast Guard, First District Commander (pers. comm.)

E.6.4.4 Impacts of human activity (fishing) on the environment

The impact of fishing on the stocks comprising the fishery is described primarily as fishing mortality. The impact of the fishery also extends beyond the target species through predator-prey relationships, competition among the regions's inhabitants for food and essential habitat, and other forms of ecosystem interaction. The relationships, to the extent they may be described and affected by the proposed action, have been discussed in section E.6.3, Biological Environment. In addition to the complex impacts of removing fish from the ecosystem, however, are the more direct impacts of the activity of fishing on the environment. These impacts are discussed below. The only section that is revised from the Amendment 5 SEIS is on the trawling and dredging impacts.

E.6.4.4.1 Trawling and Dredging Impacts

The scientific literature on trawling and dredging impacts was reviewed for the Environmental Impact Statement prepared for Amendment 5 to the Northeast Multispecies Groundfish Management Plan. The review pointed out that the consequences of this type of fishing activity were relatively little studied in the northwest Atlantic. It further suggested that one of the major problems with evaluating trawling impacts was that of scale, since the degree of fishing intensity, both on a time and space scale, will have a profound impact on the ability of an area to recover from such a perturbation. Several recent reports have considered trawling impacts in the northwest Atlantic and they are reviewed here as an addendum to the previous information.

Auster et al. (1995) estimated the area impacted by trawling activity on both Georges Bank and in the Gulf of Maine. Based on fishing effort data compiled by NMFS it was estimated that the entire area of Georges Bank is trawled up to three times per year while the Gulf of Maine is trawled once annually. This calculation addresses the question of scale but is obviously a crude estimate of trawling impact because certain areas are very intensively trawled while others are not. Auster et al. (1995) further concluded that fishing gear impacts the physical structure of benthic habitats and reduces habitat complexity but, again, scale is an important factor in deciding to what degree this is deleterious to the productivity of the ecosystem.

In another study on Georges Bank, Maekawa (1995) found that species abundance, species richness and diversity were negatively affected by trawling and dredging. Where such impacts become particularly important is when they impinge significantly on a species habitat and more specifically when they compromise a species essential habitat.

Fish habitat, in general, was addressed at a Gulf of Maine workshop in 1994, and the different scales at which habitat needs to be considered were discussed (Stevenson and Braasch, 1994). Essential habitats are defined as areas that are physically discrete and essential for the survival of a particular life stage of a species (Langton et al. 1995). If a species has a small area of essential habitat, fishing impacts in that area could have dire biological and economic consequences. The gravel pavement on the northern edge of Georges Bank is important for the survival of juvenile Atlantic cod, for example (Lough et al. 1989), and might be considered as an example of an essential habitat for this species (Langton et al. 1995). Other habitat types are also essential to different species or in different phases of the life cycle of fish.

E.6.4.4.2 Bycatch and Processing Discards

See Amendment 5 SEIS.

E.6.4.4.3 Lost Gear

See Amendment 5.

E.6.4.5 Impacts of human activity other than fishing on the fishery environment

The Amendment 5 SEIS contains a comprehensive description of the impacts of human activity on the fishery environment. The section includes discussion of contaminants, nutrient loading, ocean disposal, coastal habitat loss and mining operations. This material has been redrafted and supplemented and is being published as a Technical Memorandum which is scheduled to be available after September 18, 1995 and can be obtained from the publications office of the NEFSC, Woods Hole. The citation is: *Selected Living Resource, Habitat Conditions, and Human Perturbations of the Gulf of Maine: Environmental and Ecological Considerations for Fishery Management*, R.W. Langton, J.B. Pearce, and J.A. Gibson, eds., NOAA Technical Memorandum, NMFS-NE-106.

E.7.0 ENVIRONMENTAL CONSEQUENCES

E.7.1 BIOLOGICAL IMPACTS OF THE PROPOSED ACTION

In this section the impacts of the proposed action on groundfish stocks, other commercial stocks, marine mammals and endangered species, and on the general biological environment are discussed. The impacts of the proposed action are described as the sum of the cumulative impacts of specific management measures designed to reach a fishing mortality objective. In other words, the plan is designed to use DAS, mesh size, area closures, gear restrictions and possession limits to achieve a fishing mortality objective. Any or all of these measures may be adjusted to insure that the fishing mortality objective is achieved.

E.7.1.1 Impacts on fisheries

E.7.1.1.1 Impacts on fisheries under the Multispecies FMP

E.7.1.1.1.1 Projections of 1996-2005 Recruitment, SSB and Catch Levels for cod, haddock and yellowtail flounder, pollock, American plaice and witch flounder.

Stochastic projections of SSB and catch were performed through the year 2005 for eight stocks of cod (Gulf of Maine and Georges Bank), haddock (Georges Bank), yellowtail flounder (Georges Bank and Southern New England), pollock, witch flounder and American plaice. In all cases, the projections were initiated from the distribution of age-specific terminal population estimates derived from the most recent stock assessment reviewed by the Stock Assessment Workshop. For all stocks except Southern New England yellowtail flounder, Georges Bank haddock, American plaice and pollock, the initial year of the projections was 1994. In the case of American plaice, the initial year was 1992; for pollock and Southern New England yellowtail flounder, the initial year was 1993; and for Georges Bank haddock, the initial year was 1995. For those stocks whose initial projection year preceded 1994, fully recruited fishing mortality in each year prior to 1994 was estimated by iterating F until calculated landings equalled the reported landings for that year. Projections were then carried forward from 1994 under various scenarios of specified F.

Fishing mortality in 1994 and 1995 was assumed to have followed the nominal 10% per year reductions as per Amendment 5. An additional 10% reduction in F was assumed for 1995, even though a status quo days at sea schedule was in force for Fleet DAS vessels in 1995 under Amendment 5, to account for additional benefits of the extended closed areas (I, II and Nantucket Lightship) and the implementation of square mesh. Thus, in all scenarios, F in 1994 was set equal to 90% of the 1993 F and F in 1995 was set equal to 80% of the 1993 F.

Recruitment was projected forward in each year from a Beverton-Holt stock/recruitment (S/R) function. A lognormal error term was used to characterize the natural variability in the relationship between spawning stock and recruitment. A significant S/R relationship was found for all stocks except American plaice. In the case of American plaice, the distribution of observed recruitment was resampled in order to generate the recruitment probabilities in each projection year.

Recruitment estimated from the Beverton-Holt stock recruitment function at spawning stock biomass levels below the lowest observed in the historic series was bounded by R/SSB ratios truncated to the 10th and 90th percentile of the observed distribution. At spawning biomass

levels within the range of historic observation, recruitment was bounded by the observed distribution of R/SSB ratios.

Three fishing mortality scenarios were modeled for seven of the eight stocks. F scenarios for Georges Bank haddock were less amenable to modeling various Amendment 7 scenarios because of the large influence of Canadian management strategies on this stock. Therefore, three scenarios were modeled for Georges Bank haddock: 1) F in 1996 and onward was held at the $F_{0.1}$ level (0.24); 2) F in 1996 and onward was held slightly below the $F_{0.1}$ level (0.18 = F_{1995}); and 3) F in 1996 and onward was held well below the $F_{0.1}$ level (0.10). The output of these projections in terms of landings over the 1996-2005 period is shown in Table E.7.2.1.c. Detailed output of the cod, haddock and yellowtail flounder projections is contained in Appendix VII.

The first scenario modeled the nominal Amendment 5 trajectory of F with the exception noted above that F in 1995 was reduced instead of being held constant. Thus, beginning in 1994, F was reduced by 90, 80, 70, 60, and 50% from the 1993 level with the 50% reduced F applied in 1998 and onwards through 2005.

The second scenario modeled the Proposed Action (Preferred Alternative) as described in this amendment with a phased-in reduction in DAS over two years. For all stocks, F in 1996 was reduced by a minimum of 35 percent from the 1993 level resulting from the combined effects of a nominal 10-percent reduction in 1994 F under Amendment 5 and an additional 25-percent reduction in DAS in 1996. For Gulf of Maine cod, F was reduced by 45 percent in 1996 to account for an additional 10-percent reduction in F resulting from seasonal area closures in the western Gulf of Maine. Other stocks which occur primarily in the Gulf of Maine (American plaice, witch flounder and pollock) are not taken in the seasonal closed areas to the same extent as cod. Of these only pollock was given an additional reduction in F in 1996, equalling 10 percent of the 35-percent reduction base, or 38.5 percent. For stocks of cod and yellowtail flounder, F was reduced to $F_{0.1}$ or F_{max} (in the case of Gulf of Maine cod) in 1997 and onwards through 2005. When the threshold SSB was reached, F was allowed to increase to $F_{20\%}$. For stocks of witch flounder and pollock, F was reduced to 50 percent of the 1993 level, and for American plaice F was reduced to $F_{20\%}$ in 1997 and onward through 2005.

The third scenario modeled Alternative 3 as originally proposed in Amendment 7. For stocks of cod and yellowtail flounder, F was reduced to the $F_{0.1}$ or F_{max} level in 1996 and onwards through 2005 after being reduced by the Amendment 5 schedule in 1994 and 1995. As in Alternative 1, when the threshold SSB was reached, F was allowed to increase to $F_{20\%}$. For stocks of American plaice, witch flounder and pollock, F was reduced to 50% of the 1993 level in 1996 and onwards after being reduced by the Amendment 5 schedule in 1994 and 1995.

The following graphs (Figures E.7.1.1.1.1-8) show the projections of landings, recruitment, spawning stock biomass and fishing mortality under the different modelling scenarios described above. Lines on the graphs are labelled as follows: A7_3 for the projection of $F_{0.1}$ beginning in year one; A7_P for the proposed action with a phased-in effort reduction program; and A_5 for the no-action alternative.

The percentage of total commercial landings allocated to USA and Canadian fisheries were derived from 10-year averages computed over the 1984-1993 period as given below. In the case of haddock, however, the percentage allocation was allowed to increase gradually by 5% increments from 10% beginning in 1996.

STOCK	PERCENT	
	USA	CAN
Georges Bank cod	69	31
Gulf of Maine cod	100	0
Georges Bank haddock	10 (1996) 50 (2005)	90 (1996) 50 (2005)
Georges Bank yellowtail flounder	91	9
Southern New England yellowtail flounder	100	0
Pollock	27	73
American Plaice	100	0
Witch flounder	100	0

FIGURE E.7.1.1.1.1

FIGURE E.7.1.1.1.2

FIGURE E.7.1.1.1.3

FIGURE E.7.1.1.1.4

FIGURE E.7.1.1.1.5

FIGURE E.7.1.1.1.6

FIGURE E.7.1.1.1.7

FIGURE E.7.1.1.1.8

E.7.1.1.1.2 Impacts on species under the Multispecies FMP other than cod, haddock and yellowtail flounder

The Council has established an aggregate TAC for pollock, white hake, redfish, American plaice, witch flounder, winter flounder, and windowpane flounder. The basis for the calculating the TAC is the current potential yield, which is based on the application of a fishing mortality rate for each species component of the aggregation that will stabilize the stock at current levels. The purpose of the TAC is to monitor effort shifts in the groundfish fishery and provide a basis for controlling catch on these stocks in the event an increase is detected. Individual stocks that may be overfished will be identified in the stock assessment process, and will be addressed as the issues arise. Measures designed to rebuild cod, haddock and yellowtail flounder stocks, such as mesh size and configuration, area closures and DAS reductions will contribute to the control of overall effort on these stocks.

If the objective for these stocks is to prevent a further decrease in biomass or an increase in the exploitation rate on each stock, an aggregate TAC applied to the seven species will not be sufficient to offset the possible re-targeting of existing effort on select species. Further, of the seven species in the aggregate group, sufficient information is known about stock dynamics for at least five (pollock, redfish, white hake, American plaice and witch flounder) to allow application of individual TACs. Only winter flounder and windowpane flounder require additional information. In monitoring the impact of the management measures, the Multispecies Monitoring Committee will examine the individual species component of the aggregate.

Given the above, individual TACs are provided in Section E.5.2.2.2 for the first five of the regulated species. An aggregate TAC for combined winter flounder-windowpane flounder is also provided.

Of the seven species in the aggregate regulated species group identified by the Council, six have been determined to be overexploited, and one is considered to be fully exploited. None are considered to be underexploited. These stocks will be closely monitored for the impacts of the effort reduction program on their exploitation levels.

Silver hake, red hake and ocean pout are not currently regulated (with the exception of the Cultivator Shoal minimum mesh size) even though they are covered by the Multispecies FMP. These are small-mesh species and will be protected to some extent by the measures proposed to rebuild cod, haddock and yellowtail flounder. Quantitative assessment of the potential impacts of this amendment on these stocks is not possible. The projected impact of different fishing mortality scenarios including the no-action alternative on American plaice, witch flounder and pollock is illustrated in the preceding section.

E.7.1.1.1.3 Impact on the fishery of proposed measures to reduce the bycatch of harbor porpoise

A number of measures relating to harbor porpoise have been incorporated into the Multispecies Plan through framework adjustments implemented since Amendment 5 took effect in May 1994. The sink gillnet fleet is the only sector in the groundfish fishery affected by these regulations. The first adjustment, Framework 4, required seasonal thirty-day closures for areas defined as Massachusetts Bay, the Mid-coast and the Northeast. The removal of all sink gillnets was required in the defined areas.

Framework 12, implemented in November, 1995, expanded the size of the Mid-coast Closure

Area to include the Jeffreys Ledge Band west of 69º30'W, but excluded an area defined as Tillies Bank. The action also extended the duration of the closure, initially November 1-30, through November and December, 1995. The area was closed to fishing with sink gillnets during that two month period.

Framework 14 has been submitted to the National Marine Fisheries Service for approval. It is expected to accomplish further reductions in the porpoise bycatch through implementation of a spring closure in the Mid-coast Area, including the Jeffreys Ledge Area west of 69º30', from March 25 through April 25. The framework also included the closure of a new area south of Cape Cod from March 1 through March 30. The existing March 1-30 Massachusetts Bay closure defined in Framework 4 remains in effect.

Although none of these closures affect gillnetting in any open area, some vessels have been precluded from fishing because they are either too small to fish offshore, particularly in bad weather, or have not been able to relocate outside of the closed areas for other reasons. In other cases, a traditionally short season has been made more so prompting some fishermen to switch to alternative groundfish gear or other fisheries such as lobstering. All of the framework submission documents discuss the impacts on this fishery.

Amendment 7 as proposed may exacerbate these impacts on gillnet vessels by including a revised objective for harbor porpoise. The 1994 amendments to the Marine Mammal Protection Act require that fisheries which interact with marine mammal stocks reduce their takes to a number not to exceed a specified potential biological removal level (PBR). Council adoption of the MMPA language will directly affect sink gillnet vessels operating in New England by requiring reductions in porpoise bycatch to very low levels by April 1, 1997. Although nets deployed with acoustic devices appear to be promising as a tool to reduce takes, they are still considered experimental. Time/area closures, therefore continue to be the operative measure to achieve the required mortality reductions.

The porpoise PBR of 403 animals is not significantly different from the targets discussed in Frameworks 4 and 12 to the Multispecies Plan, but the new objective shortens the time frame and establishes a date certain for compliance. In discussing inclusion of the revised objective, however, the Council expressed concern over porpoise takes in areas that do not fall under its management authority. For the purposes of this amendment it modified the MMPA language to require that the Gulf of Maine sink gillnet fleet reduce their bycatch *proportionately* relative to the regions outside of the Council's purview.

E.7.1.1.2 Impacts on other fisheries

In Section E.6.3.3 the principal commercial fisheries in the Northeast are identified, including those that are not managed under the Multispecies FMP. The geographical range of these stocks and the status of the stocks, both in terms of their level of exploitation and stock size, vary widely. The degree to which effort that is displaced from the groundfish fisheries will affect other fisheries in the region depends on both physical and regulatory constraints. Actually how individual fisheries will be affected is unpredictable.

Table E.7.1.1.2.1 lists the principal fisheries in the region and provides information that helps identify the constraints on and opportunities for effort shifting out of the groundfish fishery. The table identifies if a species is managed, and by what agency, as well as what principal management measures are in effect, including any control date or permit moratorium. Tables E.6.4.1.1.7 and .8 in the section describing the commercial fishery, show the distribution of

permits in other fisheries held by multispecies fishery permit holders.

The degree to which a particular vessel can adapt to another fishery is somewhat constrained by its size or gear configuration. Some underutilized alternative stocks, dogfish, for example, can be fished with the same gear used to catch groundfish. In other cases, the groundfishing vessel is entirely inappropriate or requires major rerigging. These factors complicate the predictability of effort shifts resulting from the proposed action into other fisheries.

Additionally, one of the most unpredictable factors in analyzing the impacts of this action on other fisheries is personal preference. On both the market side and the producer side, the element of choice is significant. While codfish has long been the mainstay of the New England fishing industry, other species have fallen in and out of favor rather dramatically. Some of the region's highest valued fish today, bluefin tuna and monkfish, were, within the lifetimes of some fishermen now fishing for them, discarded or sold as cat food at a few cents per pound. Other stocks have also seen significant rises in consumer demand including pelagic sharks, loligo squid, and sea urchins. These fisheries have already provided an alternative to groundfishing for many fishermen or their vessels. Other stocks, in contrast, have suffered from a great decline in demand such that they are underexploited or do not offer an economically viable alternative. Mackerel and herring which supported much larger fisheries in the past than they do today, are two examples.

The individual fisherman's personal preference and ability are also unpredictable factors in trying to predict where effort might be displaced. Fishermen have often expressed strong views about specific gear types or fishing methods they do not want to use. Whether from a perceived conservation position or a simple aversion to a particular way of fishing, these views limit alternatives. Individuals have widely varying abilities or willingness to travel to other ports or further offshore, for example. The response of fishermen to changing conditions (whether it be resource, market or management conditions) has varied in the past. Some fishermen have been highly successful in developing a market tailored to a unique operation or specific product while others have shifted their operation among existing, more traditional fisheries.

In summary, there is no practical way to predict where the effort displaced from groundfishing will go and what the impact of the proposed action on other fisheries will be. Given that a significant portion of the labor and capital currently involved in groundfishing will be displaced, the impact on some other fisheries is likely to be significant but is not measurable. Counteracting the potential for detrimental effort shifts are three main factors: 1) an evolving and more-restrictive management regime in other regional fisheries; 2) the inability or reluctance of individuals to modify their behavior; and 3) a constantly changing demand sector.

TABLE E.7.1.1.2.1- Principal commercially exploited species in the Northeast EEZ other than those included in the Multispecies FMP. Also noted are the management agency, the status of the stock, primary gear used, entry controls and management measures.

MANAGEMENT AUTHORITY

NEFMC- New England Fishery Mgmt Council
MAFMC- Mid-Atlantic Fishery MGMT Council
ASMFC- Atlantic States Marine Fisheries Commission
state- individual state regulation
NM- not managed
DOC- Dept. of Commerce ("Secretarial Plan")

STATUS

U-Underexploited
F-Fully exploited
O-Overexploited
NK-not known

SPECIES	MGMT AUTH.	STATUS	PRINCIPAL GEARS	ENTRY CONTROLS	MGMT MEASURES	COMMENTS
Summer flounder	MAFMC/ ASMFC	O	directed and mixed trawl;	control date 1/26/90; moratorium; participation during 1985-1990 to qualify for permit; permit must be used to remain valid;	Quota F=.53 (1995) F=.23(1996>); minimum mesh and fish size; bycatch limits;	
Atlantic Mackerel	MAFMC	U	directed and mixed trawl; small-mesh trawl;	no control date but if 50% TAC is taken in any year control date will be published	TAC 100,000 mt for U.S. commercial	TAC not a constraint, less than 10% TAC is landed
Scup	MAFMC/ ASMFC	O	directed and mixed trawl; small-mesh trawl; pots;	control date 1/26/90; moratorium; participation during 1985-1990 to qualify for permit; permit must be used to remain valid;	plan in development; to be based on quota and minimum fish size;	scup trawl fishery (#25 on fishery list) showed no 1993 landings

SPECIES	MGMT AUTH.	STATUS	PRINCIPAL GEARS	ENTRY CONTROLS	MGMT MEASURES	COMMENTS
Atlantic Herring	ASMFC/ NEFMC	U	purse seine; mid-water trawl; weirs;	none	3-area TAC, constrains catch in Gulf of Maine only; spawning area closures;	internal waters processing (IWP) allocations shared by coastal states; preliminary mgmt. plan (PMP) in development to facilitate joint ventures in EEZ;
Butterfish	MAFMC	NK[1]	small-mesh trawl;	control date 8/93; no moratorium;	quota not currently limiting catch; fishery would close if reached;	
Goosefish (Monkfish)	NEFMC/ MAFMC[2/]	O	scallop dredge; directed and mixed trawl; large-mesh gillnet;	control date 2/27/95; no moratorium;	plan in development; most states have minimum size and liver-to-tail ratio; bycatch limit in small mesh trawl fishery;	
Tilefish	MAFMC	O	longline; mixed trawl;	control date 6/93; no moratorium;	plan in development;	
Northern Shrimp	ASMFC	F	small-mesh trawl; traps;	no entry controls;	season, mesh size, finfish excluder grate, bycatch possession limits/prohibitions	

SPECIES	MGMT AUTH.	STATUS	PRINCIPAL GEARS	ENTRY CONTROLS	MGMT MEASURES	COMMENTS
American lobster	NEFMC/ ASMFC	F-O [3/]	traps; directed and mixed trawl;	control date 3/25/91; moratorium in development;	size limit; no possession of egg-bearing females; bycatch limit in small mesh trawl fishery;	comprehensive plan in development;
Swordfish	DOC	O	pelagic longline; pelagic gillnet;	control date 8/30/91	quota by gear category; bycatch limits; minimum size; pelagic gillnet >2.5Km prohibited	
Sharks	DOC	O	pelagic longline; pelagic gillnet; sink gillnet;	control date 2/22/94	annual and semi-annual quota; prohibition on finning; recreational bag limits;	39 species divided into three groups: Pelagic, large coastal and small coastal
Cusk	NM	O	longline; otter trawl; gillnet;	no	no	
Spiny Dogfish	MAFMC/ NEFMC[4/]	U[4/]	gillnet; otter trawl;			
Black Sea Bass	MAFMC/ ASMFC	O	pots; mixed trawl;	control date 1/26/90; moratorium; participation during 1985-1990 to qualify for permit; permit must be used to remain valid;	plan in development	

SPECIES	MGMT AUTH.	STATUS	PRINCIPAL GEARS	ENTRY CONTROLS	MGMT MEASURES	COMMENTS
Squid (Ilex)	MAFMC	U	small-mesh trawl	control date 8/93	quota not currently limiting catch; fishery would close if reached;	
Squid (loligo)	MAFMC	U	small-mesh trawl	control date 8/93	quota not currently limiting catch; fishery would close if reached;	
Sea Scallop	NEFMC	O	scallop dredge; otter trawl;	control date 3/1/90; moratorium;	days-at-sea reductions; gear restrictions; catch limits on unmanaged (non-days-at-sea) effort;	
Ocean Quahog	MAFMC	F	clam dredge;	moratorium;	individual transferable quota (ITQ)	
Surf clam						
Bluefin tuna	DOC	O	pelagic hook-and-line; purse seine; harpoon;	purse seine category is limited access; control date 9/1/94 for other categories;	seasonal quota allocated to gear categories; fish size restrictions by gear category;	at-sea transfer or sale restricted; Certificate of Origin required to document imports and exports;
Yellowfin tuna	DOC	F	pelagic hook-and-line; pelagic longline; purse seine; mid-water trawl;	control date 9/1/94	minimum size;	

SPECIES	MGMT AUTH.	STATUS	PRINCIPAL GEARS	ENTRY CONTROLS	MGMT MEASURES	COMMENTS
Bigeye tuna	DOC	F	pelagic hook-and-line; pelagic longline; mid-water trawl;	control date 9/1/94	minimum size;	
Menhaden	ASMFC	F/O[5/]	purse seine	no	none for domestic catch; 60,000 mt quota for Internal Waters Processing;	quota for IWP not a constraint on catch;
Atlantic Wolffish	NM	O	mixed trawl; longline; gillnet;	no	no	
Atlantic Halibut	NM	O	bycatch in hook and trawl gears;	no	no	
Skates	NM	U	mixed and directed trawl; gillnet;	no	no	
Bluefish	MAFMC/ ASMFC	O	gillnet; otter trawl; pound net;	no	plan in development; commercial quota set annually;	

Notes:

1/ Status is at low to medium biomass level and current catch levels are below the MSY of 16,000 mt, however, the exploitation rate is unknown .
2/ The NEFMC is leading the joint management plan under development.
3/ Offshore stock is fully exploited; Gulf of Maine stock is 20% overexploited; Southern Cape Cod-Long Island stock area is 50% overexploited.
4/ The MAFMC is leading the development of the joint management plan for dogfish. The stock is at a high biomass level but exploitation rates have increased. Other measures (landings-per-unit-of-effort, mean length of landings, and mean length in

survey) have all declined in recent years. The stock is nearly fully exploited.

5/ Atlantic Menhaden are considered to be fully exploited from the point of view of recruitment overfishing and growth overfished (pers. comm., Douglas Vaughan, Beaufort Laboratory).

SOURCES:

a) Status of the Fishery Resources off the Northeastern United States for 1993,NOAA Technical Memo, NMFS-F/NEC-101;
b) Our Living Oceans, NOAA Technical Memo, NMFS-F/SPO-1;
c) and personal communications with staff of MAFMC, ASMFC, NEFSC, and Beaufort Laboratory.

E.7.1.1.3 Impact on recreational fisheries

The biological impacts of the proposed action and alternatives are discussed in Appendix VI, Analysis of Recreational Measures: Status Quo and Amendment 7 Changes. This document presents projections of catch and landings changes that will occur under the proposed recreational fishing management measures. These proposals focus primarily on cod and haddock.

E.7.1.2 Impacts on protected species

A list of protected species and their status is provided in Section E.6.3.4.

Under the auspices of the Marine Mammal Protection Act (MMPA), the National Marine Fisheries Service has administered programs that have provided for limited exemptions from the MMPA's general prohibition on the take of marine mammals. Based on the information collected previously, a new management regime for the unintentional taking of marine mammals incidental to commercial fishing operations (60 FR 45086, August 30, 1995) has categorized fisheries based on their level of incidental mortalities and serious injuries of marine mammals.

The three category fishery classification scheme (60 FR 67063, December 28, 1995) is based on a two-tiered, stock specific approach that addresses the total impact of all fisheries on each marine mammal stock and then addresses the impact of individual fisheries on each stock. This approach is based on a rate, in numbers of animals per year, of serious injuries and mortalities due to commercial fishing relative to a stock's potential biological removal (PBR) level.

Category III fisheries are those determined to have a remote likelihood of, or no known, incidental mortalities and serious injuries of marine mammals. With the exception of sink gillnets, the principal gears used in the groundfish fishery and regulated by the Multispecies FMP (bottom trawl, longline and hook-and-line) have been placed in Category III. To the extent that they occur, the impacts of these gear types on protected species are expected to at least remain stable and most likely will diminish under Amendment 7 given the severe restrictions that will be placed on the groundfish fleet and other fisheries that have a bycatch of multispecies finfish.

As a caveat to the above conclusions it should be noted that the bottom trawl fishery has incidental takes of striped dolphins, coastal bottlenose dolphins and pilot whales. Typically, observer coverage in this fishery has been low resulting in statistically weak estimates of serious injury and mortality levels. NMFS believes this fishery should remain in Category III at this time but anticipates having more information from observers in the future in order to better assess the impacts of this gear type.

Although approximately 300 to 350 out of an estimated 1,700 groundfish vessels (that is, limited access permits under Amendment 7) are involved in the sink gillnet fishery, this gear type accounts for the preponderance of interactions with protected species within the confines of the geographic area covered by this plan. Accordingly, the fishery is classified as Category I, in that it has been determined to have frequent incidental mortality or serious injury of marine mammals. In addition to harbor porpoise which is discussed separately, there have been documented interactions with the following species: north Atlantic right, humpback and fin whale; killer whale; false killer whale; white-sided, striped and offshore bottlenose dolphin; common and spotted dolphin; and harbor, gray and harp seal.

Cetaceans
Of the cetaceans which inhabit areas subject to multispecies regulations, right and humpback whales are the species of most concern, in addition to harbor porpoise. The populations of most

other cetaceans and pinnipeds are considered to be at least stable, and some are increasing despite the decline of commercially valuable finfish stocks. Entanglement in fishing gear, however, still poses a significant threat to large whales, and in some cases may be impeding stock recovery. Encounters with gear have been identified as a major source of mortality among humpback whales. An average of four to six entanglements occur each year in the southern Gulf of Maine. A NMFS database for the Northeast indicates 64 records of injured or entangled animals between 1975 and 1992. Sink gillnets were involved in a high percentage of these encounters.

Right whales are also subjected to a level of take in the groundfish fishery although collisions with ships constitute the most significant human impact (Final Recovery Plan for the Northern Right Whale, 1991). Of the 30 documented encounters with fishing gear since 1970, 13 were associated with sink gillnet gear while 6 were carrying unidentified lines or nets (see Biological Assessment).

Pinnipeds
From mid-1989 to April 1994, observers recorded 160 seal mortalities in the Gulf of Maine sink gillnet fishing operations. Prior to 1993 only harbor seals were incidentally taken on observed trips. In 1993, two gray seal mortalities were recorded, and in March 1994, perhaps as many as 46 harp seals were taken on three trips. During the period 1990-1994, 70 percent of the observed mortalities took place July through December. In 1994, high numbers of seals were caught in the spring, with a peak in March. Most seals were caught inshore in the region from Maine to southern New England although the waters off Massachusetts accounted for the majority of the interactions. Few seals were caught in sink gillnet gear in offshore areas.

Right Whale Critical Habitat
Amendment 5 to the Multispecies FMP afforded some protection to endangered whales which inhabit the Great South Channel area during the spring months. The amendment suspended the seasonal closure of a region referred to in the FMP as Area I. Prior to this action, both mobile and fixed gear fishing operations has been prohibited from February 1 to May 31 to protect juvenile and spawning haddock. In Amendment 5 the Council continued to apply the closure to sink gillnets because of a geographical and temporal overlap between Area I and the area then proposed for critical habitat designation. The Council was aware of the general predictability of the Great South Channel as a high-use habitat for endangered fin, sea and humpback whales, in addition to its importance as a right whale feeding and nursery ground. Although the timing of the closure was established to coincide with the presence of haddock, April, May and June are considered the high use months for whales, with a peak in May. A subsequent action by the Council reinstituted the Area I closure to again apply to both mobile and fixed groundfish gear, but the boundaries were reconfigured to better protect haddock. The result is a spatial overlap that covers only about a third of the critical habitat.

To remedy this and possibly similar situations in the future, the Council has expanded the scope of the Amendment 7 framework adjustment procedure to include area closures or other appropriate measures to enhance or protect marine mammal species with documented interactions with multispecies fishing gear. Presently the Council may close areas or take other action only for purposes related to the objectives of the Multispecies Plan.

Marine Reptiles - Sea Turtles
Data collected by the University of Rhode Island's Cetacean and Turtle Assessment Program (CeTAP, 1980) indicates that by far the most common species of turtle found in the waters between George's Bank and Cape Hatteras waters is the loggerhead. Leatherback turtles are the next most abundant species followed by Kemp's ridleys and green turtles which are rare. Although incidental take in groundfish gear is known to occur, the level of take does not appear to have significant impacts on the species which seasonally move northward to areas covered in

this amendment.

Depth and surface water temperatures are thought to limit the activity of sea turtles. Aerial surveys of loggerheads at sea indicate they are most common in waters less than 50 m in depth (Shoop et al. 1981; Fritts et al. 1983) but can occur offshore. They enter embayments in the Northeast when temperatures reach 20ºC to feed on benthic invertebrates. Net, trap and hook and line fisheries are known to loggerhead (Crouse, 1982) in addition to the otter trawl fishery in the Northeast (Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations, 1991).

In the case of leatherback turtles, they have a pelagic distribution and feed primarily on jellyfish (Rebel, 1974). They occur in low numbers in the waters between Cape Hatteras and Nova Scotia and then only during the warmer seasons (CeTAP, 1980). Sightings usually take place in the shallower regions of the continental shelf and in surface temperatures which range between 13º to 27ºC. Entanglement occurs primarily in lobster pot lines (Prescott, 1988), but takes have been documented in gillnets and trawl lines (Goff and Lein, 1988).

Both adult and juvenile Kemp's ridleys feed primarily in shallow coastal waters on bottom-living crustaceans (Hildebrand, 1982). Their northward movement from the Gulf of Mexico to coastal embayments occurs when temperatures approach 20ºC. With the exception of the Gulf of Mexico shrimp and summer flounder trawl fisheries, levels of takes by other gear types is unknown.

Although most nesting sites are located along the Atlantic coast of Florida, juvenile green turtles occasionally have been sighted as far north as Long Island Sound. They are incidentally taken in net trap and hook and line fisheries (Crouse, 1985).

Shortnose sturgeon
An anadromous species that spawns in the coastal river on the eastern seaboard, the sturgeon is not known to use the offshore marine environment. It was rarely the target of a commercial fishery, although it was often taken incidentally to the commercial fishery for Atlantic sturgeon which is now closed or restricted in many New England states.

Atlantic Salmon
The Council developed an FMP for Atlantic Salmon which was approved in February, 1988. The plan established a management program for the U.S. Atlantic salmon resource to complement the existing management programs of the New England states, and to complement federal management authority over salmon of domestic origin on the high seas conferred to the United States as a member of the North Atlantic Salmon Conservation Organization (NASCO). The plan prohibits the possession of Atlantic salmon taken from federal waters, thereby preventing the interception of migratory salmon on their return to natal waters.

Seabirds
In addition to marine mammals and sea turtles, seabirds are vulnerable to entanglement in commercial fishing gear (Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations, 1991). The interaction has not been quantified in the Northeast multispecies groundfish fishery, but impacts are not considered significant. Endangered and threatened bird species, which include the roseate tern and piping plover, are not impacted by the groundfish gear (Paul Nickerson, U.S. Fish and Wildlife, pers. comm.).

Prey Species
At this time it is not possible to make a determination on the impacts of the fishery on the forage of protected species. Many populations of cetaceans and pinnipeds are dependent on prey items other than groundfish, such as sand lance for fin and humpback whales, euphausiids and copepods for right whales and herring for harbor porpoise and harbor seals. To the extent that marine mammals are dependent on groundfish species in the management unit, any improvement in those stocks regulated under the proposed program will likewise benefit marine mammals.

There has been no evaluation of the potential impact of seals on fishery resources despite much discussion of the issue. A 1993 census indicates the harbor seal population on the coast of Maine has more than doubled since 1986. This increase and the range extension of seals in New England waters coincides with large increases in regional herring populations leading to a possible conclusion that there is little direct competition for groundfish resources. Indirect competition may exist, however, if commercially valuable fish and seals feed on the same prey species.

Conclusions
Overall, Amendment 7 is expected to reduce fishing effort on groundfish species by approximately 80 percent from 1993 levels through a variety of measures. The current moratorium on new entrants into the fishery will remain in place, the number of days-at-sea available to harvest groundfish will be significantly reduced from Amendment 5 levels (Section 4.4) and with some exceptions, only fisheries certified to have a bycatch of 5 percent or less of regulated groundfish species will be allowed to fish at times other than during the allocated days-at-sea (Sections 4.3).

Extensive closed areas initiated by earlier Council actions will remain in place but with the addition of the harbor porpoise closure areas described in Section 4.6. Under Amendment 7, the harbor porpoise closures would apply to all gear capable of catching groundfish for the period specified.

Vessels fishing with sink gillnet and hook gear would no longer be exempt from restrictions on

fishing effort. The gillnet fleet was not subject to effort controls under Amendment 5 in order to first evaluate the impacts of the harbor porpoise bycatch reduction measures. Under Amendment 7 gillnet and mobile gear vessels could be allocated more fishing days if they switch to a larger mesh size (Section 4.4.2). Despite this potential for some increase in effort, the overall decrease in fishing days would still significantly reduce the potential for encounters with protected species.

Gears which are exempt from the multispecies regulations are listed in Section 4.9.1. Although a number of them interact with protected species, they are either not subject to regulation under the Multispecies FMP or they operate in a manner that accounts for little or no bycatch of multispecies finfish.

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E.7.1.3 Impacts on habitat and other biota

Although there is limited data on fishing impacts on habitat in the northwest Atlantic (see section 6.4.4.1), research has shown that high-energy environments are marginally effected by trawling and dredging (Brylinsky et al. 1994) while other habitat types are more significantly impacted (Auster et al. 1995). Furthermore, natural perturbations in the environment, such as major storm events, can substantially restructure benthic communities on an aperiodic basis (Eagle, 1975; but see Turner et al. 1995 for a different perspective).

Large area closures are most likely to encompass essential habitat and potentially protect benthic communities that are important not only for conserving groundfish prey but also for protecting juvenile groundfish from becoming prey (see Gotceitas and Brown, 1993; Walters and Juanes, 1993; Tupper and Boutillier, 1995). Fine tuning of such closures, once essential habitats are identified (Langton et al. 1995b), is possible but protection of larger areas that include essential habitats is a valid, and risk-averse conservation strategy (see Ludwig et al. 1993).

The permanent closure of Area I, Area II and the Nantucket Lightship Area will have similar impacts as larger permanent closures but at a much reduced scale. Smaller closures are also more difficult to enforce and more susceptible to illegal incursions. Seasonal closures such as those proposed for the Gulf of Maine may serve to protect the fish while aggregated to spawn or migrate, and may allow spawning activity to take place undisturbed. There is little empirical information, however, to determine if such a strategy is at the appropriate temporal scale to allow the benthic community and, presumably in turn, the fish community to recover and achieve its optimal, or maximal, harvest potential (see Rosenberg et al. 1993).

The linkage between the physical state of the benthos and stock recovery is poorly understood, although Sainsbury (1987) has demonstrated a correlation between habitat destruction and reduction in fish harvest. The important thing to consider regarding all the proposed alternatives is the timing and intensity of fishing activity on habitat. In a recent review article Langton et al. (1995) discussed the importance of these two factors in developing groundfish research and management strategies. Measures that increase the frequency and intensity of fishing in an area,

such as area closures that displace vessels, will magnify the impacts of fishing on the habitat in the open areas. Whether such impacts are significant depends both on the habitat being affected and the degree to which fishing is increased. There is no way currently available to predict the impact of closing large areas and displacing the effort to other areas in terms of the total net impact on habitat or on stock recovery rates.

E.7.1.4 Impacts on Stellwagen Bank Marine Sanctuary

The designation of Stellwagen Bank as a National Marine Sanctuary does not restrict commercial fishing in the area and is intended to protect and enhance sanctuary resources. To the extent the proposed action is expected to rebuild fish stocks, the impacts are expected to be positive and consistent with sanctuary objectives. Other specific measures such as the square-mesh requirement and potential closure of all or part of the bank under various alternatives is also consistent with the resource protection mission of the Sanctuary.

E.7.2 ECONOMIC IMPACTS OF THE PROPOSED ACTION

The economic analysis, including the analyses of net benefits and administrative costs is contained in Appendix X.

E.7.3 SOCIAL IMPACTS OF THE PROPOSED ACTION

The main goal of this section is to analyze and discuss the social impacts of the proposed management program to rebuild stocks of cod, haddock, and yellowtail flounder. There are some significant limitations inherent to this analysis. Since the actual social impacts depend on how individuals and organizations react to new requirements and tasks, they cannot be fully determined before the fact. General predictions can be made in some cases, and some statements can be made as to the distribution of impacts. But the precise response of any particular individual is beyond the scope of this document. No fisherman will find his exact vessel discussed, though he will find information on some groupings of vessels which seem like his. What impact analysis does provide is essentially an educated guess about the likely outcomes of proposed actions, and, therefore, it is only an informed prediction and should be viewed within that context. Despite the differences among the alternatives, one thing is clear; given the collapse of groundfish stocks and the need to severely reduce fishing, any alternative that serves this purpose will cause serious economic and, therefore, social dislocation, both short- and long-term. This change must be viewed in the context of the change that is likely to occur if no action is taken.

The analysis builds on interviews with fishermen, notes from public meetings, and three NMFS databases: the permit files, the commercial fisheries database ("weigh-out"), and sea sampling data. See E.6.1.1 Data Considerations for a discussion of the databases and their limitations.

E.7.3.1 STATUS QUO

The management program under Amendment 5, as supplemented by Amendment 6 and Framework Adjustment 9, has been identified as not being capable of rebuilding groundfish stocks. As the stocks continue to decline (see Table E.6.3.3.2 for landings trends since 1986), the social impact of the status-quo will worsen. Under the status-quo, industry revenues will continue to decline as catch rates and stocks fall to lower levels. Despite the moratorium, the number of total permits has not dropped, but risen. In 1991, during the moratorium qualifying year, there were 4,520 vessels permitted for groundfish in the Northeast. Currently, while the number of limited access vessels is capped at 1,712, vessels continue to enter under the two open access categories. In February of 1995 there were 3,010 open access vessels; on May 9, 1995 there were 3,179; on May 26, 1995 there were 3,235. The two open access categories thus remain a potential source of rising effort although in 1994-1995, only 225 of these vessels reported landings of regulated species of more than 500 pounds.

As groundfishing revenues diminish during initial cutbacks in fishing effort, the profile of the fleet will change dramatically. Some groundfish fishermen may be able to remain fishing by switching gear and redirecting their effort to other species. (See sections E.6.4.1.1 and E.6.4.3.1 for more information on gear and species switching.) Some may move their boats to other regions of the country, or even other countries in search of catch. Others might try to enter the charter fishing business or get involved in some form of eco-tourism, e.g., whale watching. None of these options, however, is particularly promising.

Many East Coast, non-groundfish fisheries are already operating under strict regulations that would either limit or prohibit new entrants. Even where fishermen already hold permits in other fisheries (Table E.6.4.1.1.7), they are often constrained from any potential effort increase by the category under which they are permitted. Fisheries that could sustain new effort may require boats to change gear. The markets for many under-utilized species may be too weak to make additional landings profitable, and some of those species, despite their designation as "under-utilized", are already fully utilized.

Gear changes require capital outlays which may be difficult for fishermen to afford if their

revenues are decreased by groundfish cutbacks. Even if fishermen can afford to change gears to target under-utilized species, they must also learn new fishing and marketing strategies and make new market contacts (since dealers and processors often specialize to some degree; see section E.6.4.2). Also, fishermen currently in those fisheries will be negatively impacted by the additional competition. Thus, switching to other gears and species is an option for only some of the displaced groundfishermen. Those vessels most likely to be able to switch to other gears and/or species are owner-operated inshore vessels of 30-45 ft. in length, that historically have used longline, gillnet or other gear seasonally.

Moving to new regions or other countries is an option available primarily to larger boats, but there is no guarantee that the crews of those boats would want to be away from home for such long periods of time. (See Table E.7.3.5 and accompanying text for numbers of large vessels permitted for groundfish in the Northeast.) Nor is it clear that foreign stocks could withstand an increase in fishing effort since many fisheries throughout the world are being harvested to their limits. Under current economic conditions, opportunities in the recreational and eco-tourism industry may be limited. These activities also require different sets of skills than does operating a commercial harvesting vessel.

Boats remaining in the groundfish industry may need to reduce the size of their crews, or put off repairs in an attempt to make more money day at sea. Yet many fishermen already have already downsized crews to minimum levels and begun putting off repairs. Such actions could increase the frequency of injuries, thereby adding to the potential social impact of fisheries regulations. Ports such as New Bedford and Gloucester, where crews are often made up of family members, will probably under-employ where possible rather than laying off crew. While undervaluing family labor can help to keep accounts balanced, at some point such a strategy becomes untenable. When family members must be let go, the social fabric is heavily strained.

Finally, moratoriums and strict effort limitations will translate into fewer opportunities for young fishermen to enter the industry, though the level of limitation is uncertain. The fact that only 1,500-2,500 of the current 4,947 permits are estimated to be active means that there are unused permits available for the future. (See section E.6.4.1.1.1, "The Vessels and Fleets" for a discussion of how numbers of active vessels are estimated.) Further, there is still the possibility of entering under the open access categories although there is little opportunity for developing a business in those categories as long as the possession limits remain very low. It is primarily the declining stocks and consequent inability to make a living, however, which will discourage young people from entering the fishery at this time. Already, many fishermen are discouraging their children from fishing. Some generational continuity in the industry may thus be lost, but the degree to which this would happen is uncertain.

Ultimately, the continued loss of fishing revenue will push many ground-fishermen into bankruptcy as the gap between income and outlays, e.g., boat and house mortgage payments, widens. According to the SIA for Amendment 5 medium-sized, full-time groundfish vessels with high debt burdens which are most at risk in any scenario. Others may choose to leave the industry prior to financial failure. Of course, the rate at which migration out of the industry occurs, whether it is forced or by choice, will depend on a variety of factors, e.g., the financial solvency of the fishermen, career alternatives, and the availability of vessel buyout programs. Regardless of what triggers their departure, many ground-fishermen face a relatively bleak employment future. any fishermen are not formally well-educated, and the skills they do possess, which are so valuable at sea, are not readily transferrable to land-based jobs. Furthermore, no matter what skills one has, it is always difficult to find a job in a relatively weak economy such as currently exists in the Northeast.

It is not only the fishermen and their immediate families who would suffer. Industries directly associated with fishing, e.g. equipment, ice and fuel suppliers, and, especially in small towns,

even grocery suppliers largely depend on the health of the New England groundfishery. As landings fall so will profits. And in ports where fishermen and the employees of associated industries are a significant percentage of the population, a deepening groundfish crisis will hurt already weakened local economies. Processors are in a somewhat better position, due to their heavy dependence on imported product. Smaller dealers and processors who depend on domestic supplies may be unable to survive the initial reductions in landings (see section E.6.4.2).

Unemployment and the loss of personal income will place an emotional strain on relationships within families and communities. nd it is likely that federal, state, and local social service agencies will be able to ameliorate the situation only to a limited degree. The ability of fishermen to get financial assistance may be compromised by their employment history. As self-employed businessman, who often work unusual schedules and get paid in unorthodox ways, most do not qualify for unemployment benefits.

Perhaps the most difficult social impact to assess is the loss of a way of life for many. (See section E.6.4.3.1.5 "Lifestyle" for more information.) The fishing industry is an important part of the New England's past and present. Images of rocky coastlines, fishing boats, and weathered fishermen are an integral part of the way New Englanders view their region and how others view it as well. It is impossible to know exactly what would be lost if a working fishing industry were significantly reduced. Nevertheless, it is clear that we would be losing something important, not only economically, but socially. This would be especially true in ethnic enclaves and small rural towns, where traditional ties based on fishing could be strained, e.g., savings pools, debts to relatives abroad which are paid by taking immigrant labor, and networks of marine resource distribution. (See section E.6.4.3.1.3 for a discussion of relative community dependence on fishing.)

E.7.3.2 PROPOSED ACTION - COMMERCIAL VESSELS

While the specific impacts of individual measures are discussed below, some general comments are also in order. In evaluating these impacts, however, it should be kept in mind that if no action is taken groundfish stocks will continue to decline -- eventually leading to all the same harsh realities that will hit now with the implementation of a more restrictive regulatory regime.

- Will the standards, style or pace of living change?

In the short run, standards of living will inevitably drop for all but some traditional highliners and vessels which have already diversified. To the extent that vessels may need to fish beyond traditional areas -- due to closures or in search of alternative species, fishing families may need to adjust to changes in primary port of landing or number or length of trips. To the extent that fishermen use of DAS early or stop fishing in a given season to save DAS for later or cannot because of closed areas, families may find fishermen home more often or at different times of the year than usual. This, combined with financial stresses is likely to lead to relationship and role stresses within fishing families. Fishing families may need to change patterns of spending and saving to cope with lowered incomes and potential costs of re-rigging for new fisheries.

- Will cooperation and interaction patterns change?

Existing port- and gear-based differences, as well as tensions between small and large vessels and between inshore and offshore fishermen, are likely to be exacerbated in the early years -- given fewer fish, fewer DAS, and increasing financial pressures. Family roles may be challenged, as the income of a spouse gains in importance where fishing income declines.

- Will change be sudden or gradual?

The 2-year phase-in of fishing reductions is more gradual than any of the alternatives. It will be severe and sudden enough to have an obvious impact, however, the resulting changes for fishing communities may take several years to be completely felt.

- How does the proposed action fit with historical trends and participation in the fishery?

The proposed action is well in line with historical trends in regulation in this fishery, building primarily on DAS limits, closed areas, and gear restrictions. It also follows a nationwide trend of increasing limitation of effort and participation. By maintaining an open access category, however, it allows the continued growth of numbers of groundfish licenses. The trend in vessel permits is discussed in section E.6.4.1.1.1.

Beyond total participation numbers, there may be some disadvantaging of large trawlers in relation to other gears. Allowing handline and under 30 ft vessels to be exempt may encourage growth in those categories -- though the restrictions imposed on small vessels by weather and size and on handline vessels by the gear itself and the possession limits will somewhat mitigate this.

- Does the change fit with cultural or normative expectations of behavior in the fishery or community?

To the extent that this plan maximizes flexibility of fishing, within the restrictions imposed by conservation requirements, the proposed action maintains a long history of gear and species switching in the Northeast, especially by hook and gillnet boats) with .

- How do fishermen and the community members view the alternatives?

Most fishermen are by and large unhappy with all the alternatives. Many favor taking no action. Many others, however, have come to accept the need for further restrictions. Of the alternatives, the proposed action is seen as the least disruptive to the current system and perhaps the least harmful to their fishing practices and way of life.

E.7.3.2.1 CHANGES TO THE PERMIT MORATORIUM

Eliminating the open access, possession-limit-only category and the open access hook-gear-only category and moving these vessels into the handline/rod-and-reel category, limited access hook-gear-only category or the limited access possession-limit-only category attempts to allocate all available regulated species to limited access permit holders, while not completely shutting out the open-access fleet. In conjunction with other permit modification measures and adjustments to the limited access fleet, this attempts to retain maximum flexibility for vessels which depend on groundfish.

Handline/Rod-and-reel Category:

The creation of this category provides an opportunity for subsistence fishing by those who do not qualify for a limited access permit. (See section E.6.4.3.3 for more information on subsistence fishing, and section E.6.4.1.2 for more information on the recreational fishery.) Vessels fishing under the handline permit would be allowed to possess, land and sell up to 300 pounds of cod, haddock and yellowtail flounder and unlimited amounts of the other groundfish species of which pollock and white hake are most likely to be caught.

While the numbers of active rod-and-reel vessels is unknown, extrapolating from 1993 weigh-out data, at least 230 handline vessels (over 75% of open access vessels listing handline) would be active in 1995. Forty-nine percent of current open access permits list either handline or

rod-and-reel as the primary gear. Many of the rod-and-reel permits are for commercial vessels which depend primarily on using another gear, either for groundfish or other species. Most of these vessels are pelagic hook (tuna) that indicated multispecies on the permit application. Only 75 open-access hook vessels reported landing more than 500 pounds of groundfish in 1994-1995.

While some of these vessels may depend on those low levels of groundfish for important part of their revenue, small vessels are also the most able to switch gears and species, and have traditionally fished for a wider variety of species rather than targeting a single species. Retaining any open-access category at all, however, creates some potential for increased effort. While the low possession limit of 300 pounds per trip may discourage new entrants, others may seek such a permit on the assumption that some open-access permit holders have already been granted some form of limited-access and that more may qualify at a later date.

Creation of a Charter/Party Permit:

Charter/party vessels with no other qualification may fish under a charter/party permit. If the vessel already has a limited-access DAS permit, it may also take passengers (recreational fishermen) for hire. The permit offers flexibility for those vessels which have a mixed commercial and recreational fishing history and retains the maximum potential access for recreational fishing.

Currently, party/charter vessels can possess and sell up to 500 pounds. of groundfish per trip if they hold a multispecies permit. For some of these vessels, these sales may be an essential component of crew income and these crew members would be negatively impacted. In other cases, anglers may feel that selling the fish contributes to their satisfaction or they may count on the income to subsidize their trip. A prohibition on sales, therefore, could lead to fewer anglers and a resultant loss in revenue for charter/party vessels. On the other hand, the no-sale provision has received widespread public support.

Allowing Qualified Open Access Hook-Gear-Only Vessels into Limited Access Hook-Gear-Only:

As of June 1995 there were 1,843 open access hook-gear-only permit holders. Of these, only an estimated 73 qualify for limited access permits under the proposed criteria. This would increase the number of limited access hook vessels from 130 to 203. However, because the both these new and the existing limited-access hook vessels will be included in the DAS program, moving these 73 vessels into limited access is unlikely to cause large amounts of increased effort. In addition, it maintains the greatest possible flexibility for small boats, many of which are hook vessels.

Allowing Qualified Open-Access Vessels into a Limited-Access Possession Limit Category: This measure offers those who may not have bothered to apply for a limited access permit, even though they would have qualified, a second opportunity to enter the limited access program. In addition, it offers limited access scallop vessels the opportunity to retain groundfish. Those who qualify would remain under a possession limit.

It is unlikely that there will be many vessels which can actually meet the original qualification criteria but did not attempt to do so previously, given the estimates of those likely to qualify (see Amendment 5 EIS) and those currently qualified. Further, few Open access possession-limit-only vessels depend heavily on groundfish. As of June 1995 there were 3,234 open access permit holders. Only 225 of these caught more than 500 pounds combined regulated species from June 1994 through June 1995 and 73 of these were hook gear vessels discussed above.

E.7.3.2.2 TOTAL ALLOWABLE CATCH LEVELS (TAC)

A target TAC provides a yardstick for effort reduction regulations. As with any management alternative, a TAC can have both positive and negative social impacts. On the positive side, to the extent that a TAC assures confirmation with rebuilding goals, it can lead to long-term benefits by providing a stable natural resource base which, in turn, could support a healthy fishing industry. And, to the degree that the Council is able to accurately monitor the fishery, the TAC is a valuable management tool in that it clarifies when fishing effort has reached acceptable limits.

E.7.3.2.3 CERTIFICATION OF BYCATCH FISHERIES

Because precise bycatch levels for all fisheries are not known, the full impact of the 5% rule cannot be calculated. However, maintaining and allowing for some exempted fisheries does increase flexibility for fishermen attempting to diversify. Exempting all fisheries west of 72○30' recognizes that these vessels already catch very low levels of cod, haddock, and yellowtail. Vessels which do catch higher levels of regulated species are likely to already possess limited access Multispecies permits, and could fish these areas under DAS.

East of 72○30', vessels would be prohibited from possessing regulated Multispecies unless they are fishing under DAS or in an exempted fishery. Vessels catching high levels of these species are likely to already be under limited access and therefore able to fish under DAS. Other vessels, such as those currently operating under the 500-pound trip limit for combined regulated species, already do not depend on regulated species for their primary source of income. This measure will likely increase their effort in other fisheries in which they are active.

Retention of the current experimental dogfish fishery as a certified exempt fishery will help maintain options for fishermen seeking to limit their participation in groundfish fisheries. Dogfish, however, will only support small amounts of additional effort.

Addition of an exempted white hake fishery (pending qualification and with the requirement of regulated mesh or greater) gives fishermen an additional alternative fishery to enter. This will mitigate some of the financial burden of reduced catches of other regulated species.

Extending the prohibition of regulated species that currently applies in certified small-mesh fisheries to all certified fisheries should have minimal effect, since by virtue of being certified these fisheries already have extremely low catches of regulated species.

Allowing an exception of a possession limit of up to 300 pounds. for vessels using mesh of 8 inches or larger gives some flexibility for newly developing large-mesh fisheries.

E.7.3.2.4 EFFORT REDUCTION PROGRAM (DAYS AT SEA)

Reduction in Days at Sea of 50% over Two Years:.

Rather than reducing the fleet opportunity days to 158, 133, 110 and 88 over the next four years, the proposed action will allocate 139 and 88 DAS to this group of vessels over the next two years. Individual DAS vessels will have reductions of 15% in each of the next two years, instead of 10% per year. However, given the more depleted status of the stocks than was originally envisioned under these years of the SQ, many vessels, especially those in an already precarious financial position, may be unable to survive these additional DAS reductions.

Elimination of Fleet Layover Days:

Current requirements of layover-days are abolished. This will greatly enhance flexibility and address serious concerns of smaller vessels that they would be doubly impacted by the combination of layovers and their greater sensitivity to bad weather. Gillnet and hook boats, which constitute the greater portion of the small boat category, will find the removal of layover regulations especially helpful.

Addition of Hook and Gillnet Vessels to DAS:

The comparisons below of DAS allocations by limited entry category are based only on those vessels which received an individual allocation, whether they chose to use that allocation or enter another category. Not all vessels who entered a category other than Individual received an individual allocation. The discussion below, therefore, is based on a subset of all limited entry vessels.

Looking at the full 50% reduction level of 88 days, for gillnet vessels a 50 percent reduction in DAS would have meant an average of 116 DAS Individual (minimum 1, maximum 164) versus 88 "opportunity days" for Fleet (31 DAS by their individual allocations) (Table E.7.3.6). For all gillnet category vessels with individual allocations, the average 50 percent reduction level would be 18 DAS (minimum 0, maximum 158). For those gillnet vessels under Individual DAS, the average 50 percent reduction level would be 126 DAS (minimum 65, maximum 158). For limited entry hook vessels, if they had used their individual DAS their 50 percent reduction level would be 9 DAS (minimum 0, maximum 142). For those vessels in the less-than-45-foot category who are over 30 feet (and thus would be losing their exempt status), average 50 percent reduction DAS are 14 (minimum 0, maximum 100).

General Analysis of 50 Percent Reduction in DAS:

Section E.7.2.3 discusses break-even analyses by sector shares for different gear-based fleets. Below, a somewhat different break-even analysis (see discussion of methodology for each analysis) is conducted by port for three gear-based fleets (otter trawlers, gillnets, and hook vessels) for some of the major Northeast ports.

To attempt to understand the relationship of DAS to financial viability, a vessel simulator, OTTER, developed by Dr. John Gates and Philippe Lallemand at the University of Rhode Island, was used to evaluate the level of days-at-sea per year where operating costs equal gross revenues for otter trawl vessels landing in the major Northeast ports. Estimates of monthly gross revenue were made, by port, based on days-at-sea and vessel characteristics. The gross revenue equation was estimated from Northeast Fisheries Science Center (NEFSC) weigh-out data. Costs are also based on days-at-sea, vessel characteristics, and, where appropriate, the gross revenue estimate. The cost equations were estimated from information in the Capital Construction Fund. The vessels represented in the cost equations are a sub-sample of the vessels in the weigh-out data and are typically high liners.

Average vessel characteristics and yearly days-at-sea (These are arithmetic, not geometric, means and the days-at-sea are days using otter trawl gear. Most vessels used in the gross stock estimation were full time otter trawlers (Philippe Lallemand, pers. comm.)) were chosen for each port considered in the analysis and yearly gross revenue and costs were calculated for each representative vessel. Nineteen ninety three was the latest year for which data was available. Table E.7.3.1 lists averages for each port of landing.

The simulator was built to assess the performance of individual vessels. Separate cost equations were not calculated for various size vessels or for vessels from different ports. OTTER assumes all Northeast otter trawl vessels have the same cost structure, i.e., it is a homogenous fleet. Choosing a representative vessel is somewhat of an abstraction in that the actual average gross

revenue and total costs for a port are made up of vessels with different cost structures and catch capabilities.

To determine break-even days-at-sea, days-at-sea were changed from 1993 levels until gross revenue and total costs became equal. Reducing days-at-sea beyond the break-even level raises total costs above gross revenue; clearly a situation that could not be sustained beyond the very short run.

The costs considered in the analysis were:

1) Trip costs (fuel, lube, ice, water, and food)
2) Other variable operating expenses (gear, supplies, lumping, trucking, and transportation)
3) Fixed costs (insurance, license & boat taxes, repair, maintenance, travel, professional fees)
4) Periodic overhaul expenses
5) Crew share
6) Shack
7) Crew benefits
8) Bonuses

The above costs are cash costs. Non-cash costs such as depreciation and opportunity costs were not considered. If additional costs, such as non-cash costs, were included, the number of days-at-sea needed to break even would have been higher than the levels reported here. Furthermore, since OTTER calculates a combined figure for depreciation and interest and since it is difficult to measure the average vessel owner's equity in a vessel, interest expenses are excluded from the analysis. Monthly principal and interest payments can play a significant role in the determination of a vessel's break-even days-at-sea, however. Therefore, the actual number of days needed to break even is likely higher than the levels reported here.

OTTER allows the selection of a skill level for the captain. An average skill level was chosen for this analysis. It also allows the selection of pessimistic, average, and optimistic gross revenue scenarios. The pessimistic and optimistic scenarios are two standard deviations from the mean gross revenue estimation. An optimistic gross revenue scenario was chosen for this analysis. Choosing an average or pessimistic gross revenue would have increased the break-even days-at-sea since more days would be required to obtain the gross revenue that would cover total costs. Excluding certain categories of costs and choosing an optimistic gross stock gives a "best case" picture of the minimum number of days-at-sea per year that the average vessel in a given port must sustain in order to cover expenses.

The break-even analysis is conducted from the perspective of the vessel owner. It compares the gross revenue earned by the vessel with the associated costs, including what is paid to the captain and crew. In many instances the owner is the captain. So, in this case, the owner is paying himself. Gross stock will equal total costs at the break-even days at sea but the owner would still be making some "profit" from his captain's share.

The average vessel characteristics in Table E.7.3.1 have a distribution about them. The ranges of the distributions are reported in parenthesis. The length distributions were separated into quarters and the mean characteristics for the vessels in the first and fourth quarters were calculated. Break-even days-at-sea were then estimated for the first and fourth quarters and are reported in Tables E.7.3.2 and E.7.3.3, respectively. This part of the analysis was done to provide a range of break-even days-at-sea for various size vessels in each port. Table E.7.3.4 summarizes these results.

The break-even days-at-sea reported in Tables E.7.3.1-4 are for days otter trawling. Some vessels spend days-at-sea using other gear. The break-even days-at-sea reported here are for full

time otter trawlers. The analysis does not consider the effect of switching to other fisheries.

The mean break-even days-at-sea range from 95 days for Point Judith to 190 days for New Bedford with an average of 112 days across all ports considered in this analysis. The average for the first quarter vessels, across ports, is 78 days. For the fourth quarter the average is 142 days, reflecting the harder fishing of winter. These averages provide an approximation of the number of days-at-sea per year a Northeast otter trawl vessel requires to break-even. The number of break-even days-at-sea for a given vessel, however, depends on a multitude of factors and is unique to that vessel. The average break-even days-at-sea reported here should therefore not be construed as something that can be directly applied at the individual vessel level.

In addition, not all vessels will react in the same manner to revenue decreases. For instance: "Family relationships play an important role in boat financing in Gloucester and New Bedford. Recent immigrant families, either Italian [primarily Sicilian] in Gloucester or Portuguese in New Bedford, utilize the family and community ethnic structure to accumulate the savings required for an investment in fishing. By maintaining high rates of savings within a family and by pooling family assets, both self-financing and bank borrowing are facilitated. This family structure of pooled income and assets, as well as the strong cultural commitment to fishing, implies a more resilient ability to endure revenue fluctuations than normal business borrowers, but it also implies that capital will be slow to leave the industry following a more permanent downturn (Doeringer, Moss & Terkla 1986:46-47)."

Table E.7.3.1 1993 Average Vessel Characteristics (range in parenthesis) and Break-even Days-at-sea by Port Landed

	PORTLAND, ME	GLOUCESTER, MA	BOSTON, MA	NEW BEDFORD, MA	PT. JUDITH, RI
LENGTH (FEET)	59 (32 - 94)	62 (30 - 136)	77 (41 - 120)	70 (36 - 103)	67 (38 - 105)
GROSS TONS	73 (9 - 192)	74 (7 - 199)	125 (31 - 199)	111 (13 - 197)	96 (14 - 198)
HORSE POWER	384 (15 - 1175)	383 (90 - 1125)	585 (165 - 1175)	458 (100 - 1090)	434 (115 - 1400)
AGE (YRS.)	17 (4 - 68)	26 (5 - 73)	15 (3 - 48)	22 (3 - 64)	20 (3 - 50)
HULL MATERIAL	steel	steel	steel	steel	steel
CREW SIZE (INCL. CAPT.)	5 (2 - 13)	5 (2 - 15)	5 (2 - 12)	5 (2 - 13)	5 (2 - 9)
BREAK-EVEN DAYS-AT-SEA	105	130	150	190	95

Table E.7.3.2 First Quarter Average Vessel Characteristics and Break-even Days-at-sea

	PORTLAND, ME	GLOUCESTER, MA	BOSTON, MA	NEW BEDFORD, MA	PT. JUDITH, RI
LENGTH (FEET)	43	39	53	54	49
GROSS TONS	24	19	53	53	35
HORSE POWER	284	248	294	282	230
AGE (YRS.)	18	21	22	29	31
HULL MATERIAL	steel	steel	steel	steel	steel
CREW SIZE (INCL. CAPT.)	2	3	4	4	3
BREAK-EVEN DAYS-AT-SEA	75	95	105	137	55

Table E.7.3.3 Fourth Quarter Average Vessel Characteristics and Break-even Days-at-sea

	PORTLAND, ME	GLOUCESTER, MA	BOSTON, MA	NEW BEDFORD, MA	PT. JUDITH, RI
LENGTH (FEET)	80	89	97	85	83
GROSS TONS	144	155	177	159	152
HORSE POWER	588	664	912	647	690
AGE (YRS.)	13	20	10	15	10
HULL MATERIAL	steel	steel	steel	steel	steel
CREW SIZE (INCL. CAPT.)	6	7	7	7	5
BREAK-EVEN DAYS-AT-SEA	143	185	175	224	122

Table E.7.3.4 Range of Break-even Days-at-Sea by Port

	PORTLAND, ME	GLOUCESTER, MA	BOSTON, MA	NEW BEDFORD, MA	PT. JUDITH, RI
FIRST QUARTER	75	95	105	137	55
MEAN	105	130	150	190	95
FOURTH QUARTER	143	185	175	224	122

A less differentiated analysis of hook and gillnet break-even DAS, using cost data from the Scotia-Fundy region and from the NMFS Capital Construction Fund, estimates that hook vessels of less than 51 GRT require 82 DAS to break even, and larger hook vessels require 117 DAS. Thus many vessels will be unable to maintain viability under 50% reduction in DAS and an 80% reduction in fishing effort.

The largest vessels will be the first to fail financially (see discussion of definitions of "large" below) -- unless the firm has other assets to support it through the extremely low DAS allocations. However, even small vessels will find it difficult to survive on these DAS levels. Thus, hardship is fairly well distributed across ports. Of those who survive then, the distribution should be fairly similar to today, though large, corporate owners may find it easier to "ride out the storm".

There are various definitions of "large". One used in the SIA for Amendment 6 called those of 125 GRT or more large. By that definition, there are 239 large limited entry vessels (5% of all limited entry vessels). Peterson and Smith (1981) defined large as either over 60 ft. or over 40 GRT. This would give 507 limited entry vessels over 60 ft. (30% of limited entry vessels) and 675 limited entry vessels over 40 GRT (39% of limited entry vessels). Obviously, the length and

tonnage categories are overlapping rather than mutually exclusive, so the numbers in these two categories should not be combined.

By length, Massachusetts has the most large vessels in absolute terms, followed by New Jersey, and (for states with over 10 large vessels), Virginia and North Carolina have the most large vessels in percentage terms. By tonnage in Amendment 6 categories, Massachusetts has the most large vessels in absolute terms, and North Carolina, Rhode Island, Virginia and Massachusetts have the most large vessels in percentage terms (Table E.7.3.5). By Peterson and Smith tonnage categories, Maryland, North Carolina and Rhode Island have the most large vessels in percentage terms, and Massachusetts, Maine and Rhode Island have the most large vessels in absolute terms. By selected ports (Tables E.6.4.3.1 and E.6.4.3.2), it is primarily large, urban ports which have large vessels by the Peterson and Smith length definition, though some smaller ports such as Newport and Point Judith, RI also have significant numbers of vessels over 60 feet. Peterson and Smith tonnage definitions yield similar results. However, when looking at numbers of DAS as low as 30-40, even small vessels will find it difficult to make a living.

As vessels strive to remain solvent under these low DAS levels, there will be increased incentives to fish closer inshore, thus avoiding losing DAS to steaming time. The Groundfish Industry Advisory Committee has pointed out that even in year one of Amendment 5 large vessels were fishing further inshore than usual, causing gear conflicts. With lower DAS levels these conflicts will increase initially, though they should subside somewhat over time as more vessels are forced out of the fishery altogether.

TABLE E.7.3.5 Numbers & Percents of Large Limited Access Vessels by Tonnage

STATE	Amendment 6 SIA Definition		Peterson and Smith Definition	
	Number	Percent	Number	Percent
Connecticut	13	13		
Massachusetts	294	15	131	7
Maryland	6	27		
Maine	100	12	26	3
North Carolina	25	25	9	9
New Hampshire	13	6	7	3
New Jersey	47	10	19	4
New York	69	13	13	2
Rhode Island	94	23	30	8
Virginia	13	15	7	8
Total	675	39	244	14

Required 20-day Block Out During the March-May Spawning Period:

Fishermen generally favor measures which protect spawning fish. The ability of most vessels to choose the 20-day block offers them maximum flexibility within this restriction. It is also a

continuation of an existing measure for most of these vessels. Though handline vessels and vessels of 30 ft. or less are required to take the first 20 days of the period, this is the period when they are least likely to be fishing because of the weather at that time of year and their small size.

E.7.3.2.4 GEAR RESTRICTIONS

Minimum Mesh Size:

Since it stays the same, there are no impacts.

Square Mesh Requirements:

Since they stay the same there are no impacts.

Gillnet Gear Restrictions:

New Category of Large Mesh Gillnets:

Some gillnet vessels already fish with larger meshes and would have no additional impact due to changing gear. Among interviewed gillnet trips (of 1,360 interviewed weigh out trips, 441 were by identified tonnage vessels. There were 111 unique tonnage vessels which made those 441 trips), 21% were fishing with mesh sizes of 7 inches or greater in 1993, and 3 percent of gillnetters were already fishing with 8 inches mesh, primarily for monkfish. Most of these vessels landed in Chatham, MA. Eighty-four percent of gillnet vessels may already be fishing with mesh larger than the current regulation 6-inch mesh size. Thus the impact may be relatively small, though it will hit large ports the hardest because vessels landing there are the least likely to have meshes larger than required by law. The 155 DAS in year one and 120 DAS in year two would be considerably below the average of 226 DAS for Individual DAS gillnet vessels, but considerable above the 32 DAS average for all gillnet vessels which received individual allocations (116 out of a total of 365 vessels permitted under gillnet, including those permitted under more than one category).

Some Possible Future Gillnet Proposals:

Further, the Multispecies Gillnet Subcommittee has recommended the possibility of specific gillnet fisheries for dogfish and monkfish.

In the 1993 weigh out files there were 13,523 trips by tonnage gillnet vessels which caught dogfish. Of these, 9,689 had a recorded mesh size. These trips were made by 91 individual vessels. Twenty-one percent of these vessels used a mesh of 7 inches or greater (7-9.5 inches). The majority of these large mesh vessels (68%) landed in Chatham, Massachusetts. In the 1994 weigh-out files there were 6,155 trips by tonnage gillnet vessels. Of these, 2,835 had a recorded mesh size. These trips were made by 40 vessels. only 3% of these vessels, all located in Chatham, used mesh of 7 inches or greater (7-7.5 inches).

Thus, there is a small fleet of large mesh dogfish vessels which could take advantage of this regulation, primarily landing in Chatham, MA. The dogfish fleets of ports such as Portsmouth, NH and Gloucester, MA tend to use regulation mesh, however, and would be less able to adopt this measure. If they chose to do so, they would require new nets.

In the 1993 weigh out there were 69,390 trips by tonnage gillnet vessels which caught monkfish. Of these, 50,702 had a recorded mesh size. These trips were made by 108 unique vessels. Only 4% of these vessels used 8 inches or greater mesh (8-9.5 in.). They were concentrated mostly in Point Judith, RI. In the 1994 weigh out files, there were 28,947 trips by tonnage vessels which

caught monkfish. Of these, 14,316 recorded a mesh size. This represented 47 unique vessels, none of which used a mesh of 8 inches or greater.

Thus, there may be small numbers of vessels already able to take advantage of this option. The majority, however, would need new nets.

There has also been discussion of net caps for gillnet vessels. Many gillnet fishermen already support a limit of 80-100 nets per vessel. However, NMFS Sea Sampling data show the current average number of nets/vessel is 70. While some fishermen have felt this number represented nets hauled rather than nets owned, 1994 Sea Sampling data specifically includes the variable "nets owned". These data, while preliminary, show an overall average of 84 nets per vessel. When broken out by region in New England, the following are the averages:

Table E.7.3.6 Gillnets Owned by Region

	Northern ME	**Southern ME**	**NH**	**MA, north of Boston**	**MA, south of Boston**	**RI**	**Total**
Average No. Nets Owned	65	69	101	82	57	59	84
	N=20	N=14	N=25	N=61	N=23	N=18	N=161

Hook Gear Restrictions for Handline Vessels:

A restriction of 3 hooks per line cannot be analyzed at this time, because NMFS data files do not contain this variable.

Ban on Jigging Machines for Handline/Rod-and-reel Permits:

This is in keeping with the new subsistence character of this permit category.

E.7.3.2.5 AREA CLOSURES

Year-Round Closures:

A full year closure of Areas I and II and the Nantucket Lightship Area would be a continuation of the existing Framework Adjustment 9; therefore it will have no additional impacts.

Seasonal/Spawning Closures:

Possible spawning closures cannot be analyzed until they are specified. However, spawning closures are a measure which most fishermen feel is appropriate; they are therefore likely to support this type of measure.

The closures using the harbor porpoise protection ares and right whales, while affecting all gears, will most strongly affect the small boat, gillnet fleets. Because gillnet vessel are already prohibited from these areas to protect harbor porpoise, they would not experience any additional impacts. Since the closures are seasonal, the impacts would appear to be limited; however, because that seasons correspond to prime fishing season for some fleets the closures are still significant. We should also keep in mind that gillnet vessels under 30 ft. would be subject to these measures for harbor porpoise, even while exempted from other regulations.

Any large area closures, however, can cause crowding on the open grounds and may lead to gear conflicts. Overall, "[closed areas, ... can disrupt the traditional annual round of fishermen by forcing a switch to different species or different gear, or to becoming a migrant worker [especially for small vessels]. Many factors will be involved in which of these choices is made. Level of community attachment will figure into whether or not migrant labor is chosen, with day fishermen and fishermen from close-knit rural or ethnic communities being less willing to leave home for long periods of time. (But many offshore fishermen would prefer to spend more, not less, time at home as it is.) Draggers will be less likely to choose different gear (Clay 1993)." (Also see discussions on territory, port, and vessel size in sections E.6.4.1.1.1, E.6.4.1.1.2 and E.6.4.3.1.)

However, closed areas -- especially to protect spawning grounds and essential habitat -- also make sense to fishermen in ways that some other management tools do not. Worldwide, management by areas is the most common form of local regulation.

E.7.3.2.6 POSSESSION LIMITS

Haddock:

Raising the haddock trip limit from 500 pounds to 1,000 pounds would be most beneficial to large otter trawls who fish Georges Bank, primarily vessels from Gloucester and New Bedford. Both data from 1992 (prior to the imposition of the 500 pounds/trip limit) and 1993 (post the imposition of the 500 pounds/trip limit) are examined here.

Eighty three percent of haddock landings in 1992 were made by otter trawl vessels. Of the 1,650 otter trawlers which held groundfish permits in September 1992, 329 fished Georges Bank, and 202 of that 329 landed haddock in 1992. Of the 1,466 haddock trips made in 1992 by those 202 vessels, only the 290 trips to Georges Bank (made by 164 vessels) averaged more than approximately 500 pounds/trip. Those 290 trips averaged approximately 8,600 pounds per trip (NMFS 1994, the Amendment 6 SIA). Seventy on percent of haddock landings in 1993 were made by otter trawl vessels. Haddock landings were made by a total of 389 vessels (275 otter trawlers) over the course of 2,161 (1,518) trips. The overall average pounds per trip for all vessels was 248, with only the ports of Boston and Gloucester coming near to meeting the maximum of 500 pounds/trip (412 pounds/trip and 457 pounds/trip respectively), trailed by New Bedford with 274 pounds/trip.

According the SIA for Amendment 6, of the 465 otter trawl vessels landing haddock in 1992, 174 were "small" (5-60 GRT) while 112 were "medium"-sized (60-125 GRT) and 179 "large" (125-250 GRT) vessels. There was little overall difference in the annual average catch by vessel class. Small vessels took some 9,536 pounds/annum, while medium and large vessels took 9,609 and 9,770 lb/annum respectively. Of the 275 otter trawl vessels landing haddock in 1993, 42 were "small", 100 were "medium", and 132 were "large" (here, 125-215 GRT). Small vessels averaged 33 pounds/annum (i.e., pounds/vessel/year); medium vessels averaged 677 pounds/annum; large vessels averaged 2,985 pounds/annum.

The total value of the haddock landed in 1992 was $5,517,881, while the total value of all species landed by groundfish vessels was $152,984,071. Thus haddock landings had a value of 3.6 percent of total landings in 1992. The total value of the haddock landed in 1993 was $777,590, while the total value of all species landed by groundfish vessels was $727,338,123. Thus haddock landings had a value of less than 1% percent of total landings in 1993. Revenues earned by vessels had the following distribution (Table E.7.3.7):

TABLE E.7.3.7 Revenues of vessels harvesting haddock, 1992 (from Amendment 6 SIA) & 1993

Range ($)	% of all 1992 vessels* with haddock catches	% of all 1993 vessels* with haddock catches
< 500	42.5	58.6
501 - 10,000	32.9	36.3
10,001 - 50,000	19	5.1
50,001 - 100,000	2.6	0
100,001 - 250,000	2.6	0
250,001 - 1,000,000	0.4	0

* 1992 Vessel N = 468 (1/13/94); 1993 Vessel N = 389 (6/2/95)

With regard to income, 21 of the 164 vessels fishing Georges Bank in 1992 reported that 10 percent of their revenue came from haddock, and 5 vessels reported that haddock comprised more than 20 percent of their earnings. Looking more broadly, at all vessels landing haddock, while only 26 vessels depended on haddock for over 20% of their revenues in 1992, there were 115 vessels which earned more than $10,000 from haddock landings in 1992. In 1993, there were only 20 vessels which earned more than $10,000 from haddock landings.

Most haddock landings come from large vessel ports. The principal port for haddock landings in 1992 was Gloucester, which handled 42 percent of all haddock reported landed. However, haddock landings comprised only 2 percent by weight of total landings in Gloucester, and 7 percent of total landed value. A similar situation existed in New Bedford, where 28 percent of all haddock reported caught was landed; haddock landings represented 1 percent of all landings by weight and value in 1992 in New Bedford. In Boston, which handled 14 percent of haddock landings, haddock comprised 5 percent of total landings and 7 percent of landed value. Portland received 12 percent of reported landings; haddock comprised 1 percent of Portland's total landings and 2 percent of total landed value. Of small and medium boat ports, only Chatham, MA and Newport, RI land significant levels of haddock.

In 1993, the principal port for haddock landings was still Gloucester, with 27% of all haddock trips and 49% of haddock pounds landed. New Bedford had 20% of haddock trips and 21% landings. Boston was third with 16% of trips and 20% of landings. Chatham, MA and Newport, RI still land some haddock, but less than 2% of all landed pounds. Gloucester, Boston and New Bedford would certainly benefit to some degree, as might Portland, Chatham and Newport.

TABLE E.7.3.8 Percent of Total Haddock Trips per Port in 1993 (1992) from Selected Ports to Selected Fishing Areas, by Otter Trawl Vessels

	Portland	Boston	Gloucester	New Bedford	Chatham	Newport
561	0.07 (0.06)	0.09 (0.11)	0.1 (0.03)	0.09 (0.06)	0 (0)	0.23 (0.07)
562	<0.01 (0.01)	0.06 (0.09)	0.14 (0.08)	0.43 (0.06)	0 (0)	0.05 (0.17)
521	0.04 (0.09)	0.36 (0.4)	0.1 (0.16)	0.1 (0.04)	1 (1)	0.04 (0.33)
522	0.23 (0.07)	0.32 (0.3)	0.07 (0.16)	0.12 (0.57)	0 (0)	0.5 (0.34)
Subtotal	0.34 (0.23)	0.83 (0.90)	0.41 (0.43)	0.74 (0.73)	1 (1)	0.82 (0.91)

513	0.24 (0.23)	0.02 (0.01)	0.17 (0.21)	0 (<0.01)	0 (0)	0 (0.01)
515	0.1 (0.47)	0.07 (0.03)	0.25 (0.19)	<0.01 (0.01)	0 (0)	0.01 (0.04)
525	0 (0)	0.05 0.02)	0.01 (0.01)	0.19 (0.19)	0 (0)	0.04 (0)
526	0 (0)	0 (0)	0 (0)	0.05 (0.07)	0 (0)	0.04 (0.04)
Total	0.68 (0.93)	0.97 (0.96)	0.84 (0.84)	0.98 (1)	1 (1)	0.91 (1)

Vessels currently averaging over 1,000 pounds. combined cod, haddock and yellowtail /trip are large mesh trawls in Portland, ME; Boston, MA; Gloucester, MA; New Bedford, MA; Montauk, NY; and Newport, RI and dredge vessels in New Bedford). Of these ports, large mesh trawls are most dependent on their cod, haddock and yellowtail income in Gloucester, Boston, and New Bedford (50-54% of total revenues) (see Table E.6.4.1.1.2.1). Vessels targeting large amounts of haddock are located primarily in Gloucester and New Bedford, followed by Portland. These would be the most aided by raising the current 500-pound limit to 1,000 lb.

Certified Fisheries:

A possession limit of zero pounds should not be particularly onerous for the certified fisheries, since they already have less than a 5% bycatch rate of regulated species.

Winter Flounder:

In the Mid-Atlantic Regulated Mesh Area, where there is little groundfish caught, the 200 lb. possession limit on winter flounder increases the flexibility of small vessels.

Skate Bycatch Allowance:

Allowing a 10% bycatch of skate in the Southern New England Regulated Mesh Area when the vessel is fishing in an exempted fishery will aid southern New England fishermen to maintain financial viability in the face of increased pressure from redirected northern fishing.

Exception for vessels fishing with 8-inch mesh or larger:

The 300-pound possession limit encourages movement to higher mesh sizes, a long-term conservation measure. In 1993, only six percent of the tonnage, groundfish vessels that were interviewed (weighout, logbook, sea sampling) and where a mesh size was reported, used a mesh larger than 6 inches. (There were 59,501 recorded trips. Of these 22,036 had a weighout, logbook, or sea sampling interview. Of these, 13,527 reported a mesh size. Of these, 10,798 were trips by tonnage vessels with gears of otter trawl, pair trawl, Danish seine, or gillnet and therefore identified by vessel number in the weigh out. This gave 753 unique tonnage vessels whose mesh size, vessel size, and port of landing could be determined.) However, in 1993 the regulated size was 5.5 inches (not 6 inches as currently). Therefore, a more accurate measure of the number of vessels likely to be using a larger than 6 inches mesh today may be the percentage of vessels that, in 1993, were using mesh larger than the required 5.5. inches. With that threshold the number rises to 18 percent. Gillnet boats were much more likely to have larger than required mesh than were otter trawlers. Ports where the 1993 vessels with larger mesh than required by regulation were most likely to land were Downeast Maine ports such as Stonington, Boothbay Harbor, and South Bristol; other small boat ports such as Chatham, MA; and the gillnet fleets of Gloucester and Portland.

Vessels Under 30 Feet:

The impact of the 300-pound cod, haddock, and yellowtail flounder limit for vessels under 30 feet is difficult to evaluate because most vessels under 30 feet are also undertonnage and therefore do not appear as individual vessels in the weigh out. Permit data for 1993 show 1,282 vessels of under 30 feet in length. Of these, 79 percent are undertonnage. There are only 16 identifiable vessels under 30 feet in the weighout. However, given the pounds/trip numbers in Table E.6.4.1.1.2.1 for gear types which tend to be composed of smaller vessels (i.e., hook and gillnet), a 300 lb. trip limit for vessels under 30 feet is unlikely to have any impact. (See the sub-section "Undertonnage Vessels" within section E.6.4.1.1 for more information on the undertonnage fleet.)

Rod-and-reel/Handline Open Access Vessels:

The 300-pound cod, haddock, and yellowtail flounder possession limit should affect small numbers of those in this category. Only 225 of all open access vessels, for instance, reported landings of more than 500 pounds of all regulated species combined during from June 1994 to June 1995. Thus a 300-pound trip limit probably would affect only a few of the open access vessels.

Limited Access Scallop Vessels:

A limited access scallop vessel would be allowed to retain the possession limit of 300 pounds of regulated species while fishing under scallop DAS. This represents a reduction of 200 pounds of regulated species and corresponding revenues from the current 500-pound possession limit.

Exempted Gears:

The exempted gears, for the most part, take little or no groundfish. Thus it is appropriate that they be exempted. Lobster pots, however, do take enough groundfish for the no possession rule to impact them. Permit files do not distinguish lobster pots and traps from other pots and traps. However, overall, 356 groundfish permit holders (7%) list pots and trap as their only gear and another 932 (19%) list pots and traps as one of the gears they fish. (See Tables E.6.4.1.1.7-8 and accompanying text for information on those who catch both lobsters and groundfish.)

E.7.3.2.7 EXCEPTIONS TO THE DAYS-AT-SEA PROGRAM

Vessels 30 Feet and Under in Length:

Vessels 30 feet and under have an option to fish under a possession limit instead of DAS. These vessels are primarily undertonnage and take very little groundfish. (See Human Environment Chapter for more information on undertonnage vessels and their landings.) Exempting them has little impact on conservation, yet recognizes the need of such small vessels for maximum flexibility of action. There are only 100 vessels with limited access permits in this category.

Rod-and-reel/Handline Only Vessels:

Because of the strict possession limit, DAS are less needed as a conservation measure for these vessels. Depending on the total numbers of such vessels, however, their total landings may become a source of concern. These vessels are predominantly small vessels manned by two or three fishermen. Consequently they are limited by weather and have relatively low costs and high profit margins.

Vessels with Large Mesh:

Gillnet vessels fishing with 7-inch mesh or greater have additional DAS available. See E.7.3.2.4 "Large Mesh Option" for discussion.

Mobile Gear with Large Mesh:

See sections E.7.3.2.3 and E.7.3.2.6 for discussion of impacts.

Possession-Limit-Only Limited Access:

The current possession limit of zero pounds obviates any other discussion of impacts. At a future date, however, vessels with this permit may be able to fish for small amounts of groundfish. At that point the discussion would parallel that above for handline/rod-and-reel.

E.7.3.2.8 EXCEPTIONS FROM CLOSED AREAS

Allowing gears already found to take little or no groundfish into areas closed for groundfish conservation purposes should mitigate any possible impacts on exempted gears, while having no detrimental effects on groundfish vessels. Allowing recreational and party/charter vessels in these areas reflects existing policy for other closed areas, and reflects the relatively minor impact of recreational fishing on groundfish stocks. Further, the more stringent recreational and party/charter regulations under this Amendment will further limit their impact on groundfish.

E.7.3.2.9 CLOSED AREAS SUPERSEDING EXEMPTED FISHERIES

This will facilitate enforcement and thus ultimately benefit fishermen who are following the rules. This provision is consistent with the widespread industry support of closed areas.

E.7.3.2.10 MANDATORY DATA REPORTING

Monitoring in general and data reporting in particular are essential to successful management. Without an accurate knowledge of how fisherman are behaving there is no way to determine if the requirements of a Fishery Management Plan are being violated and, therefore, if enforcement actions are necessary. Monitoring is especially important in the heterogeneous, Northeastern groundfish fishery, where many fisherman feel that their concerns have not been adequately reflected in the management process, a situation that creates a disincentive to voluntarily comply with the regulations produced by that process.

E.7.3.2.11 ALLOWING ANNUAL CHANGES OF CATEGORY

Some vessels will qualify for more than one category (e.g., fleet or individual das, large mesh gillnet or fleet das, etc.). Especially for vessels entering a new category this year (e.g., gillnets, limited access hook gear), it may not be immediately obvious which category provides maximum fishing and earning opportunities. Further, for those in a DAS category it may be more advantageous to be in Individual DAS in year one but in fleet DAS in Year Two, or vice versa. This provision gives vessels the opportunity to adjust at the beginning of each year as they gain more information during the life of the amendment.

E.7.3.2.12 FRAMEWORK ADJUSTMENTS

Allowing adjustments to DAS means not only that the Council, in conjunction with NMFS, has to lower DAS if effort limitations are insufficient, but also increase DAS when stocks begin to grow and increased effort becomes possible.

Leaving open the possibility of adjusting any measures, as needed, to meet rebuilding goals

greatly increases the long-term effectiveness of this amendment, and therefore ultimately benefits the fishing industry.

Addition of an industry member to the technical group known as the MMC will allow "ground-truthing", and assure fishermen that their knowledge and expertise is being taken into account in making necessary adjustments.

E.7.3.3 PROPOSED ACTION FOR RECREATIONAL AND CHARTER/PARTY VESSELS

As noted under Economic Impacts (E.7.2), there is widespread support among recreational fishermen for both minimum sizes and bag limits. Few (17%) of trips in the Northeast actually average more than 10 fish, and only those fishing for food or income, or those expert fishermen for whom a large number of fish is important to their recreational experience, are likely to be adversely affected.

E.8.0 RATIONALE FOR ADOPTION OF THE PREFERRED ALTERNATIVE

With this action, the Council is addressing a severe resource crisis in the New England multispecies fishery. The Council has considered a range of alternatives including complete closure of the fishery, both directed and bycatch fisheries, large area closures, quotas, and the proposed approach of accelerating the DAS reduction program currently in place. It has also developed a system for monitoring the fishery and the progress of rebuilding and making timely adjustments to meet the plan objectives. Section E.5.2 contains a discussion of the range of alternatives considered and the rationale for rejecting those not adopted.

The Council rejected the no-action alternative despite widespread support for continuing the current plan from the fishing industry because it would not achieve the amendment objectives. However, the proposed action more closely resembles the current management system than any of the other alternatives which were considered. It builds on the program implemented under Amendment 5 by eliminating nearly all of the exemptions from DAS, accelerating the DAS reduction program, and lifting the 10-percent-per-year reduction cap. The proposed action also continues and enhances the mesh regulations, area closures and restrictions on bycatch fisheries in the current plan. This approach greatly reduces the implementation costs for both the fishing industry and government agencies, and minimizes the social impacts that would result from a more radical shift in management systems, especially only two years after the implementation of Amendment 5 (which was a radically new management system).

Even though the average reduction in fishing mortality rates for the critical stocks necessary to reach the target fishing mortality rates is about eighty percent from 1993 levels, the Council proposes to phase-in a fifty-percent reduction in DAS over two years and apply other measures to achieve the plan objectives. There are two primary reasons for this approach. First, the current DAS system is based on individual vessel allocations of DAS, not on some total fleet effort capacity. Therefore, without a system that allows vessels to consolidate DAS, whether through market-based mechanisms or a re-allocation of days made available through a vessel capacity reduction program, any greater reduction in DAS would result individual allocations which are not sufficient for vessels to survive financially.

Secondly, the Council and NMFS have been widely criticized for not using current data that measures the impacts of Amendment 5 and subsequent management actions, and for not giving enough credit to the effect of mesh-size increases, area closures and other measures. In adopting the proposed action, the Council considered public comments questioning the assumptions and the lack of an observed and measured description of the impacts of the current plan, as well as all other available information. The Council also considered the social and economic consequences under the eventuality that the assumptions are wrong.

This action reduces the reliance on an assumed linear relationship between DAS and fishing mortality by phasing in the reductions and scheduling only a 50-percent reduction in DAS for each vessel when an 80-percent reduction in fishing mortality rates is required. If the combined effect of all measures in the plan is not sufficient to meet the objectives, the flexibility and monitoring provided under the modified framework adjustment procedure will enable the Council to respond to recent information as it becomes available. The framework procedure also provides a contingent authority for the Regional Director to implement adjustments in the event the Council fails to do so.

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8.2	Executive Order 12866 (RIR)- including the "major rule" determination and the regulatory impact review;
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8.6	Paperwork Reduction Act (PRA) analysis;
8.7	Marine Mammal Protection Act (MMPA).