AMENDMENT 5 TO THE
FISHERY MANAGEMENT PLAN
AND THE FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE
ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

August 1995

Mid-Atlantic Fishery Management Council

in cooperation with

the Atlantic States Marine Fisheries Commission,

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

Draft adopted by MAFMC: 1 June 1994
Final adopted by MAFMC: 25 May 1995
Final approved by NOAA: 9 February 1996

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

NOV 27 1995

To All Interested Government Agencies and Public Groups:

Pursuant to the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Final Environmental Impact Statement (FEIS) for Amendment 5 to the Fishery Management Plan for Atlantic Mackerel, Squid, and Butterfish Fisheries (FMP)

LOCATION: The exclusive economic zone off the coasts of the Atlantic States

SUMMARY: Amendment 5 to the FMP would: eliminate joint ventures and directed foreign fishing for Illex and Loligo squid (squids) and butterfish; establish a moratorium on new entrants to the directed fisheries for the squids and butterfish; establish new permit requirements; establish a quota-setting process that is based on recommendations made by a Technical Monitoring Committee; establish minimum mesh requirements for the Loligo fishery with exemptions for the sea herring fishery and the summer Illex fishery occurring outside the 50-fathom curve; require mandatory reporting for permitted vessels and dealers; revise certain biological reference points for Atlantic mackerel and Loligo squid; and specify conditions under which annual seasonal quotas may be established for the Loligo fishery.

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Copies of the FEIS/Amendment are enclosed for your information. Please send one copy of your comments to me in Room 5805, OPSP, U.S. Department of Commerce, Washington, D.C. 20230.

Sincerely,

Donna Wieting

Donna Wieting
Acting Director, Office of
Ecology and Conservation

Enclosures

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2. SUMMARY

The Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries (FMP) modified by this Amendment was implemented on 1 April 1983.

The current management unit is all Atlantic mackerel, *Loligo pealei*, *Illex illecebrosus*, and butterfish under US jurisdiction, excluding the Gulf of Mexico and the Caribbean Sea.

The objectives of the FMP are:

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.
2. Promote the growth of the US commercial fishery, including the fishery for export.
3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.
4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.
5. Increase understanding of the conditions of the stocks and fisheries.
6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

The fishing year for Atlantic mackerel, *Illex* and *Loligo* squid, and butterfish is the twelve (12) month period beginning 1 January.

Management Measures

The management measures adopted by the Council are:

1. Revise the management unit to be all Atlantic mackerel (*Scomber scombrus*), *Loligo pealei*, *Illex illecebrosus*, and butterfish (*Peprilus triacanthus*) under US jurisdiction.

2. For *Loligo*, Maximum Sustainable Yield (MSY) and maximum Optimum Yield (OY) are set at 36,000 metric tons (mt) and Joint Venture Processing (JVP) and Total Allowable level of Foreign Fishing (TALFF) are set equal to zero.

3. For *Illex*, MSY and maximum OY remain at 30,000 metric tons (mt), but JVP and TALFF are set equal to zero.

4. For Atlantic mackerel the Allowable Biological Catch (ABC) in US waters for the upcoming fishing year is that quantity of mackerel that could be caught in US and Canadian waters minus the estimated catch in Canadian waters and maintain a spawning stock size in the year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt. Additionally, the ABC may not exceed the Long-Term Potential Catch, as estimated by the Northeast Fisheries Science Center, minus the estimated catch in Canadian waters. Domestic Annual Harvest (DAH), both the commercial and recreational components, Domestic Annual processing (DAP), JVP, and TALFF will be estimated as with the current FMP, except that no formula will be used to estimate the recreational catch.

5. For butterfish, MSY and maximum OY remain at 16,000 metric tons (mt), but JVP and TALFF are be set equal to zero. However, if there is a TALFF specified for Atlantic mackerel, in order to reduce waste of butterfish, there will be a TALFF that shall not exceed 0.08% of the allocated portion of the Atlantic mackerel TALFF.

6. To insure that sufficient escapement from the winter offshore *Loligo* fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass, the Regional Director may establish seasonal quotas based upon the recommendations of the Atlantic Mackerel, Squid, and Butterfish Monitoring Committee and the Council. Seasonal quotas, if any, will be specified as part of the annual quota setting process prior to the upcoming fishing year.

7. Any owner of a vessel desiring to fish for Atlantic mackerel, *Loligo* or *Illex* squid or Atlantic butterfish within the US EEZ for sale, or transport or deliver for sale, any Atlantic mackerel, *Loligo* or *Illex* squid, or Atlantic butterfish taken within the EEZ, must obtain a permit from NMFS for that purpose. *Illex*, *Loligo*, and butterfish vessels must meet the criteria set forth in 9.1.2.1.1.2 in order to qualify for a moratorium permit.

8. The owner of a party and charter boat (vessel for hire) must obtain a party or charter boat permit.

9. A vessel is eligible for a moratorium permit in the *Loligo* and butterfish fishery if it meets any of the following criteria:

A. The vessel landed and sold 20,000 pounds of *Loligo* or butterfish in any 30 consecutive day period of *Loligo* or butterfish (including joint venture landings) between 13 August 1981 and 13 August 1993; or

B. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

C. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

10. A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

A. The vessel had five landings (including joint venture landings) of 5,000 pounds of *Illex* (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 and 13 August 1993; or

B. have purchased recirculating sea water equipment, an on board plate freezer or commercial blast freezer by 31 May 1994 and installed this equipment and have landed five trips of at least 5,000 lb.of *Illex* prior to the implementation of the final regulations of Amendment 5; or

C. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

D. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

11. A vessel that does not qualify for a *Loligo*/butterfish or *Illex* moratorium permit may land *Loligo*, *Illex*, and/or butterfish if (1) it possesses an incidental catch permit, (2) fishes with a net legal in the directed fishery, (3) lands no more that 2,500 pounds of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and (4) the operator of the vessel files the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

12. Any dealer of Atlantic mackerel, squid, or butterfish must have a permit. A dealer of Atlantic mackerel, squid, or butterfish is defined as a person or firm that receives Atlantic mackerel, squid, or butterfish for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport .

13. An operator of a vessel with permit issued pursuant to this FMP must have an Operator's Permit issued by NMFS. Any vessel fishing commercially for Atlantic mackerel, squid, or butterfish under a *Loligo* and butterfish moratorium permit, an *Illex* moratorium permit, a mackerel permit, an incidental catch permit or with a party/charter boat permit must have on board at least one operator who holds a permit. That operator may be held accountable for violations of the fishing regulations and may be subject to a permit sanction. During the permit sanction period, the individual operator may not work in any capacity aboard a federally permitted fishing vessel.

14. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will be made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office, and the Northeast Fisheries Science Center. The MAFMC Executive Director or his designee will chair the Committee. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target harvest levels (OY) for Atlantic mackerel, squid, or butterfish are not exceeded. The Committee will also review the gear used to catch Atlantic mackerel, squid, or butterfish to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the harvest targets and propose such regulations as appropriate, including seasonal quotas in the *Loligo* fishery.

15. Owners or operators of otter trawl vessels possessing one pound or more of *Loligo* squid may only fish with nets having a minimum mesh size of 1-⅞" diamond, inside stretch measure, applied throughout the entire net including the body and codend. This minimum mesh requirement applies to the inner portion of the net and codend. The owner or operator of a fishing vessel shall not use any device, gear or material including but not limited to nets, net strengtheners, ropes, lines, or chaffing gear on the outer portion of the trawl net with a mesh opening of less than 4.5" mesh (stretch , inside measure). If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail. During the months of June, July, August, and September otter trawl vessels fishing for *Illex* seaward of the 50 fathom curve shall be exempt from the *Loligo* mesh requirement. Vessels participating under the Illex exemption which possess *Loligo* must not have available for immediate use nets below the minimum mesh sizes described above when the vessel is landward of the 50 fathom curve. In addition, vessels participating in the directed fishery for sea herring shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

16. When the landings of Atlantic mackerel by US vessels with commercial permits first reached 50% of ABC, the Secretary of Commerce will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. However, the Council reserves the right to modify this percentage should the exercise of it's judgement so dictate. For purposes of this action, landings of Atlantic mackerel by US vessels are defined to include transfer at sea from US vessels to foreign vessels as well as landings at US docks.

17. Commercial logbooks must be submitted, at a minimum, on a monthly basis by Federal permit holders in order to monitor the fishery. The Secretary may implement additional data collection procedures. Real-time assessment and management of the *Loligo* and *Illex* resources may be necessary due to the risk of overfishing stocks comprised of only a single cohort. During year one of the management program, the Regional Director shall specify the data elements and reporting time frames necessary to establish a real-time assessment and management program for the annual squid species. In addition, the Council will investigate the feasibility and costs and benefits of implementing such a management system in year two of the management program.

18. Operators of party and charter boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total amount in pounds and numbers of each species taken; date(s) fished; number of trips; duration of trip; locality fished; crew size; landing port; number of anglers carried on each trip; and discard rate.

19. In order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity of Atlantic mackerel, *Loligo*, *Illex*, and butterfish purchased (in pounds), and the name and permit number of the vessels from whom the Atlantic mackerel, *Loligo*, *Illex*, and butterfish was purchased.

20. Section 303(a)(5) of the MFCMA requires that at least estimated processing capacity of, and the actual processing capacity utilized by US fish processors must be submitted to the Secretary.

21. Only vessels with moratorium permits may transfer *Loligo, Illex,* or butterfish at sea.

22. Vessel owners or operators or dealers who falsify data in order to qualify a vessel under a moratorium will lose their vessel or dealers permit.

The adopted provisions are presented in detail in Section 9.1. The alternatives to the adopted measures are discussed in Appendix 1 of the Amendment.

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APPENDICES

4. INTRODUCTION

4.1. HISTORY OF DEVELOPMENT OF THE FMP

In March 1977, the Council initiated development of the Mackerel and Squid FMPs. The Council adopted the Mackerel FMP for hearings in September 1977 and the Squid FMP for hearings in October 1977. Hearings on Mackerel and Squid FMPs were held in December, 1977. The Mackerel and Squid FMPs were adopted by the Council in March 1978. The Mackerel FMP was submitted for NMFS approval in May 1978. The Squid FMP was submitted for NMFS approval in June 1978. However, based on NMFS comments, the Council requested that the Mackerel and Squid FMPs be returned.

The FMPs were revised, the revisions being identified as Mackerel FMP Supplement 1 and Squid FMP Supplement 1. These two Supplements, along with the original Butterfish FMP, were adopted for public hearings by the Council in July of 1978. Hearings on all three documents were held during September and October 1978 and all three FMPs were adopted in final form by the Council in November 1978. The Butterfish FMP was submitted for NMFS approval in December 1978. Mackerel FMP Supplement 1 and Squid FMP Supplement 1 were submitted for NMFS approval in January 1979. NMFS approved Squid FMP Supplement 1 in June 1979 and Mackerel FMP Supplement 1 in July 1979. Both FMPs were for fishing year (1 April - 31 March) 1979-80.

The Butterfish FMP was disapproved by NMFS in April 1979 because of a need for additional justification of the reasons for reducing OY below MSY. The Butterfish FMP was revised, adopted by the Council, and resubmitted for NMFS approval in June 1979. It was approved by NMFS in November 1979 for fishing year 1979-80.

The Council adopted Amendments 1 to both the Mackerel and Squid FMPs for hearings in August 1979. Hearings were held during October 1979. The Amendments were adopted by the Council and submitted for NMFS approval in November 1979. Both Amendments were approved by NMFS in March 1980. This extended the Squid FMP for an indefinite time beyond the end of fishing year 1979-80 and extended the Mackerel FMP through fishing year 1980-81. Butterfish FMP Amendment 1, extending the FMP through fishing year 1980-81, was adopted by the Council for hearings in December 1979 with hearings held during January 1980. During January 1980 the Amendment was adopted in final form by the Council and submitted for NMFS approval. It was approved in March 1980

The Council began work on an amendment to merge the Mackerel, Squid, and Butterfish FMPs in March 1980 the document being identified as Amendment 2 to the Mackerel, Squid, and Butterfish FMP. The Amendment was adopted by the Council for public hearings in August 1980. However, NMFS commented that there were significant problems with the Amendment that could not be resolved prior to the end of the fishing year (31 March 1981). The Council then prepared separate Amendments 2 to both the Mackerel and Butterfish FMPs to extend those FMPs through fishing year 1981-82. Since Amendment 1 to the Squid FMP extended that FMP indefinitely, there was no need to take this action for the Squid FMP. Those drafts were adopted for public hearing by the Council in October 1980 with hearings held in November. The Amendments were adopted in final form by the Council and submitted for NMFS approval in November 1980. Amendment 2 to the Mackerel FMP was approved by NMFS in January 1981 and Amendment 2 to the Butterfish FMP was approved by NMFS in February 1981.

In October 1980 the merger amendment, previously designated as Amendment 2, was redesignated Amendment 3. The Council adopted draft Amendment 3 to the Squid, Mackerel, and Butterfish FMP in July 1981 and hearings were held during September. The Council adopted Amendment 3 in October 1981 and submitted it for NMFS approval. NMFS review identified the need for additional explanation of certain provisions of the Amendment. The revisions were made and the revised Amendment 3 was submitted for NMFS approval in February 1982.

The Amendment was approved by NMFS in October 1982. However, problems developed with the implementation regulations, particularly with the Office of Management and Budget through that agency's review under Executive Order 12291. In an effort to have the FMP in place by the beginning of the fishing year (1 April 1983) the FMP, without the squid OY adjustment mechanism, or a revised Atlantic mackerel mortality rate, and retitled as the Atlantic Mackerel, Squid, and Butterfish FMP, was implemented by emergency interim regulations on 1 April 1983. By agreement of the Secretary of Commerce (Secretary) and the Council, the effective date of those emergency regulations was extended through 27 September 1983.

The differences between the FMP and the implementing regulations resulted in a hearing before the House Subcommittee on Fisheries and Wildlife Conservation and the Environment on 10 May 1983.

Amendment 1 to the Atlantic Mackerel, Squid, and Butterfish FMP was prepared to implement the squid OY adjustment mechanism and the revised mackerel mortality rate. That Amendment was adopted by the Council on 15 September 1983, approved by NMFS on 19 December 1983, and implemented by regulations published in the *Federal Register* on 1 April 1984.

Amendment 2 was adopted by the Council on 19 September 1985 and approved by NOAA 6 March 1986. Amendment 2 changed the fishing year to the calendar year, revised the squid bycatch TALFF allowances, put all four species on a framework basis, and changed the fishing vessel permits from permanent to annual.

Amendment 3 was adopted by the Council in two actions. The Atlantic mackerel overfishing definition was adopted by the Council at its October 1990 meeting. The *Loligo*, *Illex*, and butterfish overfishing definitions were adopted at the December 1990 meeting. This was done because the Northeast Fisheries Center proposed changes to the overfishing definitions proposed in the hearing draft for the squids and butterfish. The Center's concerns were incorporated in the version adopted at the December 1990 meeting.

Amendment 4, approved by NMFS 8 November 1991, authorized the Regional Director, Northeast Region, NMFS (Regional Director) to limit the areas where directed foreign fishing and joint venture transfers from US to foreign vessels may take place. Directed foreign fishing must be conducted seaward of at least 20 miles from the shore. Operations of foreign vessels in support of US vessels (that is, joint ventures) may operate anywhere in the Exclusive Economic Zone (EEZ) throughout the management unit unless specific areas are closed to them. The catch limitations were changed by requiring that, if the preliminary initial or final amounts differ from those recommended by the Council, the *Federal Register* notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 criteria set forth for the species affected. Additionally, for Atlantic mackerel, the specification of OYs and other values may be specified for three years at one time. These annual values may be adjusted within any year and prior to the second and third years as set forth above. However, projecting specifications over several years should allow more orderly development of the fishery since the revisions to the specifications for the second and third years would be done by notice, rather than by regulatory measures. The joint ventures section was changed to allow the Regional Director may impose special conditions on joint ventures and directed foreign fishing activities. Such special conditions may include a ratio between the tonnage that may be caught in a directed foreign fishery relative to the tonnage that may be purchased over-the-side from US vessels and relative to the tonnage of US processed fish that must be purchased by the venture.

4.2. PROBLEMS FOR RESOLUTION

4.2.1. Overcapitalization Should be Avoided

The fishery currently has more than sufficient capacity to harvest all the allowable biological catch (ABC). This FMP was initially designed to encourage US fishermen to harvest underutilized resources. The US fishery has grown to where there is now no need for foreign harvests, and additional investment by US fishermen will only dissipate any profits for existing fishermen who have invested heavily to build this fishery.

4.2.2. Additional Management Measures are Necessary for *Loligo* and *Illex*

Both of these two fisheries have become completely Americanized. No foreign harvests of either of these animals have occurred since 1987. Domestic harvests for both species are approaching the MSY levels. At present, the Regional Director can only close the fishery if the quotas are exceeded. This management alternative may not be the best solution for the continued smooth and efficient operation of these fisheries.

4.2.3. Butterfish Bycatch Discard Mortality May Be Inhibiting Sufficient Growth Such That Achievement of Maximum Sustainable Yields Are Prevented

Sea sampling data for 1989, 1990, and 1991 indicate that as much butterfish (by weight) is discarded as is landed. This may be a partial explanation for why there have been relatively low levels of butterfish landings over the past several years in light of very favorable stock assessments. Adequate resource has been consistently identified to have landings at the MSY level (16,000 metric tons), however actual landings have only been around one quarter this level. Availability for fishermen was thought to have been the explanation in the past. However, sea sampling data indicate that discards may be having a significant impact on the resource.

4.2.4. Lack of Data

National Standard 2 states that "measures shall be based upon the best scientific information available". Although recreational and commercial catch data have been adequate to formulate and implement management measures, data collection should be improved, in order to allow for better management in the future. An improved data base will allow the Council to more finely tune the management system to the needs of the fishery. These data are necessary to assess the impact and effectiveness of management measures, as well as monitor fishing mortality and increases in stock size to determine if additional amendments to the FMP will be necessary.

4.2.5. Mixed Species Fishery

The Mid-Atlantic mixed species fishery relies principally on summer flounder, scup, black sea bass, yellowtail flounder, winter flounder, butterfish and *Loligo*, as either directed or bycatch in other directed fisheries. Many of these species are also components of the southern New England trawl fisheries since stock migrations occur between the Mid-Atlantic and New England areas. Generally, fishing activities follow these species as they make annual migrations from south to north and from offshore to inshore waters. Many of the above identified species in this mixed fishery are overexploited. Directed effort from some of the above species has been switched to species managed in this FMP. The above complicates the identification of appropriate and effective management strategies and thus requires close coordination of regulatory measures in order to properly manage this species assemblage.

4.2.6. Possible Spatial and Temporal Conflicts Between the Recreational and Commercial Fisheries

Recreational fishermen report that trawling in near shore waters reduces the availability of mackerel to party boats so that successful trips cannot be made within the time available for party boat trips.

4.2.7. Internal Waters Processing Projects

There is concern that internal waters processing projects authorized by the States may conflict with the management measures of this FMP.

Problems 4.2.6 and 4.2.7 are inter-related in that, while foreign processing vessels in an IWP project must be in the Territorial Sea or internal waters, the US fishing vessels generally fish in the EEZ, but relatively close to shore. This issue was studied by the Council's Scientific and Statistical Committee (SSC), which concluded that available data were inconclusive to determine whether the IWP fishing negatively impacted on recreational fishing opportunities. Since no new information has been developed since the SSC review, these problems will not be addressed in this Amendment.

4.2.8. Habitat Degradation.

Atlantic mackerel, *Loligo*, and butterfish are continental shelf species that spend significant portions of their lives in coastal waters. These species generally make inshore and northern migrations during warm months and are found in tidal bays and sounds as well as the ocean environment. Those same areas are known to be increasingly affected by coastal development (e.g., dredging, marinas, docks, etc.) and the related declines in habitat quality and quantity. This increase in habitat degradation plays an important role in Atlantic mackerel, *Loligo* and butterfish population health.

4.3. MANAGEMENT OBJECTIVES

The objectives of the FMP are:

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.

2. Promote the growth of the US commercial fishery, including the fishery for export.

3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.

4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.

5. Increase understanding of the conditions of the stocks and fisheries.

6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

4.4. MANAGEMENT UNIT

The management unit is all northwest Atlantic mackerel (*Scomber scombrus*), *Loligo pealei, Illex illecebrosus*, and butterfish (*Peprilus triacanthus*) under US jurisdiction.

5. DESCRIPTION OF STOCKS

5.1. SPECIES AND THEIR DISTRIBUTION

5.1.1. *Loligo*

Known by the common names of long-finned squid, winter squid, common squid, and bone squid, *Loligo pealei* is one of five Atlantic species of the genus *Loligo* of the squid family *Loliginidae*. *Loligo pealei* ranges over the continental shelf from New Brunswick (Summers 1969) to the Gulf of Mexico. However, primary concentrations occur from Georges Bank to Cape Hatteras (Serchuk and Rathjen 1974). *L. pealei* probably forms one stock which migrates on and offshore as much as 200 km seasonally, generally remaining in waters where the temperature is greater than about 46 F (Lange and Sissenwine 1980).

Seasonal differences in geographic and bathymetric distribution of *Loligo* are evident and appear to be related to bottom water temperatures. During winter and early spring, when water is coldest inshore, the bulk of the population concentrates along the outer edge of the continental shelf in 46-54 F waters (Figure 1). From late spring to early autumn the species disperses from the shelf edge into shallow coastal waters with heaviest concentrations usually occurring in the Cape Hatteras, New York Bight, and Nantucket Shoals areas (Figure 1). During summer, however, concentrations of *Loligo* may occur anywhere on the continental shelf. This dispersion is part of a spring inshore spawning migration which begins in the southern areas and as water temperatures rise, proceeds northward along the coast. By April or May, mature squid arrive in Massachusetts waters with smaller immature individuals arriving in May and June. During late spring and summer, *Loligo* may be found in harbors and estuaries, particularly in southern New England. In the fall, concentrations appear in the southern New England and Hudson Canyon area in water less than 360′ deep (Rathjen 1973, Serchuk and Rathjen 1974, Tibbetts 1975). Vovk (1969) also found large fall concentrations of long-finned squid in the area between Block Island and southern Georges Bank. In late autumn they move offshore to overwinter along the edge of the continental shelf.

Loliginid squid show a diurnal cycle of vertical migration moving up in the water column at night. Catches of *L. pealei* (Summers 1969, Serchuk and Rathjen 1974, and Lux *et al.* 1974) taken by bottom trawl show a decline at night. The diurnal vertical migration of *L. pealei* may be associated with the pursuit of food organisms such as euphausids (Serchuk and Rathjen 1974).

5.1.2. *Illex*

The summer or short-finned squid (*Illex illecebrosus*) is one of three species of *Illex* found in the northwest Atlantic. It is also found in the eastern Atlantic where it ranges from Scandinavia southward to the Bristol Channel (southwest England) and westward to the Faroe Islands and Iceland. In the western Atlantic, north of Cape Canaveral it is possible that *I. illecebrosus* is the only *Illex* species taken in significant numbers (Voss and Brakoniechi 1984).

I. illecebrosus undergoes seasonal migrations. During the spring and summer, they migrate into coastal waters about 30-50′ deep off Newfoundland and Nova Scotia and onto the continental shelf in the New England and Mid-Atlantic areas and may form large surface schools. This inshore movement may be in response to temperature and salinity preferences, and off Canada may be due to their pursuit of capelin (*Mallotus villosus*) which also move inshore at this time. In late fall (October-December) short-finned squid move offshore to the edge of and beyond the continental shelf where they spawn (Figure 2). Spawning occurs in the deep waters of the continental slope during the winter and to some extent into spring. Spawning takes place between the Florida Peninsula and central New Jersey (Froerman 1984), which is supported by the distribution of larvae.

Unlike *Loligo*, *Illex* is not restricted to water above 46 F (Mercer 1973). The optimum temperature range of *Illex* is about 45-59 F, although they were taken by Canadian research surveys on the Grand Banks at depths of 180-1,200′ with bottom water temperatures of 33-46 F (Squires 1957). However, large concentrations of short- finned squid are usually found along the edge of the continental shelf where temperatures are greater than 41 F (Tibbetts 1975). Since *Illex* are often seen at the surface at night, their vertical movements must frequently be several hundred meters (Arnold 1979).

Stock structure for *I. illecebrosus* has not been fully determined (Lange 1984b). The actual stock structure of this species is probably complex, but given the lack of published findings on stock structure, there is no reason to reject the hypothesis that the population constitutes a unit stock.

5.1.3. Atlantic Mackerel

Atlantic mackerel (*Scomber scombrus*) is a fast swimming, pelagic, schooling species distributed between Labrador (Parsons 1970) and North Carolina (Anderson 1976a). The existence of separate northern and southern spawning contingents was first proposed by Sette (1950). The southern group spawns primarily in the Mid-Atlantic Bight during April-May while the northern group spawns in the Gulf of St. Lawrence in June-July. Both groups overwinter between Sable Island (off Nova Scotia; Figure 3) and Cape Hatteras in water generally warmer than 45 F (USDC 1984a).

Both groups make extensive northerly (spring) and southerly (autumn) migrations to and from spawning and summer feeding grounds (Figure 3). The southern contingent begins its spring migration from waters off North Carolina and Virginia in March- April, and moves steadily northward, reaching New Jersey and Long Island usually by April-May, where spawning occurs. These fish may spend the summer as far north as the Maine coast. In autumn this contingent moves southward and returns to deep offshore water near Block Island after October (Hoy and Clark 1967).

The northern contingent arrives off southern New England in late May, and moves north to Nova Scotia and the Gulf of St. Lawrence where spawning occurs usually by July (Hoy and Clark 1967, Bigelow and Schroeder 1953). This contingent begins its southerly autumn migration in November and December and disappears into deep water off Cape Cod.

Even though there are two spawning groups of mackerel in the Northwest Atlantic, biochemical studies (Mackay 1967) have not established that genetic differences exist between them. These two contingents intermingle off southern New England in spring and autumn (Sette 1950). Tagging studies reported by Beckett *et al.* (1974), Parsons and Moores (1974) and Moores *et al.* (1975) indicate that some mackerel that summer at the northern extremity of the range overwinter south of Long Island. Precise estimates of the relative contributions of the two contingents cannot be made (ICNAF 1975). Both contingents have been fished by the foreign winter fishery and no attempt was made to separate these populations for assessment purposes by the International Commission for the Northwest Atlantic Fisheries (ICNAF), although separate Total Allowable Catches (TAC) were in effect for Subareas 5 and 6 and for areas to the north from 1973- 1977. Since 1975 all mackerel in the northwest Atlantic have been assessed as a unit stock (Anderson 1982). Thus, Atlantic mackerel are considered one stock for fishery management purposes.

5.1.4. Butterfish

Butterfish (*Peprilus triacanthus*) occur along the east coast of North America from Newfoundland to Florida (Hildebrand and Schroeder 1928) and are commercially important between Cape Hatteras and southern New England (Waring and Anderson 1983). This species has also been observed in deeper offshore waters off Cape Hatteras and Florida, and infrequently as far north as Prince Edward Island (Nichols and Breder 1927, Murawski *et al.* 1978).

Butterfish north of Cape Hatteras display definite migratory patterns in response to water temperature (Murawski *et al.* 1978). The seasonal migration of butterfish is similar to that of scup (*Stenotomus chrysops*), Atlantic mackerel (*Scomber scombrus*), weakfish (*Cynoscion regalis*), and long-finned squid (*Loligo pealei*). Horn (1970), Waring (1975), and Fritz (1965) concluded that summer movements of butterfish are both inshore and northward. Butterfish south of Cape Hatteras evidence no strong inshore-offshore migrations (Murawski *et al.* 1978)

Butterfish travel in small schools, usually near the surface when inshore during the warm months. Bigelow and Schroeder (1953) state that butterfish "seldom descend deeper than 15 to 30 fathoms during the summer," and the northern component of this stock spends winter and early spring offshore and near the bottom. Water temperature is probably the most significant factor affecting butterfish distribution. In winter and early spring (Figure 4) in the Mid-Atlantic area, butterfish appear in water 600- 675' deep, at the edge of the continental shelf (Horn 1970, Bigelow and Schroeder 1953). South of New York Bight, from New Jersey to the Chesapeake Bay, butterfish overwinter along the 600' contour (Heald 1968). In the spring butterfish begin moving inshore until summer when they are distributed throughout the entire Mid-Atlantic and New England areas (Figure 4). Butterfish appear off Rhode Island by the end of April, at Cape Cod by May, and arrive in the Gulf of Maine usually by June.

5.2. ABUNDANCE AND PRESENT CONDITION

5.2.1. *Loligo pealei*

Indices of relative abundance for *Loligo* were derived from Northeast Fishery Science Center's offshore spring and autumn bottom trawl surveys which have been conducted since 1967 (Tables 1 and 2). Survey biomass indices in autumn 1992 and spring 1993 were 35-50% below average. Although a strong year class recruited to the winter 1992-1993 fishery (resulting in large increases in landings), spring 1993 survey indices were lower - rather than higher - than in 1992. Overall, the US *Loligo* stock is considered to be at a medium biomass level, and is probably fully-exploited.

5.2.2. *Illex illecebrosus*

Indices of relative abundance for *Illex* were derived from Northeast Fishery Science Center's offshore spring and autumn bottom trawl surveys which have been conducted since 1967 (Tables 3 and 4). Survey indices reveal a cyclical pattern of *Illex* abundance. Periods of low indices (1967-1974 and 1982-1986) were followed by periods of very high abundance (1975-1981 and 1988-1990). The most recent indices were about the long term average. SAW 17 (NMFS 1994) concluded that the *Illex illecebrosus* stock is at an intermediate level of abundance and is considered under-exploited (based on the current MSY of 30,000 mt).

5.2.3. Atlantic Mackerel

No formal assessment of Atlantic mackerel has been conducted since 1991. The Council/Center agreement on assessments every three years was based upon time constraints and the fact that fishing mortality is considered minimal. The Atlantic mackerel stock assessment will be not be updated or formally reviewed in 1994. An analytical assessment based on virtual population analysis methodology (VPA) of the northwest Atlantic mackerel stock was last reviewed at the 1991 spring Stock Assessment Review Committee (NMFS 1991). Overall, the conclusion was that the mackerel stock has experienced several years of strong recruitment and very low fishing mortality rates resulting in a substantial increase in the point estimates of biomass. It was the consensus of the 1991 SARC that the stock is presently under-exploited. The increasing stock biomass was confirmed by a Canadian assessment which concluded that their spawning group (the Northern contingent) is about one million metric tons (Peterson pers. comm.).

Recruitment to the northwest Atlantic mackerel stock has been increasing in recent years. Following a period of poor year classes from 1976 through 1980, there has been a series of relatively good recruitment with especially strong year classes in 1982, 1987, and 1988 (NMFS 1991). These cohorts have contributed to the marked increase in stock biomass in recent years. This increase in biomass and the relatively stable catches in recent years produce a perceived decrease in the fishing mortality rates in 1989 and 1990.

Total stock biomass (ages 1 and older) increased from around 250,000 mt in 1962-1965 to 1.5 million mt in 1969-1972 before dropping to a low level of around 750,000 mt during 1976-1982. The total stock increased to about 2,900,000 mt at the beginning of 1990. Spawning stock biomass (50% of age 2 fish and 100% of ages 3 and older) increased from about 600,000 mt in 1981 to an estimated 2,400,00 mt at the start of 1990. The 1991 SARC performed a sensitivity run that removed the 1987 NEFSC survey abundance index which was consistently high for all age classes. The concern was the potential for large influence of this survey point on the results, giving an increase in biomass in recent years. This modification had the effect of decreasing the estimated mean stock biomass from about 2.9 million mt to 2.4 million mt, but had little effect on the recent trends in biomass. With the 1987 index removed, the overall spawning stock biomass would be around 1.9 million mt.

Catch per tow from NEFC bottom trawl surveys (spring and autumn) and catch per day from the US commercial fishery continue to reflect an increasing trend in mackerel stock biomass (Anderson 1985). Spring catch per tow rose sharply from 0.13 kg in 1983 to 0.83 kg in 1984, the highest index since 1971 (Table 5). Although the spring index has fluctuated markedly since 1980, it has exhibited a pronounced upward trend (Anderson 1985). Autumn catch per tow increased from 1983 (0.03 kg) to 1984 (0.08 kg). This index has also fluctuated considerably in recent years, but has also displayed an increasing trend, although to a lesser extent than the spring index. Both indices exhibit year- to-year changes which reflect both the variability of the timing of the seasonal migrations relative to the timing of the survey and the inherent variability of mackerel catches in the NEFC bottom trawl survey. The increasing trend in both of these indices in recent years, however, is a reflection of increasing stock biomass.

The fluctuations in mackerel year-classes are generally believed to be due to variations in larval survival (Sette 1943; Bigelow and Schroeder 1953, Hoy and Clark 1967). Factors influencing mortality of larvae may include water temperature, zooplankton abundance, wind driven surface currents, epizotics, and the abundance of mackerel larvae relative to their prey (Sette 1943, Taylor *et al.* 1957, Sindermann 1958, MacKay 1967, Lett *et al.* 1975, Winters 1976, Anderson and McBride 1976). Average recruitment levels may be reduced when the spawning stock drops below some critical level. There was concern that the heavy fishing coupled with poor recruitment in the 1970s would drive the spawning stock down below such a level, and catch restrictions have been imposed since 1976 to promote rebuilding of the stock (Anderson and Paciorkowski 1980).

5.2.4. Butterfish

The SAW 17 (NMFS 1994) Advisory Report included the following concerning the state of the stock:

"The Atlantic butterfish stock is at a low to medium biomass level and current catch levels are below the MSY of 16,000, however, exploitation rate is unknown. Although recruitment of butterfish has remained high in recent years, the stock size of adults has declined since 1990 and is currently well below average. Since 1988, annual butterfish landings have averaged 2,500 mt, or only 25% of the domestic allowable harvest (DAH) of 10,000 mt. Landings in 1993 are projected to be 3,000 mt. Survey biomass indices in autumn 1992 and spring 1993 were among the lowest in the survey time series (Table 6 and 7). Fishing effort increased in 1992 but, overall, has been relatively stable since 1984. Commercial landings per unit of effort (LPUE) in 1992 remained at the low levels observed since 1988."

5.3. ECOLOGICAL RELATIONSHIPS AND STOCK CHARACTERISTICS

5.3.1. *Loligo*

Previous studies of the life history and population dynamics of this species assumed that *Loligo* died after spawning at an age of 18-36 months based on the analysis of length frequency data (which suggested a "crossover" life cycle (Mesnil 1977, Lange and Sissenwine 1980)). However, recent advances in the aging of squid have been made utilizing counts of daily statolith growth increments (Dawe *et al.* 1985, Jackson and Choat 1992). Preliminary statolith ageing of *Loligo* indicates a life span of less than one year (Macy 1992, Brodziak and Macy 1994). Consequently, the most recent stock assessment for *Loligo* was conducted assuming that the species has an annual life-cycle and has the capacity to spawn throughout the year (NMFS 1994), as now appears typical of pelagic squid species studied throughout the world (Jereb *et al.* 1991).

Eggs are collected in gelatinous capsules as they pass through the female's oviduct during mating. Each capsule is about 3" long and 0.4" in diameter. Mating activity among captive *Loligo* was initiated when clusters of newly spawned egg capsules were placed in the tank. During spawning the male cements bundles of spermatophores into the mantle cavity of the female, and as the capsule of eggs passes out through the oviduct its jelly is penetrated by the sperm. The female then removes the egg capsule and attaches it to a preexisting cluster of newly spawned eggs. The female lays between 20 and 30 of these capsules, each containing 150 to 200 large (about 0.05"), oval eggs, for a total of 3,000 to 6,000 eggs. These clusters of demersal eggs, with as many as 175 capsules per cluster, are found in shallow waters (10-100') and may often be found washed ashore on beaches (Grosslein and Azarovitz 1982).

Loligo eggs in captivity develop in 11 to 27 days at temperatures ranging from 73 to 54 F; in nature, they may develop over a 40 F span of seawater temperature, beginning at 46 F. Little is known about the larval stages of *Loligo*; larvae are about 0.1" at hatching. They are not often found in the spawning areas and are assumed to be washed away by currents. A few 0.8" and many 1 to 2" juveniles appear in autumn research vessel catches in shallow waters. Significant numbers of these juveniles have also been found around Hudson Shelf Valley in late winter when adults are mostly found offshore. These are presumably October spawned individuals just beginning to move offshore (Grosslein and Azarovitz

1982).

Loligo are known to feed on small fish including silver hake, butterfish, mackerel, herring, and menhaden, and also on squid and crustaceans. However it is difficult to identify the species of fish eaten or to quantify the diet because squid do not swallow their prey whole (Langton and Bowman 1977).

Bluefish, sea ravens, spiny dogfish, and the Atlantic angel shark are known to be major *Loligo* predators. The fourspot flounder, witch flounder, roughtail stingray, and white hake are also known to prey on *Loligo*. In many cases, squid remains in the stomach of fish are only identified as "squid" without reference to species. It is likely that some of these are *Loligo* and there are at least 42 other species of "squid"- eating fish in addition to those identified above (Langton and Bowman 1977). Cetacean and seabird predation upon squid is substantial. Kenney *et al.* (1985) estimated that between 154,000 mt and 224,000 mt of squid were consumed off the northeast US annually by whales and dolphins.

5.3.2. *Illex*

The age and growth of *Illex* has been well studied relative to other squid species, being one of the few for which the statolith ageing method has been validated (Dawe *et al.* 1985). Research on the age and growth of *Illex* based on counts of daily statolith growth increments indicates an annual life span (Dawe *et al.* 1985). *Illex* grow rapidly, achieving mantle lengths of 10" (25 cm) by the end of the summer. The growth of males and females is nearly identical at sizes less than 8" mantle length. In larger individuals the males are slightly heavier at a given length than females. In spring and summer *Illex* commonly average 6-7" mantle length and weigh 2-4 oz. By late summer and early autumn they have increased to an average size of about 7-10" long and weigh 4-11 oz.

Until recently, little was known about *Illex* reproduction (Grosslein and Azarovitz 1982). The principal spawning area is believed to be south of Cape Hatteras over the Blake Plateau during December and January. Spawning is believed to occur on the continental slope pelagial between the Florida Peninsula and 40° N, which is substantiated by the larvae distribution pattern (Froerman 1984). During late winter and early spring larvae and juveniles are transported northward by the Gulf Stream. In late spring, juveniles begin to move onto the shelf into shallow water.

Froerman (1984) proposed a life cycle involving five ecologically isolated stages. *Illex* spawning occurs throughout the year, with a peak in a fall- winter-spring period. After spawning, the remaining four stages of the life cycle are:

1. Planktonic development stage (embryogenesis, larva, juvenile, to 1"). This phase passes in the pelagial of the continental slope waters or in the northern Gulf Stream edge. The duration of the planktonic stage is 20-30 days. The distribution of egg masses, larvae, and juveniles during this period depends on the peculiarities of the water mass dynamics in the biotope.

2. Nektonic pelagic development stage outside the shelf. The duration is 2.5-3.5 months. During this period the juveniles of 1 to 4" mantle length feed in the pelagial of the continental slope water and perform an active migration towards the shelf on completion of the pelagic stage. The mean migration velocity is 2.5 miles per day.

3. Nektonic stage of feeding and maturation above the shelf. The duration of this stage is 7-10 months, and in the feeding ground 4-8 months. Mean length fluctuates from 4-14". Rates of growth and maturation change depending on season and feeding ground.

4. State of migration for spawning and complete maturation. The duration is 1-4 months. Length of the females is 5-7.5" and of the males 6-10". The mean migration velocity is 11.1 miles per day.

Sperm are stored in elongate, bat-shaped spermatophores. During copulation the male places spermatophores in the female's mantle cavity, attaching them to the mantle wall near the oviduct opening. It is believed that the eggs are spawned one by one, in batches, and fertilized within the mantle cavity. During the spawning of *I. illecebrosus*, eggs from the oviducts, sperm from the implanted spermatophores, and a jelly-like substance from the nidamental glands are mixed with seawater and exuded slowly into a spherical gelatinous egg mass of low density (O'Dor et al. 1980). Egg masses are neutrally buoyant which probably aids in dispersal.

The ecological relationships between squid and other species are complex. The food of *Illex* consist of primary, secondary and tertiary consumers while they themselves are prey species to a variety of predators. Food habits of squid are difficult to quantify because they do not swallow their prey whole. They are known to prey on fish and crustaceans such as krill . As they grow, the diet of *Illex* changes from one dominated by crustaceans to one composed largely of fish (Langton and Bowman 1977) . Cannibalism is common and larger specimens in particular are known to prey heavily on others of their own species (Vinogradov 1984).

Illex are a major source of food for marine carnivores. Adults are heavily preyed on by porpoises, whales, and numerous pelagic fishes (e.g., tuna and swordfish). Other known predators of *Illex* are the fourspot flounder, goosefish, and bluefish. *Illex* is probably eaten by a substantially greater number of fish, however, partially digested animals are often difficult to identify and are simply recorded as squid remains, with no reference to the species. There are at least 47 other species of fish that are known to eat "squid" (Langton and Bowman 1977). As noted above, squid comprise an important component of the diet of marine birds and mammals (Kenney *et al.* 1985).

5.3.3. Atlantic Mackerel

Mackerel spawning occurs during spring and summer and progresses from south to north. The southern contingent spawns from mid-April to June in the Mid-Atlantic Bight and the Gulf of Maine (Figure 3), and the northern contingent spawns in the southern Gulf of St. Lawrence from the end of May to mid-August (Morse 1978). Most spawn in the shoreward half of continental shelf waters, although some spawning extends to the shelf edge and beyond. Spawning occurs in surface water temperatures of 45-57 F, with a peak around 50- 54 F (Grosslein and Azarovitz 1982).

All Atlantic mackerel are sexually mature by age 3 while about 50% of the age 2 fish are mature. Average size at maturity is about 10.5-11" FL (Grosslein and Azarovitz 1982). Growth is very rapid with fish reaching 20 cm (7.9 in) by their first autumn (Anderson and Paciorkowski 1978). The maximum age observed is 17 years (Pentilla and Anderson 1976).

Fecundity estimates ranged from 285,000 to 1.98 million eggs for southern contingent mackerel between 12-17" FL. Analysis of egg diameter frequencies indicated that mackerel spawn between 5 and 7 batches of eggs per year. The eggs are 0.04-0.05" in diameter, have one 0.1" oil globule, and generally float in the surface water layer above the thermocline or in the upper 30- 50'. Incubation depends primarily on temperature; it takes 7.5 days at 52 F, 5.5 days at 55 F, and 4 days at 61 F (Grosslein and Azarovitz 1982).

Mackerel are 0.1" long at hatching, grow to about 2" in two months, and reach a length of 8" in December, near the end of their first year of growth. During their second year of growth they reach about 10" in December, and by the end of their fifth year they grow to an average length of 13" FL. Fish that are 10- 13 years old reach a length of 15-16" (Grosslein and Azarovitz 1982). MacKay (1973) and Dery and Anderson (1983) have found an inverse relationship between growth and year class size.

Mackerel are opportunistic feeders and prey most heavily on crustaceans such as copepods, krill, and shrimp. They also feed on squid, and less intensively on fish and ascidians (Langton and Bowman 1977).

Mackerel have been identified in the stomachs of a number of different fish. They are preyed upon heavily by whales, dolphins, spiny dogfish, silver hake, white hake, weakfish, goosefish, Atlantic cod, bluefish, and striped bass. They also comprise part of the diet of swordfish, red hake, Atlantic bonito, bluefin tuna, blue shark, porbeagle, sea lamprey, and shortfin, mako and thresher sharks (Langton and Bowman 1977).

5.3.4. Butterfish

Butterfish spawning takes place chiefly during summer (June- August) in inshore waters generally less than 100′ deep. The times and duration of spawning are closely associated with changes in surface water temperature. The minimum spawning temperature is approximately 60 F. Peak egg production occurs in Chesapeake Bay in June and July, off Long Island and Block Island in late June and early July, in Narragensett Bay in June and July, and in Massachusetts Bay June to August (Grosslein and Azarovitz 1982).

Butterfish eggs, 0.027-0.031" in diameter, are pelagic, transparent, spherical, and contain a single oil globule. The egg membrane is thin and horny. Incubation at 65 F takes less than 48 hours. Newly hatched larvae are 0.08" long and like most fish larvae are longer than they are deep. At 0.2" larval body depth has increased substantially in proportion to length, and at 0.6" the fins are well differentiated and the young fish takes on the general appearance of the adult. Larvae are found at the surface or in the shelter of the tentacles of large jelly fish (Grosslein and Azarovitz 1982).

Butterfish eggs are found throughout the New York Bight and on Georges Bank, and they occur in the Gulf of Maine, but larvae appear to be relatively scarce east and north of Nantucket Shoals. In 1973, from mid-June to early September, larvae were common in the plankton off Shoreham, NY. Post larvae and juveniles were common in plankton net samples taken in August in the vicinity of Little Egg Inlet, NJ. Juveniles 3-4" long have been taken in Rhode Island waters in late October (Grosslein and Azarovitz 1982).

Growth is fastest during the first year and decreases each year thereafter. Young of the year butterfish collected in October trawl surveys (at about 4 months old) average 4.8" long. Fish about 16 months old are 6.6", at about 28 months old fish are 6.8", and at 40 months old they are 7.8". Maximum age is reported as six. More recent studies showed that the population was composed of four age groups ranging from young of the year to over age three (Grosslein and Azarovitz 1982). Some butterfish are sexually mature at age one, but all are sexually mature by age two (Grosslein and Azarovitz 1982).

Young butterfish feed primarily on jellyfish (Horn 1970), and ctenophores and salps (Haedrich 1967). The diet of adult butterfish includes other small fish, squid, crustaceans, polychaetes, tunicates and chaetognaths (Bigelow and Schroeder 1953, Leim and Scott 1966, Nichols and Breder 1927, Maurer and Bowman 1975).

As is typical of a small, schooling, pelagic finfish, butterfish are subject to predation by a number of larger species. Haddock, silver hake, swordfish, bluefish, weakfish, goosefish, sand tiger, porbeagle, and red hake are several species which are known to consume butterfish specifically. Butterfish are also preyed upon by squid and may be a significant part of their food since seasonal distribution patterns of *L. pealei* are similar to butterfish (Tibbetts 1975).

5.4. ESTIMATES OF MAXIMUM SUSTAINABLE YIELD

5.4.1. *Loligo*

Sissenwine and Tibbetts (1977) estimated MSY at about 44,000 mt, based on the assumptions of a moderate stock-recruitment relationship, an annual recruitment of about 1.5 billion individuals and a life span of 18-36 months. New yield per recruit calculations based on an annual life cycle for *Loligo* indicate for an estimated cohort of average size (2.2 billion squid), a maximum yield of 36,000 mt could be realized (NMFS 1994).

5.4.2. *Illex*

No new information is available concerning yield per recruit for *Illex*. Lange (1984b) estimated MSY for *Illex* to be 40,000 mt.

5.4.3. Atlantic Mackerel

The current MSY estimate is 134,000 mt, based on the long-term equilibrium catch projections presented by Anderson (1985). Anderson (1985) examined the stock recruitment relationship for mackerel. He found a relationship between year class size at age 1 and the spawning stock biomass that produced that year class which indicated that low spawning stock levels had a high probability of producing poor year classes. Although there was no distinct separation between levels of spawning stock biomass which have typically produced good or poor year classes, a level of about 700,000 mt appeared appropriate at that time.

For example, during 1962-1984 the estimated spawning stock biomass was 634,000 mt or less during 15 of those 23 years (averaging 391,000 mt per year) and only 4 of the 15 year classes produced were above median size (740 million fish at age 1). In the remaining 8 years, spawning stock biomass was 721,000 mt or higher (averaging 1,145,000 mt per year) and 7 of the 8 year classes produced were above median size. All year classes were above median size when spawning stock biomass was 763,000 mt or higher. Anderson (1985) concluded that there seemed to be a stock recruitment relationship sufficient to be of guidance for management purposes. From the standpoint of ensuring a high probability of good recruitment, he suggested maintaining a spawning stock biomass of 700,000 mt or higher, although the Council later chose to modify this to 600,000 mt.

The Council considered a re-examination of the stock recruitment relationship by the MAFMC Scientific and Statistical (S&S) Committee appropriate given that an updated S-R time series is available from the 1991 stock assessment (Table 8). The S&S Committee found the median year class size for the 28 year Atlantic mackerel stock-recruitment time series to be 1.277 billion fish. During the 17 of 28 years when spawning stock biomass (SSB) was less than 900,000 mt, only 35% (6 of 17) of the ensuing year classes were observed to be above the median. The majority of year classes (65%) produced when SSB was less than 900,000 mt fell below the median. Conversely, 82% of the year classes were above the median recruitment level when SSB exceeded 900,000 mt. The S&S Committee concluded that a minimum of SSB threshold of 900,000 mt should supplant the original estimate of 600,000 mt (MAFMC 1994). Hence, the Council has chosen to increase the minimum SSB threshold level for Atlantic mackerel to 900,000 mt for this Amendment.

5.4.4. Butterfish

A preliminary estimate of MSY was 21,500 mt (Murawski and Waring 1978). This estimate, however, presupposed certain mesh sizes were used in the fishery and an average level of annual recruitment to the stock. These conditions may not be completely met. Mesh sizes used by domestic vessels frequently vary from that which theoretically will produce MSY. In addition, the best scientific evidence available indicates that annual recruitment to this fishery is not constant and that the substantial variations in yearly recruitment which have been observed in the past will probably continue.

A realistic estimate of MSY, based on the present mix of gear in the fishery, may be between 15,000-19,000 mt. The best conservative estimate of MSY under current fishery conditions is approximately 16,000 mt. This is the MSY estimate used in the FMP. It is also the "long-term potential catch" projected by USDC (1984a). There is no reason to change the estimate at this time since there appear to be sufficient fish available to support a catch up to the maximum currently allowed (USDC, 1985c).

6. DESCRIPTION OF HABITAT

6.1. DISTRIBUTION OF THE SPECIES, HABITAT REQUIREMENTS, AND HABITATS OF *LOLIGO, ILLEX,* ATLANTIC MACKEREL AND BUTTERFISH

6.1.1. Distribution of *Loligo, Illex,* Atlantic Mackerel and Butterfish

Loligo

Loligo pealei ranges over the continental shelf from New Brunswick (Summers 1969) to the Gulf of Mexico. However, primary concentrations (Figure 1) occur from Georges Bank to Cape Hatteras (Serchuk and Rathjen 1974). *L. pealei* probably forms one stock which migrates on and offshore as much as 200 km seasonally, generally remaining in waters where the temperature is greater than about 46 F (Lange and Sissenwine 1980).

Seasonal differences in geographic and bathymetric distribution of *Loligo* are evident and appear to be related to bottom water temperatures. During winter, when water is coldest inshore, the bulk of the population concentrate along the outer edge of the continental shelf in 46-54 F waters (Summers 1967 and Vovk 1969). From late spring to early autumn the species disperses from the shelf edge into shallow coastal waters with heaviest concentrations usually occurring in the Cape Hatteras, New York Bight, and Nantucket Shoals areas. During summer, however, concentrations of *Loligo* may occur anywhere on the continental shelf. This dispersion is part of a spring inshore spawning migration which begins in the southern areas and as water temperatures rise, proceeds northward along the coast. By April or May, mature squid arrive in Massachusetts waters with smaller immature individuals arriving in May and June. During late spring and summer, *Loligo* may be found in harbors and estuaries, particularly in southern New England. In the fall, concentrations appear in the southern New England and Hudson Canyon area (Figure 1) in water less than 360' deep (Rathjen 1973, Serchuk and Rathjen 1974, Tibbetts 1975). Vovk (1969) also found large fall concentrations of long-finned squid in the area between Block Island and southern Georges Bank. In late autumn they move offshore to overwinter along the edge of the continental shelf.

Loliginid squid show a diurnal cycle of vertical migration moving up in the water column at night. Catches of *L. pealei* (Summers 1969, Serchuk and Rathjen 1974, and Lux *et al.* 1974) taken by bottom trawl show a decline at night. The diurnal vertical migration of *L. pealei* may be associated with the pursuit of food organisms such as euphausids (Serchuk and Rathjen 1974).

Illex

Illex illecebrosus is one of three species of *Illex* found in the northwest Atlantic. It is also found in the eastern Atlantic where it ranges from Scandinavia southward to the Bristol Channel (southwest England) and westward to the Faroe Islands and Iceland. In the western Atlantic, north of Cape Canaveral it is possible that *I. illecebrosus* is the only *Illex* species taken in significant numbers (Voss and Brakoniechi 1984).

I. illecebrosus undergoes seasonal migrations. During the spring and summer, they migrate into coastal waters about 30-50' deep off Newfoundland and Nova Scotia and onto the continental shelf in the New England and Mid-Atlantic areas and may form large surface schools. This inshore movement may be in response to temperature and salinity preferences, and off Canada may be due to their pursuit of capelin (*Mallotus villosus*) which also move inshore at this time. In late fall (October-December) short-finned squid move offshore to the edge of and beyond the continental shelf where they spawn (Figure 2). Spawning occurs in the deep waters of the continental slope during the winter and to some extent into spring. Spawning takes place between the Florida Peninsula and central New Jersey (Froerman 1984), which is supported by the distribution of larvae.

Unlike *Loligo*, *Illex* is not restricted to water above 46 F (Mercer 1973). The optimum temperature range of *Illex* is about 45-59 F, although they were taken by Canadian research surveys on the Grand

Banks at depths of 180-1,200' with bottom water temperatures of 33-46 F (Squires 1957). However, large concentrations of short- finned squid are usually found along the edge of the continental shelf where temperatures are greater than 41 F (Tibbetts 1975). Since *Illex* are often seen at the surface at night, their vertical movements must frequently be several hundred meters (Arnold 1979).

Stock structure for *I. illecebrosus* has not been fully determined (Lange 1984b). The actual stock structure of this species is probably complex, but given the lack of published findings on stock structure, there is no reason to reject the hypothesis that the population constitutes a unit stock.

Atlantic Mackerel

Atlantic mackerel (*Scomber scombrus*) is a fast swimming, pelagic, schooling species distributed between Labrador (Parsons 1970) and North Carolina (Anderson 1976a). The existence of separate northern and southern spawning contingents was first proposed by Sette (1950). The southern group spawns primarily in the Mid-Atlantic Bight during April-May while the northern group spawns in the Gulf of St. Lawrence in June-July. Both groups overwinter between Sable Island (off Nova Scotia; Figure 4) and Cape Hatteras in water generally warmer than 45 F (USDC, 1984a).

Both groups make extensive northerly (spring) and southerly (autumn) migrations to and from spawning and summer feeding grounds (Figure 3). The southern contingent begins its spring migration from waters off North Carolina and Virginia in March- April, and moves steadily northward, reaching New Jersey and Long Island usually by April-May, where spawning occurs. These fish may spend the summer as far north as the Maine coast. In autumn this contingent moves southward and returns to deep offshore water near Block Island after October (Hoy and Clark 1967).

The northern contingent arrives off southern New England in late May, and moves north to Nova Scotia and the Gulf of St. Lawrence where spawning occurs usually by July (Hoy and Clark 1967, Bigelow and Schroeder 1953). This contingent begins its southerly autumn migration in November and December and disappears into deep water off Cape Cod.

Even though there are two spawning groups of mackerel in the Northwest Atlantic, biochemical analyses (Mackay 1967) have not established that genetic differences exist between them. These two contingents intermingle off southern New England in spring and autumn (Sette, 1950). Tagging studies reported by Beckett *et al.* (1974), Parsons and Moores (1974) and Moores *et al.* (1975) indicate that some mackerel that summer at the northern extremity of the range overwinter south of Long Island. Precise estimates of the relative contributions of the two contingents cannot be made (ICNAF, 1975). Both contingents were fished by the foreign winter fishery and no attempt was made to separate these populations for assessment purposes by the International Commission for the Northwest Atlantic Fisheries (ICNAF), although separate Total Allowable Catches (TAC) were in effect for Subareas 5 and 6 and for areas to the north from 1973- 1977. Since 1975 all mackerel in the northwest Atlantic have been assessed as a unit stock (Anderson 1982). Thus, Atlantic mackerel are considered one stock for fishery management purposes.

Butterfish

Atlantic Butterfish (*Peprilus triacanthus*) occur along the east coast of North America from Newfoundland to Florida (Hildebrand and Schroeder 1928) and are commercially important between Cape Hatteras and southern New England (Waring and Anderson 1983). This species has also been observed in deeper offshore waters off Cape Hatteras and Florida, and infrequently as far north as Prince Edward Island (Nichols and Breder 1927, Murawski *et al.* 1978).

Butterfish north of Cape Hatteras display definite migratory patterns in response to water temperature (Murawski *et al.* 1978). The seasonal migration of butterfish is similar to that of scup (*Stenotomus chrysops*), Atlantic mackerel (*Scomber scombrus*), weakfish (*Cynoscion regalis*), and long-finned squid (*Loligo pealei*). Horn (1970), Waring (1975), and Fritz (1965) concluded that summer movements of butterfish are both inshore and northward. Butterfish south of Cape Hatteras evidence no strong inshore-offshore migrations (Murawski *et al.* 1978)

Butterfish travel in small schools, usually near the surface when inshore during the warm months. Bigelow and Schroeder (1953) state that butterfish "seldom descend deeper than 15 to 30 fathoms during the summer," and the northern component of this stock spends winter and early spring offshore and near the bottom. Water temperature is probably the most significant factor affecting butterfish distribution. In winter and early spring in the Mid-Atlantic area, butterfish appear in water 600- 675' deep, at the edge of the continental shelf (Figure 4; Horn 1970, Bigelow and Schroeder 1953). South of New York Bight, from New Jersey to the Chesapeake Bay, butterfish overwinter along the 600' contour (Heald 1968). In the spring butterfish begin moving inshore until by summer they are distributed throughout the entire Mid-Atlantic and New England areas. Butterfish appear off Rhode Island by the end of April, at Cape Cod by May, and arrive in the Gulf of Maine usually by June.

6.1.2. Habitats of *Loligo, Illex,* Mackerel and Butterfish

The near shore spawning areas and the inshore nursery areas are essential for the survival of these species. These inshore areas are also utilized for feeding by some of these adults. Major alterations to the habitat could be disruptive to the species' life cycle.

The Council, attempting to coordinate and obtain the best information available, requested each State from North Carolina to Maine to identify the essential habitat under their jurisdiction. New Jersey, New York, and Massachusetts did not respond to the request. The following paragraphs are paraphrased from the responses of the State experts.

In North Carolina (Monaghan pers. comm.) atlantic mackerel have been a major component of flynet catches in and north of the Oregon Inlet area in March and April. Butterfish are minor components in the long haul seine fishery (June through September), the sciaenid pound net (June and July) and the flounder pound net fishery (September through October) (NCDMF 1992). In general, they seem to be caught by nearshore fisheries early in the season (November through December) and then are caught by deepwater gear later in the season (January through April). From the above information Monaghan (pers. comm.) suggests that they stay in the sounds until water cools in the fall, they move offshore, probably come back into the sounds as the temperatures rise in the spring. *Loligo* are caught by nearshore flounder and deepwater fisheries as bycatch throughout the season (December through April). They are also abundant from August through December inside of 120 feet (Monaghan pers. comm.)

In Virginia (Gillingham pers. comm.) commercial landings of Atlantic mackerel are sporadic. Trawls account for most landings though inshore gillnets occasionally take mackerel in the late winter and early spring. A directed recreational fishery occurs in late winter and early spring in some years. No "critical" habitat can be identified for Atlantic mackerel in Virginia waters at this time. Butterfish are caught or landed in Virginia 12 months of the year. In the years of greatest abundance, trawls fishing greater than 12 miles in the ocean account for the majority of the poundage while pound net and gillnet landings are significant in other years. Butterfish occur throughout Virginia"s portion of the Chesapeake Bay though no directed fishery exists, likewise no recreational fishery exists in Virginia. The Chesapeake Bay is used as a feeding area for juveniles and adults and any degradation of water quality would be expected to have a detrimental effect on the stock (Gillingham pers. comm.). Squid are available off the Virginia coast year round with trawls accounting for nearly 100 percent of the total. Squid occur in the lower portion of the Chesapeake Bay though no documented landings are available. No recreational fishery exists in Virginia but squid provide forage for several important recreational species of fish, including striped bass, bluefish, flounder, and grey trout.

In Maryland (Casey pers. comm.) *Loligo pealei* is the primary squid in the Atlantic commercial fishery but is only caught incidental to other sought species. In 1992, commercial landings totalled 60,500 pounds with no discernable seasonality. Squid are caught throughout Maryland's coastal bays with *Loligo* being found along with the Brief squid (*Lolliguncula brevis*). They are only caught in small numbers, usually less than 100 per year (Figure 5). No *Illex* have been caught in Maryland's coastal bays and probably make up only a very small percentage of the total squid landings (Casey pers. comm.). In the coastal bays squid are found over muddy bottom where depths are greater than 4 feet. Much of these bays however, are only 6 to 8 feet deep. At night, schools of squid are attracted to bridge and pier lights in the Ocean City area (Casey pers. comm.).

In Maryland, Atlantic mackerel are caught by both commercial and recreational fishermen in the Atlantic ocean. No juvenile or adult mackerel have been observed in the coastal bays (Casey pers. comm.).

Butterfish are also an incidental catch of the Atlantic fishery off of Maryland. The majority of the landings occur in the late fall and early winter. Small numbers of juveniles are occasionally caught in the coastal bays (Figure 6). Juvenile butterfish are also found over muddy bottom where depths are greater than 4 feet (Casey pers. comm.).

In Delaware, nearly the entire Delaware Bay and the majority of the two smaller bays are utilized by squid, Atlantic mackerel, and butterfish for feeding areas, migratory routes, or nursery habitat (Figures 7 through 11). Squid spawning areas (Figure 7) in Delaware Bay were delineated using anecdotal information supplied by DNREC trawl program personnel based on observations of squid egg masses recovered during trawling operations (Cole pers. comm.).

Pennsylvania does not consider any waters of their Commonwealth to be essential habitat for *Loligo, Illex*, Atlantic mackerel, or butterfish (Snyder pers. comm.).

Atlantic mackerel are uncommon in CT DEP trawl survey catches (Figure 12). Mackerel catches are too sporadic in the trawl survey to evaluate depth, substrate or spatial preferences (Simpson pers. comm.). Mackerel larvae have been identified from Millstone Nuclear Power Station larval monitoring, but again abundance is low with mackerel accounting for only 0.1% of larvae collected since 1976.

Butterfish are numerically the most abundant species (Figure 13) in most years in the CT DEP trawl survey with catches ranging from 40,000 to 97,000 individuals collected in 200 tows (Simpson pers. comm.). Butterfish arrive in Long Island Sound as early as May, but are not common until July. Abundance peaks in September through October with recruitment of YOY and declines substantially in November. Butterfish are found in similar densities in depths ranging from 20 to 125 feet, but are generally more common on mud and transitional substrates than on sand. Butterfish larvae are regularly taken in Millstone Nuclear Power Station monitoring efforts in Niantic Bay, located in Eastern Long Island Sound.

Loligo occur in Long Island Sound from May to November and are one of the most common species (Figure 14) taken in the CT DEP trawl survey with catches ranging from 12,000 to 58,000 annually (Simpson pers. comm.). spawning principally occurs in May and June in the eastern half of the Sound based on the distribution of large, gravid squid. Evidence for later spawning is provided by egg masses which appear in samples through September. *Loligo* exhibit a strong preference for the deeper strata (60 to 90 ft, and 90 + ft) in the Sound and are associated more frequently with transitional and sand substrates than mud, with catch rates on transitional substrate being twice that of mud. Eastern and central Long Island Sound have higher catch rates than the western Sound due principally to the coarse to fine sediment gradient running from east to west (Simpson pers. comm.).

In Rhode Island, Macy (1980) found that *Loligo pealei* first appear in lower Narragansett Bay in April and then they rapidly move up the bay into warmer waters (Gray pers. comm.). They remain in Rhode Island waters until November when they head offshore (Jeffries *et al.* 1988 and Lynch, 1991). Every summer *Loligo* and its egg masses are common in shallow coves along the coast of Rhode Island (Griswold and Prezioso 1981). The egg masses have been seen attached to rocks, seaweed, submerged debris, pilings (Lynch 1994 and Gray 1994). In Block Island Sound, juvenile squid begin to appear in late June and remain until the end of October, with the greatest abundance occurring in July. Juveniles were found in surface and bottom temperatures that averaged 63 F and 60 F, respectively, from Block Island Sound (Hersey 1978). Juveniles collected from 1979-1991, have been found in temperatures ranging from 45 F to 75 F (Lynch 1992). Adult *Loligo* continued to be absent during the spring assessment in Narragansett Bay and Rhode Island Sound and have been collected in temperatures ranging from 45 F to 75 F (Lynch 1992).

Records of *Illex illecebrosus* landed in Rhode Island waters are rare (Gray pers. comm.). Prior to 29 June 1992, no *Illex illecebrosus* had ever been noted in Rhode Island coastal waters by the Rhode Island Division of Fish and Wildlife (Lynch 1992). In Rhode Island Sound, they were collected in a depth strata of 48 to 60 feet. They have also been collected in the lower Narrow River, over mud and silty sand (Gray 1994).

Squid, both *Loligo* and *Illex* are observed in New Hampshire, July through September, first appearing when they move into shallow water to deposit their egg cases. They are seen in both the near shore coastal waters as well as Great Bay estuary. No fishery occurs for them in State waters but some commercial catches take place in the nearby EEZ (Nelson pers. comm.). Landings for New Hampshire usually do not exceed 7,000 lbs/year. There are no New Hampshire habitat studies for squid.

Atlantic mackerel appearance in New Hampshire near shore waters is variable year to year. They typically arrive in May and remain present into June in sizeable numbers. Following this initial peak period of abundance they either remain in reduced, spotty schools throughout the summer or leave and reappear in October. While present in State waters they are a major component of the 1/2 day party boats and private boat recreational fishery. No habitat studies specific to mackerel have been conducted in New Hampshire waters (Nelson pers. comm.).

Butterfish may be found in New Hampshire waters during the summer/fall, July to October. Their peak abundance according to information from monthly environmental study samples occurs in September (Nelson pers. comm.). While no fishery exists for butterfish in State waters there are, however, incidental commercial catches in the EEZ that may approach 1,000 lbs/year. No habitat study has been done for butterfish in New Hampshire waters.

Atlantic mackerel appear along the Maine coast in June-July and remain throughout the summer and fall (Langton pers. comm.). The smaller, juvenile mackerel ('tinkers') are common in nearshore waters. Juvenile and adult mackerel are caught by recreational fishermen from shore and aboard small boats and party boats. Coastal waters of the Gulf of Maine are important feeding grounds for Atlantic mackerel. During their residence in coastal waters, they may be exposed to a range of contaminants that have been detected in coastal sediments and marine organisms (e.g., heavy metals, PCB's), either directly in the water column or in the smaller fish that they consume. Mackerel prey heavily on juvenile Atlantic herring in shallow coastal waters, especially in the spring and early summer. There is no specific information on toxic contamination of mackerel in coastal waters of the Gulf of Maine, but they are known to accumulate paralytic shellfish toxins which can be passed on to other predators (Haya *et al.* 1990). Fourteen humpback whales died in Cape Cod Bay in late November 1987 as a result of consuming contaminated mackerel which apparently accumulated the toxin in the Gulf of St. Lawrence (Geraci *et al.* 1989).

In 1985, the National Oceanic and Atmospheric Administration (NOAA) began a program to develop a comprehensive data base on the distribution and relative abundance of selected fish and invertebrate species in the Nation's estuaries. The Estuarine Living Marine Resources (ELMR) program was conducted jointly by the National Ocean Services's Strategic Environmental Assessments (SEA) Division and the National Marine Fisheries Service (NMFS). The objective was to develop a consistent data base on the spatial and temporal distribution, relative abundance, and life history characteristics of fishes and invertebrates to enable comparisons among species and estuaries. These data are to be combined with other NOAA data sets to better define and understand the biological coupling of estuarine and marine habitats (USDC 1994a).

While the importance of estuarine areas to fish and invertebrate populations is well documented, few consistent and comprehensive data sets exist that allow examinations of the relationships of many species found in or among groups of estuaries. Most of the distribution and abundance data for estuarine-dependent species is for the offshore life stages where major sampling programs have focused, and does not adequately describe estuarine distributions. Because life stages of many species use both estuarine and marine habitats, it is necessary to combine information on distribution, temporal utilization, and life history strategies to understand the linkages between estuaries and near shore/offshore areas. No nationwide data base that would allow these evaluations existed prior to ELMR.

Three salinity zones provide the spatial framework for organizing information on species distribution and abundance within each estuary. These zones are tidal fresh (0.0 to 0.5 ppt), mixing (0.5 to 25.0 ppt), and seawater (25.0 ppt and greater). Four criteria were used to identify species: commercial value, recreational value, indicator of environmental stress, and ecological value. A data sheet was developed for each species in each estuary, including information on spatial distribution by salinity zone, temporal distribution by life history stage, and relative abundance level. Each data sheet was then reviewed by experts with local knowledge of particular species and/or estuaries.

The ELMR program is an important step in developing an information base to bridge the gap between site-specific estuarine problems and regional management strategies. Filling this gap is more important now than ever, as it is clear that the cumulative effects of small changes in many estuaries may have a total systemic effect throughout large segments of the Nation's estuaries and coastal ocean. Although the knowledge available to conserve and protect estuaries continues to be limited, the ELMR data base will allow comparisons among species, groups of species, specific life stages and times of year within an estuary, and geographic regions. The estuaries evaluated for the North Atlantic and Mid-Atlantic are presented in Figures 15a and 15b, respectively.

The spatial distribution and relative abundance of Atlantic mackerel and butterfish were evaluated for both the North Atlantic (Table 9) and Mid-Atlantic (Tables 10 and 11). Unfortunately, neither species of squid in this FMP were analyzed in either area under ELMR. The ELMR program in the South Atlantic did not delineate any of the four species in this FMP. The monthly temporal distribution of Atlantic mackerel and butterfish in the North Atlantic estuaries is identified in Tables 12-14. The monthly temporal distribution of Atlantic mackerel and butterfish in the Mid-Atlantic (south of Cape Cod) is identified in Tables 15-18.

The ELMR program is not tremendously useful for mackerel and butterfish because these two species are not as significantly estuarine-dependent as some other species managed (i.e. summer flounder and bluefish). However the presence/absence data are significant especially when a State has not yet identified essential habitats in their waters. It is planned that the States will be asked to use the formats of the mackerel and butterfish data and present their knowledge on the two squid species.

6.2. HABITAT CONDITION

Squid, mackerel, and butterfish, owing to their migratory nature, are all exposed to the full range of human activities and environmental conditions during parts of their life history. All four of these species, with the possible exception of *Illex,* are affected to some degree by pollutant loading and habitat degradation in near shore coastal areas. *Loligo* and butterfish are most vulnerable because they use estuarine and shallow coastal areas for spawning and nursery habitats. Assessments made by the Ocean Pulse and Northeast Monitoring Programs indicate extensive, detrimental amounts of toxic organic and inorganic contaminants, such as heavy metals, PCBs, and petroleum hydrocarbons in the various physical compartments of the marine ecosystem (Boehm and Hirtzer 1982, Boehm 1983, Pearce 1979, Reid *et al.* 1982). This is particularly true for sediments in the Mid-Atlantic Bight that receive contaminated dredged materials, sewage sludge, and industrial wastes. Elevated levels of petroleum hydrocarbons have even been found in all estuaries as far north as Maine. Elevated PCB levels have been found in sediments and biota in Buzzards Bay, in the New York Bight apex, as well as other locations (Reid *et al.* 1982).

Generally, the nation's most contaminated estuaries are in highly urban areas (Turgeon *et al.* 1989) such as those around much of the mid Atlantic coast. Turgeon *et al.* (1989) describe concentrations of toxic metals and toxic organics in Long Island Sound and relate them to nation wide levels as found in mussel tissues and fish livers, however since the fish were not specified, it is unknown whether any of these four species were included in the study. Zdanowicz and Gadbois (1990) provide a data summary for the baseline phase of the National Status and Trends Program. Estuaries over the entire range of these species were sampled for concentrations of selected chemical contaminants, as well as indicators of potential biological effects from 20 sites throughout the northeast region. Unfortunately, no data specific to *Loligo, Illex,* mackerel, or butterfish are presented.

Most research on the toxicological effects of various contaminants in fish is recent and ongoing. Many anomalies probably have not been described or their magnitude documented. The Councils encourage fishermen to report or provide fish or shellfish with tumorous type growths to: Dr. John C. Harshberger, Director, Registry of Tumors in Lower Animals, Smithsonian Institution, Museum of Natural History, Washington, DC 20560 (202-357-2647) or to Dr. Robert Murchelano, NMFS, Woods Hole Laboratory, Water Street, Woods Hole, MA (508-548-5123).

Chemical contaminants of coastal waters include inputs from municipal and industrial wastewater, agricultural pesticides and fertilizers, animal waste, urban nonpoint sources, stormwater runoff and atmospheric deposition. Within the Mid-Atlantic region (Cape May to Cape Fear, as defined in the Mid-Atlantic Marine Research Plan 1994), there are more than 75 coastal counties and cities that have one or more publicly owned treatment works discharging to coastal waters. Toxic components of these contaminants include heavy metals such as lead, cadmium, chromium, zinc, copper, silver and mercury, and organic compounds such as DDT, chlordane, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). All of these compounds are generally due to discharges to coastal waters from human activities, although there are some cases of natural concentrations. In the Mid-Atlantic region, northern Chesapeake Bay (especially Baltimore Harbor) and the Elizabeth River in Virginia contain the highest levels of these contaminants except for DDT (Mid-Atlantic Marine Research Plan 1994). Lead, silver, zinc, DDT, chlordane, and PCBs have high concentrations at sites within Delaware Bay (Figures 16-19). DDT, chlordane and PCBs are now banned for the most part, but continue to exist in the environment and are used in other countries. Atmospheric deposition of toxins such as pesticides and PCBs may be more of a problem in marine waters than on land, since there may be more bioconcentration of pesticides and PCBs in marine food chains (NRC 1993). The National Research Council recommends source control of pollutants, since many toxic substances are difficult and/or expensive to remove from wastewater.

Coastal areas are vitally important as feeding, spawning, and nursery grounds for these four species. However, population shifts to coastal areas and associated industrial and municipal expansion have accelerated competition for use of the same habitats. It has been projected (48 FR 53142-53147) that demographic shifts during the 1980's and 1990's will result in, 75% of the US population living within 50 miles of the coastlines (including the Great Lakes). As a result, these habitats have been substantially reduced and continue to suffer the adverse effects of dredging, filling, coastal construction, energy development, pollution, waste disposal, and other human related activities. In the case of wetlands, from 1954 to 1978 there was an average annual loss of 104,000 acres which was a ten fold annual increase in acreage lost between 1780 and 1954 (48 FR 53142 - 53147). The pressure on coastal and ocean habitats is nowhere greater than in the densely populated, industrialized Northeast. It is obvious that new systems are needed to conserve habitats and living marine resources, while facilitating the completion of necessary, compatible economic developments.

Toward this goal, NMFS issued its formal Habitat Conservation Policy in November 1983 (48 FR 53142-53147). The goal of the policy is: "to maintain or enhance the capability of the environment to ensure the survival of marine mammals and endangered species and to maintain fish and shellfish populations which are used, or are important to the survival and/or health of those used, by individuals and industries for both public and private benefits: jobs, recreation, safe and wholesome food and products". The Habitat Conservation Policy provided impetus to NMFS's Regional Action Plan (RAP) process which is to foster coordinated management and research responses to major habitat conservation issues and problems, and to develop better steps to address them in the future (USDC

1985). The priorities from the RAP process are currently being re-evaluated within the Northeast region (peterson pers. comm.).

The RAP process identified six water management units in the Northeast region (Figure 20). The boundaries of each water management unit (WMU) were established on the basis of the biogeographic consistency of the entire WMU and its distinctness from other WMUs. Each WMU is relatively consistent in its physical and chemical characteristics with normal latitudinal and seasonal variations in temperature, salinity, and nutrient content. The biota include both endemic and migratory species that exhibit normal seasonal fluctuations in species composition, individual population size, and geographic distribution. These six units are: Coastal Gulf of Maine, Gulf of Maine, Georges Bank West to Block Channel, Coastal Middle Atlantic, Middle Atlantic Shelf, and Offshelf (USDC 1985).

The Coastal Gulf of Maine WMU encompasses an area bounded seaward by the observable limits of coastal processes, including riverine and estuarine plumes, coastal upwelling and diurnal tidal fluxes. Geographically, the area is bounded on the northeast by the Canadian Border and on the southwest by Cape Cod. This zone is generally marked by steep terrain and bathymetry, joining at a rock bound coastline with numerous isles, embayments, pocket beaches, and relatively small estuaries. Circulation is generally to the southwest along Stellwagen Bank, and finally offshore at Cape Cod. The habitats are presently affected by ocean disposal and effluents from major urban areas, along with significant nonpoint source pollution associated with the various rivers. Continued pressure to fill already depleted marsh and shallow water areas occurs in most parts of the area (USDC 1985).

The Gulf of Maine is a partly enclosed sea of 55,000 square miles separated from the Atlantic Ocean by Browns and Georges Banks. It is an area of five major basins, floored with clays and gravelly silts, and broken by rocky outcroppings, numerous ledges and banks. The circulation is only generally understood: a seasonal clockwise gyre swings around the Gulf and joins the clockwise gyre on the northern edge of Georges Bank. Presently, threats to the area are from the coastal Gulf of Maine and from ships transiting the area (USDC 1985).

The Georges Bank West to Block Channel WMU includes Georges Bank, the Great South Channel, and Nantucket Shoals. These areas have similar habitats, biota and hydrographic regimes. Overall, this WMU is highly productive and heavy fishing pressure is exerted on its numerous fish and shellfish. It is threatened by OCS exploratory drilling and by nonpoint source pollution from atmospheric fallout, general circulation patterns, and marine transportation activities (USDC 1985).

The Coastal Middle Atlantic WMU encompasses a zone from Cape Cod southwest to Cape Hatteras. The area is characterized by a series of sounds, broad estuaries, large river basins and barrier islands. The predominantly sand bottom is characterized by a ridge and swale topography. The waters of the Coastal Middle Atlantic have a complex and seasonally dependent pattern of circulation. Seasonally varying winds and irregularities in the coastline result in the formation of a complex system of local eddies and gyres. Currents tend to be strongest during the peak river discharge period in late spring and during periods of highest winds in the winter. In late summer, when winds are light and estuarine discharge is minimal, currents tend to be sluggish, and the water column is generally stratified. The Coastal Middle Atlantic provides major habitats for anadromous, estuarine, and endemic species. Migratory species play a major role in this WMU, and make up the predominant stocks in various seasons. Estuaries provide major spawning and nursery areas for many of the endemic and migratory species. These species are presently affected by nonpoint and point sources of pollution from major rivers and urban areas, as well as by direct loss of habitat caused by filling of wetlands, damming and diversion of rivers, and mosquito ditching in marshes (USDC 1985).

The Middle Atlantic Shelf WMU covers the area from the Block Island Front southward to Cape Hatteras. The inshore boundary follows the observable limits of coastal processes, primarily estuarine plumes, and lies approximately 30 miles from the coast. This WMU generally is characterized as a sandy plain, with a ridge and swale topography. Numerous submarine canyons intersect this area. The surface circulation over the shelf can be divided into a two celled system, separated at the Hudson Valley. The subsurface and bottom circulation tends to flow in a westerly-southwesterly direction that varies with the passage of weather systems and offshore warm core rings. Hydrographic conditions vary seasonally from vernal freshening and warming, through summer stratification, to fall/winter breakdown and cooling. This WMU has a different faunal composition than the Gulf of Maine or Georges Bank. Fish populations are predominantly migratory, and species composition varies with season. It is threatened by OCS exploratory drilling; by nonpoint source pollution from atmospheric fallout, general circulation patterns, and marine transportation activities; and by ocean disposal of sewage sludge and industrial wastes (USDC 1985).

The Offshelf WMU encompasses the zone defined by the mean observable limits of the shelf-slope front seaward to the mean axis of the Gulf Stream. The area is overlain by the Slope Water Regime, a mass of relatively warm saline water having a generally weak circulation to the southwest. The upwelling area along the inner boundary of the shelf-slope front is high in productivity and rich in commercially valuable fish and shellfish. Offshore, the Gulf Stream undulates as it moves to the northeast, forming a dynamic boundary from which warm core rings are borne. These rings spawned at a rate of about eight per year, are about 50 to 100 miles in diameter; they break off east of the area and transit to the southwest, eventually coming in contact with the shelf at southwestern Georges Bank. The passage of each ring marks a major event in the hydrographic regime and may significantly affect the biota of the shelf-slope front and possibly of the shelf itself. Other than ring passages, impacts on the offshelf waters are primarily from nonpoint source pollution from atmospheric fall out, marine transportation, and from point source pollution from dumping at deep water dump site 106 and ocean incineration (USDC 1985).

Each of the oceanic areas identified in section 6.1 as important for *Loligo, Illex,* mackerel and butterfish are subject to numerous man caused habitat threats. Rather than spend extensive efforts detailing degradation in individual oceanic systems (an effort generally already being performed by the individual States), this section will broadly address the major types of abuse (i.e., agricultural, urbanization, and industrialization) dominant in the largest, most important areas (i.e., Chesapeake Bay, Hudson River/Long Island Sound, and the New England coast).

Extensive urban development along the western shore of the Chesapeake has resulted in human population and industrial growth at the expense of the natural environment. The Baltimore - Washington - Norfolk corridor is a major demographic region where numerous commercial and industrial activities are centered. These activities have adversely affected the environment through habitat modification and destruction, and the introduction of contaminants in point and nonpoint source discharges. The eastern shore of the Bay is primarily agricultural and residential. Uncontrolled agricultural and suburban runoff, however, also introduces significant quantities of sediments, trace metals, and chemicals that degrade water quality.

The Hudson River/Long Island Sound area is heavily urbanized and in parts industrialized or supportive of large scale agriculture. The middle and upper Hudson River valley and eastern Long Island support extensive agricultural areas and large populations with the associated habitat abuses. The lower portion of the Hudson River area, northern New Jersey, and western Long Island are inhabited by the greatest concentration of people anywhere in the US as well as supporting extensive utility, petro-chemical, and other heavy industry.

The New England coast, since heavily developed, has some of all three major types of abuse. However, the areas are generally localized (i.e., an individual power generating station or urbanized center) and since the estuaries are only used on a limited basis, the abuses do not seem as detrimental as those in the previously mentioned systems.

In summary, the most concise synopsis of the health of the Nation's marine environments can be viewed as that presented in the findings of the Congressional Office of Technology Assessment report (1987):

"Estuaries and coastal waters around the country receive the vast majority of pollutants introduced into marine environments. As a result, many of these waters have exhibited a variety of adverse impacts, and their overall health is declining or threatened.

"In the absence of additional measures, new or continued degradation will occur in many estuaries and some coastal waters around the country during the next few decades (even in some areas that exhibited improvements in the past).

"In contrast, the health of the open ocean generally appears to be better than that of the estuaries and coastal waters. Relatively few impacts from waste disposal in the open ocean have been documented, in part because relatively little waste disposal has taken place there and because wastes disposed of there usually are extensively dispersed and diluted. Uncertainty exists, however, about the ability to discern impacts in the open ocean."

6.3. GENERAL CAUSES OF POLLUTION AND HABITAT DEGRADATION

6.3.1. General Habitat Degradation Threats

The Council, in efforts to coordinate with NMFS, has adopted the NMFS Regional Action Plan (USDC 1985) identified environmental threats as potential issues that may affect essential habitat. These issues are currently being re-evaluated and may be reprioritized (Peterson pers. comm.).

Estuarine and coastal lands and waters are used for many purposes that often result in conflicts for space and resources. Some uses may result in the absolute loss or long term degradation of the general aquatic environment or specific aquatic habitats, and pose theoretically significant, but as yet unquantified, threats to the biota and their associated habitats. Issues arising from these activities, and the perceived threats associated with them, are of serious concern to the public.

Multiple use issues are constantly changing, as are the real or perceived impacts of certain activities on living marine resources. The coastal and oceanic activities that generate these issues can threaten living marine resources and their habitats. Threats to resources occur when human activities cause changes in physical habitat, water and sediment chemistry, and structure and function of biological communities.

The Coastal Middle Atlantic and Coastal Gulf of Maine WMU share similar activities that threaten habitats and the well being of living marine resources in estuarine and near shore areas (USDC 1985). Likewise, the Gulf of Maine, Georges Bank, Middle Atlantic Shelf and Offshore WMUs share similar activities that threaten the welfare of biota and habitats in offshore areas.

The following discussion identifies and describes each multiple use issue and the potential threats associated with that issue (USDC 1985). For the purposes of this discussion, an "issue" is a point of debate or controversy evolving from any human activity, or group of activities, that results in an effect, product, or consequence. Environmental and socio-economic issues remaining to be resolved satisfactorily with regard to their impacts on marine organisms, their habitats, and man developed from the multiple, often conflicting uses of coastal lands and waters.

6.3.1.1. Waste Disposal and Ocean Dumping

The Atlantic Ocean off the northeastern United States has been used for the disposal of wastes, including sewage sludge, dredged material, chemical wastes, cellar dirt, and radioactive material. Some waste treatment methods, such as chlorination, pose additional problems to aquatic species. Habitats and associated organisms have been degraded by long term ocean disposal, particularly of sewage wastes. Sewage pollution causes closure of shellfish beds,and occasionally, of public swimming areas. Additional research on the impacts of ocean disposal at deep water dump sites is urgently needed (USDC 1985).

Ocean disposal of sewage sludge, industrial waste products, dredged material, and radioactive wastes degrades water quality and associated habitats. The deep water dump site is 106 miles offshore.

Concentrations of heavy metals, pesticides, insecticides, petroleum products, and other toxics all contribute significantly to degradation of waters off the northeastern States. Organic loading of estuarine and coastal waters is an emerging problem. Symptoms of elevated levels include excessive algae blooms, shifts in abundance of algal species, biological oxygen demand (BOD) increases in sediments of heavily affected sites, and anoxic events in coastal waters. Changes in biological components are a consequence of long term ocean disposal. Harmful human pathogens and parasites can be found in biota and sediments in the vicinity of ocean dump sites. In addition, shellfish harvesting grounds have been closed because of excessive concentrations of pathogenic and indicator species of bacteria.

Many of the above issues and concerns may also be germane to the dumping of fish and shellfish waste in the ocean. The closure of land based processing plants because of the plants inability to meet National Pollution Discharge Elimination System (NPDES) or State Pollution Discharge Elimination System (SPDES) effluent requirements encourages the attempts for at sea disposal. While fishery byproducts may be nutritive in value, problems of BOD increases, excessive algal blooms, and concentrations of pathogenic bacteria, may all be associated with ocean disposal of fisheries products. The onus of proof of no environmental harm must fall to the group that wants to use the ocean for disposal purposes.

The deeper waters of the offshore WMUs present a different set of problems, compared with shallower waters, with respect to oceanic currents, warm core rings, and other physical and chemical oceanographic processes. Furthermore, less is known and understood about deep water ecosystems than their shallow water counterparts. It is imperative that studies be undertaken to reveal the fate and role of contaminants in deep water ecosystems, and to refine information about the shelf ecosystem through which these materials may be transported (USDC 1985).

6.3.1.2. Coastal Urbanization

Half of the human population makes its home within 60 miles of one ocean or another. Population rose 85 percent within 50 miles of the Atlantic and Gulf coastlines between 1940 and 1980, compared to 70 percent for the nation as a whole. In the United States, the home is often accompanied by: a car, and an oil leak that trickles into the nearby stream and down to the shore; a lawn, showered with pesticides that wash "away" in the rain; a neighboring farm, and manure that seeps down to the bay, firing an algae bloom; and a paper mill, spilling traces of toxic dioxin into the river. The list goes on. To accommodate development and create beach view property, mangroves, marshes and dunes are torn away. The bottom line is always clear. Aquatic life will continue to lose out as long as connections between fish populations and human numbers are not made.

Tremendous development pressures exist throughout the coastal area of the Northeast Region. More than 2,000 permit applications are processed annually by the NMFS Northeast Region for commercial, industrial, and private marine construction proposals. The proposals range from generally innocuous, open pile structures, to objectionable fills that encroach into aquatic habitats, thereby eliminating their productive contribution to the marine ecosystem. The projects range from small scale recreational endeavors to large scale commercial ventures to revitalize urban waterfronts.

Associated with marine construction are a number of impacts which affect living marine resources directly, and indirectly through habitat loss or modification. Many of these projects are of sufficient scope to singly cause significant, long term or permanent impacts to aquatic biota and habitat; however, most are small scale causing minor losses or temporary disruptions to organisms and environment. The significance of small scale projects lies in the cumulative effects resulting from the large number of these activities.

Urban construction is not limited to the shore, but upland development, too, which can adversely impact aquatic areas. One of the major problems arising from urban development is the increase in nonpoint source contamination of estuarine and coastal waters. Highways, parking lots, and the reduction in terrestrial vegetation and fringe marshes facilitate runoff loaded with soil particles, fertilizers, biocides, heavy metals, grease and oil products, PCBs, and other material deleterious to aquatic biota and their habitats. Atmospheric emissions resulting from certain industrial processes contain sulphurous and nitrogenous compounds that contribute to acid precipitation, a growing source of concern in some fresh water sections of tidal streams. Nonpoint pollution is incorporated in water, sediments, and living marine resources. Although nonpoint sources of pollution do not usually cause acute problems, they can contribute to subtle changes and increases of contaminants in the environment (USDC 1985).

As residential, commercial, and industrial growth continues, the demand for potable, process, and cooling water, flow pattern disruption, waste water treatment and disposal, and electric power increases. As ground water resources become depleted or contaminated, greater demands are placed on surface water through dam and reservoir construction or some other method of freshwater diversion. The consumptive use of significant volumes of surface freshwater causes reduced river flow that can affect down stream salinity regimes as saline waters intrude further upstream.

Water that is not lost through consumptive uses is returned to the rivers or streams as point source waste water discharges. Although the waste water generally is treated, it still contains contaminants. Domestic waste water contains residual chlorine compounds, nutrients, suspended organic and inorganic compounds, trace metals and bacteria. Industrial discharges may contain many dissolved and suspended pollutants, including metals, toxic substances, halogenated hydrocarbons, petroleum products, nutrients, organics and heat.

Construction in and adjacent to waterways often results in elevated suspended solids emanating from the project area. The distance the turbidity plume moves from the point of origin is dependent upon tides, currents, nature of the substrate, scope of work, and preventive measures employed by the contractor.

Excessive turbidities can abrade sensitive epithelial tissues, clog gills, decrease egg buoyancy, reduce light penetration; thereby affecting photosynthesis of phytoplanktonic and submerged vegetation, and cause localized oxygen depression. Suspended sediments subsequently settle, which can destroy or degrade productive shellfish beds and nursery sites.

The effects of turbidity and siltation are generally, but not always, temporary and short term. Other construction activities can result in permanent loss or long term disruption of habitat. Dredging can degrade productive shallow water and destroy marsh habitat or resuspend pollutants, such as heavy metals, pesticides, herbicides, and other toxins. Concomitant with dredging is spoil disposal, which traditionally occurred on marshes or in open water. Shoreline stabilization can result in gross impacts, through filling of intertidal and sublittoral habitat; or cause subtle effects, resulting in the elimination of the ecotone between shore and water, or through the scouring of benthic habitat by reflective wave energy.

Sewage treatment effluent produces changes in biological components as a result of chlorination and increased contaminant loading. Sewage treatment plants constructed where the soils are highly saturated often allow suburban expansion in areas that would have otherwise remained undeveloped, thereby exacerbating already severe pollution problems in some areas.

Another aspect of urban development is nonpoint source pollution, which is caused by land based activities that result in materials being transported to aquatic areas. Certain pollutants (pathogens, phosphorus, sediments, heavy metals, and acid precipitation) from nonpoint sources are demonstrable problems in Atlantic coastal and estuarine waters (USDC 1985). Nonpoint source pollution appears to be a chronic threat that will affect the Northwest Atlantic Ocean in the upcoming decades.

Diversion of freshwater to other streams, reservoirs, industrial plants, power plants, and municipalities can change the salinity gradient downstream and displace spawning and nursery grounds. Patterns of estuarine circulation necessary for larval and plankton transport could be modified. Such changes can expand the range of estuarine diseases and predators associated with higher salinities that affect commercial shellfish.

Industrial waste water effluent is regulated by EPA through permits. While the NPDES provides for issuance of waste discharge permits as a means of identifying, defining, and where necessary, controlling virtually all point source discharges, the problems remain due to inadequate monitoring and enforcement. It is not possible presently to estimate the singular, combined, and synergistic effects on the ecosystem impacted by industrial (and domestic) waste water.

6.3.1.3. Energy Production and Transport

Energy production facilities are widespread along Atlantic coastal areas. Electric power is generated by various methods, including land based nuclear power plants, hydroelectric plants, fossil fuel stations, and possibly future offshore floating nuclear power plants. These facilities compete for space along the coastal zone; they require water for cooling and, in the case of coal fired plants, generate voluminous amounts of fly ash and sulfur dioxide, as well as electricity. In addition, hydroelectric plants, with their need for dams, substantially modify river courses and affect anadromous fish runs and/or restoration programs.

The impacts on the marine and estuarine environment resulting from the various types of power plants include water consumption, heated water and reverse thermal shock, entrainment and impingement of organisms, discharge of heavy metals and biocides in blow down water, destruction and elimination of habitat, and disposal of dredged materials and fly ash (USDC 1985).

The Outer Continental Shelf (OCS) exploratory and production drilling and transport may affect biota and their habitats through the deposition of drilling muds and cuttings. Oil spills resulting from well blowouts, pipeline breaks, and tanker accidents are of major concern. Seismic testing operations can interfere with fishing operations and damage or destroy fishing gear. In addition, exclusion areas around drilling rigs can result in conflicts between fishermen, both recreational and commercial, and the oil companies.

6.3.1.4. Port Development and Utilization

All ports require shoreside infrastructure, mooring facilities, and adequate channel depth. Ports compete fiercely for limited national and international markets and continually strive to upgrade their facilities. Dredging and dredged material disposal, filling of aquatic habitats to create fast land for port improvement or expansion, and degradation of water quality are the most serious perturbations arising from port development. All have well recognized implications to living marine resources and habitat.

6.3.1.5. Agricultural Development

Agricultural development can affect fisheries habitat directly through physical alteration and indirectly through chemical contamination. Fertilizers, herbicides, insecticides, and other chemicals are washed into the aquatic environment with the uncontrolled nonpoint source runoff draining agricultural lands. These chemicals can affect the growth of aquatic plants, which in turn affects fish, invertebrates, and the general ecological balance of the water body. Additionally, agricultural runoff transports animal wastes and sediments that can affect spawning areas, and generally degrade water quality and benthic substrate. Excessive uncontrolled or improper irrigation practices often exacerbate the contaminant flushing as well as deplete and contaminate ground water. One of the most serious consequences of erosional runoff is that the frequent dredging of navigational channels results in dredged material that requires disposal, often in areas important to living marine resources (USDC 1985).

6.3.1.6. Marine Mineral Extraction

Mining for sand, gravel, and shell stock in near shore coastal and estuarine waters can result in the loss of infaunal benthic organisms, modifications of substrate, changes in circulation patterns, and decreased dissolved oxygen concentrations at deeply excavated sites where flushing is minimal. Sand

and gravel mining tends to result in suspended materials at the mining sites, and turbidity plumes may move several miles from individual sites. Mining also results in ranges in sediment type or sediment quality, often over areas measurable in square miles. Deep borrow pits created by mining may become seasonally or permanently anaerobic (USDC 1985).

6.3.1.7. Other Effects of Nonpoint Pollution (NAPS)

Many of the adverse impacts associated with NAPS were discussed above under individual threats. Cumulatively, however, the effects of this environmental insult may have much more far reaching implications for fisheries resources. Estuarine and riverine plumes entering coastal waters are influenced by coriolis and other dynamic forces. These plumes may remain as discrete water masses flowing close to the coast for hundreds of miles. Consequently, plumes from different estuaries may converge and act synergistically to effect changes in the structure of biological communities, such as occurred in the North Sea off Denmark (FAO 1992).

6.3.1.8. Coastal and Wetland Use and Modification

Intense population pressures have adversely affected many estuarine and marine habitats along the Atlantic coast. Demand for land suitable for home sites, resorts, marinas, and industrial expansion has resulted in the loss or alteration of large areas of wetlands through dredging, filling, diking, ditching, upland construction, and shoreline modification.

As residential and commercial use of coastal lands increased, so does the recreational use of coastal waters. Marinas, public access landings, private piers, and boat ramps all vie for space. Boating requires navigational space, a place to berth for some boat owners, and boat yards for repair and storage.

As population densities increase in these areas, greater pressures are exerted to develop remaining lands, and the demand for nuisance insect control on adjacent undeveloped wetlands either through chemical or physical (i.e., ditching) methods, also intensifies.

In addition to residential and recreational development, other competing uses further contribute to the destruction or modification of wetland areas. Agricultural development can significantly affect wetlands. Common flood control measures in low lying coastal areas include dikes, ditches, and stream channelization. Wetland drainage is practiced to increase tillable land acreage. Wildlife management techniques that also destroy or modify wetland habitat include the construction of dredged ponds, low level impoundments, and muskrat ditches and dikes (USDC 1985).

In general wetland loss is not something the Council can directly affect. The Council's Congressional mandate is to reduce fishing mortality when a resource is overfished. Loss of habitat and reduced ability to reproduce because of environmental degradation are generally considered part of the natural mortality estimate when stock assessments are performed and thus outside the control of the MFCMA. It is becoming increasingly apparent that fishing mortality reductions are significantly hampered by the constant loss of species habitat.

Significant coastal wetlands have been lost recently. Tiner (1987) in a report entitled "Mid-Atlantic wetlands A disappearing natural treasure", quantifies the current status and recent trends in wetlands in the mid-Atlantic. The trends are alarming. Between 1955 and 1981, Delaware lost about 42,000 acres of coastal wetlands and inland vegetated wetlands. Delaware lost 3.8% of its coastal wetlands. Between 1955 and 1978, about 24,000 acres of Maryland's coastal wetlands and inland vegetated wetlands disappeared. Maryland lost 9% of its coastal wetlands. Between 1956 and 1977, over 63,000 acres of Virginia's coastal and inland vegetated wetlands were lost, with an overall loss of 6.3% of the coastal wetlands. The coastal areas of Virginia, Maryland, and Delaware are absolutely critical habitat for young stages of scup.

The NMFS 1985 priorities on the multiple use issues and threats to living marine resources were identified in the RAP document (USDC 1985). Activities identified as high priority included urban and port development, ocean disposal, dams and agricultural practices. Medium priority activities included industrial waste discharges, domestic waste discharges, and OCS oil and gas development (Table 19). These priorities are currently being re-evaluated (Peterson pers. comm.).

Finally, habitat alteration by the fishing activities themselves is perhaps the least understood of the important environmental effects of fishing (National Research Council 1994). Alterations to resource habitats due to fishing may result from the loss of habitats of non-target species, such as species encrusting cobbles, or of other epibenthic habitats, which may be important nursery areas for juvenile fish; from the alteration of nutrient levels and bottom sediment, including destruction of habitat by bottom trawling, dredging, and other fishing and processing operations; and from the generation of suspended debris that can have lethal effects long after fishing activities have ceased.

6.4. PROGRAMS TO PROTECT, RESTORE, PRESERVE, AND ENHANCE THE HABITAT OF THE STOCKS FROM DESTRUCTION AND DEGRADATION

The MFCMA provides for the conservation and management of living marine resources (which by definition includes habitat), principally within the EEZ, although there is significant concern for management throughout the range of the resource which includes the State controlled waters. The MFCMA also requires that a comprehensive program of fishery research be conducted to determine the impact of pollution on marine resources and how wetland and estuarine degradation affects abundance and availability of fish.

The MFCMA established Regional Fishery Management Councils that have the responsibility to prepare fishery management plans which address habitat requirements, describe potential threats to that habitat, and recommend measures to conserve those habitats critical to the survival and continued optimal production of the managed species. The NMFS Habitat Conservation Policy (48 FR 53142 - 53147), specifically Implementation Strategy 3, established the basis for a partnership between NMFS and the Councils to assess habitat issues pertaining to individual manages species. Under MFCMA, the action agencies (such as the Corps of Engineers) have to respond within 45 days to any Council's comments on habitat issues.

Other NMFS programs relative to habitat conservation are found in the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Anadromous Fish Conservation Act of 1965. The NMFS shares responsibilities with the FWS for conservation programs under these laws.

In addition to the above mentioned NMFS programs, other laws regulate activities in marine and estuarine waters and their shorelines. Section 10 of the River and Harbor Act of 1899 authorizes the Army Corps of Engineers (COE) to regulate all dredge and fill activities in navigable waters (to mean high water shoreline). Section 404 of the Clean Water Act of 1980 authorizes EPA to regulate the discharge of industrial and municipal wastes into waters and adjacent wetlands. EPA has delegated authority under Section 404 to the COE to administer all dredge and fill activities under one program. Section 401 of the Clean Water Act authorizes EPA, or delegated States with approved programs, to regulate the discharge of all industrial and municipal wastes. The EPA and COE also share regulatory responsibilities under the Marine Protection, Research, and Sanctuaries Act of 1972.

All of the activities regulated by these programs have the potential to adversely affect living marine resources and their habitat. The NMFS, EPA, FWS, and State fish and wildlife agencies have been mandated to review these activities, assess the impact of the activities on resources within their jurisdiction, and comment on and make recommendation to ameliorate those impacts to regulatory agencies. Review and comment authority is provided by the Fish and Wildlife Coordination Act of 1934 (as amended 1958) and the National Environmental Policy Act of 1969. Consultative authority extends to all projects requiring federal permits or licenses, or that are implemented with federal funds.

Other legislation under which NMFS provides comments relative to potential impacts on living marine resources, their associated habitats, and the fisheries they support include, but are not limited to, the

Coastal Zone Management Act of 1972; the Marine Protection, Research, and Sanctuaries Act of 1972; and the Endangered Species Act of 1973 (Section 7 consultation).

A more detailed discussion of the pertinent legislation affecting their protection, conservation, enhancement, and management of living marine resources and habitat can be found in the NMFS Habitat Conservation Policy (48 FR 53142-53147).

In addition, NMFS and the other Federal resource agencies are involved in other programs with the States (e.g., NMFS administers Saltonstall-Kennedy and Fish and Wildlife Service administers Wallop-Breaux programs) that provide grants to conserve fish habitats and improve fisheries management.

Individual States also regulate wetlands, which complements Federal habitat conservation programs. Over the past two decades, the United States has devised various public and private programs to protect and manage this valuable wetland resource. Unfortunately, most of these programs have addressed only limited aspects of the wetlands protection problem, and they have been adopted haphazardly and incoherently (The Conservation Foundation 1988). This has led to duplication and uncertainty, at times imposing burdensome costs. The existing programs also leave major gaps in the protection effort.

The members of the National Wetlands Policy Forum (The Conservation Foundation 1988) firmly believe the nation cannot afford to allow the present situation -- with its inadequate wetlands protection, its confusion, its costs and frustration -- to continue. The National Wetlands Policy Forum members recognize that wetlands protection is only one of many issues the nation is facing, but they believe it clearly merits a higher priority than it has received in the past.

6.5 MID-ATLANTIC FISHERY MANAGEMENT COUNCIL HABITAT POLICY (adopted by Council January 1987)

Recognizing that all species are dependent on the quantity and quality of their essential habitats, it is the policy of the Mid-Atlantic Fishery Management Council to:

Conserve, restore and develop habits upon which commercial and recreational marine fisheries depend, to increase their extent and to improve their productive capacity for the benefit of present and future generations. (for the purposes of this Policy, "HABITAT" is defined to include all those things, physical, chemical and biological that are necessary to the productivity of the species being managed.)

This policy shall be supported by three policy objectives which are to:

(1) Maintain the current quantity and productive capacity of habitats supporting important commercial and recreational fisheries, including their food base. (This objective will be implemented using a guiding principle of NO NET HABITAT LOSS).

(2) Restore and rehabilitate the productive capacity of habitats which have already been degraded.

(3) Create and develop productive habitats where increased fishery productivity will benefit society.

The Council shall assume an aggressive role in the protection and enhancement of habitats important to marine and anadromous fish. It shall actively enter Federal decision making processes where proposed actions may otherwise compromise the productivity of fishery resources of concern to the Council.

COUNCIL HABITAT RESPONSIBILITIES

The Council will assist in the development of each fishery management plan to insure that:

(1) Habitat significant to the species to be managed as well as its prey (where information is available) is adequately defined in the plan, and

(2) Recommendations to responsible agencies are included in the plan which identify habitat improvement or changes in Federal policies, which are necessary to achieve the objectives of the plan.

The Council will review those proposed habitat alterations, policy or other human actions which may have a significant adverse impact on those fisheries addressed in the Council's proposals and finding that adverse impacts will occur, the Council may file or present the Council's position to the Federal agency(s) responsible for the action which could (1) oppose the proposed action, (2) suggest project modifications or (3) seek full compensation for unavoidable fishery losses.

The Council may also recommend changes in the Federal statutes and their implementing regulations to protect marine fishery resources and their habitats in water development projects and policy.

GUIDELINES

The following guidelines could assist the Council in making its assessment of the proposed actions:

(1) The extent to which the activity would directly affect the production of fishery resources or their essential food base (e.g., as a result of dredging, filled marsh lands, pollution, reduced access, etc.);

(2) The extent to which precedent would be set in relation to existing or potential cumulative impacts of similar or other developments in the project area;

(3) The extent to which the activity would indirectly affect the production of fishery resources (e.g., alteration of circulation, salinity regimes, detrital export, etc.);

(4) The extent of any adverse impact that can be avoided through project modification or other safeguards (e.g., piers in lieu of channel dredging);

(5) The existence of alternative sites available to reduce unavoidable project impacts; and

(6) The extent to which the activity requires a waterfront location if dredging or filling wetlands is involved.

Project Review Process

(1) Significant projects shall be selected by Council using the following criteria:

(a) Judgment that significant adverse effects may occur; or

(b) Notification by the Council or staff of significant projects that should be considered.

(2) NMFS shall forward copies of public notices of significant Federally authorized projects or policy immediately to Council staff followed by special briefings, as appropriate, or by NMFS position statements, as developed.

(3) Council staff, when appropriate, shall catalog notices and forward copies to the Council. The staff shall request state and other Federal assessments (position statements) of project impact and forward them to the Council.

(4) When appropriate, Council shall develop a Council position.

(a) The Council may file adverse comments or recommended project modifications to reduce environmental damage with the Federal construction or regulatory agency (COE, FERC, etc.).

(b) Council staff or members may testify at public hearings, as needed.

(c) Council may hold public hearings, as appropriate.

(5) The Council shall report on its actions at Council meetings as needed.

Criteria to Define Significant Projects

(1) Projects that may directly affect fisheries or habitat for which the Council has a management or research interest.

(2) Projects which significantly affect habitat important to species managed under the MFCMA or important to species upon which managed species are dependent for food.

(3) Projects that may be precedent setting or in unique or critical habitat areas.

(4) Projects having a substantial or significant indirect impact on surface water flow, detritus export, saltwater intrusion, isolating nursery areas, etc.

(5) Highly "controversial" projects, i.e., those which generate much publicity, strong opinions from user of the affected resource.

6.6. HABITAT PRESERVATION, PROTECTION AND RESTORATION RECOMMENDATIONS

Management of fisheries requires both control of fishing mortality (by the Councils) and preservation and restoration of habitat (by the States, NMFS, F&WS EPA, and the Corps of Engineers). As noted above as a purpose for this action, the Council intends to work closely with these other agencies for habitat preservation.

Although these four species are not overexploited, like many other species in the northwest Atlantic, it is worthwhile to stress habitat conservation for increasing the survivability of juveniles, as well as management actions to control fishing mortality, which will strengthen the use of the habitat information in meeting the MAFMC mandates that "irreversible or long term adverse effects on fishery resources and the marine environment are avoided".

Loligo and butterfish are dependent on estuarine habitats for some of their life (section 6.1). It is precisely these habitats that are most vulnerable to anthropogenic impacts and loss. It is probable that fishing mortality rates on these species may not be larger than mortality associated with habitat loss, but mortality attributable to habitat loss reduces the amount of the resource harvestable by man. However, the essential habitat areas designated by the States (section 6.1.2) must be protected in order to allow these populations to be maintained with current fishing mortality rates.

The Council has the ability to control fishing mortality and reduce that component of risk through the Magnuson Act. Equally important to reducing risk is the quality of the habitat. In this area the primary Federal responsibility is that of EPA and the Corps of Engineers, since the Magnuson Act only allows the Council the right to comment on proposals. Spawning and nursery areas and migratory pathways must be protected and kept viable if fishing regulations are to succeed. Successful fishery management requires a partnership between the fishery managers and the habitat protection agencies for the programs to succeed. It would not be fair to place stringent regulations on the fishermen in order to solve the stock problems, only to lose any gains to pollution and habitat degradation. The recommendations that follow are made in keeping with this philosophy.

It is the policy of the Mid-Atlantic Fishery Management Council (section 6.5) to oppose any loss of aquatic habitat or wetlands which contributes to the conservation of fish stocks. Where loss of habitat is unavoidable locally, the Council endorses recreation of quantitatively and qualitatively equivalent habitat. The Council recognizes the multiple resource base of our coastal areas and recognizes the need to accommodate other natural resource management objectives with special sensitivity to goals that may be contrary to the objectives of fishery management. The intent of the Council is to support no net loss of fishery habitat while minimizing all detrimental alterations of these essential habitats.

This policy is intended to allow the MAFMC to optimize the management of fisheries in the mid-Atlantic EEZ through a concerted effort to establish a quality habitat and to seek to reverse the serious problems affecting the reproduction, size frequency and distribution of fish. The Council will accomplish this through participation in the review of private and government projects which would adversely affect fish production.

It is the Councils believe that there is a role for technology in protecting and restoring marine habitat. A report by the National Research Council (1994) finds that coastal engineering can and should play a positive role in protection and restoration work. However, the use of technology for these purposes is not a substitute for prudent and wise stewardship of marine resources. At the rate that coastal areas are being developed for industrial, commercial, and residential uses, and with significant losses from natural erosion and subsidence, there is no offsetting engineering fix to achieve "no net loss" of marine habitat (NRC 1994). Sound ecological principles need to be applied in measures to protect or restore marine habitats, Because of the complexity of natural ecosystems, full restoration of natural functions at altered or disturbed sites can take years, and is feasible in only some situations. In sum, technology has an important role to play in protecting and restoring marine habitats as one element of a national strategy to improve the management of these essential natural resources. Technology, is not an answer on to itself.

The Council is deeply concerned about the effects of marine and estuarine habitat degradation on fishery resources. They have a responsibility under the MFCMA to take into account the impact of habitat degradation on *Loligo, Illex,* mackerel and butterfish. The following recommendations are made in light of that responsibility and are in full accordance with the Council's Habitat Policy and Position Paper on Habitat and the Environment.

1. All available or potential natural habitat *Loligo, Illex,* mackerel and butterfish should be preserved by encouraging management of conflicting uses to assure access by the fish to essential habitat and maintenance of high water quality standards to protect migration, spawning, nursery, overwintering, and feeding areas.

2. Filling of wetlands should not be permitted in or near nursery areas. Mitigating or compensating measures should be employed where filling is unavoidable. Project proponents must demonstrate that project implementation will not negatively affect *Loligo, Illex,* mackerel and butterfish, their habitat, or their food sources.

3. Best engineering and management practices (e.g., seasonal restrictions, dredging methods, disposal options, etc.) should be employed for all dredging and in water construction projects. Such projects should be permitted only for water dependent purposes when no feasible alternatives are available. Mitigating or compensating measures should be employed where significant adverse impacts are unavoidable. Project proponents should demonstrate that project implementation will not negatively affect these species, their habitat, or their food sources.

4. The disposal of sewage sludge, industrial waste, and contaminated dredged material in *Loligo, Illex,* mackerel and butterfish habitat, including the New York Bight, should not be allowed. Advanced garbage, industrial waste, and sludge handling techniques are now available and must be encouraged. Specifically:

a. The Council opposes ocean dumping of industrial waste, sludge and other harmful materials.

b. The Council requests EPA require each permitted ocean dumping vessel be required to furnish detailed information concerning each trip to the dump site. This might be in the form of transponders; locked Loran C recorder plots of trip to and from the dump site; phone call to EPA when vessel leaves and returns to port; or other appropriate method to ascertain that vessels dump only in designated areas.

c. The Council requests fishermen and other members of the public to report to the EPA, Coast Guard and the Council any observance of vessels dumping other than in the approved dump sites. A list of permitted vessels would accompany this request with the additional request for reporting of any vessel not on the approved list. The report should include date, time, location (longitude, latitude, Loran bearings), vessel name of the dumping vessel, the nature of the material dumped, name of reporting individual and vessel. Photographs taken by witnesses and a willingness to personally testify against alleged violators are also desirable. This would enable EPA or the Coast Guard to take appropriate action against illegal dumping.

d. The Council strongly urges State and Federal environmental agencies to reduce the amount of industrial waste, sludge and other harmful materials discharged into rivers and the marine environment, and for these agencies to increase their surveillance monitoring and research of waste discharge. The Council requests that the Environmental Protection Agency implement and enforce all legislation, rules and regulations with emphasis on the best available technology requirements and pretreatment standards.

5. Ocean disposal of fish waste should not be allowed in any areas where environmental harm may occur. The burden of proof that no environmental harm exists should be on the entity proposing the disposal. An environmental monitoring program to characterize the proposed site prior to, during, and after disposal occurs must be undertaken and is the financial responsibility of the entity benefiting from the use of the ocean environment. As an example, the dumping of fish wastes in areas of surf clams or scallops could provide enrichment that could trigger undesirable organisms, such as paralytic shellfish poisoning (PSP).

6. The siting of industries requiring water diversion and large volume water withdrawals should be avoided in *Loligo, Illex,* mackerel and butterfish essential areas. Project proponents must demonstrate that project implementation will not negatively affect these species, their habitat, or their food supply. Where such facilities currently exist, best management practices must be employed to minimize adverse effects on the environment.

7. Dechlorination facilities should be used to destroy chlorine at sewage treatment plants and power plants.

8. No toxic substances in concentrations harmful (synergistically or otherwise) to humans, fish, wildlife, and aquatic life should be discharged. The EPA's Water Quality Criteria Series should be used as guidelines for determining harmful concentration levels. Use of the best available technology to control industrial waste water discharges must be required in areas critical to the survival of these species. Any new potential discharge into critical areas must be shown not to have a harmful effect on *Loligo, Illex,* mackerel and butterfish. In calculating potential impacts, the stratification affects of mixing zones should be carefully considered.

9. The EPA, for the EEZ, and States, for the Coastal Zone, should review their water quality standards and make changes as needed with respect to the habitat requirements of *Loligo, Illex,* mackerel and butterfish migratory passage and feeding and to maintain edible fish and shellfish; that is, flesh and organ buildup of contaminants must be considered.

10. Water quality standards in nursery, spawning, feeding, and areas of migratory passage should be enforced rigidly by State or local water quality management agencies, whose actions should be carefully monitored by the EPA. Where State or local management efforts (standards/enforcement) are deemed inadequate, EPA should take steps to assure improvement; if these efforts continue to be inadequate, EPA should assume authority, as necessary.

11. Appropriate measures must be taken as soon as possible to reduce acid precipitation and runoff

into estuaries and near shore waters.

12. EPA and appropriate agencies must establish and approve criteria for vegetated buffer strips in agricultural areas adjacent to nursery areas to minimize pesticide, fertilizer, and sediment loads to these areas critical for survival. The effective width of these vegetated buffer strips varies with slope of terrain and soil permeability. The Soil Conservation Service and other concerned Federal and State agencies should conduct programs and demonstration projects to educate farmers on improved agricultural practices that would minimize the wastage of pesticides, fertilizers, and top soil and reduce the adverse effects of these materials.

13. The Mid-Atlantic Council will cooperate with NMFS and the New England and South Atlantic Councils in a review of the broad range of human activities having the potential to adversely affect squid, mackerel and butterfish.

6.7. HABITAT RESEARCH NEEDS

The National Status and Trends Program of NOAA (USDC 1987b and 1989b) should provide guidance in making intelligent decisions involving the use and allocation of resources in the nation's coastal and estuarine regions. These decisions require reliable and continuous information about the status and trends on environmental quality in the marine environment. Four general objectives have been established for the early years of the National Status and Trends Program (USDC 1987b and 1989b). Those objectives are (1) to establish a national data base using state of the art sampling, preservation, and analysis methodologies; (2) to use the information in the data base to estimate environmental quality, to establish a statistical basis for detecting spatial and temporal change, and to identify areas of the nation that might benefit from more intensive study; (3) to seek and validate additional measurement techniques, especially those that describe a biological response to the presence of contaminants; and (4) to create a cryogenic, archival specimen bank containing environmental samples collected and preserved through techniques that will permit reliable analysis over a period of decades. While the Council concurs with these objectives, efforts by this program or other NMFS programs also must look at specific issues which include:

1. It is necessary that scientific investigations be conducted on *Loligo, Illex,* mackerel and butterfish to emphasize the long term, synergistic effects of combinations of environmental variables on, for example, reproductive capability, genetic changes, and suitability for human consumption.

2. The Council recommends the following areas for future habitat directed investigations: field studies on the direct and indirect effects of contaminants on mortality; studies on the interactive effects of pH, contaminants, and other environmental variables on survival of *Loligo, Illex,* mackerel and butterfish; and continued studies on the importance of factors controlling the production and distribution of food items that appear in the diet of these four species.

7. DESCRIPTION OF FISHING ACTIVITIES

7.1. US COMMERCIAL FISHERY

7.1.1. *Loligo pealei*

United States fishermen have been landing squid along the Northeastern coast of the US since the 1880's (Kolator and Long 1978). The early domestic fishery utilized fish traps and otter trawls but was of relatively minor importance to the US fishery due to low market demand. The squid taken were used primarily for bait (Lux *et al.* 1974). However, squid have long been a popular foodfish in various foreign markets and therefore a target of the foreign fishing fleets throughout the world, including both coasts of North America (Okutani 1977). USSR vessels first reported incidental catches of squid off the Northeastern coast of the United States in 1964. Fishing effort directed at the squids began in 1968 by

USSR and Japanese vessels. By 1972, Spain, Portugal and Poland had also entered the fishery. Reported foreign landings of *Loligo* increased from 2000 mt in 1964 to a peak of 36,500 mt in 1973 (Table 20). Foreign *Loligo* landings averaged 29,000 mt for the period 1972-1975.

Foreign fishing for *Loligo* began to be regulated with the advent of extended fishery jurisdiction in the US in 1977. Initially, US regulations restricted foreign vessels fishing for squid (and other species) to certain areas and times (the so-called foreign fishing "windows"), primarily to reduce spatial conflicts with domestic fixed gear fishermen and minimize bycatch of non-target species. The result of these restrictions was an immediate reduction in the foreign catch of *Loligo* from 21,000 mt in 1976 to 9,355 mt in 1978.

By 1982, foreign *Loligo* catches had again risen above 20,000 mt. At this time, US management of the squid resources focused on the Americanization of these fisheries. This process began with the development of joint ventures between US fishermen and foreign concerns. Domestic Annual Harvest (DAH) was increased from 7,000 mt in the 1982-83 fishing year to 22,000 mt for 1983-84. Foreign allocations were reduced from 20,350 mt during 1982-83 to 5,550 mt during 1983-84 (Lange 1985). The foreign catch of *Loligo* fell below 5,000 mt by 1986, to 2 mt in 1987 and finally to zero in 1990.

The development and expansion of the US squid fishery was slow to occur for several reasons. First, the domestic market demand for squid in the US has traditionally been limited to the bait market. Secondly, the US fishing industry lacked both the catching and processing technology necessary to exploit squid in offshore waters. In the late 19th and early 20th century, squid were taken primarily by pound nets. Even though bottom otter trawls eventually replaced pound nets as the primary gear used to capture squid during this century, the US industry did not develop the appropriate technology to catch and process squid in deep water until the 1980's.

The annual US domestic squid landings (including *Illex* landings) from Maine to North Carolina averaged roughly 2,000 mt from 1928-1967 (NMFS 1994). During the period 1965-1980, US *Loligo* landings ranged from roughly 1,000 mt in 1968 to 4,000 mt in 1980. The US *Loligo* fishery began to increase dramatically beginning in 1983 when reported landings exceeded 15,000 mt. Since the cessation of directed foreign fishing in 1987, the US domestic harvest of *Loligo* has averaged 17,800 mt during 1987-1992 (Table 20). The ex-vessel value of US caught *Loligo* increased from 7.8 million dollars in 1983 to 23.3 million in 1992 (Table 21).

In 1992 *Loligo* landings totaled 18,172 mt, a total of 99% of which was taken by otter trawl (Table 22). Nearly half of the 1992 harvest (8,112 mt) was take from statistical area 616, while six statistical areas (616, 537, 613, 622, 612, and 526; Figure 21) accounted for 87% of the total landings. Seasonally, 81% of the 1992 *Loligo* landings occurred in winter and autumn (Jan-Apr and Oct-Dec)(NMFS 1994). Provisional data for 1993 indicate that total US *Loligo* landings were 21,500 mt.

Historically (1983-1992), the inshore fishery has accounted for roughly 40% (1982-1983) of the total *Loligo* catch (Table 21). However, since 1989, greater than 80% of the total catch was made in offshore waters. In 1992, the vast majority (97%) of *Loligo* were taken in offshore waters.

A summary of species landed on otter trawl trips landing at least 2,500 lbs of *Loligo* in 1992 is given in Table 23. The total weight of *Loligo* landed based on the 2,500 lb threshold represented 93.8% of total *Loligo* landings for the year. *Loligo* accounted for 48.9% of the weight landed on these trips. More than half (51.9%) of the value of these trips was attributed to *Loligo*. The top five species in terms of weight landed in association with *Loligo* on these trips were silver hake, Atlantic mackerel, scup, butterfish and *Illex*. In terms of value, the top five associated species were silver hake, summer flounder, scup, butterfish and Atlantic mackerel.

7.1.2. ***Illex illecebrosus***

As in the case of *Loligo*, *Illex* have been exploited by US fishermen since at least the late 1800's, being used primarily as bait. From 1928 to 1967, reported annual US squid landings from Maine to North

Carolina (including *Loligo pealei*) ranged from 500-2,000 mt (Lange and Sissenwine 1980). However, foreign fishing fleets became interested in exploitation of the neritic squid stocks of the Northwest Atlantic Ocean when the USSR first reported squid bycatches in the mid-1960's. By 1972, foreign fishing fleets reported landing 17,200 thousand mt of *Illex* from Cape Hatteras to the Gulf of Maine. During the period 1973-1982, foreign landings of *Illex* in US waters averaged about 18,000 mt, while US fisherman averaged only slightly more than 1,100 mt per year (Table 24). Foreign landings from 1983-1986 were part of the US joint venture fishery which ended in 1987 (NMFS 1994). The domestic fishery for *Illex* increased steadily during the 1980's as foreign fishing was eliminated in the US EEZ. US landings first exceeded 10,000 mt in 1987 and ranged roughly from 11,000 mt in 1990 to 17,800 mt in 1992.

Because their geographical range extends well beyond the US EEZ, *Illex* are subject to heavy exploitation in waters outside of US jurisdiction. During the mid-1970's, a large directed fishery for *Illex* developed in NAFO sub-areas 2-4 (Figure 22). Reported landings of *Illex* increased dramatically from 17,700 mt in 1975 to 162,000 mt in 1979. *Illex* landings in NAFO subareas 2-4 subsequently plummeted to slightly less than 13,000 mt by 1982. Hence, within the total stock of *Illex* (NAFO Subareas 2-6) landings peaked in 1979 at 180,000 mt but have since declined sharply, ranging from 2,800 to 22,200 mt during the period 1983-1991 (NMFS 1994).

In 1992, US *Illex* landings were a record high 17,827 mt with an ex-vessel value of $9,700,000 (average price = $0.54 per kg/$0.25 per lb). Statistical area 622 accounted for 63% of the total harvest, while three areas (SA 622,626, and 632) accounted for 96% of the total in 1992 (Table 25). Temporally, 94% of the 1992 *Illex* landings were taken during June through October. Bottom otter trawl gear accounted for virtually all (99.9%) of the 1992 landings (NMFS 1994).

A summary of species landed on otter trawl trips landing at least 50,000 lbs of *Illex* in 1992 is given in Table 26. The total weight of *Illex* landed based on the 50,000 threshold represented 96% of total *Illex* landings for the year. Compared to the *Loligo* fishery, trips directed at *Illex* landed predominantly that species with relatively little bycatch. *Illex* accounted for 97.7% of the weight landed on these trips and 92.7% of the value. The top five species landed, in both weight and value, in association with *Illex* on these trips were butterfish, *Loligo* squid, swordfish, goosefish (angler) and bluefish.

7.1.3. Atlantic mackerel

7.1.3.1. Commercial fishery

Atlantic mackerel have a long history of exploitation off the northeastern coast of the United States dating back to colonial times. American colonists of the 1600's considered mackerel one of their most important staple commodities (Hoy and Clark 1967). The principal commercial gear was the haul seine prior to 1800. Hook and line then became the primary gear until about 1850 when the purse seine was introduced and largely replaced the traditional hook and line method (Anderson and Paciorkowski 1978).

Formal record keeping for Atlantic mackerel in the US began in 1804. During 1804-1818, the US fishery was confined to near shore waters and annual landings averaged about 3,100 mt. Reported landings then increased sharply when the offshore salt mackerel fishery developed in 1818. As the market for salt mackerel grew, so did the fleet in both size and number of vessels. Within 20 years, more than 900 sailing vessels operated from US ports and landings subsequently reached a pre-1850 peak of 80,300 mt in 1831. Annual US landings averaged 41,700 mt from 1819 to 1885 but varied from 10,500 mt in 1840 to 81,300 mt in 1884. The Canadian mackerel fishery developed later than in the US, and although catch statistics were first reported in 1876, their fishery was probably significant since 1850. Combined US and Canadian landings peaked in 1885 at 106,000 mt, but declined sharply to 13,300 mt by 1889 (Anderson and Paciorkowski 1978).

Landings remained low during the period 1886-1924, averaging 18,100 mt per year (9,400 mt US, 11,700 mt Canadian). The fishery changed significantly during this period as vessels changed from sail to motor power and market demand shifted from salted to fresh mackerel. Average landings subsequently increased to 35,200 mt (23,500 mt US, 11,700 mt Canadian) for the period 1925-1949 with the highest level of 49,200 mt in 1944. Landings gradually declined during the next decade, falling to 6,100 mt in 1959 (Hoy and Clark 1967; Anderson and Paciorkowski 1978).

The modern northwest Atlantic mackerel fishery underwent dramatic change with the arrival of the European distant-water fleets (DWF) in the early 1960's. While the first DWF landings reported in 1961 were not large (11,000 mt), they increased substantially to over 114,000 mt by 1969 (Table 27). Total international commercial landings (NAFO Subareas 2-6, Figure 22) peaked at 437,000 mt in 1973 and then declined sharply to 77,000 by 1977 (Overholtz 1989).

The Magnuson Act of 1976 established control of the portion of the mackerel fishery occurring in US waters (NAFO Subareas 5-6) under the auspices of the Mid-Atlantic Fishery Management Council. Reported foreign landings in US waters declined from an unregulated level of 385,000 mt in 1972 to less than 400 mt from 1978-1980 under Magnuson (the foreign mackerel fishery was restricted by NOAA Foreign Fishing regulations to certain areas or "windows"). Under the control of the MAFMC Mackerel FMP and subsequent amendments, foreign mackerel catches were permitted to increase gradually to 15,000 mt in 1984 and then to a peak of almost 43,000 mt in 1988.

Recent US management policy of no TALFF combined with political and economic changes in Eastern Europe resulted in a decline in foreign landings from 9,000 mt in 1991 to 0 in 1992 and 1993. US commercial landings of mackerel increased steadily from roughly 3,000 mt in the early 1980's to greater than 31,000 mt in 1990. However, US mackerel landings have since declined to 12,418 mt in 1992 and 3,962 mt in 1993.

A summary of species landed on otter trawl trips landing at least 10,000 lbs of Atlantic mackerel in 1992 is given in Table 28. The total weight of Atlantic mackerel landed based on the 10,000 lb threshold represented 86% of total Atlantic mackerel landings for the year. Atlantic mackerel accounted for 61.2% of the weight landed on these trips but only 31.5% of the value. The top five species landed in terms of weight in association with Atlantic mackerel on these trips were Atlantic herring, *Loligo* squid, silver hake,scup, and butterfish. In terms of value, the top five species were *Loligo* squid, silver hake, scup, butterfish, and Atlantic herring.

7.1.3.2. Recreational fishery

The Atlantic mackerel is seasonally important to the recreational fisheries of the Mid-Atlantic and New England regions. They are available to recreational anglers primarily during the spring migration. Historically, mackerel first appear off Virginia in March and gradually move northward. Christensen *et al.* 1979 found mackerel to be available to the recreational fishery from Delaware to New York for about three weeks (generally from early April to early May). As a result, the annual recreational catch of mackerel appears to be sensitive to changes in their migration and subsequent distribution pattern (MAFMC 1983).

Since 1979 recreational mackerel landing have varied without trend from 1,100 mt in 1982 to 4,700 mt in 1987. Recreational mackerel landings occur from Virginia to Maine, with highest catches from New Jersey to Massachusetts (Table 29). New Jersey accounted for 37% of the recreational mackerel landings for the period 1979-1991, followed by Massachusetts (25%) with the remaining States landing roughly equal amounts of Atlantic mackerel.

7.1.4. Atlantic Butterfish

Atlantic butterfish were landed exclusively by US fishermen from the late 1800's (when formal record keeping began) until 1962 (Murawski and Waring 1979). Reported landings averaged about 3,000 mt from 1920-1962 (Waring 1975). Beginning in 1963, vessels from Japan, Poland and the USSR began to exploit butterfish along the edge of the continental shelf during the late-autumn through early spring. Reported foreign catches of butterfish increased from 750 mt in 1965 to 15,000 mt in 1969, and then to about 18,000 mt in 1973. With the advent of extended jurisdiction in US waters, reported foreign landings declined sharply from 10,353 mt in 1976 to 1,326 mt in 1978. Foreign landings were slowly phased out by 1987. Since 1988, foreign butterfish landings have averaged about 1 mt.

During the period 1965-1976, US Atlantic butterfish landings averaged 2,051 mt. From 1977-1987, average US landings doubled to 5,252 mt, a historical peak of slightly less than 12,000 mt landed in 1984. Since then US landings have declined sharply to an average of 2,500 mt since 1988 (Table 30). Recent levels of harvest represent only 25% of the domestic allowable harvest of 10,000 mt and are well below historical yields. Recent reductions in Japanese demand for butterfish has probably had a negative effect on butterfish landings.

Butterfish landings totalled 2,700 mt in 1992. Almost half (45%) of the 1992 total came from southern New England waters (Statistical Area 53, Table 31). Two statistical areas, 53 and 61, accounted for over 75% of the 1992 total. About half of the landings occurred during January and February, the remainder being distributed throughout the rest of the year (Table 31).

A summary of species landed on otter trawl trips landing at least 500 lbs of butterfish in 1992 is given in Table 32. The total weight of butterfish landed based on the 500 lb threshold represented 91.6% of total butterfish landings for the year. Butterfish accounted for only 8.3% of the weight landed on these trips and 8.8% of the value. The top five species landed in association with butterfish on these trips were *Loligo*, silver hake, *Illex*, Atlantic mackerel, and scup. In terms of value, the top five species were *Loligo*, silver hake, summer flounder, scup, and *Illex*. These data illustrate the non-directed nature of the butterfish fishery.

8. DESCRIPTION OF ECONOMIC CHARACTERISTICS OF THE FISHERY

8.1. DOMESTIC HARVESTING SECTOR

8.1.1. Commercial Fishery

Loligo pealei has experienced an increase in consumer demand in both domestic and foreign markets over the past ten years. Strong market demand in combination with a decline in traditional groundfish species in the Northeastern US and the "Americanization" of this fishery has led to the rapid expansion of catch and revenue to US harvesters. In nominal terms, the ex-vessel value of *Loligo pealei* landings has steadily increased from $5.9 million in 1984 to $29.6 million in 1993. When adjusted for inflation (in 1982 dollars), 1993 landings were still valued at $23.7 million. Nominal ex-vessel price increased from $588/mt in 1984 to $1,329/mt in 1993. Even when adjusted for inflation, average ex-vessel value of *Loligo* nearly doubled over the past ten years (Figure 23).

The average price and total value of US *Illex* landings over the past ten years were more variable when compared to *Loligo*, reflecting more variable abundance and availability to US harvesters. However, the nominal value of *Illex* landings increased overall nearly ten-fold from $862,000 in 1984 to $8.6 million in 1993 with a record US landings value of $9.7 million in 1992. Adjusted for inflation, *Illex* ex-vessel prices increased by 64% from $241/mt in 1984 to $395/mt in 1993. Deflated price for *Illex* reached a peak of $500/mt in 1991 (Figure 24).

Since 1984, the ex-vessel value of Atlantic mackerel (not including joint ventures) ranged from a low of $978,500 in 1985 to a high of $4.8 million in 1991. Prior to 1988 the landed value of Atlantic mackerel averaged roughly one million dollars. Since then landings by US vessels have increased and hence landed value increased steadily from 1987-1991 and have since declined. In contrast to the squid species, the nominal price for Atlantic mackerel in 1993 ($283/mt) was actually less than in 1984 ($317/mt). During this time period, price fluctuated from a low of $226/mt in 1987 to a high of $384/mt in 1989. In deflated terms, the value of US mackerel landings were level at slightly less than $1.0 million from 1984-1987 and then rose continually to a peak of $4.2 million in 1991 (Figure 25). Since then the value of US mackerel landings have declined to less than $1.0 million.

Prior to 1984, butterfish ex-vessel value (Maine-Virginia) increased steadily from $970,000 in 1974 to $3.3 million in 1983 with a peak occurring in 1982 at $5.1 million. During that period prices ranged from $542/mt (1975) to $798/mt (1978), with 1983 at $705/mt. Peak landings for the period 1965-1993 occurred in 1984 (roughly 12,000 mt) and price subsequently fell to $592/mt. Since then the volume of butterfish landed has declined, but the price (adjusted for inflation) doubled from $720/mt in 1985 to $1,423/mt in 1986. The adjusted value and price subsequently declined throughout the 1980's with a recent increase observed in 1993 (Figure 26). Total value of butterfish landed exceeded $6.0 million in 1984, 1986, and 1987 and then gradually declined from 1987-1991. Total ex-vessel value increased to 5.6 million dollars in 1993.

8.1.2. Recreational Fishery

Marine recreational fishing is important in the New England and Mid-Atlantic regions with 1975 sales estimated to be a minimum of $634 million (Centaur Management Consultants 1977). Direct sales related to marine recreational fishing for all species from North Carolina to Maine were most recently estimated to be $1.8 billion in 1985 (SFI 1988). These sales and services required an estimated 30 thousand person-years and generated wages of $370 million. Estimates of the economic activity specifically associated with marine recreational fishing for Atlantic mackerel were not available from the SFI study.

The only estimates of economic activity associated with the recreational mackerel fishery were made by MAFMC (1990). Using estimates of the number of Atlantic mackerel trips and average cost per trip by mode in 1978 and 1979 provided by Christensen et al. (1979), MAFMC (1990) estimated direct expenditures for mackerel fishing in the Mid-Atlantic region of $1.62 million in 1978 and $1.75 million 1979.

No data exist on the economics of the recreational fishing for squid or butterfish. These species are important as bait in other recreational fisheries, therefore, they become a direct expense in these fisheries.

8.2. DOMESTIC PROCESSING SECTOR

The National Marine Fisheries Service conducts a voluntary survey of the processing sector of the US east coast fisheries annually (Koplin, pers. comm.). Information is collected from processors and wholesale dealers. Annual estimates of the production and associated employment for the Atlantic mackerel, squid, and butterfish (MSB) species complex for the period 1983-1992 are given in Table 33. The number of companies which processed the MSB complex ranged from 13 in 1985 to 19 in 1992. Average employment by those companies rose from 348 employees in 1985 to 1,343 in 1991. Total pounds of Atlantic mackerel, squid, and butterfish processed ranged from 3.1 to 4.8 million pounds during the period 1983-1989 and then increased sharply to 13.6 million pounds in 1990. The value of the MSB complex processed followed a similar pattern showing a dramatic increase in recent years. In 1992, the total value of the complex was $27.8 million. The vast majority of the value (99%) in 1992 was attributed to squid.

8.3. INTERNATIONAL TRADE

8.3.1. The World Market for Squid

Perhaps the most closely watched squid fishery in the world is that which occurs in the South West Atlantic, off the Falkland Islands and Argentina. Species of both *Loligo* and *Illex* are harvested there, and the enormous catches which were brought back from the area in 1988 and 1989 led to a huge glut on the world market, with volumes placed in cold storage which required years to work down.

Catches from the South West Atlantic have fallen off substantially in the intervening years, with 1993 and early 1994 harvests a particular disappointment. *Illex* harvests dropped 30% from 1992, and the 1994 total is expected to be down by 58% (FAO 1994b). These events have had an impact on squid prices in all markets. Squid prices have continued to rise in the first half of the year for all product forms and species, with the exception of the Italian market, where *Illex* has never played an important role.

Other factors which contributed to tighter squid supplies in 1993 include (Ross 1994):

- The international ban on large scale driftnet fisheries reduced squid landings by the major producing nations of Japan, Korea, and Thailand.
- Financial problems experienced by the Eastern European fleet reduced their squid fishing effort.
- The fishery off California for *Loligo opalescens* experienced below normal landings in the spring of 1993.

Japan is the largest market for squid in the world. The shortage in 1993 is the probable cause for a sharp decline of Japanese imports of squid: only 44,000 mt were purchased in 1993, a drop of 17% from 1992. Argentine shipments of *Illex* to Japan decreased by almost 60% to 5,400 mt (FAO 1994a).

Japanese Imports of Squid (FAO 1994a)

Year	1988	1989	1990	1991	1992	1993
Thou. Tons	47.9	48.2	53.0	46.2	52.9	44.0

As a result of lower landings and imports, Japanese inventories of squid fell to 80,098 mt on May 31, 1994, a decline of over 30% from a year earlier (Sonu 1994). With inventories down in Spain as well, prices are only expected to increase.

8.3.2. US Exports

US cold storage holdings of squid were 2,151 mt on 4/30/94, down 36% from a month earlier, but up 56% from the 1,380 mt in storage one year ago (Infofish Trade News, 1994a).

Export statistics for US squid are frequently inaccurate in their identification of the species involved, and the fact that exporters might send a shipment by truck or rail across the US to leave from a port on the opposite coast makes the "port of export" an unreliable determinant of where the squid actually came from. Most of the "loligo" squid which is exported from the US actually *Loligo opalescens* caught off the coast of California.

Total exports of all species of US squid amounted to 23,490 mt in 1993, an increase of 3% over the 22,725 mt shipped in 1992. Average value actually dropped from $1,516/mt to $1,432/mt, and is thought to be due to unexpectedly heavy year-end landings of West Coast *Loligo* having to be sold at reduced prices to clear out inventory (Ross 1994).

"*Loligo pealei* continues to show strong demand in several European markets, especially for the larger sizes. The Italian market demand was up for the large size and high quality *Loligo pealei* through the third quarter of the year, but currency devaluations of the lira and supply problems eventually resulted in consumer price resistance. In addition, supplies from Thailand were down, although supplies of inexpensive Indian squid began to appear at reduced prices. Total US squid exports to Italy decreased by 12% in volume to 3,555 mt and 18% in value down to $7.0 million in 1993." (Ross 1994)

8.3.3. Trade Barriers

Japan has an import quota which covers squid that operates similarly to the "98 Country Quota" described in the "Mackerel - Trade Barriers" section. The main difference is that the squid quota limits volume, while the mackerel quota limits the total value of imports, and is denominated in US dollars (Ross 1994).

The EC had a minimum reference price for *Illex* that was in effect from July 6, 1990 through June 30, 1991. It has not been reactivated since that time (Ross 1994).

8.3.4. 1994 MAFMC Processor Survey Results for *Loligo* squid

Each year the Mid-Atlantic Council surveys East Coast processors to ascertain their expectations on current and future *Loligo* production. Totals are not directly comparable between years because the respondents (and their numbers) will differ from year to year.

Production estimates for *Loligo* squid are as follows (mt):

Product/Market	1994 (18 Reporting)	1995 (13 Reporting)
US Food Market	8,581	8,557
US Bait Market	160	110
Foreign Export Market	10,128	2,911
TOTAL	18,869	11,578

The 1995 production estimates must be considered as conservative due to the lower number of respondents. A number of the larger known processors failed to return the survey.

In order to more accurately assess processor's expectations, amounts expected to be processed in 1994 v. 1995 were compared for only those firms which provided estimates for both years. For these firms, projected needs increased 35% in 1995.

8.3.5. Current Market Overview for *Illex*

Domestic commercial landings of *Illex* will likely reach an all-time high in 1994, as world demand has been strong and it is one of the very few remaining species on the east coast that has been available in quantity this season. The severe depletion of the groundfish resource and the scarcity of *Loligo* has brought a great deal of attention to *Illex*.

8.3.6. The World Market for *Illex* Squid

World markets for both *Illex* and *Loligo* are intertwined, and were discussed previously for *Loligo*. A summary statement would characterize world supplies of *Illex* as being significantly lower than in recent years, and that prices in the near term are likely to rise.

Export statistics for both *Illex* and *Loligo* were discussed previously for *Loligo*, due to the difficulty in distinguishing between them (and west coast squid) using current data collected by the Bureau of Census.

Major export markets for US squid have traditionally been found in Italy, Spain, and Greece. Italy shows a distinct preference for *Loligo pealei* in the larger size ranges. The Greek market prefers smaller sized squid, either *Loligo pealei* or *Loligo opalescens*. Spain has traditionally shown a preference for either of the east coast squids over *Loligo opalescens,* however a devaluation of the peseta in 1993 had the result of improving sales of smaller sized squid and the less expensive west coast squid. (Ross 1994)

8.3.7. Processor Survey Results for *Illex* squid

Each year the Mid-Atlantic Council surveys East Coast processors to ascertain their expectations on current and future *Illex* production. Totals are not directly comparable between years because the respondents (and their numbers) will differ from year to year.

Production estimates for *Illex* squid are as follows (mt):

	1994 (18 Reporting)	1995 (13 Reporting)
US Food Market	5,456	6,679
US Bait Market	17,238	9,919
Foreign Export Market	19,467	13,263
TOTAL	42,161	29,861

The 1995 production estimates must be considered as conservative due to the lower number of respondents. A number of the larger known processors failed to return the survey.

In order to more accurately assess processor's expectations, amounts expected to be processed in 1994 v. 1995 were compared for only those firms which provided estimates for both years. For these firms, projected needs increased 17% in 1995.

8.3.8. Current Market Overview for Butterfish

Japan is the only major market outside the US for butterfish. Due to the continuing Japanese recession and much higher imports from the US, the market is currently in oversupply.

8.3.9. US Production and Exports

While annual landings of butterfish have exceeded 10,000 mt in the past 12 years, from 1990 to 1992 they remained under 3,000 mt. Then in 1993 harvests jumped 61% to 4,430 mt, at an average value of over $1,500 per mt.

Much of this production was sent straight to the Japanese market, which imported 2,215 mt from the US in 1993, up 80% from the previous year. The average price reached $2,912 per mt, up from just over $2,600 in 1992.

High inventories from 1991 were finally eliminated in 1992. Yet in 1993, mainly due to high prices, many Japanese processors dropped butterfish from their product list, and the Japanese market actually shrunk even as US exports increased by 80%. As the year progressed, Japanese processors began to substitute jack mackerel imported from the Netherlands, a major competitor of US butterfish. Since butterfish are harvested throughout the winter months in New England, landings continued strong into early 1994 and exports continued to flow into Japan (Ross 1994).

"Due to the jump in exports, high prices, and the ongoing Japanese recession, there is currently an oversupply of butterfish on the Japanese market, resulting in lower prices and high inventories. The situation is expected to deteriorate further in 1994 as US landings continue to exceed recent catch levels." (Ross 1994)

8.3.10. Processor Survey Results for Atlantic Butterfish

Each year the Mid-Atlantic Council surveys East Coast processors to ascertain their expectations on current and future butterfish production. Totals are not directly comparable between years because the respondents (and their numbers) will differ from year to year.

Production estimates for butterfish are as follows (mt):

Product/Market	1994 (18 Reporting)	1995 (13 Reporting)
US Food Market	1,386	791
US Bait Market	699	663
Foreign Export Market	5,395	4,710
TOTAL	7,480	6,164

The 1995 production estimates must be considered as conservative due to the lower number of respondents. A number of the larger known processors failed to return the survey.

8.3.11. Current Market Overview for Mackerel

Global landings of Atlantic mackerel have been on an increasing trend, leaving ample supplies and leading to a price decline in a number of markets. US exporters will continue to face a very difficult challenge in placing product abroad.

Jamaica has been one of the more steady, promising markets for US frozen mackerel, and 1993 saw Jamaican purchases fall to under 1,000 mt from over 1,700 mt purchased in 1992 (Ross 1994). The brief surge of exports to Japan in 1991 has likewise fallen sharply.

The key problem for the US fishery remains that of Atlantic mackerel not being a desirable fish in the eyes of most American consumers, and transportation costs have been prohibitive in shipping this low-value, bulk product to foreign markets where it enjoys greater acceptance. In order to compete in the world bulk market, the US will have to emulate its foreign competitors which harvest, process, and ship mackerel in large quantities so as to take advantage of economies of scale.

In the short term, US exporters have been working hard at expanding high-value niche markets which will accept the smaller sized (400 - 600 gram), lower fat mackerel typical of the US east coast. Some progress has been made in Japan for products such as dehydrated mackerel loins and vinegared mackerel (Ross 1994).

8.3.12. Major World Producers of Atlantic Mackerel

The leading producers of Atlantic mackerel in 1991 were the United Kingdom, Norway, Ireland, the Netherlands, and Russia (FAO 1993):

Country	1991 Landings (mt)
United Kingdom	184,900
Norway	151,300
Ireland	75,300
Netherlands	39,700
Russia	32,200

8.3.13. Major World Consumers of Atlantic Mackerel

Major importing countries of Atlantic mackerel include Japan, Nigeria, the Netherlands, Egypt, and Denmark (FAO 1993):

Country	1991 Imports (mt)
Japan	196,200
Nigeria*	40,000
Netherlands	67,800
Egypt*	20,000
France	30,900
Denmark	30,800

* *Estimates*

While the Eastern European nations and former Soviet Union do not appear in this list, they also represent a very important market for Atlantic mackerel.

8.3.14. Recent Trends in the World Mackerel Market

Much of what is important in the world market for mackerel revolves around events in a few key nations and markets. For many years, Japan was a leading producer of mackerel, with landings of over 1.6 million tons recorded in 1978 (USITC 1993). Over the years their landings have decreased steadily, amounting to only 527,000 tons in 1989, and then suffering a sharp fall to 273,000 in 1990.

Since Japan is a leading consumer of mackerel, this turn of events forced them to become the world's largest importer of mackerel, climbing from a mere 1,155 mt in 1985 (Sonu 1992) to over 192,000 mt in 1991.

Norway has been a preferred supplier of the Japanese market for some time, and has consistently placed far more product there than the United Kingdom, which is currently the largest producer and exporter of mackerel. Back in 1988, Norway exported over 30,000 mt to Japan, while the UK sold less than 1,200 mt. An important advantage which both these nations have over the United States is the distinct characteristics which Atlantic mackerel from European waters have relative to the same species off the northeast coast of the US. European mackerel have a higher fat content than their North American counterparts, as well as reaching a larger average size and having a "blunter," deeper shape. All of these characteristics appeal to the Japanese market and cause them to prefer European mackerel to our own (Ross 1994). Size is very important, as the prized 600+ gram fish command twice the price of smaller fish.

The UK has made more of a market among other EC nations, as well as Eastern Europe and the former Soviet Union. A critical, volume outlet for the UK has been the fleet of "klondyke" processing vessels from such countries as Latvia which anchor off of Shetland ports and purchase mackerel brought to them by UK vessels.

World Landings (FAO 1993 and FNI 1994b)

Year	1986	1987	1988	1989	1990	1991	1992
Thou. Tons	608.0	700.1	708.7	591.1	660.8	682.2	789.0

After rising to a peak in 1988 of over 700,000 mt, world landings fell sharply to just over 590,000 mt in 1989. While 1990 saw the beginning of a recovery for many countries, it was a very bad year for the Japanese fleet, which saw its harvests plummet 48% from the previous year (USITC 1993). Norway, Japan's preferred supplier of imported mackerel, was unable to meet the unexpected demand with its Jan - Mar 1991 fishery. This left the door open to the US and many other countries to place product in the most valuable mackerel market in the world. While the US east coast placed almost 2,900 mt in Japan by the end of the year, Norway shipped over 144,000 mt to Japan, with 70,000 mt consisting of product it imported from other countries and then resold to the Japanese (Ross 1994, USITC 1993, and FNI 1992).

Unfortunately, much of the reexported product was of a lesser quality and smaller size than Norway traditionally supplied, and the Japanese reacted accordingly. Norway's image as a quality producer was tarnished, and its exporters accused of greed. In 1992 Japan punished Norway by lowering its mackerel imports significantly, and cutting prices 33% from NOK 4.7 to NOK 3.15 (FNI 1992). Norway's response was to launch an expensive marketing campaign in Japan, and direct lower quality product to the Nigerian market.

As world landings of mackerel continued to strengthen in 1992, markets around the world felt the effects of political and institutional change in the Soviet Union. The disintegration of large, state-run distribution systems created economic chaos and a shortage of hard currency to pay for mackerel imports. Much of the production which had gone to the klondyking fleet was diverted on to the open market, creating a mackerel glut and a fall in prices.

Fortunately, market conditions improved in 1993 as means were found to cope with the crisis in 1992. Much is still uncertain in the former Soviet Republics, but as many as 88 klonkykers managed to hang on and return for the 1992-1993 season. The 1993-1994 season got off to a slow start with some very bad weather, and local concerns turned to safety and pollution when the Latvian factory ship *Lunokhod 1* was grounded and destroyed in November 1993, followed two weeks later by the Russian *Borodinskoye Polye* (FNI 1993). However, landings improved in January and nearly 100 klondykers anchored around Lerwick at the height of the season.

The absence of the massive, old distribution networks in the newly independent republics forced western businesses to forge new links into these markets. Many smaller enterprises have begun to take their place, often taking the form of joint ventures with the necessary capital being supplied by western partners (Ross 1994). Given that governmental institutions in many of these areas are still forming, it is likely that much of this activity goes unrecorded.

With first quarter reports of landings for 1994 reaching the press, mackerel supplies seem abundant, and an increasing trend in landings has led to a price decline in a number of markets. The UK reports first quarter landings of 88,163 mt, up 12% from the first quarter of 1993 (Seafish Industry Authority 1994). For the first 4 months of 1994, Japanese landings of mackerel at 42 major ports totaled 191,582 mt, an increase of 117% over the same period in 1993. The average ex-vessel price posted a drop of 45% from 1993 in response (Sonu 1994).

Japanese cold storage holdings of frozen mackerel were 134,590 mt as of May 31, 1994, up 15% from a year earlier (Sonu 1994).

8.3.15. Future Supplies of Mackerel

The prospects for the European stock of mackerel look positive, with the TACs for the North Sea and Areas VI & VII up 8% in 1994 (Fishing News 1992 & 1993).

EEC TACS	1992	1993	1994
North Sea	76,320	85,130	95,680
VI & VII	423,170	461,050	493,250
Total	499,490	546,180	588,930

A 1992 assessment estimated the spawning stock biomass at 2.9 million mt, up from 2.4 million mt in 1989 (FNI 1994a)

8.3.16. US Production and Exports of Mackerel

The lack of markets which will pay attractive prices to fishermen is the key to recent landings patterns. The landings peak in 1991 corresponds simply to a unique combination of events: a relatively successful internal waters processing venture for mackerel between Russia and the State of New Jersey, and the one-year open door into the Japanese market (Table 34). That year US producers were able to ship over 2,800 mt of frozen mackerel to Japan at an average value of $882/mt. The following year saw shipments fall to only 63 mt.

The other two markets which the US has been able to place mackerel into consistently are Jamaica and Canada. While prices and quantities shipped to Jamaica have fluctuated in recent years, they have purchased product in every year since 1988. Peak shipments occurred in 1992, with over 1,700 mt exported at an average value of $927/mt (Table 34). Unfortunately, exports fell sharply in 1993 to less that 1,000 mt, with an average value of $604/mt.

Cross-boarder trade with Canada for fresh and frozen mackerel is perhaps our most stable market. Quantities are not large, though values can be, as Canada purchased just over 500 mt of fresh mackerel in 1993 at an average value of $1,900/mt (Table 34). Most of this product is used as bait in the Canadian longline and crab fisheries, as the successful development of squid markets has diverted their harvests into much higher value products for human consumption (Ross 1994).

Canada also sells mackerel into the US market, and 1993 saw the flow of trade move in Canada's favor. "Although relatively minor, overall US exports of mackerel (primarily Atlantic mackerel) to Canada decreased by 26% in volume and 21% in value in 1993, while imports from Canada were up by 80% in volume and 42% in value (Ross 1994).

8.3.17. US Competitiveness: Production Costs

There are of course a variety of markets around the world in which the US can attempt to sell mackerel products. In order to compete in the world bulk market, the US will have to emulate its foreign competitors which harvest, process, and ship mackerel in large quantities so as to take advantage of economies of scale. Currently the US east coast industry does not have the large vessels necessary to participate in this market, and so has concentrated its efforts on higher-priced niche markets that are as close to the US as possible, such as the fresh market in Canada.

One interesting comparison was made in 1990 which examined the relative production costs of an east coast freezer trawler with those of a Norwegian-built vessel (USITC 1993). The Norwegian vessel had a hold capacity in excess of 8,400 mt, and could process 200 mt per day. The US vessel had a hold capacity of 159 mt, and could process only one-fifth as much as the Norwegian vessel at 36 mt/day. Comparative results of the analysis estimated the average unit production costs of the Norwegian vessel at $171 per mt, while the US vessel was over twice that at $352 per mt.

8.3.18. US Competitiveness: Costs of Transport

The costs of shipping fisheries products around the globe will depend principally on several key variables (Ross 1994):

- The quantities involved.
- The flow of trade between the origin and destination points.
- The distance to be crossed.
- The insurance costs (risks) associated in doing business in the involved portions of the world.
- Whether shipment will incur special costs such as passage through the Panama Canal.

The countries which make a business in mackerel, such as the Norwegians and the United Kingdom, deal with the product in bulk. The lowest rate for shipping product is the "break bulk" rate, which requires product to be packaged in a certain way, and shipped in quantities that are in the thousands of tons. The price for transatlantic shipment along a heavily traveled route (such as a major East Coast port and the Netherlands) could be as low as $100 - $150 per mt. When a volume producer can supply several thousand tons at a time to fill a small steamer for a voyage, it will be able to take advantage of these rates.

Currently, US East Coast producers do not have the capacity to operate on this scale, and will ship in refrigerated containers. A typical container will hold approximately 40,000 lbs, or slightly over 18 metric tons. Costs of shipping by the container-load can easily be double that of a good break bulk rate.

The location of where you are shipping to and from bring in three more factors which influence the cost of shipment. Distance, of course, is very important, as the fuel costs in shipping to Japan from the US East Coast will be significantly greater than a trip to Europe. Second, when there is a greater volume of traffic between two points, there will be greater competition between carriers, and a greater variety of ships and sizes will be available to match the shipper's needs to a particular vessel and its schedule. A shipment to a lesser-traveled African country, for example, will likely incur higher costs than to Europe even if the distance were the same.

Finally, the shipment of perishable, frozen product to third world countries which cannot provide the facilities or security of other nations increases the costs of insurance, which can be significant.

Examples of relative shipping costs published in a 1993 study estimated that shipping containers from New York to ports in West Africa or the Middle East would cost between $370 and $429 per metric ton (USITC 1993). By contrast, "Western European mackerel industry officials reported that, depending on the export market (ports in North and West Africa), their transport costs amounted to $100 to $200 per metric ton."

8.3.19. Trade Barriers

Japan continues to maintain a "98 Country Quota," which includes Atlantic mackerel. It consists of an allocation issued to Japanese firms which allows them to import no more than a maximum value (in $US) of foreign fisheries products that fall within 12 commodity groups. It presents two special problems for US exporters of mackerel. The first is that the quota is allocated primarily among firms which have a long history of fisheries involvement; firms that will consequently have many preexisting trade relationships with other countries for mackerel. A new firm which might choose to do business with the United States would have to buy quota rights from other firms, increasing its costs (Ross 1994).

The second problem is that Japanese firms have an incentive to use their allocation on the imported products which will bring them the greatest profit. A low-value product such as East Coast Atlantic mackerel will likely have lower margins than competing products, and hence be an unattractive alternative for Japanese importers.

Nigeria prohibits the import of fishery products which have a delivered value of more than $580 per mt. This effectively bars the import of most US fisheries products (Ross 1994).

Côte d' Ivoire is an important market for mackerel as well. While it currently doesn't have any direct trade barriers to imports of Atlantic mackerel, exporters should be aware that a recent devaluation of their currency has substantially increased the costs of importing fishery products. Government intervention has limited the impact on consumers somewhat, yet the cost of a 20 kg carton of mackerel has increased by 45% (ITN. 1994b).

Egypt asks that orders ("tenders") for imported fisheries products be placed through the government. Participation in these programs can be difficult, as a relationship with an Egyptian firm is required, and bond money must be posted (Ross 1994).

The European Community has a seasonal tariff on mackerel. During their peak landings season of June 16 - February 14, a 20% tariff is levied on foreign imports of mackerel. This overlaps with the US east coast season of December through May (USITC 1993).

Poland follows the EC system of a 20% tariff from June through February (USITC 1993).

8.3.20. Processor Survey Results for Mackerel

Each year the Mid-Atlantic Council surveys East Coast processors to ascertain their expectations on current and future mackerel production. Totals are not directly comparable between years because the respondents (and their numbers) will differ from year to year.

Production estimates for Atlantic mackerel are as follows (mt):

Product/Market	1994 (18 Reporting)	1995 (13 Reporting)
US Food Market	3,171	1,965
US Bait Market	8,660	3,123
Foreign Export Market	17,745	11,613
TOTAL	29,576	16,701

The 1995 production estimates must be considered as conservative due to the lower number of respondents. A number of the larger known processors failed to return the survey.

In order to more accurately assess processor's expectations, amounts expected to be processed in 1994 v. 1995 were compared for only those firms which provided estimates for both years. For these firms, projected needs increased 27% in 1995.

9. FISHERY MANAGEMENT PROGRAM

9.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

9.1.1. Specification of ABC, OY, DAH, DAP, JVP, and TALFF

9.1.1.1. General

The fishing year is 1 January - 31 December. For Atlantic mackerel, ABC, OY, DAH, DAP, JVP and TALFF, if any, and for the squids and butterfish, ABC, OY, DAH and DAP will be specified annually through an administrative process which requires that the Regional Director (RD), in consultation with the Council, prepare the required estimates as described below and also provide for public comment on those estimates. These estimates may be changed during the year.

9.1.1.2. Overfishing definitions

9.1.1.2.1. Atlantic mackerel

Overfishing is defined to occur when the catch of Atlantic mackerel exceeds the annual ABC for the species. ABC is the allowable biological catch in US waters for the upcoming fishing year. C is defined as the quantity of mackerel that is expected to be caught in Canadian waters. The total catch of Atlantic mackerel (ABC+C) shall not exceed long term potential catch (LTPC) as defined by the NEFSC. In addition, a spawning stock size (S) at the beginning of the fishing year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt shall be maintained.

It is recognized that the estimate of long-term potential catch may be revised over time. It is the Council's intention that the most recent estimate be used and that such use will not require a plan amendment.

The provision of the FMP concerning setting annual quotas prevents overfishing.

9.1.1.2.2. *Loligo*, *Illex*, and butterfish

For purposes of meeting the 602 Guidelines, overfishing for *Loligo pealei* is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1967 to present). This means, for example, that when the 1995 index is available (and thus a 29-year time series exists) that the seventh lowest annual index will be compared to the average of the 1993, 1994 and 1995 indices. If the three year average is below the seventh lowest index, overfishing will be defined as occurring. Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 36,000 metric tons (MSY estimate) based upon information prepared by the Council and included in the SAFE document. This overfishing definition meets the provisions of 602.11(c)(5) in that it:

(1) has sufficient scientific merit;

(2) is likely to result in effective action to prevent overfishing;

(3) provides a basis for objective measurement; and

(4) is operationally feasible.

For purposes of meeting the 602 Guidelines, overfishing for *Illex illecebrosus* is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present). Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 30,000 metric tons (MSY estimate minus a 10,000 metric ton ecological set aside) based upon information prepared by the Council and included in the SAFE document.

For purposes of meeting the 602 Guidelines, overfishing for butterfish is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present). Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 16,000 metric tons (MSY estimate) based upon information prepared by the Council and included in the SAFE document.

9.1.1.3. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for *Loligo*

Section 303(a)(3) of the MFCMA requires that FMPs assess and specify the OY from the fishery and include a summary of the information utilized in making such specification. OY is to be based on MSY, or on MSY as it may be adjusted for social, economic, or ecological reasons. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. MSY (section 5.4) has been specified at 36,000 mt for *Loligo*.

OY is all *Loligo* harvested pursuant to this FMP. The maximum OY for *Loligo* is 36,000 mt.

The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero.

An additional consideration in the determination of OY for *Loligo* is the seasonal distribution of landings. The seasonal and geographical distribution of *Loligo* landings in the US fishery has undergone significant change since 1983. This raises concerns about both the allocation of the resource between inshore and offshore components of the fishery and the possibility of recruitment overfishing *Loligo* which is considered to be essentially an annual species.

To insure that sufficient escapement from the winter offshore *Loligo* fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass, the Regional Director may establish seasonal quotas. This component of the management program may become part of the real-time assessment and management discussed in Section 9.1.3. Seasonal quotas for Loligo, if any, will be established as part of the annual quota setting process by the Monitoring Committee, Council, and Regional Director prior to the upcoming fishing year.

9.1.1.4. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for *Illex*

OY is all *Illex* harvested pursuant to this FMP. The maximum OY for *Illex* is 30,000 mt. The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero.

9.1.1.5. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for Atlantic mackerel

The Regional Director, in consultation with the Council, determines annual specifications relating to OY, DAH, DAP, JVP, and TALFF. The Council and Regional Director review yearly the best available biological data pertaining to the stock. ABC is the allowable biological catch in US waters for the upcoming fishing year. C is defined as the quantity of mackerel that is expected to be caught in Canadian waters. The total catch of Atlantic mackerel (ABC+C) shall not exceed long term potential catch (LTPC) as defined by the NEFSC. In addition, a spawning stock size (S) at the beginning of the fishing year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt shall be maintained. The specification of mackerel OY, DAH, DAP, and TALFF (in metric tons) is:

ABC = allowable biological catch in US waters for the upcoming fishing year.

C = estimated mackerel catch (mt) in Canadian waters for the upcoming fishing year.

S = mackerel spawning stock biomass at the beginning of the upcoming fishing year.

LTPC = long term potential catch as specified by the NEFSC (currently estimated at 134,000 mt).

ABC must meet the following constraints:

ABC <= LTPC - C and

ABC<= S - C - 900,000 mt.

OY <= ABC;

DAH <= OY.

DAP <= OY.

TALFF <= OY - DAH.

From the ABC, the Regional Director, in consultation with the Council, determines the OY for the fishing year. The OY represents a modification (reduction) of ABC, based on biological, ecological and economic factors. It is intended to provide the greatest overall benefit to the nation by incorporating all relevant factors. Examples of biological adjustments include, but are not limited to, reductions from ABC to account for availability of mackerel to the US fishery and to minimize fluctuations from year to year that could result from the biomass of a pelagic schooling species such as mackerel. Examples of economic factors include, but are not limited to, the nine factors set forth below. OY will be specified so that ABC is less than or equal to LTPC - C and that ABC is less than or equal to S - C - 900,000 mt. Determining these catches involves estimating both the US and foreign harvesting potential and market demand.

The OY is composed of the estimated Canadian catch, an initial DAH and an initial TALFF (which may be set equal to zero). The Regional Director projects the DAH by reviewing data concerning past domestic commercial landings, domestic recreational catch, projected amounts of mackerel necessary for domestic processing and for joint ventures during the fishing year, and other data pertinent for such a projection.

If the spawning stock size becomes reduced to the point where annual harvests must be reduced below long-term potential catch, each sector of the fishery will be reduced proportionately. Framework measures for the commercial fishery include minimum size limit, trip limits and/or seasonal quotas. Framework measures for the recreational fishery include minimum size limit, possession limits and/or seasonal restrictions.

The JVP component of DAH is the portion of DAH which domestic processors either cannot or will not use. In addition, this specification of OY is based on such criteria as contained in the Magnuson Act, specifically section 201(e), and the application of the following factors:

1. total world export potential by mackerel producing countries;

2. total world import demand by mackerel consuming countries;

3. US export potential based on expected US harvests, expected US consumption, relative prices, exchange rates, and foreign trade barriers;

4. increased/decreased revenues to the US from foreign fees;

5. increased/decreased revenues to US harvesters (with/without joint ventures);

6. increased/decreased revenues to US processors and exporters;

7. increased/decreased US harvesting productivity due to decreases/increases in foreign harvest;

8. increased/decreased US processing productivity; and

9. potential impact of increased/decreased TALFF on foreign purchases of US products and services and US caught fish, changes in trade barriers, technology transfer, and other considerations.

Proposed annual specifications of the ABC and OY and its component amounts are published in the *Federal Register* and provide for a public comment period. The notice will include a discussion of the 9 factors listed above as they apply to the proposed OY. At the close of the public comment period, a notice of final annual specifications with the reasons therefore are published in the *Federal Register*.

The OY may be adjusted by the Regional Director, in consultation with the Council, upward to the ABC at any time during the fishing year. An adjustment may be made to OY to accommodate DAH needs, including when the application of the above factors warrants an adjustment in TALFF. However, TALFF may not be adjusted to a quantity less than that already allocated to and accepted by foreign nations or less than that needed for bycatch. Any adjustments to the OY are published in the *Federal Register* and may provide for a public comment period.

It is recognized that the estimate of long-term potential catch may be revised over time. It is the Council's intention that the most recent estimate be used and that such use will not require a Plan Amendment.

9.1.1.6. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for Butterfish

Butterfish maximum OY is 16,000 mt. The Regional Director in consultation with the Council, determines annual specifications relating to OY, DAH, DAP, JVP, and TALFF. The Regional Director reviews yearly the most recent biological data, including data on discards, pertaining to the stock. If the Regional Director determines that the stock cannot support a level of harvest equal to the maximum OY, he would establish a lower ABC for the fishing year. This level represents essentially the modification of the MSY to reflect changed biological circumstances. If the stock is able to support a harvest level equivalent to the maximum OY, the ABC is set at that level.

Section 303(a)(3) of the MFCMA requires that FMPs assess and specify the OY from the fishery and include a summary of the information utilized in making such specification. OY is to be based on MSY, or on MSY as it may be adjusted for social, economic, or ecological reasons. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. MSY (long term potential catch; section 5.4) has been specified at 16,000 mt for butterfish.

The maximum OY for butterfish is 16,000 mt. The annual OY will be set following the procedures set forth in section 9.1.2.2.

The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero. However, if there is a TALFF specified for Atlantic mackerel, in order to reduce waste of butterfish, there will be a butterfish TALFF that shall not exceed 0.08% of the allocated portion of the Atlantic mackerel. Note that the nine factors considered in establishing OY for mackerel do not apply for butterfish because the butterfish TALFF is established for bycatch only in accordance with the preceding percentages.

9.1.2. Specification of Management Measures

9.1.2.1. Permits and fees

9.1.2.1.1. Vessel permits and fees

9.1.2.1.1.1. General

Any owner of a vessel desiring to fish for Atlantic mackerel, *Loligo* or *Illex* squid or Atlantic butterfish within the US EEZ for sale, or transport or deliver for sale, any Atlantic mackerel, *Loligo* or *Illex* squid, or Atlantic butterfish taken within the EEZ, must obtain a permit from NMFS for that purpose. *Illex*, *Loligo*, and butterfish vessels must meet the criteria set forth in 9.1.2.1.1.2 in order to qualify for a moratorium permit.

The owner of a party and charter boat (vessel for hire) must obtain a party or charter boat permit.

A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement.

A party or charter boat may have both a party or charter boat permit and a commercial permit for Atlantic mackerel or a commercial moratorium permit for squid and butterfish to catch and sell if the vessel meets the commercial vessel qualification requirements set forth in 9.1.2.1.1.2. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee.

9.1.2.1.1.2. Moratorium on entry to the commercial fishery for *Loligo*, *Illex*, and butterfish

There will be a moratorium on entry of additional commercial vessels into the *Loligo* and *Illex* squid and butterfish fisheries in the EEZ. Each State is encouraged to adopt complementary moratorium measures for those participating in the commercial fishery.

Under the moratorium, vessels and moratorium permits together may be bought and sold. The Regional Director must be notified of all sales of vessels and permits. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. Commercial vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length. Permits may not be combined to create larger replacement vessels. The moratorium may be terminated or replaced at any time by FMP amendment.

A vessel is eligible for a moratorium permit in the *Loligo* and butterfish fishery if it meets any of the following criteria:

1. The vessel landed and sold 20,000 pounds of *Loligo* or butterfish (including joint venture landings) in any consecutive 30 day period between 13 August 1981 and 13 August 1993.

2. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are

owned by the same person. "Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels.

3. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels.

A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

1. The vessel had five landings (including joint venture landings) of 5,000 pounds of *Illex* (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 and 13 August 1993, or

2. The owner or operator of the vessel purchased recirculating sea water equipment, an on board plate freezer, or a commercial blast freezer by 31 May 1994 (the freezer must be one designed for use on a fishing vessel, not be a residential or similar freezer installed on the boat to meet the eligibility criteria) and have installed the equipment and landed five trips of at least 5,000 lb. of *Illex* prior to the implementation of the final regulations of Amendment 5.

3. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person. "Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels.

4. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels.

A refrigerated sea water system is defined as system in which seawater is cooled by mechanical refrigeration and is circulated through bulk tanks which contain fish. Heat is transferred from the fish to the seawater in the tank to the mechanical refrigeration system , thereby cooling the fish. A plate freezer is defined as a system where fish are frozen by contact with refrigerated plates.

Eligibility must be established during the first year of the FMP. In other words, the moratorium permit may not be applied for more than twelve months following the effective date of the final regulations or if a vessel is retired from the fishery. This does not affect annual permit renewals.

Vessel permits issued to vessels that involuntarily leave the fishery may not be combined to create larger replacement vessels.

Applicants for moratorium permits shall provide information with the application sufficient for the Regional Director to determine if the vessel meets the eligibility requirements. Sales receipts or dealer weighout forms signed by the dealer and, for condition 3, a notarized statement from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

9.1.2.1.1.3. Commercial fishery incidental catch permit

A vessel that does not qualify for a *Loligo*/butterfish or *Illex* moratorium permit may land *Loligo*, *Illex*, and/or butterfish if (1) it possesses an incidental catch permit, (2) fishes with a net legal in the directed fishery, (3) lands no more that 2,500 pounds of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and (4) the operator of the vessel files the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

9.1.2.1.1.4. Permit application

The owner or operator of a qualified US vessel may obtain the appropriate Federal permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take Atlantic mackerel, squid, or butterfish, gross tonnage of vessel, the permit number of any current or previous fishery permit issued to the vessel, radio call sign, registered length of the vessel, engine horsepower, year the vessel was built, type of construction, type of propulsion, navigational aids (e.g., Loran C), type of echo sounder, type of computer, crew size including captain, fish hold capacity (to the nearest 100 lbs), quantity of Atlantic mackerel, squid, or butterfish legally landed during the year prior to the one for which the permit is being applied (documented by sales records), principal State of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats). Operators of commercial vessels must also supply information required to establish that the vessels qualify for a permit pursuant to the moratorium. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

Applicants for a permit under this FMP must agree, as a condition of issuance of the permit, to fish in accordance with Federal rules whether they are fishing in the EEZ or State waters, unless State rules are more restrictive..

Permits expire: (1) when the owner or operator retires the vessel from the fishery, or (2) on 31 December of each year, or (3) when the ownership of the vessel changes; however, the Regional Director shall authorize continuation of a vessel permit for the Atlantic mackerel, squid, or butterfish fishery if the new owner so requests. Applications for continuation of a permit must be addressed to the Regional Director.

The permit must be carried, at all times, on board the vessel for which it is issued, and must be maintained in legible condition. The permit, the vessel, its gear and catch shall be subject to inspection upon request by any authorized official.

The Federal costs of implementing an annual permit system for the sale of Atlantic mackerel, squid, or butterfish shall be charged to permit holders as authorized by section 303(b) (1) of the Magnuson Act. In establishing the annual fee, the Regional Director will ensure that the fee does not exceed the administrative costs incurred in issuing the permit, as required by section 304(d) of the Magnuson Act. Proper accounting for administrative costs may include labor costs (salary and benefits of permitting officers plus prorated share of secretarial support and supervision at both the NMFS regional and headquarters levels), computer costs for creating and maintaining permit files (prorated capital costs, time share and expendable supplies), cost of forms and mailers (purchase, preparation, printing and reproduction), and postage costs for application forms and permits.

9.1.2.1.2. Dealer permits and fees

Any dealer of Atlantic mackerel, squid, or butterfish must have a permit. A dealer of Atlantic mackerel, squid, or butterfish is defined as a person or firm that receives Atlantic mackerel, squid, or butterfish for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport.

An applicant must apply for a dealer permit in writing to the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the applicant desires to have the permit made effective. Applications must contain the name, principal place of business, mailing address and telephone number of the applicant. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned. Except as provided in Subpart D of 15 CFR Part 904, the Regional Director will issue a permit within 30 days of the receipt of a completed application.

A permit expires on 31 December of each year or if the ownership or the dealer changes. Any permit issued under this section remains valid until it expires, is suspended, is revoked, or ownership changes. Any permit which is altered, erased, or mutilated is invalid. The Regional Director may issue replacement permits. Any application for a replacement permit shall be considered a new permit.

A permit is not transferable or assignable. It is valid only for the dealer to whom it is issued.

The permit must be displayed for inspection upon request by an authorized officer or any employee of NMFS designated by the Regional Director.

The Regional Director may suspend, revoke, or modify, any permit issued or sought under this section. Procedures governing permit sanctions or denials are found at Subpart D of 15 CFR Part 904. The Regional Director may, after publication of a notice in the *Federal Register*, charge a permit fee. Within 15 days after the change in the information contained in an application submitted under this section, the dealer issued the permit must report the change in writing to the Regional Director.

The Regional Director shall recognize State dealer permits in lieu of Federal dealer permits if the permits contain the necessary information and are forwarded to the Regional Director by the appropriate State.

9.1.2.1.3. Operator permit and fees

An operator of a vessel with permit issued pursuant to this FMP (either a moratorium permit or a party/charter boat permit) must have an Operator's Permit issued by NMFS. Any vessel fishing commercially for Atlantic mackerel, squid, or butterfish under a moratorium permit or recreationally with a party/charter boat permit must have on board at least one operator who holds a permit. That operator may be held accountable for violations of the fishing regulations and may be subject to a permit sanction. During the permit sanction period, the individual operator may not work in any capacity aboard a federally permitted fishing vessel.

The permit program has the following requirements:

1. Any operator of a vessel fishing for Atlantic mackerel, squid, or butterfish must have an operator's permit issued by the NMFS Regional Director.

2. An operator is defined as the master or other individual on board a vessel who is in charge of that vessel (see 50 CFR 620.2).

3. The operator is required to submit an application, supplied by the Regional Director, for an Operator's Permit. The permit will be issued for a period of up to three years.

4. The applicant would provide his/her name, mailing address, telephone number, date of birth and physical characteristics (height, weight, hair and eye color, etc.) on the application, and would be requested to provide his/her social security number. In addition to this information, the applicant must provide two passport-size color photos.

5. The permit is not transferable.

6. Permit holders would be required to carry their permit aboard the fishing vessel during fishing and off-loading operations and must have it available for inspection upon request by an authorized officer.

7. The Regional Director may, after publication in the *Federal Register*, charge a permit fee.

9.1.2.2. Atlantic Mackerel, Squid, and Butterfish FMP Monitoring Committee

The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will be made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office, and the Northeast Fisheries Science Center. The MAFMC Executive Director or his designee will chair the Committee.

The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target harvest level (OY) for Atlantic mackerel, squid, or butterfish is not exceeded. The Committee will also review the gear used to catch Atlantic mackerel, squid, or butterfish to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the harvest rate target and propose such regulations as appropriate, including seasonal quotas in the *Loligo* fishery. Seasonal quotas, if any, will be established prior to the upcoming fishing year.

The Council will receive the report of the Committee and make its recommendations to the Regional Director. The Regional Director will receive the report of the Council and publish his report in the *Federal Register* for public comment by the date specified in the regulations. Following the review period, the Regional Director will set the final quota and other management measure adjustments for the year. If seasonal quotas are established in the *Loligo* fishery, they will be specified as part of the annual quota setting process prior to the upcoming fishing year.

In summary, the steps from the Monitoring Committee for action by the Regional Director are:

1. The Monitoring Committee reviews the data and makes its recommendations to the Mackerel, Squid, and Butterfish Committee.

2. The Mackerel, Squid, and Butterfish Committee consider the recommendations of the Monitoring Committee and makes their recommendations to the Council.

3. The Council considers the recommendations of the Mackerel, Squid, and Butterfish Committee and make their recommendations to the Regional Director.

4. The Regional Director considers the recommendations of the Council and publishes proposed measures in the *Federal Register*.

The Monitoring Committee, Mackerel, Squid, and Butterfish Committee, and Council meetings will all be open to the public and provide an opportunity for public comment. The publication of the Regional Director's proposed action in the *Federal Register* provides an opportunity for public comment at that level.

9.1.2.3. Time and area restrictions

Foreign vessels fishing for Atlantic mackerel shall be subject to the applicable time and area restrictions and fixed gear avoidance regulations at 50 *CFR* 611.

The Regional Director may limit the areas where directed foreign fishing and joint venture transfers from US to foreign vessels may take place. Directed foreign fishing must be conducted seaward of at least 20 miles from the shore. The Regional Director, in consultation with the Council, may move the boundary a greater distance from shore and may also establish northern, eastern, and southern boundaries for the area of directed foreign fishing (see 9.2.2 for an explanation). Operations of foreign vessels in support of US vessels (that is, joint ventures) may operate anywhere in the EEZ throughout the management unit unless specific areas are closed to them.

9.1.2.4. Minimum mesh requirements for *Loligo*

Owners or operators of otter trawl vessels possessing *Loligo* squid may only fish with nets having a minimum mesh size of 1 7/8" diamond, inside stretch measure, applied throughout the entire net including the body and codend. This minimum mesh size requirement applies to the inner portion of the net and codend. If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail.

The owners or operators of a fishing vessel possessing *Loligo* squid shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the outer portion of a trawl net with a mesh opening of less than 4.5 inch mesh (stretch, inside measure).

Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited, except that a liner may be inserted in the rear portion of the codend which may not extend more than ten meshes forward of the rear most portion of the codend.

Owners or operators of otter trawl vessels possessing *Loligo* squid may not have available for immediate use any net, any piece of net not meeting the minimum mesh requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size requirement. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

(i) it is located below the main working deck from which the net is deployed and retrieved;

(ii) the towing wires, including the "leg" wires, are detached from the net; and

(iii) it is fan-folded (flaked) and bound around its circumference.

(2) A net stowed and lashed down on deck, provided:

(i) it is fan-folded (flaked) and bound around its circumference;

(ii) it is securely fastened to the deck or rail of the vessel; and

(iii) the towing wires, including the leg wires, are detached from the net.

(3) A net that is on a reel and is covered and secured, provided:

(i) the entire surface of the net is covered with canvas or other similar material that is securely bound;

(ii) the towing wires, including the leg wires, are detached from the net; and

(iii) the codend is removed from the net and stored below deck.

(4) Nets that are secured in a manner approved by the Regional Director, provided that the Regional Director has reviewed the alternative manner of securing nets and has published that alternative in the *Federal Register*.

During the months of June, July, August, and September otter trawl vessels participating in the directed fishery for *Illex* shall be exempt from the *Loligo* minimum mesh requirements if they possess *Loligo*. For the purposes of this exemption, the directed *Illex* fishery for this time period shall be defined as otter trawl fishing for *Illex* seaward of the 50 fathom depth contour. Any vessel possessing *Loligo* which fished under the *Illex* exemption must not have available for immediate use any net with mesh sizes less than specified above for *Loligo* when the vessel moves landward of the 50 fathom contour. In addition, otter trawl vessels participating in the directed sea herring fishery shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

Since it will be difficult to detect a violation of the minimum mesh net regulation, the penalty for individuals detected of such a violation must be sufficient to provide an adequate deterrent. Since some fishermen may attempt to circumvent the minimum mesh requirement, it is recommended that the penalty for the first offense be a six month loss of moratorium permit and the penalty for a second offense be a one year loss of permit. After imposition and expiration of such a penalty, if the individual fishes without penalty for three consecutive years, the earlier offenses would be expunged from the record.

The minimum net mesh size could be changed annually, if appropriate, following the Atlantic Mackerel, Squid and Butterfish FMP Monitoring Committee process set forth in 9.1.2.2. However, the change in minimum mesh size shall become effective one calendar year after the year for which the quota specifications are being made by the Regional Director. Based upon the recommendations of the Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of *Loligo* squid equivalent to the discards with otter trawls given the minimum net mesh requirements. This provision is intended to address the problem that could develop if gear currently not in significant use in the squid fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

9.1.2.5. Catch limitations

9.1.2.5.1. General

The fishing year for Atlantic mackerel, *Illex*, *Loligo*, and butterfish is the twelve (12) month period beginning 1 January.

The specification of OYs and other values for the squids, Atlantic mackerel, and butterfish are described in Section 9.1.1 and need not be repeated here. On an annual basis, the Regional Director, based on the recommendations of the Council, and after giving opportunity for public notice and comment, sets initial annual values for the terms specified in Section 9.1.1.

On or before 15 October of each year, the Council will prepare and submit recommendations to the Regional Director of the initial annual amounts for the fishing year beginning 1 January, based on information gathered from sources including: (1) for mackerel, results of a survey of domestic processors and joint venture operators of estimated processing capacity and intent to use that capacity; (2) for mackerel, results of a survey of fishermen's trade associations of estimated fish harvesting capacity and intent to use that capacity; (3) landings and catch statistics; (4) stock assessments; and (5) any other relevant scientific information.

By 1 November each year, the Secretary will publish a notice in the *Federal Register* that specifies preliminary initial amounts of OY, DAH, DAP, JVP, and TALFF for Atlantic mackerel. The amounts will be based on information submitted by the Council and from relevant sources including those sources specified above. In the absence of a Council report, the amounts will be based on information from the sources specified and other information considered appropriate by the Regional Director. The *Federal Register* notice will provide for a comment period. The Council's recommendation and all relevant data will be available in aggregate form for inspection at the office of the Regional Director during the public comment period. If the preliminary initial amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 factors set forth in section 9.1.1.5.

On or before 15 December of each year, the Secretary will make a final determination of the initial amounts for Atlantic mackerel, considering all relevant data and any public comments and will publish a notice of the final determination and response to public comments in the *Federal Register*. If the final amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 factors set forth in section 9.1.1.5.

Additional adjustments may be made to annual values for OY, DAH, and TALFF for the mackerel fishery during the year. The Regional Director, in consultation with the Council, may modify these values up to ABC, applying the factors described in Section 9.1.1, for the benefit of the nation. The Secretary will publish a notice in the *Federal Register* and provide for comment before such revisions may take effect.

NMFS shall close the US fishery for *Loligo*, *Illex*, mackerel, or butterfish when US fishermen have harvested 80% of the allowable domestic harvest if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure will be in effect for the remainder of the fishing year. If such a closure is necessary, NMFS will provide adequate notice to US fishermen and to the Executive Directors of the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils. During a period of closure, the trip limit for the species for which the fishery is closed is 10% of the weight of the total amount of fish on board for vessels with *Loligo*/butterfish moratorium permits, *Illex* moratorium permits or mackerel commercial permits.

Also see 9.1.1.3 for a *Loligo* seasonal quota framework provision.

9.1.2.5.2. Joint ventures and foreign fishing

The Amendment continues the procedure of permitting joint ventures for Atlantic mackerel on a case by case basis, so long as joint ventures do not negatively impact US harvesters or processors. The Council believes that this is a reasonable approach. In other words, joint ventures are considered on a case by case basis for Atlantic mackerel if such joint ventures would not have a negative impact on the development of the US harvesting and processing sectors.

In order to facilitate development of the US fishery, the Regional Director may impose special conditions on joint ventures and directed foreign fishing activities. Such special conditions may include a ratio between the tonnage that may be caught in a directed foreign fishery relative to the tonnage that may be purchased over-the-side from US vessels and relative to the tonnage of US processed fish that must be purchased by the venture. These conditions will be developed through the annual specification setting process. They may be set as minimums against which applicants may submit proposals. It is the Council's intent that proposals offering the most advantageous arrangements for the US fishery get priority consideration (rather than the available quantities of JVP or TALFF, if any, being distributed among all applicants).

In order to set appropriate levels of required purchases of domestic harvested and processed product, that is, ratios, information on prices and costs must be obtained or estimated. The most important factor is the price of mackerel in the world market. Costs to be considered include the cost of operating the fishing and processing vessels (US and foreign), the foreign fishing fee and observer fee established by NMFS, transportation costs to the foreign market, prices asked by US fishermen for US harvested mackerel, and prices asked by US processors for US processed product. The guiding principle behind the establishment of ratios is to maximize benefits to the US fishing industry. It is expected that the ratios may change from year to year as the prices and costs vary. Input from US harvesters and processors is obtained annually before the ratios are chosen.

9.1.2.6. Types of vessels, gear, and enforcement devices

Foreign nations fishing for Atlantic mackerel, squid, or butterfish are subject to the gear restrictions set forth in 50 *CFR* 611.1.50(c).

9.1.2.7. Atlantic Mackerel Control Date

When the landings of Atlantic mackerel by US vessels with commercial permits first reach 50% of Allowable Biological Catch the Secretary of Commerce will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. However, the Council reserves the right to modify this percentage should the exercise of it's judgement so dictate. For purposes of this action, landings of Atlantic mackerel by US vessels is defined to include transfer at sea from US vessels to foreign vessels as well as landings at US docks.

9.1.2.8. Experimental Fishery

The Regional Director, in consultation with the Executive Director, may exempt any person or vessel from the requirements of this FMP for the conduct of experimental fishing beneficial to the management of the mackerel, squid, or butterfish resources or fisheries.

The Regional Director may not grant such exemption unless it is determined that the purpose, design, and administration of the exemption is consistent with the objectives of the FMP, the provisions of the Magnuson Act, and other applicable law, and that granting the exemption will not:

1. have a detrimental effect on the Atlantic mackerel, squid, or butterfish resource and fishery or cause any quota to be exceeded; or

2. create significant enforcement problems.

Each vessel participating in any exempted experimental fishing activity is subject to all provisions of this FMP except those necessarily relating to the purpose and nature of the exemption. The exemption will be specified in a letter issued by the Regional Director to each vessel participating in the exempted activity. This letter must be carried aboard the vessel seeking the benefit of such exemption.

All experimental activities must be consistent with the harvest rates in the FMP.

It is the Council's intention that experimental fisheries are short-term fisheries to answer specific management questions and are not used to resolve short-comings in existing fishery management plans.

9.1.2.9. Transfer at Sea

Only vessels which possess *Loligo, Illex,* or butterfish moratorium permits may transfer their catch at sea.

9.1.2.10. Other Measures

Each US fishing vessel shall display its official number on the deckhouse or hull and on an appropriate weather deck. Foreign fishing vessels shall display their International Radio Call Signs (IRCS) on the deckhouse or hull and on an appropriate weather deck. The identifying markings shall be affixed and shall be of the size and style established by NMFS. Fishing vessel means any boat, ship or other craft which is used for, equipped to be used for, or of a type which is normally used for, fishing, except a scientific research vessel. Fishing vessel includes vessels carrying fishing parties on a per capita basis or by charter which catch Atlantic mackerel, squid, or butterfish for any use.

Vessels conducting fishing operations pursuant to this FMP are subject to the sanctions provided for in the Magnuson Act.

Pursuant to Section 204(b)(12) of the Magnuson Act, if any foreign fishing vessel for which a permit has been issued has been used in the commission of any act prohibited by section 307 of the Magnuson Act the Secretary may, or if any civil penalty imposed under section 309 of the Magnuson Act has not been paid and is overdue the Secretary shall: (a) revoke such permit, with or without prejudice to the right of the foreign nation involved to obtain a permit for such vessel in any subsequent year; (b) suspend such permit for the period of time deemed appropriate; or (c) impose additional conditions and restrictions on the approved application of the foreign nation involved and on any permit issued under such application, provided, however, that any permit which is suspended pursuant to this paragraph for nonpayment of a civil penalty shall be reinstated by the Secretary upon payment of such civil penalty together with interest thereon at the prevailing US rate. Foreign nations fishing for Atlantic mackerel, squid, or butterfish are subject to the incidental catch regulations set forth at 50 *CFR* 611.13, 611.14, and 611.50.

The Regional Director may place sea samplers aboard vessels if he determines a voluntary sea sampling system is not giving a representative sample from the mackerel, squid, or butterfish fisheries.

9.1.3. Specification and Sources of Pertinent Fishery Data and Real-time Assessment and Management Framework Measures

9.1.3.1. General

Section 303(a)(5) of the MFCMA requires at least information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, and number of hauls must be submitted to the Secretary. In order to achieve the objectives of this FMP and to manage the fishery for the maximum benefit of the US, it is necessary that, at a minimum, the Secretary collect on a continuing basis and make available to the Councils: (1) Atlantic mackerel, squid and butterfish catch, effort, and ex-vessel value and the catch and ex-vessel value of those species caught in conjunction with this species complex for the commercial fishery provided in a form that analysis can be performed at the trip, water area, gear, month, year, principal (normal) landing port, landing port for trip, and State levels of aggregation; (2) catch and effort for the recreational fishery; (3) biological (e.g., length, weight, age, and sex) samples from both the commercial and recreational fisheries; and (4) annual and fully comparable NMFS bottom trawl surveys for analyses of both CPUE and age/size frequency. It is mandatory that these data be collected for the entire management unit on a compatible and comparable basis.

It is intended that the reporting requirements in this FMP are identical with those required by the Summer Flounder, Northeast Multispecies, and Atlantic Sea Scallop FMPs, so that fishermen and dealers do not need to file duplicate reports.

States are encouraged to implement equivalent fishery data collection systems for the development of a coordinated statistics gathering effort.

Foreign fishermen are subject to the reporting and record keeping requirements in 50 CFR 611.

9.1.3.2. Commercial vessels

Commercial logbooks must be submitted, at a minimum, on a monthly basis by Federal moratorium permit holders in order to monitor the fishery. The Secretary may implement additional data collection procedures. Real-time assessment and management of the *Loligo* and *Illex* resources may be necessary due to the risk of overfishing stocks comprised of only a single cohort. During year one of the management program, the Regional Director shall specify the data elements and reporting time frames necessary to establish a real-time assessment and management program for the annual squid species. In addition, the Council will investigate the feasibility and costs and benefits of implementing such a management system in year two of the management program.

9.1.3.3. Party and charter boats

Operators of party and charter boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total amount in pounds and numbers of each species taken; date(s) fished; number of trips; duration of trip; locality fished; crew size; landing port; number of anglers carried on each trip; and discard rate.

9.1.3.4. Dealers

In order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity of Atlantic mackerel, *Loligo*, *Illex*, and butterfish purchased (in pounds), and the name and permit number of the vessels from whom the Atlantic mackerel, *Loligo*, *Illex*, and butterfish was purchased.

Buyers that do not purchase directly from vessels are not required to submit reports under this provision. Dealers should report only those purchases from vessels (fishermen with commercial moratorium permits).

9.1.3.5. Processors

Section 303(a)(5) of the MFCMA requires at least estimated processing capacity of, and the actual processing capacity utilized by US fish processors must be submitted to the Secretary. The Secretary may implement necessary data collection procedures through amendments to the regulations.

9.1.3.6. Falsification of data

Vessel owners or operators or dealers who falsify data in order to qualify for a moratorium permit will lose their vessel or dealers permit.

9.2. ANALYSIS OF BENEFICIAL AND ADVERSE IMPACTS OF ADOPTED MANAGEMENT MEASURES

9.2.1. The FMP Relative to the National Standards

9.2.1.1. Conservation and management measures shall prevent overfishing while achieving, on a continuous basis, the optimum yield from each fishery

The best scientific information available indicates that squid, mackerel, and butterfish are not currently overfished. Harvests at the OY levels described in the FMP should not endanger future harvests at comparable levels. Overfishing has been defined (section 9.1.1.2). The provisions of the FMP concerning setting annual quotas prevents overfishing.

9.2.1.2. Conservation and management measures shall be based upon the best scientific information available

The FMP is based on the best and most recent scientific information.

9.2.1.3. 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 in close coordination

The FMP meets the requirements of this standard by simultaneously managing Atlantic mackerel, *Loligo*, *Illex*, and butterfish in a complementary manner. The FMP also takes into account the catch of mackerel outside US waters. This Amendment expands the geographical limits of the management unit to the geographical range of the squid species *Loligo pealei* and *Illex illecebrosus* and butterfish (*Peprilus triacanthus*) including the Gulf of Mexico.

9.2.1.4. 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 a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges

The OY and DAH estimates described in the FMP will accommodate all US demand for squid, Atlantic mackerel, and butterfish in the commercial and recreational fisheries without prejudice to residents of any State. The seasonal movements and distributions of these species make it extremely unlikely that fishermen of any State could harvest the DAH before the species become available to other US fishermen.

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

The FMP permits growth of the US fishery up to maximum biological levels. The only restrictions placed on US fishermen are the overall quotas, and the permitting requirement. No measures would change the economic structure of the industry or the economic conditions under which the industry operates.

9.2.1.6. Conservation and management measures shall take into account and allow for variations and contingencies in, fisheries, fishery resources, and catches

The FMP anticipates fluctuations in species abundance and expected trends in demand for mackerel, the squids, and butterfish.

9.2.1.7. Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication

The FMP is consistent with and complements, but does not duplicate, management measures contained in other FMPs and PMPs.

9.2.2. Entry limitations in the squid and butterfish fisheries

Limited Entry as a Discretionary Provision of a Plan

The MFCMA (Section 303(b)(6)) provides that a fishery management plan may establish a system for limiting access to a managed fishery in order to achieve Optimum Yield if, in developing such a system, the Council and the Secretary take into account six factors. A discussion of those factors and their application to the proposed limited entry program for the squid and butterfish fishery follows:

A. Present participation in the fishery.

There were 3,061 vessels with Federal commercial permits issued pursuant to the Atlantic Mackerel, Squid, and Butterfish FMP in 1993. The hold capacity of those vessels was approximately 49,600 mt. Based on unpublished NMFS weighout data, 277 vessels landed Atlantic mackerel, 383 vessels landed *Loligo* squid, 54 vessels landed *Illex* squid and 310 vessels landed Atlantic butterfish in 1993 (Tables 35-38). Roughly two thirds of the vessels who reported landing any *Loligo* (260 out of 383) accounted for 99% of the catch. About one third of the total number of vessels reporting *Loligo* landings accounted for 90% of the catch. For Atlantic mackerel, 58 of the 277 vessels (21%) who reported landing mackerel accounted for 95% of the catch. For *Illex*, 18 out 54 vessels (33%) which reported landing any *Illex* accounted for 99% of the total. Finally, 40% of the total number of vessels that reported landing any butterfish accounted for 90% of the catch.

Discussion on the number of vessels that would qualify for the squid and butterfish moratoria is based on the Northeast Fishery Science Center weighout files. These files cover the States from Maine through Virginia. They do not cover North Carolina and south. Vessels in the sample States may not be included in the weighout. In addition vessels that could qualify for the moratoria by having transferred to foreign vessels through joint ventures are not included in the weighout. Therefore, the number of vessels indicated as qualifying should be considered a low estimate.

Using *Loligo* as an example, only 10% of the vessels which possessed Federal Atlantic mackerel, squid, and butterfish permits reported landing at least one pound of *Loligo* in 1993 based on NMFS weighout data. Of this 10%, about one third landed 90% of the catch.

Those vessels who have legitimately been involved in the directed fisheries for *Loligo*, *Illex*, and butterfish will not be excluded. Under the qualifying criteria for a *Loligo*/butterfish moratorium permit, approximately 400 vessels should qualify based on NMFS weighout data. Under the Illex criteria, approximately 60 vessels should qualify (based on NMFS weighout data). Those which took small quantities in the past will be able to continue to do so under the bycatch provisions of this Amendment. However, further expansion of entry into the directed fisheries will be controlled, thus over-capitalization will be avoided. The number of vessels which landed greater than 2500 pounds per trip of *Loligo*, butterfish,and/or *Illex*, but did not qualify under the moratoria criteria is currently unknown.

B. Historical fishing practices in, and dependence on, the fishery.

The squid and butterfish resources were utilized almost exclusively by the distant water foreign fishing fleets prior to the passage of the Magnuson Act. The process of Americanization of the fishery began in the early 1980's. Since then, the harvest capacity of the domestic fleet has grown such that the *Loligo* resource is considered fully utilized (NMFS 1994). NMFS, in 1994, classified the *Illex* and butterfish resources as under-exploited. However, if demand continues to increase and market opportunities improve for these species, full utilization could be rapidly achieved given current fleet harvest capacity. A complete description of the importance of these species to fisheries of various geographical regions is given in section E below.

C. The economics of the fishery.

An economic description of the fishery is given in Section 8. In terms of value, the east coast squid fisheries are by far the most important of the squid fisheries in the US. The combined value of the east coast squid catch in 1991 was $35.6 million. This amounted to 85% of the total value of all squid landed in the United States in 1991. The US component of this fishery has grown steadily over the last decade. It is one of the few fisheries on the east coast of the US that is not severely overfished or over-capitalized. The Council seeks to limit entry into these fisheries to insure that this does not occur.

The ultimate goal of limited entry is to achieve optimum yield. The current hold capacity of the fleet is sufficient to sustain current fishing levels and potential future increases due to growth in demand. If entry is not limited, profits would likely be dissipated due to the increase among fishery participants in the industry. Furthermore, potential over-capitalization of the fleet could occur. The issue of over-capitalization is of considerable importance, especially in the squid industry. This fishery requires vessels that are capable of catching, handling, and processing large quantities of animals while meeting market product quality standards.

With the implementation of this amendment, existing vessels would not be forced out of the fishery as long as other minimum standards established in the fishery are met. In the long term, market forces would aid in reaching an equilibrium level as far as the number of participants in the industry is concerned. Given the current characteristics of the fishery, the implementation of limited entry would be expected to have a positive impact on net benefits in the long term by preventing over-capitalization, dissipation of profits and achieving optimum yield.

D. The capability of fishing vessels used in the fishery to engage in other fisheries.

There are three types of vessels engaged in the squid and butterfish fisheries. These include large vessels which catch and process large volumes of the product while fishing offshore, the inshore vessels which target squid on a seasonal basis, and vessels which take squid and butterfish as bycatch while targeting other species. The vast majority of the catch is taken by the first two categories. These vessels depend heavily on squid fishing and have few if any alternative fisheries to engage in.

E. The cultural and social framework relevant to the fishery.

A Draft Fishery Impact Statement (FIS) for this Amendment (McCay *et al.* 1994) is available as a separate document. The draft FIS presents information on the importance of the Atlantic mackerel, squid, and butterfish species complex to ports from Chatham, MA through Wanchese, NC. In addition, it describes the other species harvested in those ports, and population and employment data for the counties in which the ports are located.

In Massachusetts, the two ports examined were New Bedford and Chatham where Atlantic mackerel, squid, and butterfish are of minor importance. However, one notable exception is the reliance of the inshore trap fisheries on *Loligo*. *Loligo* accounted for less than 0.05% of the value of all species landed in New Bedford and 2.4% of the Chatham landings in 1992. However, there has been a dramatic shift to the reliance of the inshore trap fisheries on *Loligo* over the past two decades. *Loligo* accounted for greater than 90% of the value of the Chatham trap fisheries in 1993.

The value of the fishing industry of Rhode Island was estimated to be greater than $85 million in 1992. Squid was the number one species caught in Rhode Island in 1992 with 42.7 million pounds landed. Rhode Island was the leading state in squid landings in the US, accounting for 38% of the national total. Two ports, Point Judith and Quonset Point, accounted for 95% of the squid landed in Rhode Island during 1992. Three ports make up the bulk of all fishery landings in Rhode Island: Point Judith, Quonset Point, and Newport. *Loligo* was very important to Pt. Judith in 1992 where the species ranked second by value and accounted for 15.3% of the value of all species landed.

In Stonington, CT, squid (unclassified with respect to species) ranked fourth in value of all species landed in 1992. Butterfish and Atlantic mackerel were of minor importance. Squid were of particular importance to the otter trawl fishery accounting for 12.9% of the value of the landings by that gear. In addition, mackerel were important to the gill net fleet there.

Loligo squid were very important to the New York fleet which included the ports of Montauk, Shinnecock and Greenport. *Loligo* was the most important species in this area accounting for 16.2% of the total value of landings in these ports. Butterfish and Atlantic mackerel were of minor importance.

Illex and *Loligo* squid are major components of the landings in Cape May, NJ ranking second and third by value at that port in 1992. Combined they accounted for almost 20% of the value of the landings there in 1992. *Loligo* are taken year round by this fleet, with *Illex* being targeted from May through October. Atlantic mackerel accounted for 1.6% of the value of Cape May landings in 1992. *Illex*, *Loligo*, and Atlantic mackerel accounted for 56.2% of the value of all fish landed by the otter trawl fleet based in Cape May. This port has come to rely more heavily on squid resources in recent years. Atlantic mackerel are targeted according to price and availability.

South of New Jersey, Atlantic mackerel, squid and butterfish are of minor importance relative to the ports from Cape May northward. For example, *Loligo* squid ranked 19th in the value of fish landed in Ocean City Maryland in 1992, accounting for 0.2% of the value. The same pattern was observed for the ports of Hampton Roads, VA and Wanchese, NC.

F. Any other relevant consideration.

The management program is designed to avoid overfishing of the stock complex. The proposed program of limited entry is expected to promote conservation and economic efficiency by avoiding overfishing and overcapitalization in the fishery. Such program will promote resource stability and industry efficiency which is in the best interest of the fishing community and the nation.

9.2.3. Elimination of TALFF and joint ventures for the squids and butterfish

There has been no *Loligo* TALFF since 1986, no *Illex* TALFF since 1987, and no butterfish TALFF since 1990 (only as bycatch in the mackerel fishery). There have been no *Loligo or Illex* joint ventures approved since 1987, and no butterfish ever. The US fishery has demonstrated it can harvest substantial quantities of these species if abundance and demand are adequate.

The harvesting capacity of the fleet is adequate to harvest the maximum allowable catches. This is one of the reasons that the Council is proposing a moratorium on entry into the fisheries. It is inconsistent to limit entry for United States vessels and allow foreign fishing.

Eliminating TALFF and joint ventures in the FMP will simplify the annual specification setting process. It is a procedure that has been utilized in the Summer Flounder and Bluefish FMPs. The domestic squid and butterfish fisheries have developed to the point where it is now appropriate in those fisheries.

Clearly, elimination of TALFF and joint ventures will eliminate potential income to the US Federal government from permit and poundage fees. However, that income is intended to offset NMFS and Coast Guard costs in managing the foreign fishing program. If there is no foreign fishing program those costs will not be incurred, so the revenue will not be needed.

From the late 1960's to the early 1980's, foreign fleets were harvesting the bulk of *Loligo* and *Illex* caught in US waters. However, since 1987, there have been no directed foreign landings of these two species. Landing estimates indicate that for the period 1983-1993 the domestic and foreign landings of *Loligo* and *Illex* were 88% and 12%, respectively. For the period 1987-1993, almost 100% of the *Loligo* and *Illex* harvested in EEZ waters were landed by the domestic fleet. The increase in the harvesting capability of the US fleet is due to the implementation of new managerial and technical aspects associated with the fishery since the mid-1980's which has been the prime driving force of the landing success of the domestic fleet.

The foreign fleet has not been involved in the harvesting of *Loligo* and *Illex* for the last decade. This leads to the conclusion that the proposed elimination of TALFF and joint ventures for *Loligo* and *Illex* would not have adverse effects on the harvesting capability of the US fleet.

Foreign butterfish landings have averaged about 1 mt since 1988. Domestic landings in recent years have been substantially below historical average yields. The implementation of the proposed management measure is not expected to adversely impact the fishery. The intent of the proposed regulation is to maintain the traditional use and ultimately preserve the squid and butterfish stocks.

The elimination of TALFF and joint ventures is not expected to alter components on the cost side and it is expected to maintain the historical catch of the domestic fleet.

9.2.4. Minimum mesh size for *Loligo*

The Council's industry advisors report that some fishermen use liners so small that they retain *Loligo* below marketable size and the *Loligo* are then discarded. The result is biological and economic waste. This measure is intended to eliminate the use of very small liners in the *Loligo* fishery. One exception is the allowance of a small liner to be used to close the opening created by the rings in the rear most portion of the codend. The Amendment specifies that this liner or plug" may not extend more than ten meshes forward from the rear most portion of the codend. This should not significantly affect the selective properties of the 1 7/8" codend.

The advisors report that 1 7/8" mesh codends are in general use in the fishery (by the fishermen that do not use the very small liners). They state that the 1 7/8" mesh allows the very small *Loligo* to escape so they can grow to a marketable size.

Unpublished NEFSC sea sampling data for 1991 indicate that 80% of the tows that caught *Loligo* used liners. However, those trips represent only a small fraction of total *Loligo* landings and may not be representative of the directed *Loligo* fishery. Because of the poor coverage of the directed *Loligo* fishery in the sea sampling program, it is difficult to document the actual extent of current liner use and subsequently to evaluate the impact of a minimum mesh rule in this fishery.

No mesh selectivity studies have been conducted for *Loligo pealei*. However, Lange (1980) calculated the theoretical gains in yield per recruit for *Loligo pealei* for 45, 60, and 90 mm codend mesh sizes based on unpublished Japanese mesh selection factors for a closely related species of *Loligo* from the eastern Atlantic Ocean. The analysis was based upon a Ricker equilibrium yield model and assumed the typical seasonality observed in the fishery at that time. Yield under different mesh regulations was estimated based a selection factor of 1.92. This selection factor implies an L_{60} of 8.6 cm (3.4 in) for 45 mm (1.77 in) mesh, 11.5 cm (4.5 in) for 60 mm (2.4 in), and 17.3 cm (6.8 in) for 90 mm (3.5 in) mesh.

Yield per recruit estimates for the 60 and 90 mm meshes were consistently greater than for the 45 mm mesh for all levels of F when M was assumed to be less than 0.13. Lange (1980) concluded that an increase in mesh size from 45 to 60 mm would not significantly reduce the short-term yield, and further that the yield per recruit would be significantly increased by the resulting increase in the size at entry to the fishery.

The minimum mesh rule for *Loligo* has two exemptions specified in the Amendment. The first is the exemption for directed *Illex* trips seaward of the 50 fathom contour during the months of June through

September. This exemption was included because of concerns raised by fishermen that a small bycatch of *Loligo* can be expected in the *Illex* fishery. Since mesh smaller than 1 7/8 " is in general use in the *Illex* fishery, these vessels would be in violation of the minimum mesh rule for *Loligo.* Industry advisors testified that the *Loligo* bycatch is very small and that almost all of the *Illex* fishing during this period occurs outside of the 50 fathom depth contour. Table 26 supports the notion that the directed *Illex* fishery retains a small bycatch of *Loligo.* In addition, most of the *Loligo* are inshore at this time and would not be subject to exploitation by smaller mesh under this exemption. The overall effect of this exemption appears to be positive and should have no measurable effect on the partial recruitment vector for *Loligo*. The second exemption is for the sea herring fishery. Industry advisors testified that this fishery is very clean but does retain a small bycatch of *Loligo*. Since mesh sizes less than those specified for *Loligo* are commonly being used in the herring fishery, these vessels also would be in violation of the *Loligo* mesh rule. The effect is expected to be similar to that of the *Illex* exemption.

The incorporation of this management option in this Amendment is the direct response of concerns raised by fishermen in the industry. It is intended to decrease biological and economic waste due to the harvest of non-marketable animals and ultimately to result in higher yield per recruit. While Lange's analysis indicated an increase in yield per recruit with mesh sizes up to 90 mm, the analysis was based upon the assumption that *Loligo* live greater than one year. Her analysis was found to be sensitive to the value of natural mortality assumed. The values chosen are presumably too low given that *Loligo* are now known to live only one year. Updated estimates of changes in yield per recruit, size composition and selectivity data are needed to properly evaluate the potential benefits of increasing the mesh beyond the size proposed in this Amendment. Future assessments should estimate increases in yield associated with various mesh sizes based on recently published age and growth data for *Loligo*. Since this is a framework measure, a mesh size greater than the one currently proposed could then be implemented pending the outcome of those analyses.

Major changes on net benefits from the implementation of this measure cannot be fully quantified given existing information. This measure provides that the minimum mesh size may be adjusted as part of the annual quota setting process, so that, if future research shows that another size is more appropriate, the minimum mesh requirement may be adjusted without a plan amendment.

9.2.5. Revised Atlantic mackerel specification limits

Since 1983 the FMP has provided limits within which the allowable catch of Atlantic mackerel may be set. The current FMP specifies that the catch may not exceed the amount which results in a fishing mortality rate of $F_{0.1}$ while, at the same time, the spawning stock biomass must be maintained at 600,000 mt or greater. As a result of high recruitment combined with relatively low fishing rates in recent years, the adult stock biomass has grown to the point that the Allowable Biological Catch (ABC) has risen to 850,000 mt under the current quota specification guidelines. However, the NEFSC has advised the Council to keep harvest levels at or below 200,000 mt because of the volatile nature of a pelagic schooling species such as Atlantic mackerel.

As part of the preparation of this Amendment, it was considered appropriate to review the mackerel specification parameters so that they would yield biologically appropriate catch limits, rather than relying on the essentially informal advice of the NEFSC. The NEFSC felt that the gap between the estimated mackerel biomass and recent catch levels was so great that they should allocate their resources to other species. As a result, no formal stock assessment has been conducted since 1991.

The issue, therefore, was reviewed by the Council's Scientific and Statistical Committee (SSC) at a meeting on April 19, 1994. The SSC recommended revising the spawning stock biomass threshold from 600,000 mt to 900,000 mt based on a review of updated spawning stock and recruitment data. The SSC also recommended that ABC not exceed the long term potential catch as estimated by the NEFSC (currently 134,000 mt). Those SSC recommendations were adopted by the Council for this Amendment.

The effect of these recommendations is to lower the maximum ABC, but the new level is still well above any catches taken by the US recreational and commercial fisheries during the 20th century. The new strategy is more conservative than the current FMP, but is considered appropriate given the long-term history of the fishery. Based on historical data (Figure 24), whenever the catch has exceeded about 100,000-150,000 mt, the catch dropped significantly in the next few years.

Considering the fact that both the recreational and commercial harvest of Atlantic mackerel have been far below the proposed maximum ABC, it is expected that the anticipated costs in terms of reduced economic surpluses in the producer, consumer and recreational sectors will be very small. Furthermore, the establishment of management alternatives for "healthy stocks" such as the Atlantic mackerel, should enhance the long term stability of the fishery by preventing overfishing. The prevention of overfishing and potential stock collapse will lead to positive changes in net benefits.

9.2.6. Revised *Loligo* MSY

Since the beginning of MFCMA management, the *Loligo* MSY has been 44,000 mt (as it was previously under ICNAF). Among other factors, this was based on an estimated 18 month life span.

SAW-17 produced a new *Loligo* assessment which revised the life span to 12 months. This assessment included the recommendation that MSY be set at 36,000 mt. The assessment cautioned that catches in excess of 30,000 mt may only be achieved during years of high abundance. This information will be taken into consideration during the annual specification of OY.

The proposed MSY for *Loligo* is well above historical high domestic yields. The proposed MSY takes into consideration recently revised biological parameters for the species. This in turn, is expected to enhance the long term stability of the fishery. The impact on net benefits from the implementation of this option is expected to be positive since it should prevent overfishing.

9.2.7. Seasonal *Loligo* allocations

There are essentially two *Loligo* fisheries, an offshore winter fishery and a spring-summer inshore fishery. The inshore fishery generally coincides with the primary spawning season.

In the 1970's and early 1980's when the foreign fishery was active, most of the catch was made from November through March. This was considered to negatively impact the inshore (largely southern new England trap) fishery such that the FMP was amended to change the fishing year from the calendar year to a 1 April - 31 March year. With the end of the foreign fishery the fishing year was respecified as the calendar year.

The increased US catch of *Loligo* can be attributed largely to increased activity in offshore winter fishery that emulates the old foreign fishery. There is concern that this may negatively impact the inshore fishery similar to the foreign fishery. Tables 39 and 40 summarize the seasonal distribution of *Loligo* landings by month and quarter for the periods 1983-1992 and 1992, respectively. There clearly has been a seasonal shift in landings patterns with a sharp reduction observed in the third quarter of 1992 compared to the historical average (1983-92). This Amendment would allow the Regional Director to implement seasonal quotas to minimize these impacts. An additional benefit of seasonal quotas would be to assure that an adequate portion of the stock would be allowed to spawn.

Seasonal quotas, if any, will be implemented as part of the annual quota setting process which is initiated by the Monitoring committee and will be specified before the beginning of the fishing year. Seasonal quotas could be established in a variety of ways, including monthly, bimonthly, or quarterly quotas. Their purpose would be to limit what the offshore fishery could take in the first six months of the calendar year, but that fishery would have another opportunity during the October through December period. One option would be to establish quarterly harvest quotas for *Loligo*. The annual quota, which could be specified in the range of 0-36,000 mt, could be divided into quarterly components based on the historical seasonal distribution of landings as illustrated in Table 39. The directed fishery could operate unrestrained until 80% of the quarterly quota was reached and then a trip limit could be imposed until the end of that quarter. The trip limit would allow the continued harvest of *Loligo* taken as bycatch in other fisheries which would otherwise have to be discarded.

This component of the management program would allow for a more equitable distribution of landings among the various sectors of the fishery. The evaluation of potential seasonal allocations related to each specific fishery requires biological, social and economic data which are limited at the present time. As a result, the costs and benefits associated with seasonal allocations cannot be fully addressed at this point. However, displacement of fishermen would be avoided by allowing historical allocations to continue.

It is expected that individuals involved in different aspects of the *Loligo* fishery and the nation as a whole would benefit from a comprehensive analysis of the expected benefits and costs associated with this regulatory alternative. The enactment of a framework addressing seasonal *Loligo* allocations is expected to have positive benefits by allowing an equitable seasonal allocation of the resource.

9.2.8. No Transfer at Sea by Non-Moratorium Vessels

The provision included in the plan which prohibits non-moratorium vessels from transferring at sea is intended to preserve the integrity and intent of the limited entry program. The plan allows for non-moratorium vessels to land 2,500 pounds or less of *Loligo, Illex* or butterfish per trip. This provision was added to prevent a discard problem by non-moratorium vessels from occurring . However, non-moratorium vessels could circumvent the moratorium by transferring their catch at sea . Therefore, the Council has chosen to include the no transfer at sea by non-moratorium vessels provision to prevent this .

9.2.9. Atlantic Mackerel Control Date

The Amendment provides that when the landings of Atlantic mackerel by US vessels with commercial permits first reach 50% of ABC the Secretary will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. The goals of the Council in adopting this measure were two-fold. First, the recent landings of mackerel by the US fleet have been well below ABC primarily due to a lack of markets (see Chapter 8). The Council was concerned that to limit entry to the mackerel fishery at the present time would discourage attempts by US harvesters and/or processors from developing the fishery and markets any further than those that currently exist for a resource which appears to grossly under-exploited. However, the Council was concerned that if markets were to develop without some safeguards in place, the fishery could become rapidly over-capitalized. The Council thus adopted the 50% trigger as a compromise to allow further expansion of the fishery while maintaining some ability to safeguard against rapid over-capitalization of the fishery.

9.2.10. Loss of Permit for Falsification of Data

During the course of the development of this Amendment, concern was expressed by many that individuals may falsify their landing records in order to qualify for a moratorium permit. To discourage this from occurring, the Council has chosen to provide for the loss of permit if an individual falsifies records or data to qualify for a moratorium permit. This applies to both dealer and moratorium permits. This provision should discourage this activity from occurring, and should help to insure that only qualified vessels will receive moratorium permits.

9.2.11. Fishery Impact Statement

The Magnuson Act requires that every FMP or Amendment "include a fishery impact statement for the plan or amendment (in the case of a plan or amendment thereto submitted to or prepared by the Secretary after October 1, 1990) which shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on (A) participants in the fisheries affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants."

In order to comply with the consultation provisions, a member of the New England Council was appointed a voting member off the Mid-Atlantic Council's Squid, Mackerel, and Butterfish Committee. Industry members from Massachusetts, Rhode Island, and North Carolina were treated as part of the Mid-Atlantic Council's Squid, Mackerel, and Butterfish Industry Advisory Subcommittee. Public hearings on Amendment 5 were held in New England as well as in the Mid-Atlantic. Summaries of the hearings are presented in Appendices 4 and 5.

In order to identify the ports important to fisheries managed by the Mid-Atlantic Council and to identify the fisheries relatively important to those ports, the Council retained Dr. Bonnie J. McCay of Rutgers University to prepare a background document (McCay *et al.* 1993). The research covered ports from Chatham, Massachusetts, to Wanchese, North Carolina. McCay *et al* is largely based on two data sources. Landing statistics are from the National Marine Fisheries Service. Information about the ports is from interviews with key informants. The quality of the port descriptions, therefore, depends on the information supplied by the informants. The following port descriptions are taken from McCay *et al.* The port descriptions are brief summaries of the material in McCay *et al.* and readers with questions are encouraged to obtain the original document.

Data from the 1990 US Census of Population for the counties in which the fishing ports discussed above are located are shown in Table 41. They are included to provide a context within which to consider the port profiles.

For purposes of orientation, Barnstable County, MA includes all of Cape Cod, including the fishing port of Chatham. New Bedford is located in Bristol County, MA. The port of Newport is located in Newport County, RI. Galilee is located in Washington County, RI. Stonington is located in New London County, CT. Greenport, Shinnecock/Hampton Bays, and Montauk are located in Suffolk County, NY. Freeport is located in Nassau County, NY. Brooklyn is located in Kings County, NY. Belford, Point Pleasant, Barnegat Light (Long Beach), and Cape May/Wildwood. Ocean City is located in Worcester County, MD. Virginia has a system whereby certain cities exist apart from counties. Within the scope of this analysis, Hampton, Norfolk, Newport News and Virginia Beach all fall into this category. Wanchese is located in Dare County, NC.

Chatham, Massachusetts

The total landed value of fish in Chatham in 1992 was around $11 million. Groundfish and shellfish --bay scallops, quahogs, and mussels-- comprise the majority of the landed value for Chatham, accounting for over 80% of the landed value. *Loligo* accounted for 2.38% of landed value in 1992, harvested by pound-nets (65%) and fish pots (37%).

Atlantic mackerel accounted for 0.45%, caught by fish pots (77%), draggers (5%), and sink gill nets (4.6%).
Pound nets and fish pots or traps accounted for only 4.6% of the total landed value of species in Chatham in 1992. However, *Loligo* accounted for 31% of the fish pot value and 86% of the pound net revenue. Atlantic mackerel accounted for 12% of the fish pot value and 3% of the pound net revenue. Butterfish accounted for 0.33% of the fish pot value and 0.20% of the pound net revenue.

New Bedford, Massachusetts

The squids, mackerel, and butterfish are not important to New Bedford. *Loligo* squid made up 0.05% of the total landed value for New Bedford in 1992. The other species covered by this FMP accounted for less than 0.01%.

Loligo is caught during the spring months of April and May by inshore boats in Nantucket Sound, and more boats are now fishing for *Loligo* offshore, reported a New Bedford port agent. Even into late fall, he said, boats are targeting squid offshore. New Bedford's *Loligo* fleet are those that summer flounder during the summer. They target squid during the spring and fall when they are not going for summer flounder. The port agent reported that some of the small boats offload at sea to freezer boats from Rhode Island.

Newport, Rhode Island

Within Newport there are three commercial fishing packing and distributing businesses. One mainly deals with draggers, gillnetters and some scallopers, and brings in a great deal of groundfish. Another is a lobster house, but they also handle the trappers. And there is a trap company located in Newport. Species caught in traps are discussed below. The dealer that handles mostly draggers packs and distributes the majority of species of important to this study. The trap company also deals with these species but not in as large of quantities.

Approximately 15 large draggers were tied up at the fish house that deals with draggers during a recent visit (1992) to Newport. The fish house owner, the local port agent, and fishermen spoken with on this day said that having 15 boats in port at the same time was unusual, and had to do with a storm moving through the area. Most of the boats that offload at the Newport fish house are not from Newport. They are from other ports such as New Bedford, various Long Island ports, Cape May, and Pt. Judith. These boats are going primarily for squid at the time of our visit, which was in December. This particular fish house owner does not own any of the boats that offload at his dock.

The fishermen who make up the crews in Newport are not necessarily from Newport, but some local people from the area do work on the boats. Some crew members come from Point Judith, New Jersey, New York, and New Bedford. Typically the owners of the boats do not work the boats. Often the owners used to fish but do not anymore. As with almost all of the ports, crews are paid on the share system.

The total value of landings in Newport for 1992 was $14.5 million. Lobster ranked first, accounting for 44% of landed value. *Loligo* ranked sixth.

Other Washington County Communities, RI (including Quonset Point)

The value of the landings at Other Washington County communities including Quonset Point in 1992 was around $20 million.

Other Washington County including Quonset Point includes both traditional and innovative fisheries. Processing facilities for squid in the region have resulted in the dominance of both *Loligo* and *Illex* squid in terms of landed value, but lobster and bay quahogging and oystering remain important, as well as other inshore activities such as eel potting, trapping striped bass, and an unusual spearfishery for tautog (blackfish). There is some handlining for bluefin tuna and trolling for inshore species such as striped bass and summer flounder as well as yellowfin tuna.

Atlantic mackerel, butterfish, scup, summer flounder, and angler are among the top ten species landed by value, and they figure importantly in the catch of the otter trawl vessels. The gillnet fishery for cod and tautog includes a small amount of angler and Atlantic mackerel. The fish pots are predominantly for scup, but some black sea bass, summer flounder, bluefish, and *Loligo* squid are caught in them too.

Virtually all of the angler, butterfish, weakfish, Atlantic mackerel, and squid landed here are brought in by draggers.

A major fishing location in Washington County is located at Quonset Point, an abandoned Navy Base which houses several isolated industrial developments, including a major offloading facility for car imports. As for commercial fishing, Quonset Point is port to five factory trawlers, two of which are from Rhode Island and three from Portland, Maine. The five trawlers range in length from 117 ft. to 155 ft., and they can hold 4 to 5 hundred thousand lbs. of frozen product per trip. This contrasts with wet boats which have a 150,00 thousand lb. capacity. The Rhode Island boats are owned by the president of a service and sales facility located at Quonset Point. The other three boats are owned by a man from Portland, Maine.

The service and sales facility located at Quonset Point started out with one boat about seven to eight years ago. The two boats owned by the president of the facility at Quonset Point were built specifically as freezer boats. These boats take one to two week trips. The three boats from Maine are converted supply boats and they may stay out as long as thirty days on some trips.

On occasion, the freezer trawlers engage in joint ventures with American boats. The smaller boats will fish and offload onto the freezer boats. The freezer boats have also in the past participated in joint ventures with Russian, Dutch and Polish boats.

The freezer boats target *Loligo* squid, *Illex* squid, butterfish, mackerel, whiting and sometimes scup. They may target herring but not normally.

The *Illex* squid season lasts from June to October, and the freezer boats average 12 day trips when they are working *Illex*. From November to May is the *Loligo* season, and the trawlers average 30 days out while they are targeting *Loligo*. Mackerel is caught from December to April.

The freezer trawlers do not have any significant landings of butterfish. Butterfish is available year round but butterfish are only desirable from December to February because of their fat content.

The Quonset Point boats will fish from North Carolina up to the Canadian border although they rarely go that far north. They fish for *Illex* up to 100 fathoms off the coast of New Jersey. *Loligo* fishing is mostly done around Hudson Canyon and Block Canyon.

The fish is packaged on the boats in plastic bags and placed in aluminum trays. Fiberboard boxes are also used. The boxes hold approximately 27 to 28 pounds of fish and one boat can hold approximately 13,000 boxes, or 360,000 pounds of fish.

The freezer trawlers are at sea 280 days per year. October and May are the slow months. During this time the crew works on boat maintenance and painting.

The average cost of operating one of these boats for two years is $2,200,000 which covers fuel, maintenance, repairs and nets.

The Rhode Island boats have from 9 to 11 crew members plus a captain and all of these crew are from the local area. The service and sales facility at Quonset Point employs twenty-two persons apart from the crews. This number includes office personnel and 'lumpers' who unload the boats.

Crew size increases during the *Loligo* squid season. During *Loligo* season the crew sorts the squid into six sizes and also sorts through the bycatch. *Illex* squid catches are much cleaner and do not require sorting through bycatch.

The crews are full-time workers and are paid on a share system. Individuals can make from $40,000 to $60,000 annually. Fuel costs comes off the top of the boat's catch. The boat takes about 52 or 58 percent and the crew takes about 42 or 48 percent. Food comes from the crew share.

Point Judith, RI

Point Judith is almost exclusively a fishing community, having a core group of fishermen who fish full-time. During the summers the streets are filled with tourists coming or going on the Block Island ferry. Yet there is little for tourists to do in Point Judith. The town does not have the condominiums, shops, and hotels that other ports such as Chatham, Newport, and Montauk have. Only one hotel stands out in Point Judith, the Dutch Inn, which is circa 1960. The few restaurants, shops, and tourist venues, such as fudge shops, are enough to take care of the summer onslaught of ferry passengers and the year round working population centered around commercial fishing.

The total value of fish landed in Point Judith in 1992 was $36.5 million. The top ten species by percent landed value in 1992 were lobster, *Loligo* squid (15%), angler, summer flounder, scup, butterfish (4%), winter flounder, yellowtail, and cod. Mackerel accounted for 1%.

Point Judith has a large fleet of trawlers, gillnetters, and lobster boats. While estimates vary, approximately 200 commercial boats dock in Point Judith, including 80 trawlers, 30 gillnetters, and 100 or so lobster boats.

One informant described Point Judith boats as diverse in their annual round and approach to the fisheries, as opposed to New Bedford boats which only go after groundfish. Point Judith boats which are not diverse are the freezer boats which only target fish for frozen markets -- the squids, butterfish, and mackerel. The diverse approach to fisheries combined with full-time experienced fishermen means the fishermen are fishing year round even if they may switch fisheries and boats during the year.

Stonington, Connecticut

The Long Island sound and its estuaries and rivers are the major foci of Connecticut fisheries. There is a small traditional haul seine fishery for alewives and other fishes (unspecified, for "industrial" uses). Dip-nets are used for blue crabs (and a few alewives). Drift gillnets are used for menhaden, bluefish, weakfish, black sea bass, alewife, atlantic mackerel, and other species. There is a specialized drift gillnet fishery for American shad. Quahogs (hard clams) are very important, and over 70% of Connecticut's landed value comes from oysters cultivated in Long Island Sound. Second to oysters are lobsters, most of which are caught inshore, in the sound. Third in value is a mixed species otter trawl fishery, most of which is based in the port of Stonington.

Stonington is the primary port in Connecticut. The main fishing fleet is out of Stonington. Stonington is the only off-shore port with a fleet consisting of trawlers, lobster boats, ocean scallopers. People are mostly going for groundfish such as cod, haddock, and flounder.

Atlantic mackerel is seldom targeted because there is no market for it in Stonington. Atlantic mackerel accounts for 0.01% of the landed value of species and these are caught primarily by drift gillnets. One vessel specializes in *Loligo* squid. Other vessels will target squid when they appear in large numbers. *Illex* squid is seldom targeted because the market is limited because the *Illex* squid spoils rapidly. There is a market for butterfish but no vessel is specialized in catching it.

The major species of fish caught in Stonington are flounder, summer flounder, squid, whiting and some codfish during the winter months. Over the past five years (1988-1993) the fishermen have caught an increasing number of monkfish. The three large scallop boats have landed the majority of the monkfish.

In the past, summer flounder was the most important species caught by fishermen in Stonington. However, squid is increasing in importance as a result of the summer flounder quotas. During the summer of 1993, one boat attempted to specialize in dogfish but he discontinued this.

Montauk Area, New York

The Montauk area ports (Montauk, Shinnecock/Hampton Bay, Greenport) had a total of $28 million in fish and shellfish landings in 1992. *Loligo* accounted for 16.18%, butterfish for 1.10%, and mackerel for 0.17% of landed value. Bottom finfish trawlers accounted for 50% of the value.

Montauk, NY

The major fisheries of Montauk, in terms of percentage of landed value, are tilefish longlining, pelagic longlining for swordfish and tunas, and finfish dragging (40%), tilefish longlining (23%) and pelagic longlining (swordfish and tunas) (18.3%). The large pelagics fishery also involved the use of drift gillnets and handlines in 1992.

Shinnecock/Hampton Bays, NY

This discussion treats Shinnecock and Hampton Bays as one and the same.

Otter trawlers accounted for 66% of the landed value in these ports in 1992.

Loligo accounted for 27% of the landed value in 1992, 99% caught by trawlers. Atlantic mackerel totalled 1.35%, with butterfish at 0.90%.

Greenport, NY

Bottom draggers accounted for 60% of the landed value in Greenport in 1992. Major species caught (percent total landed value): lobster, 28.05% and *Loligo* squid, 13.32%. Butterfish accounted for 1.88%.

Loligo squid, whiting, scup, winter flounder and summer flounder are the top five species by landed value for Greenport otter trawlers. The otter trawlers or draggers were catching scup in December 1993. Scup is typically targeted in the late fall and early winter. *Loligo* squid is targeted in the spring and fall and is a bycatch with whiting. *Illex* squid is not targeted by boats in Greenport.

Freeport/Brooklyn area, NY

Freeport has 71 permitted vessels and Brooklyn has 33.

The total value of all species landed in the Freeport/Brooklyn area in 1992 was about $4 million. The most important fisheries in terms of landed value are surf clam (45%), *Loligo* squid (13%), summer flounder (11%), scup (10%), and lobster (6%). Butterfish accounted for 0.52% and mackerel 0.31%.

Bottom otter trawlers (48%) and surf clam dredges (45%) accounted for the majority of the landed value of species in the Freeport/Brooklyn area in 1992.

Belford, Point Pleasant, and Barnegat Light, New Jersey

Belford has 32 core boats in its port. The fleet is pretty much in the 40-60 foot range and made up of older boats. Draggers, poundnetters, and lobsterpotters make up the majority of the Belford fishing boats. Belford remains a family based fishing port. The Belford Seafood Co-op is the fish house for Belford.

Long Beach Island has a core of 30 steady boats that either longline, bottom trawl line, scallop, or gillnet. The gillnet boats are small, in the 30-45 foot range, but the vessel size in the fleet goes up to 100 foot scallop boats. The fleet remains a family based fleet, and the number of boats has remained constant over the years. Two docks pack fish in Long Beach, and there is an office for a swordfish and tuna dealer which purchases fish from the boats and has an offloading facility in Point Pleasant.

Point Pleasant is the largest of these three ports and arguably the most diverse. There are 51 core boats at Point Pleasant. They run the gamut from inshore gillnetters to scallop boats, draggers, longliners and lobster potters.

For the most all boats in these three ports are owner operated. And there are no freezer boats in any of these ports. Whiting is an important species at all the ports. It was the mainstay of the fisheries in the 1970s and 1980s but has declined. Some Jersey fishermen are suggesting that Rhode Island boats are catching much of the whiting before they migrate to their winter grounds off of New Jersey.

Belford, NJ

The total landed value for Belford in 1992 was about $9.2 million. In recent years ocean quahog vessels have moved to the port of Belford, with the result that the landed value for the port is now dominated by ocean quahogs (32% in 1992). Excluding ocean quahogs from the data, lobster is the most valuable (46%

of landed value in 1992), followed by blue crab, summer flounder, menhaden, silver hake, and *Loligo* squid (4%). Excluding ocean quahogs from the data, butterfish accounted for 0.90% and mackerel 0.46% of the 1992 landed value.

The otter trawl accounts for 19% of the total landed value (much higher if ocean quahog dredges were not included). The species composition of otter trawl catches varies seasonally and over the years. In 1992 it was dominated by summer flounder (26%), silver hake (22.5%), and *Loligo* squid (14%), winter flounder (11%), and scup (9.3%).

Point Pleasant, NJ

The town of Point Pleasant is located at the mouth of the Manasquan inlet in Ocean County. The town's economy is geared towards the summer tourist and recreational economy. The commercial, party/charter boat, and recreational fishing industries are very important to the local economy, employing many of the local residents and supporting many related industries such as seafood markets, restaurants, marine supply houses, welders and salvage, and many of the tourist oriented industries.

For the ocean and bay fisheries of Point Pleasant, the entire landed value was about $16,000,000. The major species landed in 1992 (by percentage of landed value) were ocean quahog (38%), sea scallops (12%), surf clam (12%), *Loligo* squid (8%), and hard clam (6%). Butterfish accounted for 0.31% and mackerel 0.23%.

Loligo squid is caught in the winter, often mixed with whiting. In 1992, *Loligo* usurped silver hake's position as the most valuable species caught by the trawlers, and it now accounts for about 49% of the landed value of the trawlers from Point Pleasant. At first, it was caught as a bycatch by those seeking silver hake in the Gully. Now it is targeted by a few of the trawler captains. As one trawler captain stated "You can't help but target squid sometimes, there is so much out there". Thus, the change to *Loligo* was initial de facto, now it is by choice.

Butterfish are caught with *Loligo* squid. If mixed with too much squid they are unmarketable. However, in general they are a somewhat marketable fish. That which is not marketable is sometimes consumed by the crew of the vessel.

In 1992 bottom fish otter trawl accounted for 15.73% of the total landed value for the Point Pleasant area. Major species caught include *Loligo* squid (50%), silver hake (21%), summer flounder (8%), and scup (4%). Butterfish contributed 1.76% and mackerel 1.40% in 1992.

Barnegat Light/Long Beach Island, NJ

The community of Barnegat Light is located on Long Beach Island, a barrier island along the New Jersey shore. The island up to and including Barnegat Light is intensely developed with summer and beach/boarding houses, and much of the community is heavily geared toward the summer beach economy. During the winter, Barnegat Light's economy slows significantly, and one of the major forms of employment becomes commercial fishing. It hires 150 people working on docks and is one of the biggest income generating businesses on the island during the winter.

The larger region, including Barnegat Bay ports, had landings worth about $32 million in 1992. Major species, by percent of the landed value (excluding surf clams and ocean quahogs) were: sea scallops (28%), hard clams (17%), swordfish (13%), tuna (17%), and tilefish (8%). Butterfish accounted for 0.05%.

Cape May, NJ

Cape May is the most southerly town in New Jersey. The town is noted for its tremendous tourist and beach economy during the summer. While there are marinas in the town, there is little conflict for space with the commercial fishermen because the commercial docks are separated from the rest of the community.

Along one stretch of road lies most of the commercial fishing docks in the town. These include a surf clam dock and three commercial finfish docks.

All told, there are 33 local draggers operating from Cape May docks, most of which are wet boats. There are some equipped with refrigerated sea water (RSW) capacity and seven boats with flash freezers. Many transient boats (57 in 1992) land in the Cape May/Wildwood area from places like Pt. Pleasant. and Port Judith, especially to take advantage of winter stocks of *Loligo* squid and to find safe harbor during storms.

For the Cape May/Wildwood area, the entire landed value for 1992 was about $37 million. Cape May landed about $30.4 million, Wildwood landed $4.5 million, and other ports in the Cape May area landed $2.3 million. Major species landed include sea scallops (28%), ocean quahog (11%), *Illex* squid (10%), *Loligo* squid (9%), and surf clams (8%). Mackerel contributed 1.56% and butterfish 0.62% in 1992. Other ports in this area and the statistics that follow include Cold Spring Harbor, near Cape May, and Sea Isle City, to the north. There are now two tilefish boats, two fish trap (pot) boats and one dragger working out of Sea Isle City, and tilefish and black sea bass are the species targeted.

Tilefish are not landed, except in Sea Isle City. Scup are targeted by draggers. Black sea bass are caught by pot boats and some draggers. Fluke are targeted by draggers. Dogfish are caught by gillnetters in November, December and in the spring at which time they switch from the spiny dogfish to the smooth dogfish. Draggers target dogfish in the early winter months. Some draggers may just catch them if they happen to run into them. Atlantic mackerel are targeted by draggers in the winter. *Loligo* squid is almost a year round fishery for draggers. But they may be going for either squid on a trip. *Illex* squid is caught by draggers from May to October. Butterfish are a bycatch of squid and are rarely targeted. Gillnetters catch weakfish but there aren't many doing this any more because of state regulations. So there is a drop in these landings. Draggers also target weakfish. Bluefish are caught by gillnetters and they are a bycatch for draggers.

Together with bottom sea scallop trawling, bottom fish otter trawling accounts for 39.33% of the total landed value of the Cape May/Wildwood area. Major species caught by bottom fish otter trawl are *Illex* squid, *Loligo* squid, summer flounder, and scup.

Loligo squid is targeted during the winter by the freezer trawlers. It is one of the largest landings and money makers, accounting for about 25% of the total landed value of all bottom fish otter trawl. The squid are hauled aboard and flash frozen into blocks of ice and kept in cold storage until they can be returned to port. The demand for *Loligo* squid is largely for an export market in flash frozen squid. They also market the squid to a lesser extent in the fresh fish markets in New York and Philadelphia. The domestic and foreign markets are growing slowly.

Illex squid is the largest summer fishery for the freezer trawlers. It is a relatively recent fishery because *Illex* is decomposes at higher temperatures. To handle large volumes of *Illex* it is necessary to have RSW capacity, and it is preferable to have flash freezers to ensure a better product. *Illex* is the biggest fishery for the bottom fish trawlers from Cape May, accounting for 27% of the total landed value of the gear in 1992. The market for *Illex* is predominantly aimed at europe for flash frozen product. However, there is a growing market for processed *Illex* rings in the United States.

Butterfish is sometimes landed with squid. When mixed with large amounts of squid, it is unmarketable, and is sometimes consumed by the captain and crew of the vessel. However, it is sometimes landed in appreciable quantities and can be marketed.

Although atlantic mackerel is a low valued fish at Cape May, it is caught in substantial numbers and its value does increase under certain conditions. For example, a recent joint venture with the Russians allowed for an increased value in atlantic mackerel landings in two ways. First, it increased the landings of Atlantic mackerel. Second, it opened a new market for the boats to sell their catch.

Atlantic City, NJ

Atlantic City's port is primarily clam boats. However it also has four boats potting for black sea bass year round. These are small boats between 34 and 40 ft. They could sea bass pot year round but the catch is higher from the spring to late fall. There is some gillnetting here for weakfish and bluefish in the spring and fall, but this is decreasing. One guy comes here from Barnegat Light every year to gillnet for sturgeon.

Shark River, NJ

Shark River, in Monmouth County, is a small port dominated by charter and party boats and private recreational boats. It has also been an important lobstering port and has had some gillnetting and dragging, as well.

Highlands & Atlantic Highlands, NJ

These Monmouth County ports are close to Sandy Hook; Atlantic Highlands is a sports fishing center. Highlands has sports fishing but also a small amount of lobstering and other fishing and -- together with Seabright -- an important bay fishery for hard clam sand soft clams.

Port Norris & other Cumberland County ports, NJ

Port Norris and other Cumberland County ports fringe the Delaware Bay and were traditionally the center of oystering. Oystering is negligible because of oyster diseases. Gillnetting and sports fishing for weakfish and other species, as well as blue crab potting, are becoming very important.

Ocean City, Maryland

Ocean City is currently the primary port for ocean fishing vessels in Maryland. Its boats are primarily smaller boats; they are either inshore boats or small trawler, day boats. Its harbor area is directly west of the inlet at the southern end of the city and is one and a quarter miles from the ocean.

The total landed value of fish and shellfish in Ocean City and environs in 1992 was about $8 million. The surf clam and ocean quahog fishery represented 62% of that total. Summer flounder (5%), black sea bass (5%), and butterfish (0.35%) are among the species of concern that are relatively important to the fisheries. As elsewhere in the region, the actual number of species landed and sold is extremely high: (70 species).

After the clam dredge, the most important gear type in terms of landed value was the pelagic longline (12.35%), closely followed by the otter trawl dragger (11.9%).

The trawlers (there are about six to ten of them here) are the larger boats of the port, ranging in size from 62 feet and 32 tons to 73 feet and 103 tons. None of the boats in Ocean City have refrigerated sea water. They chill the fish in ice salt water in barrels on the deck. The Ocean City draggers take a large variety of finfishes, topped by summer flounder (50%) and spiny dogfish (27.6%) in 1992. Horseshoe crabs make up an unusually large component of this catch, followed closely by weakfish. Black sea bass, butterfish, scup, *Loligo* squid, and Atlantic mackerel are of some importance.

Hampton Roads/Hampton, Virginia

Ninety-five different species were landed in the Hampton Roads area in 1992. Sea scallops (63%) and summer flounder (17%) were the two most important species in the Hampton Roads area in terms of landed value in 1992. Substantial quantities of *Loligo*, *Illex*, and mackerel were landed, but the quantities may not be reported because of data confidentiality constraints. Butterfish accounted for 0.03% of the value in 1992.

Scallop dredges (54%) and otter trawlers (20%) are the most important gear types in terms of landed value in Hampton Roads.

Atlantic mackerel, *Loligo* squid and *Illex* squid are discussed together in this section because there is one boat that lands in Hampton Roads and in Cape May that targets these three species. This fisherman is targeting *Loligo* now (Nov.-Dec.1993) and it is bringing a good price. This fisherman targets *Illex* squid during the summer. *Illex* squid does not bring as high a price but is abundant. Atlantic mackerel pass through the waters in the Hampton Roads area from about January to about February or March and this fisherman will use a midwater trawl to catch them. One informant referred to this as a high rise net used for mackerel and squid. This fisherman mostly fishes between Wachapreague, VA and Ocean City, MD. Charter boat captains often buy some of the squid for bait.

One informant said that *Loligo* squid used to be a bycatch with summer flounder with otter trawlers but no more because the larger net mesh used to catch summer flounder is too large to catch the squid.

Atlantic mackerel is caught primarily by draggers. A small amount are caught by sink gill nets and pound nets also. One informant said that fishermen used to catch it in February but the water is too warm for the mackerel now (1993). According to one informant, all of the fishermen will catch Atlantic mackerel if they are in the waters close to Hampton Roads but in the past few years the water has been too warm. One fisherman said, "It's good fishing when mackerel are here." Party boats especially like to go out for mackerel. Fishermen used to get 50-60 cents per pound for the Atlantic mackerel. "Unless it gets cold we won't see them this year."

Butterfish were 0.03% of the total 1992 landed value in Hampton Roads. Draggers land 57% of this catch and sink gill netters land 34%. Butterfish were 0.82% of the 1992 landed value for pound netters. Butterfish is an incidental catch to squid. Some fishermen in Hampton Roads catch both long butterfish and star butterfish (more diamond shaped with high dorsal fin and long pectoral fin). The star butterfish brings a higher price. These are caught with draggers and pound nets. The pound net fishery catches them primarily in July, August and September.

Wanchese, North Carolina

Wanchese is located on the southern end of Roanoke Island in North Carolina. Wanchese has traditionally been a fishing community with commercial fishing operations since the late 1800's. Many of the current residents of Wanchese are descendants of people who settled here in the late 1600's and early 1700's.

Wanchese is bounded on three sides by estuarine waters and is twenty minutes (by boat) from Oregon Inlet. Thus it is a convenient location for inshore and offshore boats. However, Oregon Inlet is sometimes impassable for the larger trawler boats and many of these boats from Wanchese will stay in Hampton, Virginia or New Bedford, Massachusetts during the winter months. Wanchese is also the site of the Wanchese Seafood Industrial Park (WSIP) which was developed in the 1970s to be a major site for seafood processing activities. However, because of the uncertain nature of Oregon Inlet and the general decline in fisheries since the 1970s, very few businesses actually operate at the WSIP.

Summer flounder (21%) were the most important species in Dare County in 1991 in terms of landed value. In 1991 the value of all species landed in Dare County was over $11 million. Blue crabs (hard) are second in importance (11%), followed by weakfish (9%). Other species of interest landed in Dare County in 1991 were bluefish (4.02%), sea basses (3.41%), dogfish (1.00%), tilefish (0.53%), scup (0.41%), butterfish (0.31%), squid (0.29%), and Atlantic mackerel (0.12%).

The total landed value for the following species was $4,763,534 in 1992 (USDC 1993): summer flounder, black sea bass, Atlantic mackerel, scup, weakfish, squids, tilefish, sharks/dogfish uncl., butterfish, bluefish, and whiting. Of these species, 45.03% of the landed value comes from gill netters and 34.05% of the landed value is from draggers. Pound netters bring in 13.5% of the landed value; handliners bring 5.43%; haul seiners bring 1.78%; trollers bring 0.07%; and less than 0.01% of the total landed value comes from crab pots.

Summer flounder is 40.81% of the total landed value for these species in 1992 and is the most important in terms of landed value in Wanchese. Weakfish is the second most valuable (24.35% of total value) followed by dogfish (14.50%).

Conclusions

The purpose of the Amendment is to provide a framework for the continued orderly development of the fishery while preventing overfishing. Therefore, most fishermen will be positively impacted by the Amendment. There will likely be some fishermen who may have caught *Loligo*, *Illex*, or butterfish that will not qualify for the moratorium and will be reduced to catching bycatch quantities. This issue is discussed in section 9.2.2.

Another issue with this Amendment is that the limited entry provisions reduce the possibility that fishermen will enter the fishery that have never participated in these fisheries. The most frequently mentioned group of fishermen identified in this category are those that have been negatively impacted by the severely overfished condition of the groundfish resources. They are seeking alternative species. However, it is the Council's conclusion that the harvesting capacity of the fleet that will qualify for the moratoria plus the fleet that will harvest the bycatch allowance can take the maximum Optimum Yields for the species involved and no extra capacity is needed in the fishery.

9.3. RELATION OF RECOMMENDED MEASURES TO APPLICABLE LAWS AND POLICIES

9.3.1. FMPs

This Amendment is related to other plans to the extent that all fisheries of the northwest Atlantic are part of the same general geophysical, biological, social, and economic setting. US and foreign fishing fleets, fishermen, and gear often are active in more than a single fishery. Thus regulations implemented to govern harvesting of one species or a group of related species may impact upon other fisheries by causing transfers of fishing effort. Many fisheries of the northwest Atlantic result in significant nontarget species fishing mortality on other stocks and as a result of other fisheries. Atlantic mackerel, squid, and butterfish are food items for many commercially and recreationally important fish species, as well as themselves utilizing many finfish and invertebrate species as food items. Furthermore, research programs often provide data on stock size, levels of recruitment, distribution, age, and growth for many species regulated by preliminary fishery management plans, FMPs, and proposed FMPs.

9.3.2. Treaties or International Agreements

No treaties or international agreements, other than GIFAs entered into pursuant to the Magnuson Act, relate to these fisheries. It is possible that a fisheries agreement with Canada will be developed in the future.

9.3.3. Federal Law and Policies

The US Department of Commerce, acting through the Council, pursuant to the Magnuson Act, has authority to manage the stocks under US jurisdiction. Foreign fishing for mackerel, squid, and butterfish is regulated by the Magnuson Act pursuant to which Governing International Fishery Agreements (GIFA) are negotiated with foreign nations for fishing within the EEZ.

While Outer Continental Shelf (OCS) development plans may involve areas overlapping those contemplated for offshore fishery management, no major conflicts have been identified to date. The Council, through involvement in the Intergovernmental Planning Program of the MMS monitors OCS activities and has opportunity to comment and to advise MMS of the Council's activities. Certainly, the potential for conflict exists if communication between interests is not maintained or appreciation of each other's efforts is lacking. Potential conflicts include, from a fishery management position: (1) exclusion areas, (2) adverse impacts to sensitive biologically important areas, (3) oil contamination, (4) substrate hazards to conventional fishing gear, and (5) competition for crews and harbor space. We are not aware of pending deep water port plans which would directly impact offshore fishery management goals in the areas under consideration, nor are we aware of potential effects of offshore fishery management plans upon future development of deep water port facilities.

9.3.3.1. Marine Mammals and Endangered Species

Numerous species of marine mammals and sea turtles occur in the northwest Atlantic Ocean. The most recent comprehensive survey in this region was done from 1979-1982 by the Cetacean and Turtle Assessment Program (CETAP), at the University of Rhode Island (University of Rhode Island 1982), under contract to the Minerals Management Service (MMS), Department of the Interior. The following is a summary of the information gathered in that study, which covered the area from Cape Sable, Nova Scotia, to Cape Hatteras, North Carolina, from the coastline to 5 nautical miles seaward of the 1000 fathom isobath.

Four hundred and seventy one large whale sightings, 1547 small whale sightings and 1172 sea turtles were encountered in the surveys (Table 42). The "estimated minimum population number" for each mammal and turtle in the area, as well as those species currently included under the Endangered Species Act, were also tabulated.

The CETAP (University of Rhode Island 1982) concluded that both large and small cetaceans were widely distributed throughout the study area in all four seasons, and grouped the 13 most commonly seen species into three categories, based on geographical distribution. The first group contained only the harbor porpoise, which is distributed only over the shelf and throughout the Gulf of Maine, Cape Cod, and Georges Bank, but probably not southwest of Nantucket. The second group contained the most frequently encountered baleen whales (fin, humpback, minke, and right whales) and the white-sided dolphin. These were found in the same areas as the harbor porpoise, and also occasionally over the shelf at least to Cape Hatteras or out to the shelf edge. The third group indicated a "strong tendency for association with the shelf edge" and included the grampus, striped, spotted, saddleback, and bottlenose dolphins, and the sperm and pilot whales.

Loggerhead turtles were found throughout the study area, but appeared to migrate north to about Massachusetts in summer and south in winter. Leatherbacks appeared to have had a more northerly distribution. CETAP hypothesized a northward migration of both species in the Gulf Stream with a southward return in continental shelf waters nearer to shore. Both species usually were found over the shoreward half of the slope and in depths less than 200 feet. The northwest Atlantic may be important for sea turtle feeding or migrations, but the nesting areas for these species generally are in the South Atlantic and Gulf of Mexico.

This problem may become acute when climatic conditions result in concentration of turtles and fish in the same area at the same time. These conditions apparently are met when temperatures are cool in October but then remain moderate into mid-December and result in a concentration of turtles between Oregon Inlet and Cape Hatteras, North Carolina. In most years sea turtles leave Chesapeake Bay and filter through the area a few weeks before the summer flounder fishery becomes concentrated. Efforts are currently under way (by VIMS and the US Fish and Wildlife Service refuges at Back Bay, Virginia, and Pea Island, North Carolina) to more closely monitor these mortalities due to trawls. Fishermen are encouraged to carefully release turtles captured incidentally and to attempt resuscitation of unconscious turtles as recommended in the 1981 *Federal Register* (pages 43976 and 43977).

The only other endangered species occurring in the northwest Atlantic is the shortnose sturgeon (*Acipenser brevirostrum*). The Councils urge fishermen to report any incidental catches of this species to the Regional Director, NMFS, One Blackburn Drive, Gloucester, MA 01930, who will forward the information to persons responsible for the active sturgeon data base.

The range of Atlantic mackerel, *Loligo*, *Illex*, and butterfish and the above mentioned marine mammals and endangered species overlap and there always exists a potential for an incidental kill. Except in unique situations, such accidental catches should have a negligible impact on marine mammal or abundances of endangered species, and the Councils do not believe that implementation of this FMP will have any adverse impact upon these populations. The impacts to marine mammals and endangered species of the proposed management measures is fully described in the FEIS section G.4.

Commercial and recreational fisheries lose thousands of pounds of fishing gear annually. Incidences of entanglement in and ingestion of this gear is common among sea turtles and marine mammals, and may result directly or indirectly in some deaths.

9.3.3.2. Marine sanctuaries

National marine sanctuaries are allowed to be established under the National Marine Sanctuaries Act of 1973. Currently there are 11 designated marine sanctuaries (Figure 28) that creates a system that protects over 14,000 square miles (National Marine Sanctuary Program 1993).

There are two designated national marine sanctuaries in the area covered by the FMP: the *Monitor* National Marine Sanctuary off North Carolina, and the Stellwagen Bank National Marine Sanctuary off Massachusetts. There are currently five additional proposed sanctuaries, but only one, the Norfolk Canyon is on the east coast.

The *Monitor* National Marine Sanctuary was designated on 30 January 1975, under Title III of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA). Implementing regulations (15 CFR 924) prohibit deploying any equipment in the Sanctuary, fishing activities which involve "anchoring in any manner, stopping, remaining, or drifting without power at any time" (924.3 (a)), and "trawling" (924.3 (h)). The Sanctuary is clearly designated on all National Ocean Service (NOS) charts by the caption "protected area." This minimizes the potential for damage to the Sanctuary by fishing operations. Correspondence for this sanctuary should be addressed to: *Monitor* NMS, NOAA, Building 1519, Fort Eustis, VA 23604.

The NOAA/NOS issued a proposed rule on 8 February 1991 (56 FR 5282) proposing designation under MPRSA of the Stellwagen Bank National Marine Sanctuary, in Federal waters between Cape Cod and Cape Ann, Massachusetts. On 4 November 1992, the Sanctuary was Congressionally designated. Implementing regulations (15 CFR 940) will become effective following Congressional review. Commercial fishing is not specifically regulated by Stellwagen Bank regulations. Correspondence for this sanctuary should be addressed to: Stellwagen Bank NMS, 14 Union Street, Plymouth, MA. 02360.

Details on sanctuary regulations may be obtained from the Chief, Sanctuaries and Reserves Division (SSMC4) Office of Ocean and Coastal Resource Management, NOAA, 1305 East-West Highway, Silver Spring, MD 20910.

9.3.3.3. Indian treaty fishing rights

No Indian treaty rights are known to exist relative to mackerel, squid, or butterfish.

9.3.4. State, Local, and Other Applicable Law and Policies

9.3.4.1. Management activities of adjacent States and their effects on the FMP's objectives and management measures

Several States have minimum size limits for the commercial sale or possession of mackerel: Massachusetts, 6"; Connecticut, 7"; New York, 7"; and New Jersey, 7".

All of the east coast States mandate a permit or license for the commercial harvest and sale of finfish. The criteria for defining "commercial" harvest and sale, however, vary among the States. It is impossible to gauge the degree to which such requirement may affect domestic harvests, since fees for such permits and the enforcement of the applicable regulations also vary among the States.

All of the States have various regulations which prohibit or restrict the use of various kinds of commercial (and sometimes recreational) fishing gear within certain portions of state waters during all or parts of the year. For example, New Jersey prohibits all trawling within 2 miles of shore. Maryland prohibits the use of otter and beam trawls within 1 mile of shore. Delaware prohibits fishing with trawls, dragnets, and dredges operated by any power vessel within 3 miles of shore. Virginia prohibits fishing with trawl nets or 'similar devices' within the 3 mile limit of the Virginia Atlantic shoreline (with limited exceptions). In addition, several States restrict and/or regulate commercial harvesting within their jurisdiction by non- residents. Such regulations may or may not inhibit the magnitude of the commercial and recreational harvests of these species. It is probable, however, that these kinds of restrictions, particularly on trawling, serve to maintain or increase the proportion of the commercial catch which is harvested from the EEZ. This should support the effectiveness of the management measures in this FMP, since it would be difficult in many States for individuals to circumvent the regulations accompanying the FMP by transferring their harvests of these species to the territorial sea.

Several States also have mesh size specifications which may affect the magnitude of and/or the sizes of the fish in the catch.

No other State or local laws that control the fisheries that are the subject of this FMP are known to exist.

There are no implications regarding E.O. 12612 (Federalism) with regard to this Amendment.

9.3.4.2. Coastal Zone Management (CZM) Program consistency

The CZM Act of 1972, as amended, provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals.

The Council must determine whether the FMP will affect a State's coastal zone. If it will, the FMP must be evaluated relative to the State's approved CZM program to determine whether it is consistent to the maximum extent practicable. The States have 45 days in which to agree or disagree with the Councils' evaluation. If a State fails to respond within 45 days, the State's agreement may be presumed. If a State disagrees, the issue may be resolved through negotiation or, if that fails, by the Secretary.

The FMP was reviewed relative to CZM programs of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and North Carolina. Letters were sent to all of the States listed. The letters to all of the States except New Hampshire and Pennsylvania stated that the Council concluded that the FMP would affect the State's coastal zone and was consistent to the maximum extent practicable with the State's CZM program as understood by the Council. New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, and Delaware concurred with the Council's conclusions. The other States did not respond. The Council assumes that no response implies agreement by the non-responding State that this FMP is consistent with their CZM progam.

9.4. COUNCIL REVIEW AND MONITORING OF THE FMP

9.4.1. Monitoring

The Council will monitor the fishery using the best available data, including that specified in section 9.1.3. The commercial, recreational, biological, and survey data specified in section 9.1.3 are critical to the evaluation of the management measures adjustment mechanism. It is necessary that NMFS incorporate all of the above data types from North Carolina fisheries into the overall NEFC data bases. Additionally, improved stock assessments are necessary for FMP monitoring. As a result of that monitoring, the Councils and ASMFC will determine whether it is necessary to amend the FMP.

The primary organization in the review and monitoring process will be the Atlantic Mackerel, Squid, and Butterfish FMP Monitoring Committee (section 9.1.2.2).

9.4.2. Research and Data Needs [pursuant to MFCMA 303(a)(8)]

Estimates of discarded Atlantic mackerel, squid, and butterfish will be very important, especially from freezer trawlers, for adjusting the overall quotas. It is, therefore, important that levels of sea sampling effort be sufficient and representative of the fisheries that contribute to Atlantic mackerel, squid, and butterfish fishing mortality to accurately describe the level of discard. It must be recognized that this sea sampling will likely involve some vessels not in the directed fishery, but vessels in the bycatch fisheries as well.

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Table 1. Stratified mean catch per tow in numbers and weight (kg) of *Loligo pealei* in NEFSC spring bottom trawl surveys, Cape Hatteras to Georges Bank (Strata 1-23, 25, and 61-76), 1968 - 1993. Mean number per tow indices are prsented for all sizes of *Loligo*, for pre-recruits (≤8 cm), and for recruits (> 8 cm).

Year	All Sizes	(CV)[1]	Pre-Recruit	Recruit	Kg/Tow	Mean Wt (g) Per Squid
1968	26.9	(25%)	5.7	21.1	1.4	53
1969	14.8	(21%)	2.0	12.8	1.2	82
1970	26.6	(22%)	17.7	8.9	.9	34
1971	35.0	(24%)	20.3	14.7	1.6	46
1972	65.2	(21%)	37.0	28.2	3.2	49
1973	42.4	(27%)	19.2	23.5	2.9	67
1974	231.2	(30%)	196.0	35.3	4.1	18
1975	166.6	(31%)	126.0	40.6	4.2	25
1976	200.1	(17%)	153.6	46.5	5.2	26
1977	18.8	(30%)	10.0	8.8	.8	42
1978	49.1	(34%)	36.0	13.2	1.5	30
1979	113.8	(34%)	95.5	18.4	2.3	20
1980	54.6	(34%)	39.6	15.0	1.9	35
1981	48.1	(27%)	28.1	20.0	1.9	40
1982	70.6	(27%)	50.0	22.6	2.1	30
1983	46.9	(24%)	17.5	29.4	2.1	44
1984	78.1	(31%)	54.0	24.1	2.6	33
1985	83.4	(21%)	61.5	22.0	2.4	28
1986	99.6	(24%)	70.8	28.8	2.9	30
1987	31.0	(16%)	12.7	18.3	2.1	67
1988	130.1	(28%)	94.7	35.4	3.6	28
1989	153.0	(30%)	92.4	60.6	5.2	34
1990	136.2	(23%)	102.6	33.6	3.7	27
1991	181.2	(24%)	131.7	49.4	4.5	25
1992	90.4	(30%)	69.9	20.5	2.7	30
1993	46.5	(28%)	26.3	20.2	1.8	40
1968-91 Average	87.7	(26%)	61.7	26.1	2.7	38

[1] Coefficient of variation for the all sizes index.

Source: NMFS (1994a)

Table 2. Stratified mean catch per tow in numbers and weight (kg) of *Loligo pealei* in NEFSC autumn bottom trawl surveys, Cape Hatteras to Georges Bank (Strata 1-23, 25, and 61-76), 1967-1993. Mean number per tow indices are presented for all sizes of *Loligo*, for pre-recruits (≤8 cm), and for recruits (>8 cm).

Year	All Sizes	(CV)[1]	Pre-Recruit	Recruit	Kg/Tow	Mean Wt (g) Per Squid
1967	143.1	(22%)	123.4	19.6	4.1	29
1968	187.7	(13%)	118.8	68.9	7.6	41
1969	252.3	(15%)	160.1	92.2	10.2	40
1970	90.9	(14%)	54.1	36.9	3.3	36
1971	173.6	(15%)	141.7	31.9	3.2	18
1972	288.6	(18%)	220.1	68.4	6.9	24
1973	395.6	(15%)	275.4	120.2	11.4	29
1974	267.7	(18%)	186.4	81.2	8.7	32
1975	653.3	(20%)	543.0	110.3	11.4	17
1976	436.7	(14%)	321.4	115.3	12.0	28
1977	413.1	(13%)	316.6	96.6	8.5	21
1978	153.3	(16%)	99.2	54.2	4.5	29
1979	205.9	(15%)	166.4	39.5	4.0	19
1980	387.2	(16%)	297.5	89.7	8.3	22
1981	241.3	(15%)	171.5	69.8	6.1	25
1982	270.9	(22%)	216.4	54.5	5.8	21
1983	384.7	(15%)	261.8	122.9	11.6	30
1984	316.4	(17%)	160.4	155.9	12.8	41
1985	460.2	(15%)	322.2	138.0	13.1	28
1986	459.6	(16%)	364.6	95.0	8.9	19
1987	59.8	(14%)	33.9	25.9	2.2	37
1988	405.3	(16%)	316.0	89.3	7.7	19
1989	450.6	(15%)	291.3	159.3	11.9	26
1990	385.8	(14%)	286.6	99.2	9.2	24
1991	321.0	(11%)	194.7	126.3	11.0	34
1992	788.9	(30%)	755.8	33.1	5.3	7
1993[2]	190.8	- -	124.3	66.5	5.1	27
1967-92 Average		312.2	(16%)	225.7	86.4	8.228

[1] Cofficient of variation for the all sizes index.

[2] Provisional survey indices.

Source: NMFS (1994a)

Table 3. Stratified mean catch per tow in numbers and weight (kg) of *Illex illecebrosus* in NEFSC spring bottom trawl surveys, Cape Hatteras to Georges Bank (Strata 1-23, 25, and 61-76), 1968-1993. Mean number per tow indices are presented for all sizes of *Illex*, for pre-recruits ($\leq$10 cm), and for recruits ($>$10 cm).

Year	All Sizes	(CV)[1]	Pre-Recruit	Recruit	Kg/Tow
1968	0.21	(49%)	0.00	0.21	0.02
1969	2.60	(50%)	2.30	0.30	0.04
1970	0.88	(42%)	0.24	0.64	0.04
1971	0.10	(37%)	0.04	0.09	0.01
1972	0.03	(39%)	0.01	0.03	0.01
1973	0.05	(52%)	0.00	0.05	0.01
1974	1.16	(38%)	0.10	1.05	0.07
1975	0.27	(33%)	0.13	0.14	0.02
1976	0.35	(24%)	0.01	0.34	0.03
1977	0.32	(18%)	0.20	0.12	0.02
1978	1.35	(47%)	0.02	1.32	0.07
1979	0.93	(25%)	0.16	0.78	0.08
1980	0.63	(22%)	0.22	0.42	0.04
1981	1.74	(31%)	0.09	1.65	0.10
1982	1.22	(24%)	0.02	1.20	0.08
1983	0.11	(28%)	0.02	0.09	0.01
1984	0.40	(70%)	0.35	0.05	0.01
1985	1.47	(77%)	1.25	0.22	0.04
1986	0.35	(68%)	0.29	0.06	0.01
1987	0.50	(41%)	0.28	0.22	0.02
1988	0.20	(43%)	0.10	0.11	0.01
1989	0.47	(31%)	0.01	0.47	0.05
1990	0.64	(36%)	0.04	0.60	0.03
1991	1.92	(41%)	0.43	1.49	0.08
1992	0.88	(31%)	0.17	0.71	0.03
1993	0.60	(22%)	0.02	0.58	0.04
1968-92 Average	0.75	(40%)	0.26	0.49	0.04

[1] Coefficient of variation for the all sizes index.

Source: NMFS (1994a)

Table 4. Stratified mean catch per tow in numbers and weight (kg) of *Illex illecebrosus* in NEFSC autumn bottom trawl surveys, Cape Hatteras to Georges Bank (Strata 1-23, 25, and 61-76), 1967-1992. Mean number per tow indices are presented for all sizes of *Illex*, for pre-recruits (≤10 cm), and for recruits (>10 cm).

Year	All Sizes	(CV)[1]	Pre-Recruit	Recruit	Kg/Tow
1967	2.1	(21%)	0.1	2.0	0.3
1968	2.3	(24%)	0.2	2.1	0.4
1969	0.8	(28%)	0.1	0.7	0.1
1970	3.4	(29%)	1.5	1.9	0.3
1971	1.9	(10%)	0.3	1.6	0.4
1972	3.5	(29%)	1.1	2.4	0.4
1973	1.3	(19%)	0.1	1.2	0.2
1974	3.0	(55%)	1.8	1.2	0.2
1975	12.4	(53%)	6.2	6.2	1.1
1976	30.9	(27%)	0.6	30.3	10.0
1977	15.8	(21%)	1.1	14.7	4.7
1978	29.4	(22%)	5.1	24.3	6.3
1979	32.8	(16%)	2.6	30.2	9.0
1980	17.1	(19%)	0.7	16.5	3.6
1981	61.9	(41%)	0.4	61.5	20.0
1982	4.6	(15%)	1.1	3.5	0.6
1983	2.8	(15%)	0.2	2.6	0.3
1984	6.4	(18%)	0.4	5.9	0.7
1985	2.0	(13%)	0.3	1.6	0.2
1986	3.2	(18%)	0.5	2.7	0.3
1987	30.0	(42%)	1.3	28.7	2.7
1988	24.0	(17%)	0.7	23.3	2.9
1989	22.2	(27%)	1.9	20.3	2.3
1990	24.5	(10%)	1.2	23.3	2.9
1991	8.6	(15%)	0.4	8.2	1.0
1992	12.3	(15%)	3.3	9.0	1.1
1967-91 Average	13.9	(24%)	1.2	12.7	2.8

[1] Coefficient of variation for the all sizes index.

Source: NMFS (1994a)

Table 5. Mackerel Stratified Mean Weight (kg/tow) and Number per Tow from NEFC Spring Research Surveys for Stratas 1-25 and 61-76 for 1968-1992 for Standard and Log Transformed Data. Smoothed Values were Obtained from an IMA Model.

	Standard		Smoothed		Log		Smoothed	
Year	Wt	Number	Wt	Number	Wt	Number	Wt	Number
1968	5.609	70.869	1.147	10.016	1.669	15.253	0.413	2.289
1969	0.055	0.484	0.935	5.944	0.031	0.178	0.345	1.601
1970	2.200	9.356	1.098	6.886	0.871	2.528	0.393	1.694
1971	3.145	12.668	1.179	7.350	0.887	2.773	0.404	1.662
1972	1.542	8.490	1.116	6.786	0.603	2.260	0.375	1.480
1973	6.746	20.973	1.013	5.902	0.382	1.199	0.328	1.218
1974	0.656	2.241	0.720	3.661	0.335	1.129	0.281	1.004
1975	0.242	3.540	0.519	2.588	0.167	0.986	0.235	0.811
1976	0.254	1.800	0.412	1.683	0.141	0.541	0.206	0.630
1977	0.081	0.287	0.348	1.075	0.071	0.195	0.189	0.505
1978	0.345	0.970	0.354	0.976	0.193	0.429	0.197	0.483
1979	0.089	0.172	0.362	0.888	0.080	0.146	0.205	0.473
1980	0.202	0.559	0.444	1.251	0.140	0.310	0.242	0.578
1981	2.470	5.872	0.602	2.187	0.744	1.565	0.306	0.794
1982	0.854	5.167	0.678	2.936	0.359	0.998	0.345	0.960
1983	0.135	0.884	0.743	3.386	0.112	0.551	0.387	1.153
1984	2.611	16.228	1.015	5.588	0.883	2.463	0.510	1.591
1985	2.232	8.242	1.227	6.939	0.924	2.685	0.626	2.021
1986	1.264	4.178	1.482	8.231	0.443	1.196	0.730	2.434
1987	7.492	35.231	1.828	11.699	3.208	11.531	0.909	3.351
1988	4.133	16.792	1.881	12.392	2.056	5.560	0.961	3.655
1989	1.100	12.273	1.749	12.104	0.668	3.841	0.922	3.684
1990	1.548	10.748	1.723	11.780	0.824	3.645	N/A	N/A
1991	5.600	23.270	N/A	N/A	N/A	N/A	N/A	N/A
1992[1]	4.430	23.560	N/A	N/A	N/A	N/A	N/A	N/A

1 preliminary

Source: USDC (1991b) and Peterson (pers. comm).

Table 6. Stratified mean catch per tow in numbers and weight (kg) of Atlantic butterfish from NEFSC spring bottom trawl surveys, Cape Hatteras to Georges Bank (Strata 1-14, 16, 19, 20, 23, 25, 61-76). 1968-1993.

Year	Mean Number/Tow	(CV %)	Mean Weight/Tow	(CV %)
1968	33	(59%)	2.0	(63%)
1969	31	(80%)	3.1	(83%)
1970	10	(29%)	0.5	(30%)
1971	22	(56%)	0.8	(41%)
1972	228	(96%)	6.6	(92%)
1973	69	(33%)	5.4	(40%)
1974	25	(49%)	1.7	(48%)
1975	121	(20%)	4.0	(19%)
1976	31	(44%)	1.3	(29%)
1977	7	(34%)	0.6	(33%)
1978	5	(29%)	0.3	(32%)
1979	13	(36%)	1.0	(42%)
1980	58	(24%)	3.2	(26%)
1981	44	(21%)	2.5	(30%)
1982	49	(42%)	2.5	(42%)
1983	65	(42%)	3.9	(67%)
1984	16	(42%)	0.7	(37%)
1985	38	(45%)	1.6	(40%)
1986	66	(46%)	2.8	(41%)
1987	16	(40%)	0.6	(31%)
1988	13	(38%)	0.5	(30%)
1989	32	(81%)	0.8	(67%)
1990	9	(45%)	0.4	(39%)
1991	28	(71%)	1.0	(59%)
1992	27	(40%)	0.8	(32%)
1993	18	(21%)	0.6	(21%)
1968-1992 Average	42	(46%)	1.9	(44%)

Source: NMFS (1994a)

Table 7. Stratified mean numbers per tow at age and stratified mean weight (kg) per tow of Atlantic butterfish (Peprilus triacanthus) in NEFSC autumn bottom trawl surveys, Cape Hatteras to Georges Bank (offshore strata 1-14, 16, 19-20, 23, 25, and 61-76; inshore strata 1-46), 1968-1992 (from NMFS 1994a).

	Age								
Year	**0**	**1**	**2**	**3**	**4**	**Total**	**Age 1+**	**Mean Wt Per Tow**	**3-Yr Mean of Age 0**
1968	41.28	50.59	1.64	0.10	0.00	93.61	52.3	7.7	-
1969	39.48	18.82	2.12	0.16	0.00	60.58	21.1	3.9	-
1970	26.43	11.24	0.86	0.10	0.00	38.63	12.2	2.3	35.73
1971	208.85	8.76	0.70	0.24	0.00	218.55	9.6	4.3	91.58
1972	73.20	8.34	0.31	0.05	0.00	81.90	8.7	2.7	102.82
1973	119.10	27.73	1.50	0.07	0.00	148.40	29.3	6.1	133.71
1974	82.13	15.96	1.74	0.37	0.00	100.20	18.0	3.8	91.47
1975	26.34	17.54	1.71	0.15	0.00	45.74	19.4	2.3	75.85
1976	110.63	26.50	2.12	0.33	0.00	139.58	29.0	5.8	73.03
1977	47.73	32.78	6.22	0.24	0.00	86.97	39.3	5.2	61.56
1978	134.96	7.96	10.18	1.05	0.00	154.15	19.2	4.3	97.77
1979	231.51	73.01	4.85	0.18	0.00	309.55	78.1	12.1	138.06
1980	233.19	80.42	18.82	0.73	0.04	333.20	100.0	15.2	199.88
1981	234.55	47.14	12.88	0.29	0.01	294.87	60.3	7.0	233.08
1982	80.31	26.12	4.73	0.14	0.14	111.44	30.7	4.7	182.68
1983	358.77	78.49	10.70	3.25	0.07	451.28	92.5	12.8	224.54
1984	268.60	79.55	11.07	2.79	0.00	362.01	93.4	11.4	235.89
1985	286.26	85.69	12.40	2.27	0.09	386.71	100.4	15.2	304.54
1986	140.16	29.75	12.19	1.96	0.33	184.39	44.3	6.8	231.67
1987	78.59	31.55	7.17	0.25	0.00	117.56	39.0	4.7	168.33
1988	282.28	21.59	13.29	0.20	0.00	317.36	35.1	7.3	167.01
1989	332.31	49.95	15.05	1.03	0.00	398.34	66.0	12.2	231.06
1990	328.29	33.35	3.89	0.95	0.00	366.57	38.3	8.9	314.29
1991	168.38	20.53	3.60	0.29	0.00	192.80	24.4	5.3	276.32
1992	230.26	9.54	4.51	0.09	0.00	244.40	14.1	4.5	242.31
1968-91 Average	163.89	36.81	6.66	0.72	0.03	208.10	44.2	7.2	

Table 8. Atlantic mackerel stock biomass and recruitment based on results of Virtual Population Analysis.

Year	Recruitment (No. Age 1 x 1000)	Spawning Stock Biomass (mt x 1000)
1962	303	174.6
1963	207	191.4
1964	236	211.0
1965	295	231.8
1966	683	258.0
1967	2,003	280.6
1968	4,999	513.4
1969	2,087	943.2
1970	2,541	1,149.4
1971	1,352	1,207.8
1972	1,372	1,287.8
1973	1,154	941.0
1974	1,943	734.2
1975	2,454	576.2
1976	492	558.4
1977	148	665.2
1978	54	870.2
1979	216	826.8
1980	97	756.8
1981	238	613.6
1982	1,414	569.8
1983	5,164	596.0
1984	531	974.4
1985	1,243	1,427.6
1986	1,496	1,499.6
1987	946	1,516.4
1988	3,218	1,682.2
1989	4,921	1,866.4
1990	1,311	2,421.6

Source: Overholtz, 1991.

Table 9. Spatial distribution and relative abundance of Atlantic mackerel and butterfish in North Atlantic estuaries.

		North Atlantic Estuaries																	
		Passamaquoddy Bay			Englishman Machias Bays			Narraguagus Bay			Blue Hill Bay			Penobscot Bay			Muscongus Bay		
Species/Life Stage		T	M	S	T	M	S	T	M	S	T	M	S	T	M	S	T	M	S
Atlantic mackerel	A		○	○		○	○		○	○		○	○		○	○		○	◉
Scomber scombrus	S																		
	J		○	○		√	√		√	√		√	√		○	○		○	◉
	L			na			na			na			na			√			
	E			na			na			na			na			√			
Butterfish	A		√	√		√	√		√	√		√	√		√	√		√	√
	S																		
Peprilus triacanthus	J		√	√		√	√		√	√		√	√		√	√		√	√
	L		na	na											√	√			
	E		na	na											√	√			

		North Atlantic Estuaries																	
		Damariscotta River			Sheepscot River			Kennebec/Androscoggin Rivers			Casco Bay			Saco Bay			Wells Harbor		
Species/Life Stage		T	M	S	T	M	S	T	M	S	T	M	S	T	M	S	*	M	S
Atlantic mackerel	A		○	◉		○	◉		○	◉		○	○		○	○		√	√
Scomber scombrus	S																		
	J		○	◉		○	◉		○	◉		○	○		○	○		√	√
	L												na						
	E												na						
Butterfish	A		√	√		√	√		√	√		√	√		√	√			
	S																		
Peprilus triacanthus	J		√	√		√	√		√	√		√	√		√	√			
	L																		
	E																		

		North Atlantic Estuaries														
		Great Bay			Merrimack River			Massachusetts Bay			Boston Harbor			Cape Cod Bay		
Species/Life Stage		T	M	S	T	M	*	*	*	S	*	M	S	*	M	S
Atlantic mackerel	A			√		√				○		○	○		○	◉
Scomber scombrus	S									○						◉
	J			○		√				○		○	○		○	◉
	L		○	○		○				◉		○	◉		○	●
	E		○	◉		●				◉		○	◉		○	●
Butterfish	A		√	√		√				○		√	√		○	○
	S									√						
Peprilus triacanthus	J		√	√		√				○		√	√		○	○
	L		√	√		√				√			○			√
	E		√	√		√				○			○			○

Relative Abundance

●	Highly Abundant
◉	Abundant
○	Common
√	Rare
Blank	Not Present
na	No data available

Salinity Zone

T - Tidal Fresh
M - Mixing
S - Seawater
* - Salinity zone not present

Life Stage

A - Adults
S - Spawning adults
J - Juveniles
L - Larvae
E - Eggs

Source: USDC 1994a

Table 10. Spatial distribution and relative abundance of Atlantic mackerel and butterfish between Cape Cod and Delaware.

		Mid-Atlantic Estuaries																	
		Waquoit Bay			Buzzards Bay			Narragansett Bay			Long Island Sound			Connecticut River			Gardiners Bay		
Species/Life Stage		*	M	S	*	M	S	T	M	S	T	M	S	T	M	*	*	M	S
Atlantic mackerel	A			○			○			○			○						○
	S												√						√
Scomber scombrus	J			√		√	√		√	○		√	○						○
	L			√		√	√		√	○			○						●
	E			√		√	◉		√	◉			◉						●
Butterfish	A		√	○		○	●		○	◉		◉	●		○			○	○
	S			√			√			√			○						○
Peprilus triacanthus	J		√	○		○	●		○	◉	√	◉	●		○			○	○
	L		√	○		√	○		√	○			○						○
	E		√	○		√	○		√	◉			○						○

		Mid-Atlantic Estuaries																	
		Great South Bay			Hudson R./ Raritan B.			Barnegat Bay			New Jersey Inland Bays			Delaware Bay			Delaware Inland Bays		
Species/Life Stage		*	M	S	T	M	S	T	M	S	T	M	S	T	M	S	*	M	S
Atlantic mackerel	A			○			○									√			√
	S																		
Scomber scombrus	J			○		√	○			√			√						
	L			○						√			√						
	E			○						√			√						
Butterfish	A		√	○		○	○		√	√			√		√	○			○
	S			○												√			
Peprilus triacanthus	J		√	○	√	○	○		○	○		○	○		○	○			○
	L			○	√	○	√			√			√			○			
	E			○			√									√			

Relative Abundance

●	Highly Abundant
◉	Abundant
○	Common
√	Rare
Blank	Not Present

Salinity Zone

T - Tidal Fresh
M - Mixing
S - Seawater
* - Salinity zone not present

Life Stage

A - Adults
S - Spawning adults
J - Juveniles
L - Larvae
E - Eggs

Source: USDC 1994b

Table 11 . Spatial distribution and relative abundance of Atlantic mackerel and butterfish in Maryland and Virginia.

		Mid-Atlantic Estuaries																	
		Chincoteague Bay			Chesapeake Bay Mainstem			Chester River			Choptank River			Patuxent River			Potomac River		
Species/Life Stage		*	*	S	T	M	S	T	M	*	T	M	*	T	M	*	T	M	*
Atlantic mackerel	A					√	√												
	S																		
Scomber scombrus	J					√	√												
	L						√												
	E						na												
Butterfish	A					O	O					√			√			√	
	S					O	O												
Peprilus triacanthus	J					O	O					√			√			√	
	L					O	O												
	E					O	O												

		Mid-Atlantic Estuaries											
		Tangier / Pocomoke Sound			Rappahannock River			York River			James River		
Species/Life Stage		*	M	*	T	M	*	T	M	*	T	M	*
Atlantic mackerel	A					√			√			√	
	S												
Scomber scombrus	J					√			√			√	
	L												
	E												
Butterfish	A		√			√			O			O	
	S												
Peprilus triacanthus	J		√			√			O			O	
	L												
	E												

Relative Abundance

●	Highly Abundant
◉	Abundant
O	Common
√	Rare
Blank	Not Present

Salinity Zone

T - Tidal Fresh
M - Mixing
S - Seawater
* - Salinity zone not present

Life Stage

A - Adults
S - Spawning adults
J - Juveniles
L - Larvae
E - Eggs

Source: USDC 1994b

Table 12 . Temporal distribution of Atlantic mackerel and butterfish in eastern Maine estuaries.

		North Atlantic Estuaries																																			
Estuary / Month		Passamaquoddy Bay												Englishman/Machias Bays												Narraguagus Bay											
Species / Life Stage		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Atlantic mackerel	A						▭	▭	▭	▭	···								▭	▭	▭	▭	···								▭	▭	▭	▭	···		
	S																																				
Scomber scombrus	J						▭	▭	▭	▭	···								···	···	···	···	···								···	···	···	···	···		
	L																																				
	E																																				
Butterfish	A						···	···	···	···	···								···	···	···	···	···								···	···	···	···	···		
	S																																				
Peprilus triacanthus	J						···	···	···	···	···								···	···	···	···	···								···	···	···	···	···		
	L																																				
	E																																				

		North Atlantic Estuaries																																			
Estuary / Month		Blue Hill Bay												Penobscot Bay												Muscongus Bay											
Species / Life Stage		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Atlantic mackerel	A						▭	▭	▭	▭	···								▭	▭	▭	▭	···								▭	▨	▭	▭	···		
	S																																				
Scomber scombrus	J						···	···	···	···	···								▭	▭	▭	▭	···								▭	▨	▭	▭	···		
	L																		···	···																	
	E																		···	···																	
Butterfish	A						···	···	···	···	···								···	···	···	···	···								···	···	···	···	···		
	S																																				
Peprilus triacanthus	J						···	···	···	···	···								···	···	···	···	···								···	···	···	···	···		
	L																			···	···	···															
	E																			···	···	···															

Relative Abundance

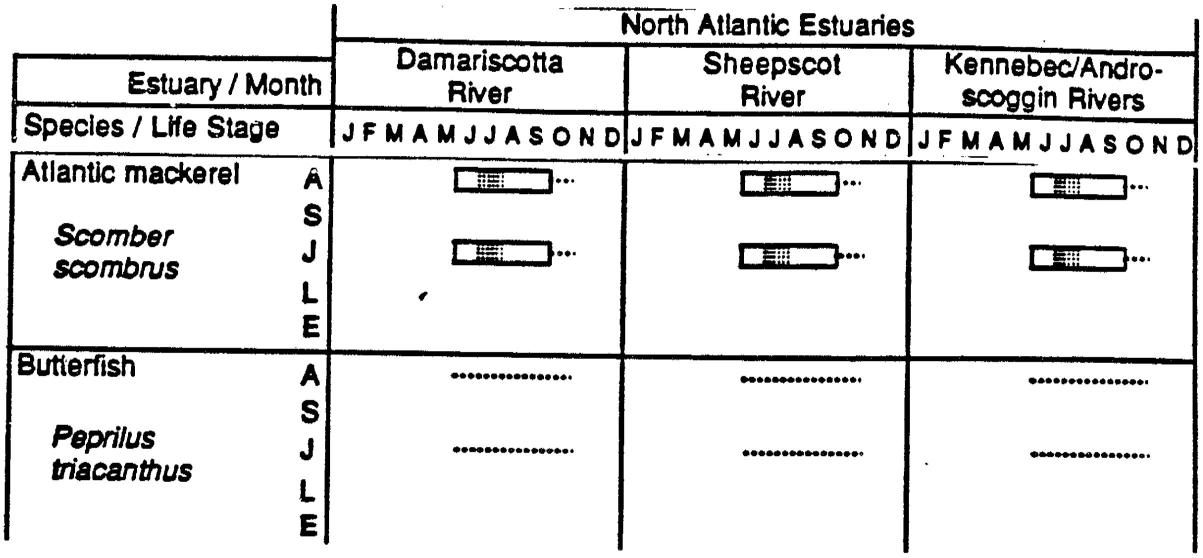
■	Highly Abundant
▨	Abundant
▭	Common
·········	Rare
Blank	Not Present
na	No data available

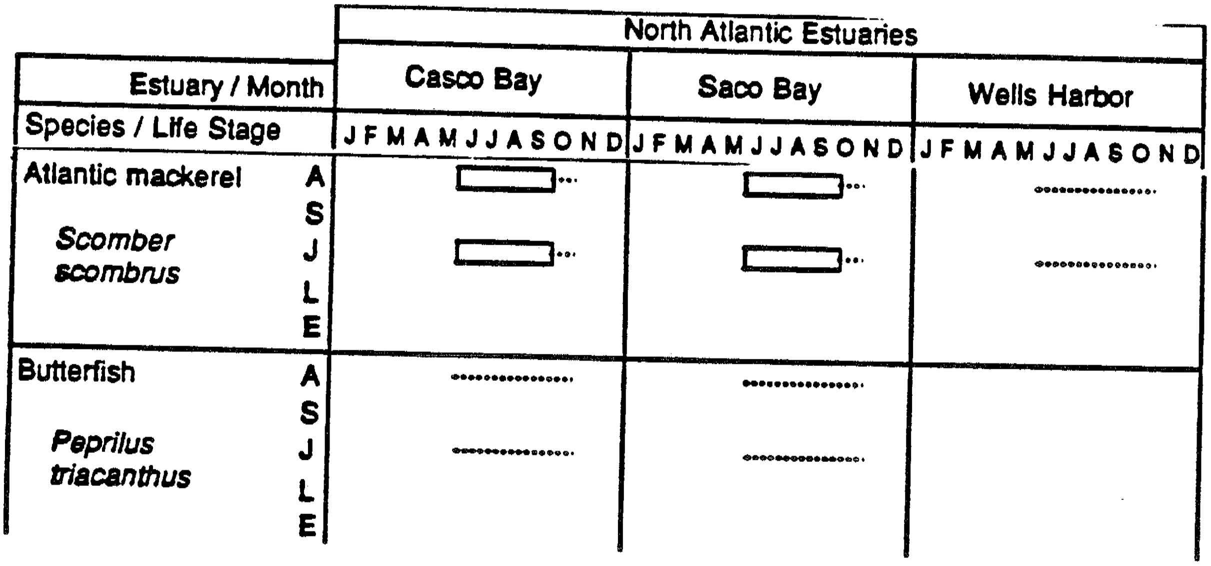
Life Stage

A - Adults
S - Spawning adults
J - Juveniles
L - Larvae
E - Eggs

Source: USDC 1994a

Table 13. Temporal distribution of Atlantic mackerel and butterfish in southern Maine estuaries.





Relative Abundance

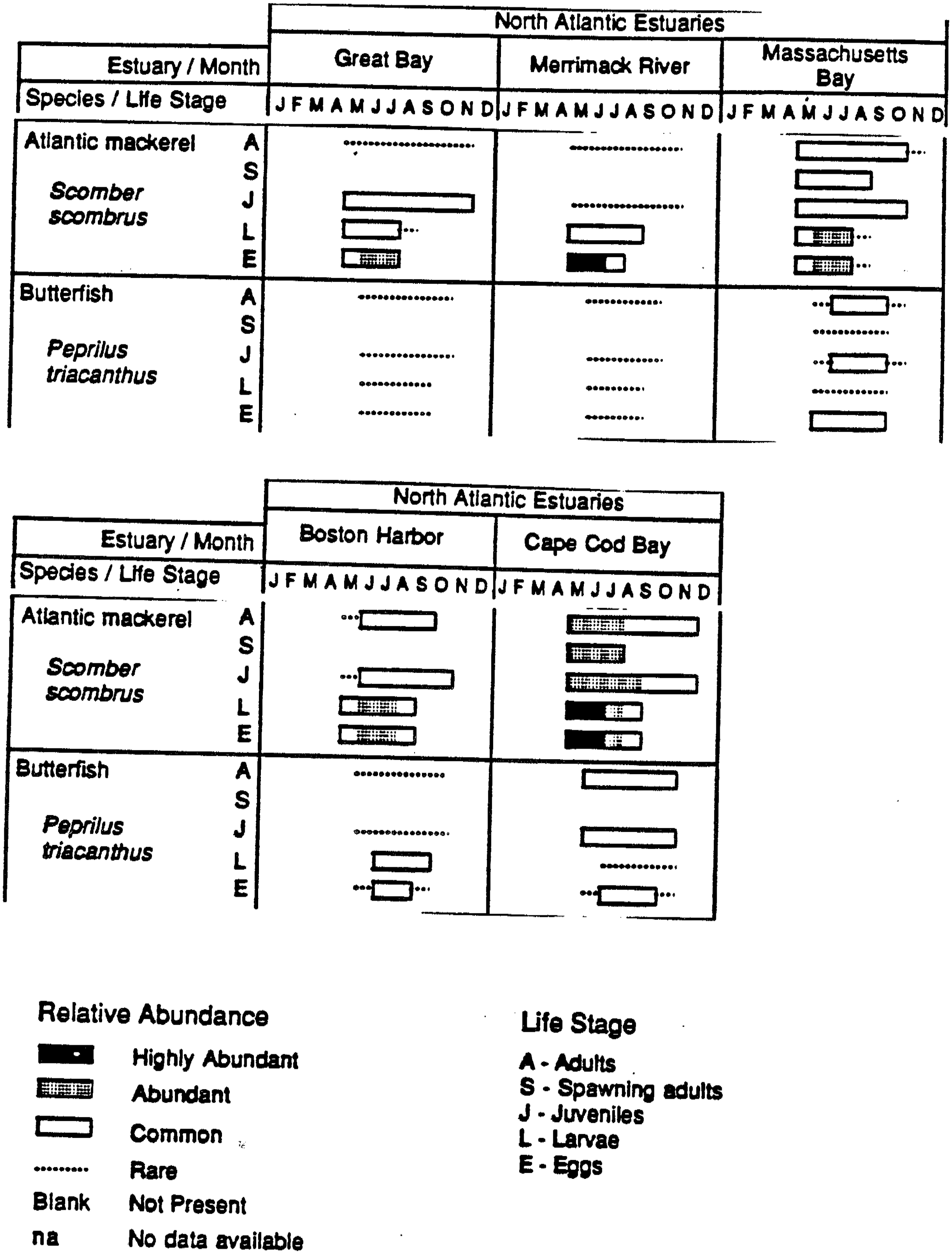
■	Highly Abundant
▨	Abundant
▭	Common
········	Rare
Blank	Not Present

Life Stage

A - Adults
S - Spawning adults
J - Juveniles
L - Larvae
E - Eggs

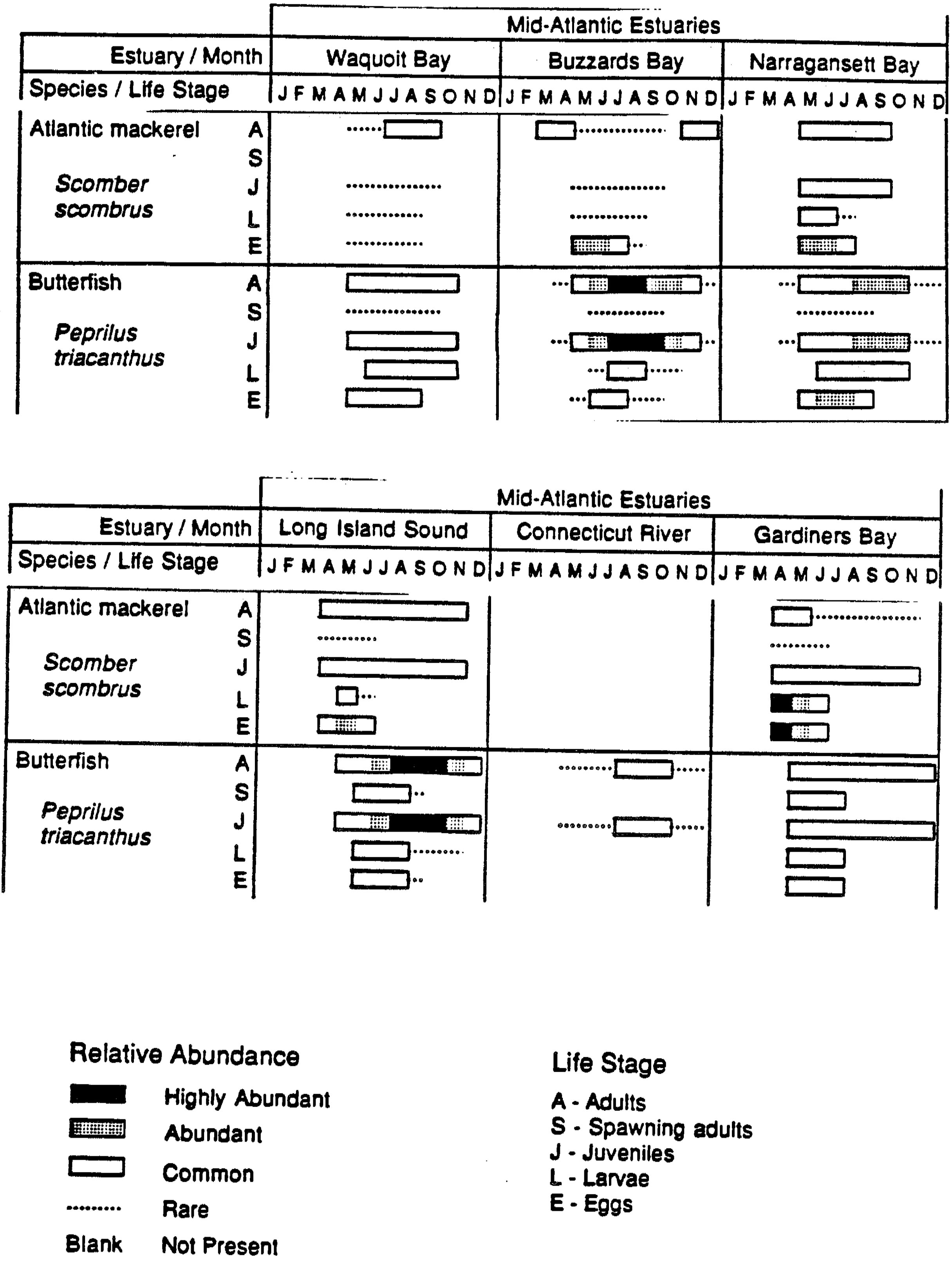
Source: USDC 1994a

Table 14. Temporal distribution of Atlantic mackerel and butterfish in New Hampshire and northern Massachusetts estuaries.



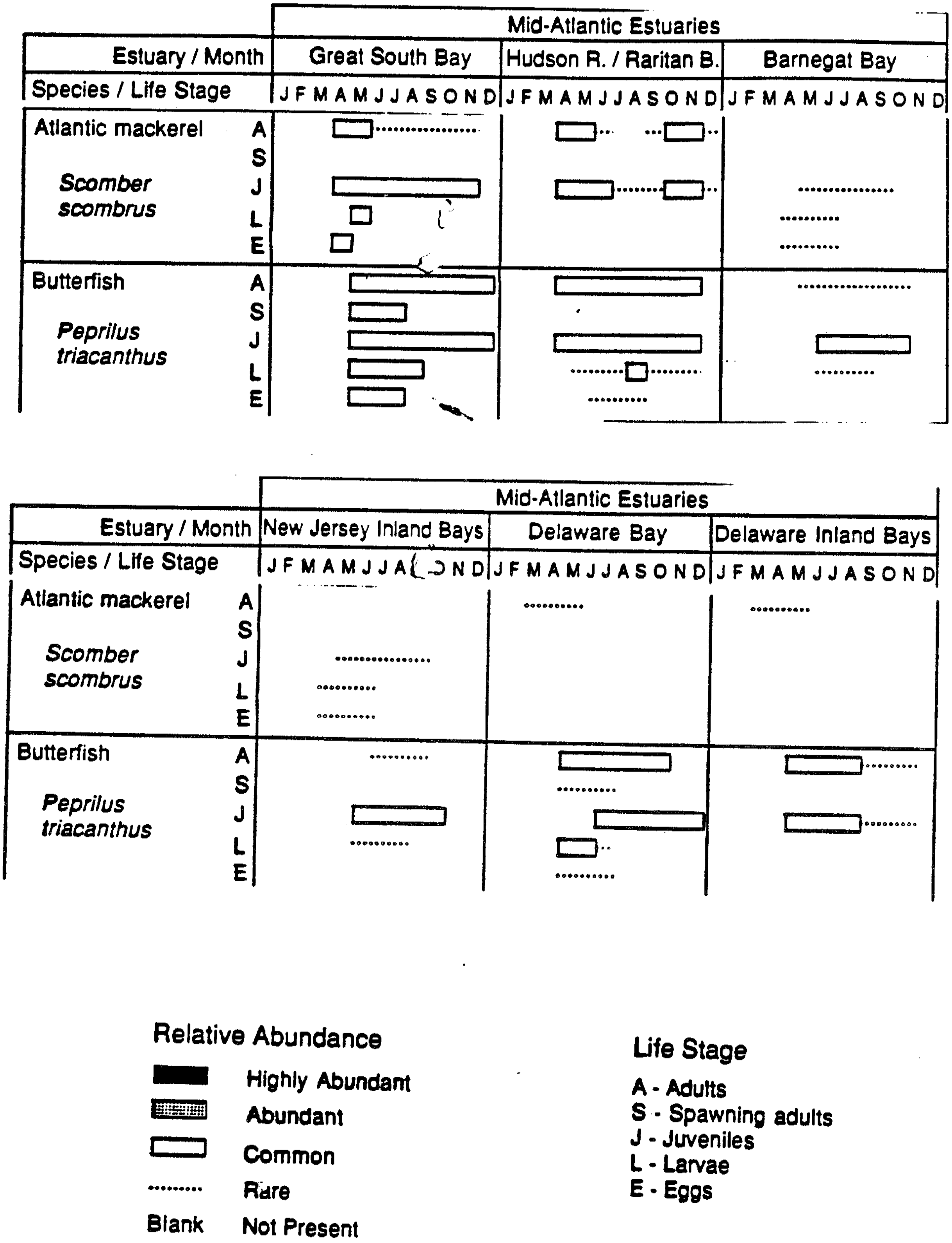
Source: USDC 1994a

Table 15. Temporal distribution of Atlantic mackerel and butterfish in New York through southern Massachusetts estuaries.



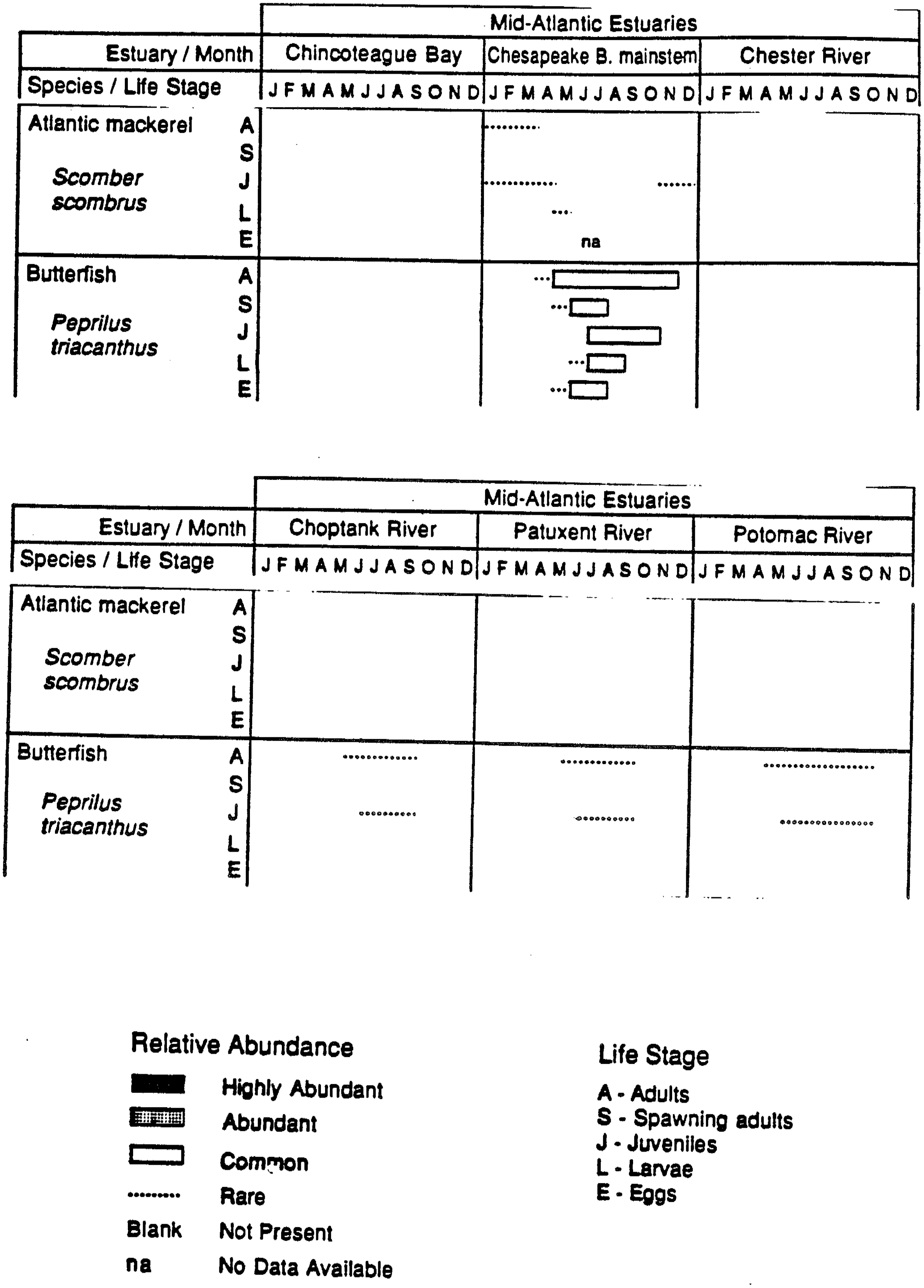
Source: USDC 1994b

Table 16 . Temporal distribution of Atlantic mackerel and butterfish in New York through Delaware estuaries.



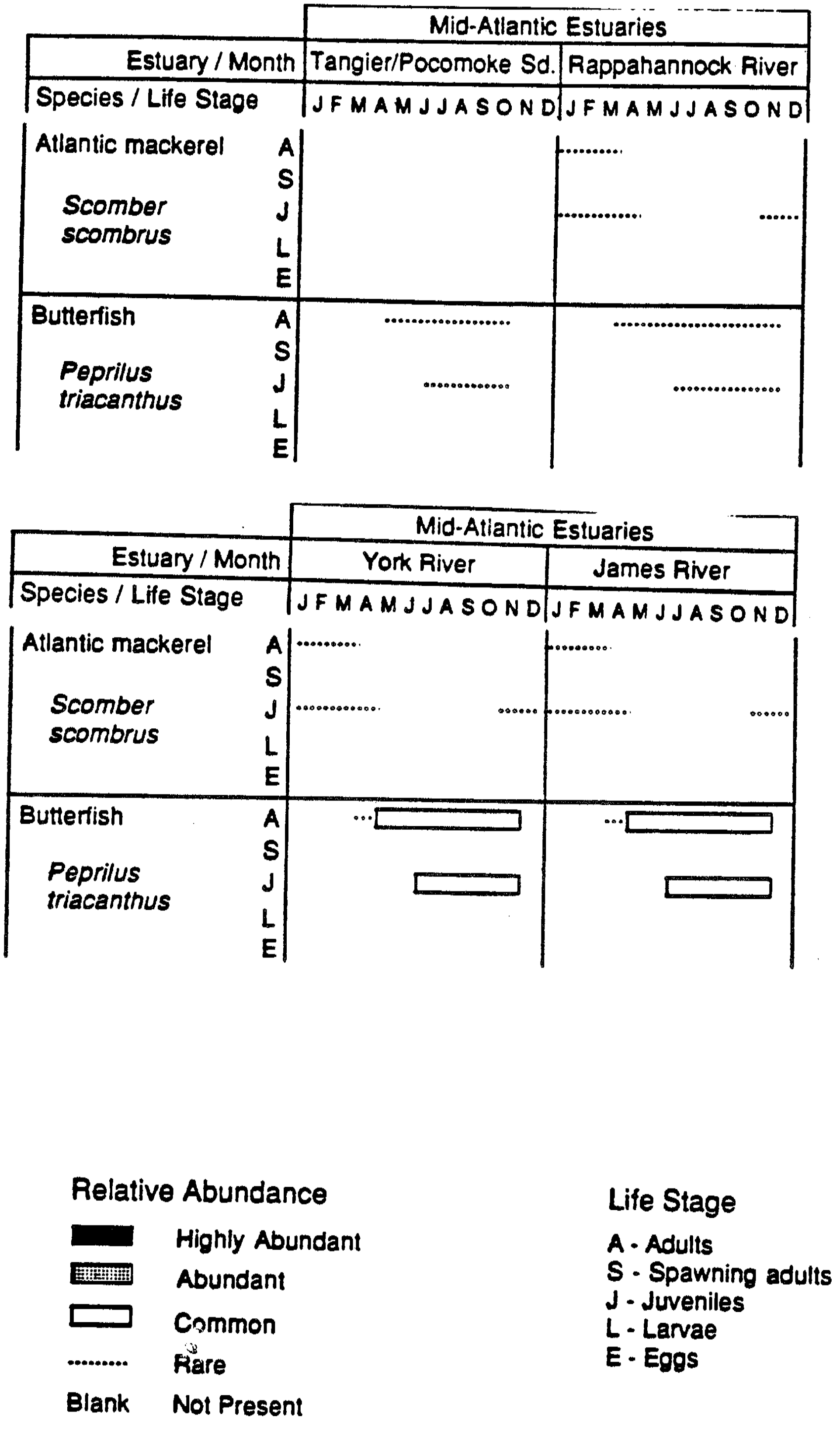
Source: USDC 1994b

Table 17. Temporal distribution of Atlantic mackerel and butterfish in Maryland and Virginia estuaries.



Source: USDC 1994b

Table 18. Temporal distribution of Atlantic mackerel and butterfish in Virginia estuaries.



Source: USDC 1994b

Table 19. Preliminary ranking of major threats to living marine resources and habitats in the Northeast.

1. Urban and port development *
2. Ocean Disposal #
3. Dams
4. Agricultural Practices ●
5. Industrial Waste Discharges @
6. Domestic Waste Discharges @
7. OCS Oil and Gas Development
8. Insect Control
9. Water Division
10. Sand and Gravel Mining
11. Power Generation

* Includes dredge and fill and construction activities covered by Section 10/104 permits, as well as point source pollution covered by NPDES permits and nonpoint source pollution.

Includes dredged material disposal in State waters, as well as actual ocean dumping of dredged material, sewage sludge, etc., covered by Section 103 permits.

● Includes nonpoint source pollution (fertilizers, animal wastes, biocides, sediments, heavy metals, etc.) that affects coastal aquatic areas.

@ Point source pollution covered by NPDES permits.

Source: USDC, 1985.

Table 20. Annual *Loligo pealei* landings (metric tons) from the Northwest Atlantic (Cape Hatteras to Gulf of Maine) the U.S.[1] and Foreign Fleets, 1963 to 1993.

Year	US	Foreign	Total
1963	1,294	0	1,294
1964	576	2	578
1965	709	99	808
1966	772	226	948
1967	547	1,130	1,167
1968	1,084	2,327	3,411
1969	899	8,643	9,542
1970	653	16,732	17,385
1971	727	17,442	18,169
1972	725	29,009	29,734
1973	1,105	36,508	37,613
1974	2,274	32,576	34,850
1975	1,621	32,180	33,801
1976	3,602	21,682	25,284
1977	1,088	15,586	16,674
1978	1,291	9,355	10,646
1979	4,252	13,068	17,320
1980	3,996	19,750	23,746
1981	2,316	20,212	22,528
1982	5,464	15,805	21,269
1983	15,943	11,720	27,663
1984	11,592	11,031	22,623
1985	10,155	6,549	16,704
1986	13,292	4,598	17,890
1987	11,475	2	11,477
1988	19,072	3	19,075
1989	23,650	5	23,655
1990	14,954	0	14,954
1991	19,409	0	19,409
1992	18,172	0	18,172
1993[2]	22,900	0	22,900

[1] Includes joint venture landings made by U.S. vessels.

[2] Provisional

Source: NMFS (1994a)

Table 21. Landed value of U.S. *Loligo* catch by year and water area for States ME-FL (all gears combined).

	State (< 3 Mi)		EEZ (> 3 Mi)		Total
Year	1000 $	% of Total	1000 $	% of Total	1000 $
83	3,103	39	4,734	60	7,838
84	2,444	39	3,755	60	6,199
85	1,783	28	4,419	71	6,202
86	2,895	32	6,078	67	8,973
87	2,542	27	6,721	72	9,263
88	3,565	23	11,865	76	15,431
89	3,264	14	19,333	85	22,597
90	1,795	12	12,156	87	13,951
91	3,460	15	19,294	84	22,754
92	958	4	22,388	95	23,347
Mean	2,581	18	11,074	81	13,656

Source: Unpublished NMFS General Canvas Data

Table 22. *Loligo* Squid Landings (metric tons) in 1992, by Area and Month.

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
513	-	-	-	-	0.2	0.3	-	-	-	-	-	-	0.5
514	-	-	-	-	0.3	-	0.0	-	0.1	0.5	1.6	0.1	2.8
521	0.1	-	-	-	0.2	0.0	-	0.9	0.0	0.2	0.2	0.0	1.8
522	-	-	-	-	0.0	-	3.8	0.0	-	4.8	-	-	8.6
525	-	-	-	-	1.5	0.3	-	-	-	-	-	-	1.7
526	-	3.2	265.2	276.0	2.7	1.6	13.1	145.6	0.9	0.1	0.1	0.5	708.9
537	351.4	227.4	353.9	357.9	125.8	54.0	302.2	266.6	77.2	465.6	260.5	294.4	3,136.8
538	-	-	-	1.5	368.2	2.6	8.1	1.0	0.3	2.6	1.1	-	385.5
539	12.2	0.2	-	1.6	57.8	49.7	18.0	15.9	8.5	34.7	99.9	99.5	398.1
611	9.5	9.5	1.6	29.6	44.4	38.6	50.6	39.0	20.2	27.0	3.0	2.7	275.7
612	81.8	3.8	0.7	0.1	80.1	108.5	267.0	123.3	0.6	24.4	7.9	23.3	721.4
613	64.8	4.0	12.4	121.4	74.5	87.4	117.3	202.8	101.8	246.7	522.2	68.1	1,623.4
614	0.1	-	-	1.3	0.3	6.9	1.2	14.2	0.3	0.0	0.0	-	24.4
615	4.8	2.3	0.0	2.9	-	104.2	10.5	19.6	-	-	-	244.8	389.1
616	809.7	2,293.8	1,458.7	622.0	133.2	117.2	81.9	-	25.8	177.9	966.9	1,425.1	8,112.2
621	3.2	3.5	0.5	2.1	3.6	27.0	19.7	1.0	0.3	1.4	1.3	3.4	67.0
622	172.5	44.5	552.2	362.9	2.4	0.0	-	0.3	2.7	10.4	72.1	288.3	1,508.3
623	-	24.5	18.1	-	-	-	-	-	-	-	-	-	42.6
625	0.1	-	-	-	0.0	-	0.0	-	-	0.2	0.9	0.7	1.9
626	6.6	11.4	74.9	99.5	0.0	-	-	0.5	2.4	47.5	30.4	16.7	289.8
631	1.3	0.5	4.6	0.0	-	-	-	-	-	0.1	0.5	0.3	7.3
632	1.3	2.3	2.8	0.4	-	-	-	-	5.0	216.0	234.5	-	462.2
635	1.6	-	-	-	-	-	-	-	-	-	-	0.3	1.9
Totals	1,521.1	2,630.7	2,745.7	1,879.1	895.2	598.1	893.3	830.9	246.2	1,260.1	2,203.2	2,468.3	18,171.9
%	8%	14%	15%	10%	5%	3%	5%	5%	1%	7%	12%	14%	
Avg % (1982-92)	6%	6%	7%	6%	19%	10%	7%	6%	4%	9%	9%	9%	

Source: NMFS (1994a)

Table 23. Landings and value by species for otter trawl trips harvesting 2,500 pounds or more of *Loligo*, based on unpublished 1992 NMFS weighout data. Records with unknown vessel identity were excluded (number of trips = 1,644).

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (LOLIGO)	37,605,209	48.861%	21,946,834	51.956%
HAKE, SILVER	9,431,248	12.254%	4,082,811	9.665%
MACKEREL, ATLANTIC	7,063,093	9.177%	1,214,848	2.876%
SCUP	4,685,335	6.088%	3,186,156	7.543%
BUTTERFISH	3,983,006	5.175%	2,510,065	5.942%
SQUID (ILLEX)	3,963,974	5.150%	1,137,752	2.693%
FLOUNDER, SUMMER	2,195,269	2.852%	3,595,796	8.513%
ANGLER	1,379,661	1.793%	922,119	2.183%
BLUEFISH	1,150,885	1.495%	287,213	0.680%
HAKE, RED	1,114,031	1.447%	303,351	0.718%
FLOUNDER, WINTER	1,008,942	1.311%	969,747	2.296%
SKATES UNC	641,492	0.834%	64,277	0.152%
SEA BASS, BLACK	502,602	0.653%	456,282	1.080%
HERRING, ATLANTIC	428,410	0.557%	38,235	0.091%
FLOUNDER, YELLOWTAIL	393,679	0.512%	405,059	0.959%
COD	218,049	0.283%	204,273	0.484%
DOGFISH (NK)	190,695	0.248%	25,416	0.060%
TILEFISH	175,398	0.228%	97,953	0.232%
WEAKFISH, SQUETEAGUE	96,904	0.126%	92,866	0.220%
EEL, CONGER	93,578	0.122%	19,914	0.047%
TAUTOG	93,516	0.122%	59,635	0.141%
FLOUNDER, WITCH	89,113	0.116%	109,019	0.258%
LOBSTER	72,531	0.094%	277,736	0.657%
HAKE, WHITE	65,306	0.085%	23,264	0.055%
POUT, OCEAN	51,657	0.067%	8,548	0.020%
WHITING, BLACK	40,206	0.052%	10,258	0.024%
SEA ROBINS	39,423	0.051%	10,135	0.024%
FLOUNDER, SAND-DAB	21,551	0.028%	6,172	0.015%
OTHER FISH	20,590	0.027%	824	0.002%
SCALLOP, SEA	19,941	0.026%	101,002	0.239%
DOGFISH SPINY	16,350	0.021%	1,512	0.004%
OTHER FISH	10,387	0.013%	4,746	0.011%
POLLOCK	10,066	0.013%	5,266	0.012%
CONCHS	9,005	0.012%	11,410	0.027%
CROAKER, ATLANTIC	6,844	0.009%	1,383	0.003%
STURGEONS	6,338	0.008%	7,469	0.018%
FLOUNDER, AM. PLAICE	5,954	0.008%	7,768	0.018%
SHAD, AMERICAN	5,762	0.007%	2,398	0.006%
DOGFISH SMOOTH	5,349	0.007%	1,782	0.004%
SHARK, SANDBAR	5,225	0.007%	1,859	0.004%
SQUIDS (NS)	5,209	0.007%	2,738	0.006%
MENHADEN	4,900	0.006%	294	0.001%
JOHN DORY	4,490	0.006%	2,502	0.006%
MACKEREL, SPAN	4,141	0.005%	2,730	0.006%
WHITING, KING	4,102	0.005%	811	0.002%
WOLFFISHES	3,802	0.005%	2,304	0.005%
HADDOCK	3,335	0.004%	747	0.002%
SWORDFISH	2,829	0.004%	8,022	0.019%

Table 23. (Continued)

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
PUFFER, NORTHERN	2,313	0.003%	1,237	0.003%
BONITO	1,946	0.003%	623	0.001%
HERRING (NK)	1,506	0.002%	240	0.001%
SHARK, NK	1,460	0.002%	1,664	0.004%
SHARK, THRESHER	1,400	0.002%	1,076	0.003%
REDFISH	869	0.001%	523	0.001%
BASS, STRIPED	698	0.001%	1,214	0.003%
SHARK, BLACK TIP	666	0.001%	120	0.000%
CUNNER	598	0.001%	51	0.000%
SHARK, DUSKY	582	0.001%	91	0.000%
CRAB, JONAH	425	0.001%	309	0.001%
COBIA	207	0.000%	267	0.001%
CRAB, ROCK	172	0.000%	170	0.000%
SPOT	170	0.000%	42	0.000%
TRIGGERFISH	145	0.000%	68	0.000%
FLOUNDER, FOURSPOT	102	0.000%	19	0.000%
SHARK, PORBEAGLE	97	0.000%	52	0.000%
FLOUNDERS (NK)	59	0.000%	60	0.000%
CRAB, HORSESHOE	40	0.000%	4	0.000%
ALEWIFE	31	0.000%	2	0.000%
HALIBUT, ATLANTIC	29	0.000%	40	0.000%
SHARK, MAKO SHORTFIN	15	0.000%	46	0.000%
MACKEREL, KING	10	0.000%	9	0.000%
TUNA, ALBACORE	9	0.000%	4	0.000%
CUSK	6	0.000%	2	0.000%
WHELK, CHANNELED	6	0.000%	5	0.000%
WHELK, KNOBBED	6	0.000%	4	0.000%
Total	76,962,949	100.000%	42,241,243	100.000%

* Note: Finfish weights are in LIVE, WHOLE weight, and shellfish weights are in LANDED, MEAT weight. Accurate calculations of price per pound (value/pounds) for landed product can only be done for the shellfish, mollusk, and crustacean species in this table.

Table 24. Short-finned squid (*Illex illecebrosus*) landings (mt) from Cape Hatteras to the Gulf of Maine during 1963 to 1993, and *Illex* landings from NAFO subareas 2, 3, and 4, inclusive, during 1973 to 1991.[1,2]

				NAFO Areas	All
	Cape Hatteras to the Gulf of Maine			2-4	Areas
Year	Domestic	Foreign	Subtotal	Subtotal	Total
1963	810	0	810	-[1]	810
1964	358	2	360	-[1]	360
1965	444	78	522	-[1]	522
1966	452	118	570	-[1]	570
1967	707	285	992	-[1]	992
1968	678	2,593	3,271	-[1]	3,271
1969	562	975	1,537	-[1]	1,537
1970	408	2,418	2,826	-[1]	2,826
1971	455	159	614	-[1]	614
1972	472	17,169	17,641	-[1]	17,641
1973	530	18,625	19,155	641	19,796
1974	148	20,480	20,628	283	20,911
1975	107	17,819	17,926	17,696	35,622
1976	229	24,707	24,936	41,767	66,703
1977	1,024	23,771	24,795	83,480	108,275
1978	385	17,310	17,695	94,064	111,759
1979	1,780	15,742	17,522	162,092	179,614
1980	349	17,529	17,878	69,606	87,484
1981	631	14,723	15,354	32,862	48,216
1982	5,902	12,350	18,252	12,908	31,160
1983	9,944	1,776	11,720	421	12,141
1984	9,547	676	10,223	715	10,938
1985	4,997	1,053	6,050	673	6,723
1986	5,176	250	5,422	111	5,533
1987	10,260	0	10,260	1,694	11,954
1988	1,966	1	1,967	846	2,813
1989	6,801	0	6,801	6,537	13,338
1990	11,316	0	11,316	10,867	22,183
1991	11,908	0	11,908	3,838	15,746
1992	17,827	0	17,827	-[2]	17,827
1993[3]	14,800	-	-	-	-
Average					
1963-92	3,540	7,020	10,560	-[1]	28,597
1973-82	1,109	18,306	19,414	51,540	70,954
1983-89	6,956	537	7,493	1,571	9,064
1990-92	13,691	0	13,691	7,353[2]	18,592

[1] ICNAF squid landings were not reported by species before 1973.

[2] Provisional *Illex* landings from NAFO Subareas 2, 3, and 4 in 1992 are not yet available.

[3] Predicted

Source: NMFS (1994a)

Table 25. *Illex* squid landings in 1992, by Area and Month.

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total	%
513	0.3	-	-	-	-	-	0.1	-	-	0.1	0.1	-	0.7	<1%
514	-	-	-	-	-	-	-	-	-	-	0.8	-	0.8	<1%
522	-	-	-	-	-	-	-	0.2	-	-	-	-	0.2	<1%
526	-	0.2	4.8	23.7	-	-	-	-	-	-	-	-	28.7	<1%
537	-	-	-	16.3	10.6	49.9	-	3.2	11.4	0.7	0.3	3.7	96.0	1%
612	-	-	-	-	-	1.5	-	-	-	-	-	-	1.5	<1%
613	0.9	-	-	-	-	-	-	-	-	0.6	-	-	1.6	<1%
614	-	-	-	-	-	-	-	0.1	-	-	-	-	0.1	<1%
615	1.2	0.7	-	-	-	-	-	-	-	-	-	2.1	3.9	<1%
616	0.1	12.1	10.9	0.6	-	447.3	-	-	-	-	132.0	27.0	630.0	4%
621	0.1	-	-	-	-	-	-	0.4	-	-	-	-	0.2	<1%
622	2.1	-	13.0	45.5	696.8	3,433.4	2,560.6	2,025.0	1,365.1	1,047.7	6.9	11.0	11,207.0	63%
623	-	-	0.9	-	-	-	-	-	-	-	-	-	0.9	<1%
626	-	0.8	0.1	0.3	-	-	1,409.0	2,382.9	227.8	69.3	-	-	4,090.1	23%
632	-	-	-	-	-	-	-	-	812.1	907.1	46.1	-	1,765.3	10%
Total	4.8	13.7	29.7	86.3	707.3	3,932.1	3,969.7	4,411.6	2,416.4	2,025.4	186.2	43.8	17,827.0	
%	<1%	<1%	<1%	<1%	4%	22%	22%	25%	14%	11%	1%	<1%		
Avg % 1988-92	<1%	<1%	<1%	<1%	1%	11%	25%	31%	24%	7%	1%	<1%		
Avg % 1982-92	<1%	<1%	<1%	<1%	4%	16%	27%	26%	22%	5%	<1%	<1%		

Source: NMFS (1994a)

Table 26. Landings and value by species for otter trawl trips harvesting 50,000 pounds or more of *Illex,* based on unpublished 1992 NMFS weighout data. Records with vessel identity unknown were excluded (number of trips = 214).

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (ILLEX)	37,660,162	97.701%	9,408,709	92.708%
BUTTERFISH	432,656	1.122%	333,482	3.286%
SQUID (LOLIGO)	409,129	1.061%	324,280	3.195%
SWORDFISH	22,829	0.059%	70,755	0.697%
ANGLER	7,805	0.020%	5,390	0.053%
BLUEFISH	5,870	0.015%	882	0.009%
HAKE, SILVER	3,903	0.010%	1,366	0.013%
JOHN DORY	2,000	0.005%	1,520	0.015%
FLOUNDER, SUMMER	1,296	0.003%	1,426	0.014%
TILEFISH	433	0.001%	418	0.004%
SHARK, MAKO	264	0.001%	428	0.004%
SHARK, DUSKY	64	0.000%	14	0.000%
TUNA NK	61	0.000%	74	0.001%
OTHER FISH	38	0.000%	57	0.001%
Total	38,546,510	100.000%	10,148,801	100.000%

* Note: Finfish weights are in LIVE, WHOLE weight, and shellfish weights are in LANDED, MEAT weight. Accurate calculations of price per pound (value/pounds) for landed product can only be done for the shellfish, mollusk, and crustacean species in this table.

Table 27. US and Foreign Atlantic Mackerel Catch (mt), 1966-1993.

	In US Waters (NAFO/ICNAF Subarea 5 and Statistical Area 6)					
Year	US Commercial	US Recreational	US Total	Foreign #	Total	Outside US Waters+
1966	2,724	4,535	7,259	6,707	13,966	12,820
1967	3,891	4,498	8,389	18,984	27,373	11,242
1968	3,929	7,781	11,710	56,040	67,750	20,837
1969	4,364	13,050	17,414	108,805	126,219	18,635
1970	4,049	16,039	20,088	205,557	225,645	21,005
1971	2,406	16,426	18,832	346,319	365,151	24,494
1972	2,006	15,588	17,594	385,337	402,931	22,359
1973	1,336	10,723	12,059	379,808	391,867	38,548
1974	1,042	7,640	8,682	293,867	302,549	44,653
1975	1,974	5,190	7,164	248,991	256,155	36,256
1976	2,712	4,202	6,914	205,945	212,859	33,063
1977	1,377	522	1,899	53,661	55,560	22,764
1978	1,605	6,571	8,176	371	8,547	25,797
1979	1,990	3,588	5,578	63	5,641	30,610
1980	2,683	2,364	5,047	399	5,446	20,499
1981	2,941	8,505	11,446	5,282	16,728	19,318
1982	3,330	1,162	4,492	9,548	14,040	16,382
1983	3,805	3,280	7,085	1,597	8,682	19,805
1984	5,954	2,618	8,572	15,045	23,617	17,942
1985	6,632	3,287	9,919	32,409	42,328	30,899
1986	9,637	3,943	13,580	25,355	38,935	26,128
1987	12,310	5,567	17,877	35,094	52,971	23,640
1988	12,309	4,204	16,513	42,858	53,371	24,390
1989	14,556	2,251	16,807	36,823	53,630	20,408
1990	31,261	2,000	33,261	9,126	42,387	25,000
1991	25,692	2,011	27,703	5,349	33,052	22,186
1992	12,418	-	-	0	-	-
1993	4,128	-	-	0	-	-

\+ = Foreign catch from NAFO/ICNAF Subareas 3 and 4 (includes Canada).

\# = includes catch taken by Poland in a research fishery from 1982 - 1987.

Sources: Anderson, 1985; USDC 1991b; and Overholtz 1994 pers. Comm.

Table 28. Landings and value by species for otter trawl trips harvesting 10,000 pounds or more of Atlantic mackerel, based on unpublished 1992 NMFS weighout data. Records with vessel identity unknown were excluded (number of trips = 234).

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
MACKEREL, ATLANTIC	23,618,350	61.208%	3,217,054	31.531%
HERRING, ATLANTIC	5,087,064	13.183%	226,339	2.218%
SQUID (LOLIGO)	4,254,954	11.027%	3,150,506	30.879%
HAKE, SILVER	2,112,977	5.476%	1,207,763	11.837%
SCUP	1,136,682	2.946%	828,889	8.124%
BUTTERFISH	676,761	1.754%	614,371	6.022%
HERRING, BLUE BACK	428,901	1.112%	20,114	0.197%
HAKE, RED	327,247	0.848%	112,424	1.102%
FLOUNDER, SUMMER	168,198	0.436%	344,123	3.373%
SQUID (ILLEX)	139,732	0.362%	29,330	0.287%
ANGLER	121,465	0.315%	72,097	0.707%
DOGFISH SPINY	120,400	0.312%	12,176	0.119%
FLOUNDER, WINTER	82,722	0.214%	86,145	0.844%
COD	63,211	0.164%	60,626	0.594%
FLOUNDER, YELLOWTAIL	39,775	0.103%	45,807	0.449%
BLUEFISH	34,939	0.091%	12,194	0.120%
SEA BASS, BLACK	31,488	0.082%	24,360	0.239%
FLOUNDER, WITCH	29,204	0.076%	47,867	0.469%
OTHER FISH	20,590	0.053%	824	0.008%
TILEFISH	16,633	0.043%	20,982	0.206%
SKATES UNC	16,512	0.043%	1,566	0.015%
POUT, OCEAN	11,041	0.029%	1,673	0.016%
LOBSTER	7,165	0.019%	40,703	0.399%
POLLOCK	6,869	0.018%	3,294	0.032%
EEL, CONGER	6,342	0.016%	1,897	0.019%
TAUTOG	6,260	0.016%	4,183	0.041%
HAKE, WHITE	5,292	0.014%	2,009	0.020%
DOGFISH (NK)	3,298	0.009%	545	0.005%
MENHADEN	3,220	0.008%	129	0.001%
FLOUNDER, SAND-DAB	2,554	0.007%	738	0.007%
SCALLOP, SEA	1,924	0.005%	9,619	0.094%
WHITING, BLACK	1,600	0.004%	512	0.005%
SHAD, AMERICAN	835	0.002%	284	0.003%
WEAKFISH, SQUETEAGUE	780	0.002%	665	0.007%
FLOUNDER, AM. PLAICE	746	0.002%	242	0.002%
OTHER FISH	456	0.001%	202	0.002%
SHARK, PORBEAGLE	379	0.001%	87	0.001%
CUNNER	256	0.001%	15	0.000%
STURGEONS	222	0.001%	380	0.004%
HADDOCK	108	0.000%	105	0.001%
REDFISH	25	0.000%	10	0.000%
JOHN DORY	22	0.000%	8	0.000%
HALIBUT, ATLANTIC	9	0.000%	12	0.000%
Total	38,587,208	100.000%	10,202,869	100.000%

* Note: Finfish weights are in LIVE, WHOLE weight, and shellfish weights are in LANDED, MEAT weight. Accurate calculations of price per pound (value/pounds) for landed product can only be done for the shellfish, mollusk, and crustacean species in this table.

Table 29. Recreational landings of Mackerel (metric tons) by State, Virginia - Maine, 1979 - 1991

	VA	MD	DE	NJ	NY	CT	RI	MA	NH	ME	Total
1979	*	*	587	856	1	341	75	1185	289	246	3579
1980	*	*	*	1682	119	103	2	318	82	159	2465
1981	*	*	*	7280	88	1	-	185	94	197	7845
1982	*	*	*	722	90	188	2	30	33	51	1115
1983	1370	441	129	713	-	-	108	232	60	50	3102
1984	5	170	91	337	20	1	274	920	200	342	2361
1985	27	-	7	769	225	47	153	596	1	224	2049
1986	501	184	1103	1762	10	18	95	318	15	245	4248
1987	-	162	-	1106	1787	517	1	660	49	381	4662
1988	-	213	200	1	8	1	6	2799	75	535	3839
1989	7	265	242	429	111	-	11	922	103	158	2250
1990	23	341	10	311	8	-	46	1375	15	93	2223
1991	4	16	13	191	113	-	-	1440	22	212	2011
Σ	1937	1792	2383	16159	2580	1217	772	10979	1037	2892	41747
Mean	215	199	238	1243	199	94	59	845	80	222	3394
%	6	6	7	37	6	3	2	25	2	7	100

- = zero; * = landings during these years were not sampled adequately for these States. Source: Overholtz pers. comm.

Source: MRFSS

Table 30. Landings (mt) of Atlantic Butterfish (*Peprilus triacanthus*) from Cape Hatteras to the Gulf of Maine. 1965 to 1993.

Year	USA	Foreign	Total
1965	3,340	749	4,089
1966	2,615	3,865	6,480
1967	2,452	2,316	4,768
1968	1,804	5,437	7,241
1969	2,438	15,073	17,511
1970	1,869	9,028	10,897
1971	1,570	6,238	7,853
1972	819	5,671	6,490
1973	1,557	17,847	19,454
1974	2,528	10,337	12,865
1975	2,088	9,077	11,165
1976	1,528	10,353	11,881
1977	1,448	3,205	4,653
1978	3,676	1,326	5,002
1979	2,831	840	3,671
1980	5,356	879	6,235
1981	4,855	936	5,791
1982	9,060	631	9,691
1983	4,905	630	5,535
1984	11,972	429	12,401
1985	4,739	804	5,543
1986	4,418	164	4,582
1987	4,508	0	4,508
1988	2,001	0	2,001
1989	3,203	1	3,204
1990	2,298	3	2,301
1991	2,189	0	2,189
1992	2,678	0	2,678
1993[1]	4,430	-	4,430
Average			
1965-76	2,051	7,999	10,050
1977-87	5,252	895	6,147
1988-92	2,474	1	2,475
1965-93	3,384	3,920	7,167

[1] Predicted

Source: NMFS (1994a)

Table 31. Atlantic Butterfish (*Peprilus triacanthus*) landings (metric tons) in 1992, by 2-digit statistical area and month.

Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Totals
51	0.51	-	-	-	-	0.01	0.02	-	0.04	0.09	0.48	0.01	1.15
52	0.01	88.70	21.00	58.45	8.59	13.13	1.13	1.23	1.36	2.90	0.13	0.31	196.94
53	535.00	218.33	32.04	20.41	29.78	73.31	11.63	26.44	66.41	48.12	29.80	113.13	1,204.40
56	-	-	-	-	-	0.17	2.19	-	-	-	-	-	2.36
61	155.06	271.27	103.87	28.54	24.83	46.72	23.48	23.82	30.08	31.47	63.33	43.23	845.70
62	2.68	3.69	12.76	4.94	2.94	35.50	13.16	15.33	99.21	60.94	83.38	28.31	362.83
63	0.01	0.01	0.03	-	-	0.01	-	-	0.68	37.19	26.49	-	64.42
Totals	693.27	582.00	169.70	112.33	66.14	168.85	51.61	66.82	197.78	180.71	203.60	184.98	2,677.80
%	26%	22%	6%	4%	2%	6%	2%	2%	7%	7%	8%	7%	
Avg % 1990-92	22%	16%	8%	4%	3%	5%	2%	5%	12%	10%	6%	7%	

Source: NMFS (1994a)

Table 32. Landings and value by species for otter trawl trips harvesting 500 pounds or more of butterfish, based on unpublished 1992 NMFS weighout data. Records with vessel identity unknown were excluded (number of trips = 1,083).

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
SQUID (LOLIGO)	23,515,140	35.838%	14,496,436	41.257%
HAKE, SILVER	10,248,164	15.619%	3,916,420	11.146%
SQUID (ILLEX)	7,143,106	10.886%	2,111,062	6.008%
BUTTERFISH	5,455,471	8.314%	3,111,138	8.854%
MACKEREL, ATLANTIC	5,397,799	8.227%	1,082,289	3.080%
SCUP	3,523,727	5.370%	2,545,385	7.244%
FLOUNDER, SUMMER	2,020,538	3.079%	3,205,009	9.122%
ANGLER	1,224,424	1.866%	839,427	2.389%
HAKE, RED	1,194,722	1.821%	304,893	0.868%
BLUEFISH	1,079,612	1.645%	260,491	0.741%
FLOUNDER, WINTER	1,015,474	1.548%	999,655	2.845%
SKATES UNC	769,332	1.172%	76,013	0.216%
WEAKFISH, SQUETEAGUE	637,603	0.972%	305,907	0.871%
FLOUNDER, YELLOWTAIL	375,903	0.573%	392,290	1.116%
SEA BASS, BLACK	282,527	0.431%	284,234	0.809%
COD	247,883	0.378%	234,121	0.666%
TILEFISH	219,061	0.334%	112,330	0.320%
HERRING, ATLANTIC	199,702	0.304%	28,932	0.082%
DOGFISH (NK)	109,969	0.168%	18,890	0.054%
EEL, CONGER	97,997	0.149%	20,042	0.057%
CRAB, HORSESHOE	92,221	0.141%	9,249	0.026%
TAUTOG	90,566	0.138%	60,759	0.173%
FLOUNDER, WITCH	90,182	0.137%	107,093	0.305%
LOBSTER	86,742	0.132%	323,795	0.922%
HAKE, WHITE	72,984	0.111%	25,302	0.072%
POUT, OCEAN	47,779	0.073%	7,772	0.022%
WHITING, BLACK	46,178	0.070%	13,145	0.037%
CROAKER, ATLANTIC	45,739	0.070%	11,209	0.032%
SEA ROBINS	36,107	0.055%	9,961	0.028%
DOGFISH SPINY	31,283	0.048%	3,172	0.009%
DOGFISH SMOOTH	27,951	0.043%	5,149	0.015%
SCALLOP, SEA	23,094	0.035%	117,328	0.334%
SPOT	18,368	0.028%	2,690	0.008%
FLOUNDER, SAND-DAB	17,990	0.027%	5,202	0.015%
WHITING, KING	13,680	0.021%	3,861	0.011%
CONCHS	10,664	0.016%	12,156	0.035%
POLLOCK	10,541	0.016%	5,483	0.016%
FLOUNDER, AM. PLAICE	9,383	0.014%	10,031	0.029%
STURGEONS	8,178	0.012%	9,595	0.027%
SHAD, AMERICAN	7,527	0.011%	2,545	0.007%
SQUIDS (NS)	7,350	0.011%	3,648	0.010%
PUFFER, NORTHERN	5,588	0.009%	2,449	0.007%
MACKEREL, SPAN	5,310	0.008%	3,147	0.009%
SHARK, SANDBAR	5,211	0.008%	1,858	0.005%
BASS, STRIPED	4,818	0.007%	6,845	0.019%
SWORDFISH	4,328	0.007%	11,621	0.033%
JOHN DORY	4,042	0.006%	2,292	0.007%

Table 32. (Continued)

Common Name	Pounds*	Species % of Total Pounds	Value	Species % of Total Value
OTHER FISH	3,909	0.006%	1,941	0.006%
WOLFFISHES	3,678	0.006%	2,269	0.006%
SHARK, THRESHER	3,549	0.005%	1,918	0.005%
CRAB, JONAH	3,109	0.005%	1,388	0.004%
MENHADEN	2,950	0.004%	285	0.001%
SHARK, NK	2,742	0.004%	2,160	0.006%
BONITO	2,372	0.004%	777	0.002%
SHARK, THRESHR BGEYE	2,155	0.003%	310	0.001%
SHARK, PORBEAGLE	1,507	0.002%	450	0.001%
WHELK, KNOBBED	927	0.001%	336	0.001%
WHELK, CHANNELED	914	0.001%	818	0.002%
HADDOCK	756	0.001%	541	0.002%
SHARK, DUSKY	693	0.001%	89	0.000%
OTHER FISH	601	0.001%	24	0.000%
CUNNER	559	0.001%	44	0.000%
REDFISH	559	0.001%	314	0.001%
MULLETS	519	0.001%	78	0.000%
SHARK, TIGER	321	0.000%	69	0.000%
WEAKFISH, SPOTTED	165	0.000%	113	0.000%
TRIGGERFISH	157	0.000%	71	0.000%
HALIBUT, ATLANTIC	120	0.000%	205	0.001%
COBIA	104	0.000%	138	0.000%
FLOUNDER, FOURSPOT	102	0.000%	19	0.000%
MACKEREL, KING	76	0.000%	53	0.000%
CRAB, ROCK	64	0.000%	63	0.000%
HERRING, BLUE BACK	60	0.000%	5	0.000%
FLOUNDERS (NK)	29	0.000%	27	0.000%
SHEEPSHEAD	16	0.000%	5	0.000%
DRUM, RED	11	0.000%	2	0.000%
Total	65,614,682	100.000%	35,136,833	100.000%

* Note: Finfish weights are in LIVE, WHOLE weight, and shellfish weights are in LANDED, MEAT weight. Accurate calculations of price per pound (value/pounds) for landed product can only be done for the shellfish, mollusk, and crustacean species in this table.

Table 33. Production and employment for Atlantic mackerel, squid, and butterfish based on NMFS survey of processors.

		Employment			
Year	Companies	Avg	Seasonal	Pounds	Dollars
1983	18	646	671	3,591,446	2,213,062
1984	18	565	590	3,069,880	2,049,547
1985	13	348	351	3,085,145	2,372,620
1986	15	364	364	2,731,323	2,562,648
1987	15	440	440	3,018,651	3,470,239
1988	16	482	483	4,834,356	5,351,154
1989	15	448	448	4,702,839	5,496,166
1990	17	1,265	1,265	13,618,485	17,551,154
1991	18	1,343	1,402	12,489,934	18,946,139
1992	19	818	818	15,174,548	27,809,375

Source: NMFS Domestic Processor Survey (Koplin, pers. comm.)

Table 34. East Coast exports of Atlantic Mackerel: 1989 - 1993

	1989		1990		1991		1992		1993	
COUNTRY OF DESTINATION	Metric Tons	$/MT	Metric Tons	$/MT	Metric Tons	$/MT	Metric Tons	$/MT	Metric Tons	$/MT
Mackerel, Fresh										
Canada	77	1,600	458	1,810	535	1,743	591	1,719	503	1902
Puerto Rico	6	1,165	-	-	-	-	-	-	-	-
USSR	-	-	-	-	1,855	136	422	135	-	-
Japan	-	-	-	-	63	895	-	-	-	-
Jamaica	-	-	-	-	-	-	79	1,152	67	764
Germany	-	-	-	-	-	-	-	-	1	3,964
Total, Fresh	83	1,566	458	1,810	2,453	506	1,092	1,066	571	1,772
Mackerel, Frozen										
Canada	531	1,381	197	1,281	209	1,280	302	1,307	172	1,230
Jamaica	310	244	1,001	901	1,659	823	1,745	927	966	604
Trinidad & Tobago	-	-	21	931	-	-	-	-	-	-
United Kingdom	-	-	20	892	-	-	-	-	-	-
Spain	-	-	21	1,982	816	1,013	22	1,470	-	-
East Germany	63	1,810	1,645	554	-	-	-	-	-	-
Italy	-	-	-	-	20	250	-	-	-	-
Rep. of Korea	-	-	18	4,232	65	1,809	-	-	-	-
Japan	-	-	98	935	2,870	882	63	1,099	214	800
Hong Kong	-	-	-	-	8	1,119	-	-	-	-
Singapore	-	-	-	-	40	1,089	-	-	-	-
Malaysia	-	-	-	-	40	397	18	426	-	-
Martinique	-	-	-	-	-	-	6	1,810	-	-
Venezuela	-	-	-	-	-	-	114	224	18	1,653
Iceland	-	-	-	-	-	-	21	550	-	-
Turkey	-	-	-	-	-	-	17	761	-	-
Mexico	-	-	-	-	-	-	-	-	246	740
Total, Frozen	904	1,021	3,022	766	5,727	905	2,308	946	1,617	729

NOTE: 1. Prior to 1989, exports of Fresh and Frozen mackerel were combined under one export commodity code.
2. The species Atlantic mackerel differentiated from other mackerel species by using the U.S. Customs District of Export.

Source: U.S. Census 07/13/94
NMFS, F/NEO3 - Fisheries Analysis Division, Gloucester, MA.

Table 35. Number of vessels, trips, and pounds landed of butterfish for various trip thresholds based on 1992 NMFS weighout data.

Threshold pounds	Butterfish vessels (number)	Butterfish vessels (percent)	Butterfish trips (number)	Butterfish trips (percent)	Butterfish pounds (number)	Butterfish pounds (percent)
0	310	100	4,051	100	5,919,813	100
100	209	67	2,108	52	5,863,964	99
200	181	58	1,660	41	5,801,569	98
300	165	53	1,401	35	5,739,443	97
400	154	50	1,225	30	5,679,488	96
500	145	47	1,088	27	5,618,671	95
600	136	44	961	24	5,549,834	94
800	128	41	818	20	5,452,098	92
1,000	123	40	715	18	5,360,326	91
2,000	91	29	445	11	4,980,441	84
3,000	70	23	328	8	4,695,836	79
4,000	62	20	276	7	4,518,131	76
5,000	58	19	240	6	4,355,482	74
10,000	43	14	128	3	3,575,388	60

Table 36. Number of vessels, trips, and pounds landed of *Illex* for various trip thresholds based on 1992 NMFS weighout data.

Threshold pounds	*Illex* vessels (number)	*Illex* vessels (percent)	*Illex* trips (number)	*Illex* trips (percent)	*Illex* pounds (number)	*Illex* pounds (percent)
0	54	100	395	100	39,292,003	100
100	33	61	341	86	39,290,649	100
200	30	56	334	85	39,289,781	100
300	27	50	324	82	39,287,409	100
400	27	50	323	82	39,287,026	100
500	27	50	323	82	39,287,026	100
600	25	46	317	80	39,283,865	100
800	25	46	315	80	39,282,560	100
1,000	25	46	312	79	39,279,714	100
2,000	21	39	296	75	39,256,677	100
3,000	21	39	287	73	39,234,544	100
4,000	20	37	280	71	39,209,785	100
5,000	19	35	276	70	39,190,920	100
10,000	18	33	261	66	39,078,693	99
25,000	18	33	243	62	38,832,103	99
50,000	17	32	214	54	37,660,162	95

Table 37. Number of vessels, trips, and pounds landed of *Loligo* for various trip thresholds based on 1992 NMFS weighout data.

Threshold pounds	*Loligo* vessels (number)	*Loligo* vessels (percent)	*Loligo* trips (number)	*Loligo* trips (percent)	*Loligo* pounds (number)	*Loligo* pounds (percent)
0	383	100	5,608	100	39,548,368	100
100	336	88	4,327	77	39,500,983	100
200	313	82	3,794	68	39,426,206	100
300	296	77	3,448	61	39,342,178	99
400	283	74	3,187	57	39,252,701	99
500	270	70	2,979	53	39,160,908	99
600	260	68	2,806	50	39,066,885	99
800	245	64	2,529	45	38,875,824	98
1,000	229	60	2,352	42	38,716,974	98
2,000	187	49	1,784	32	37,918,785	96
3,000	167	44	1,510	27	37,239,774	94
4,000	151	39	1,330	24	36,619,505	93
5,000	139	36	1,159	21	35,857,109	91
10,000	110	29	719	13	32,697,193	83

Table 38. Number of vessels, trips, and pounds landed of Atlantic mackerel for various trip thresholds based on 1992 NMFS weighout data.

Threshold pounds	Mackerel vessels (number)	Mackerel vessels (percent)	Mackerel trips (number)	Mackerel trips (percent)	Mackerel pounds (number)	Mackerel pounds (percent)
0	277	100	1,665	100	24,927,130	100
100	205	74	899	54	24,907,620	100
200	176	64	763	46	24,889,047	100
300	167	60	705	42	24,875,064	100
400	154	56	658	40	24,859,366	100
500	151	55	630	38	24,846,956	100
600	145	52	607	36	24,834,887	100
800	132	48	555	33	24,799,146	99
1,000	126	45	526	32	24,773,140	99
2,000	111	40	442	27	24,655,160	99
3,000	103	37	387	23	24,521,779	98
4,000	95	34	343	21	24,371,347	98
5,000	86	31	313	19	24,236,293	97
10,000	58	21	236	14	23,691,350	95

Table 39. Seasonal distribution of *Loligo* landings[1] 1983-92 combined.

	Month		Quarter	
	mt	%	mt	%
January	1,040.8	7.1	-	-
February	1,102.9	7.5	-	-
March	1,228.7	8.4	3,372.4	23.0
April	1,054.2	7.2	-	-
May	2,489.2	17.0	-	-
June	1,470.1	10.0	5,013.5	34.1
July	1,264.8	8.6	-	-
August	725.1	4.9	-	-
September	486.2	3.3	2,476.1	16.9
October	1,402.1	9.6	-	-
November	1,253.3	8.5	-	-
December	1,166.5	7.9	3,821.9	26.1
Total	14,683.9	100.0	14,683.9	100.0

Source: Unpublished NMFS Weighout data.

[1] Does not include joint venture or State of Connecticut landings.

Table 40. Seasonal distribution of *Loligo* landings 1992.

	Month		Quarter	
	mt	%	mt	%
January	1,521.1	8.4	-	-
February	2,630.7	14.5	-	-
March	2,745.7	15.1	6,897.5	38.0
April	1,879.1	10.3	-	-
May	895.2	4.9	-	-
June	598.1	3.3	3,372.4	18.6
July	893.3	4.9	-	-
August	830.9	4.6	-	-
September	246.2	1.4	1,970.4	10.8
October	1,260.1	6.9	-	-
November	2,203.2	12.1	-	-
December	2,468.3	13.6	5,931.6	32.6
Total	18,171.9	100.0	18,171.9	100.0

Source: Unpublished NMFS General Canvas data.

Table 41. County Population Profiles, 1990

	Barnstable MA	Bristol MA	Newport RI	Washington RI	New London CT	Suffolk NY	Nassau NY
Population characteristics:							
Population	186,605	506,325	87,194	110,006	254,957	1,321,864	1,287,348
Median age (years)	39.5	33.8	33.7	32.7	32.5	33.5	36.6
% under 18 years	21.0	24.5	22.5	23.1	23.5	24.7	21.8
% 65 or older	22.0	14.5	13.0	12.3	11.9	10.7	14.2
% White	96.2	95.3	93.9	96.6	91.9	90.0	86.6
% Black	1.5	1.6	3.9	1.0	4.8	6.3	8.6
% American Indian, Eskimo, or Aleut	0.6	0.2	0.4	0.9	0.5	0.2	0.1
% Asian or Pacific Islander	0.5	0.9	1.2	1.3	1.3	1.7	3.1
% Other race	1.1	2.1	0.6	0.2	1.5	1.7	1.6
Household characteristics:							
Persons per household	2.35	2.64	2.53	2.64	2.59	3.04	2.94
% married-couple families	54.7	56.8	55.5	59.4	58.7	66.4	66.4
% female households	9.8	12.5	10.2	9.0	9.6	10.4	10.2
% White households	97.0	95.8	95.0	97.3	93.5	92.4	89.6
% Black households	1.3	1.5	3.4	0.8	4.0	5.0	7.0
% American Indian, Eskimo, or Aleut households	0.5	0.2	0.4	0.8	0.5	0.2	0.1
% Asian and Pacific Islander households	0.3	0.6	0.8	0.9	0.9	1.2	2.2
% Other race households	0.9	1.9	0.4	0.2	1.1	1.2	1.1
Housing characteristics:							
Owner-occupied housing units	56,136	110,843	19,416	27,082	60,315	340,253	347,143
Renter-occupied housing units	21,450	76,825	13,271	12,229	32,930	84,466	84,372
Median value (dollars)	162,800	141,700	160,900	152,700	149,200	165,900	209,500
Median contract rent (dollars)	547	345	551	497	493	696	678

	Kings NY	Monmouth NJ	Ocean NJ	Atlantic NJ	Cape May NJ	Worcester MD
Population characteristics:						
Population	2,300,664	553,124	433,203	224,327	95,089	35,028
Median age (years)	32.3	35.0	38.5	34.0	37.7	37.5
% under 18 years	26.3	24.4	22.7	22.9	22.1	22.0
% 65 or older	12.4	12.7	23.2	14.5	20.1	17.3
% White	46.9	87.4	95.3	76.7	92.6	77.8
% Black	37.9	8.5	2.8	17.4	5.6	21.3
% American Indian, Eskimo, or Aleut	0.3	0.1	0.1	0.3	0.2	0.2
% Asian or Pacific Islander	0.8	2.8	0.9	2.1	0.6	0.5
% Other race	10.0	1.2	0.9	3.5	0.9	0.2
Household characteristics:						
Persons per household	2.74	2.74	2.54	2.56	2.44	2.44
% married-couple families	40.5	61.0	60.7	48.4	54.4	54.8
% female households	21.5	9.8	8.6	13.7	10.3	11.5
% White households	53.0	89.4	96.6	79.2	94.2	81.0
% Black households	35.1	7.5	2.1	16.4	4.6	18.4
% American Indian, Eskimo, or Aleut households	0.3	0.1	0.1	0.3	0.2	0.2
% Asian and Pacific Islander households	3.6	2.1	0.6	1.6	0.4	0.3
% Other race households	7.9	0.9	0.6	2.5	0.6	0.1
Housing characteristics:						
Owner-occupied housing units	214,788	143,533	139,417	54,923	27,242	9,797
Renter-occupied housing units	613,411	54,037	28,730	30,200	10,614	4,345
Median value (dollars)	196,100	180,400	126,000	105,900	112,800	83,500
Median contract rent (dollars)	428	567	578	503	474	296

	City VA	City VA	News VA	Beach VA	York VA	Dare NC
Population characteristics:						
Population	133,793	261,229	170,045	393,069	42,422	22,746
Median age (years)	30.8	27.4	29.5	28.9	32.8	35.2
% under 18 years	25.0	23.0	27.4	28.0	29.2	22.4
% 65 or older	9.6	10.5	9.3	5.9	7.5	12.5
% White	58.4	56.7	62.6	80.5	81.3	95.7
% Black	38.9	39.1	33.6	13.9	15.6	3.6
% American Indian, Eskimo, or Aleut	0.3	0.4	0.3	0.4	0.3	0.2
% Asian or Pacific Islander	1.7	2.6	2.3	4.3	2.3	0.3
% Other race	0.7	1.2	1.2	0.9	0.5	0.2
Household characteristics:						
Persons per household	2.58	2.55	2.59	2.82	2.90	2.41
% married-couple families	54.1	44.8	52.4	62.9	70.4	58.8
% female households	13.5	16.1	15.1	9.5	8.8	7.3
% White households	62.0	60.6	65.4	83.6	83.3	96.3
% Black households	36.0	36.3	31.8	2.5	14.7	3.1
% American Indian, Eskimo, or Aleut households	0.3	0.4	0.3	0.3	0.3	0.2
% Asian and Pacific Islander households	1.1	1.9	1.5	2.8	1.3	0.2
% Other race households	0.5	0.7	0.9	0.7	0.4	0.2
Housing characteristics:						
Owner-occupied housing units	29,429	39,387	31,993	84,719	10,359	6,648
Renter-occupied housing units	20,244	50,091	31,959	50,847	4,115	2,701
Median value (dollars)	78,200	74,500	85,200	96,500	121,600	108,100
Median contract rent (dollars)	385	361	368	484	442	416

Source: Data based on the 1990 Census of Population, April 1, 1990. U.S. Bureau of the Census.

Table 42. Cetaceans and Turtles found in Survey Area

Scientific name	Common name	Est. Minimum Number in Study Area	Endangered	Threatened
LARGE WHALES				
Balaenoptera physalus	fin whale	1,102	X	
Megaptera novaeangliae	humpback whale	684	X	
Balaenoptera acutorostrata	minke whale	162		
Physeter catodon	sperm whale	300	X	
Eubalaena glacialis	right whale	29	X	
Balaenoptera borealis	sei whale	109	X	
Orcinus orca	killer whale	unk		
SMALL WHALES				
Tursiops truncatus	bottlenose dolphin	6,254		
Globicephala spp.	pilot whales	11,448		
Lagenorhynchus acutus	Atl. white-sided dolphin	24,287		
Phocoena	harbor porpoise	2,946		
Grampus griseus	grampus (Risso's) dolphin	10,220		
Delphinus delphis	saddleback dolphin	17,606		
Stenella spp.	spotted dolphin	22,376		
Stenella coeruleoalba	striped dolphin	unk		
Lagenorhynchus albirostris	white-beaked dolphin	unk		
Ziphius cavirostris	Cuvier's beaked dolphin	unk		
Stenella longirostris	spinner dolphin	unk		
Steno bredanensis	rough-toothed dolphin	unk		
Delphinapteras leucas	beluga	unk		
Mesoplodon spp.	beaked whales	unk		
TURTLES				
Caretta caretta	logggerhead turtle	4,017		X
Dermochelys coriacea	leatherback turtle	636	X	
Lepidochelys kempi	Kemp's ridley turtle	unk	X	
Chelonia mydas	green turtle	unk		X

Source: University of Rhode Island 1982.

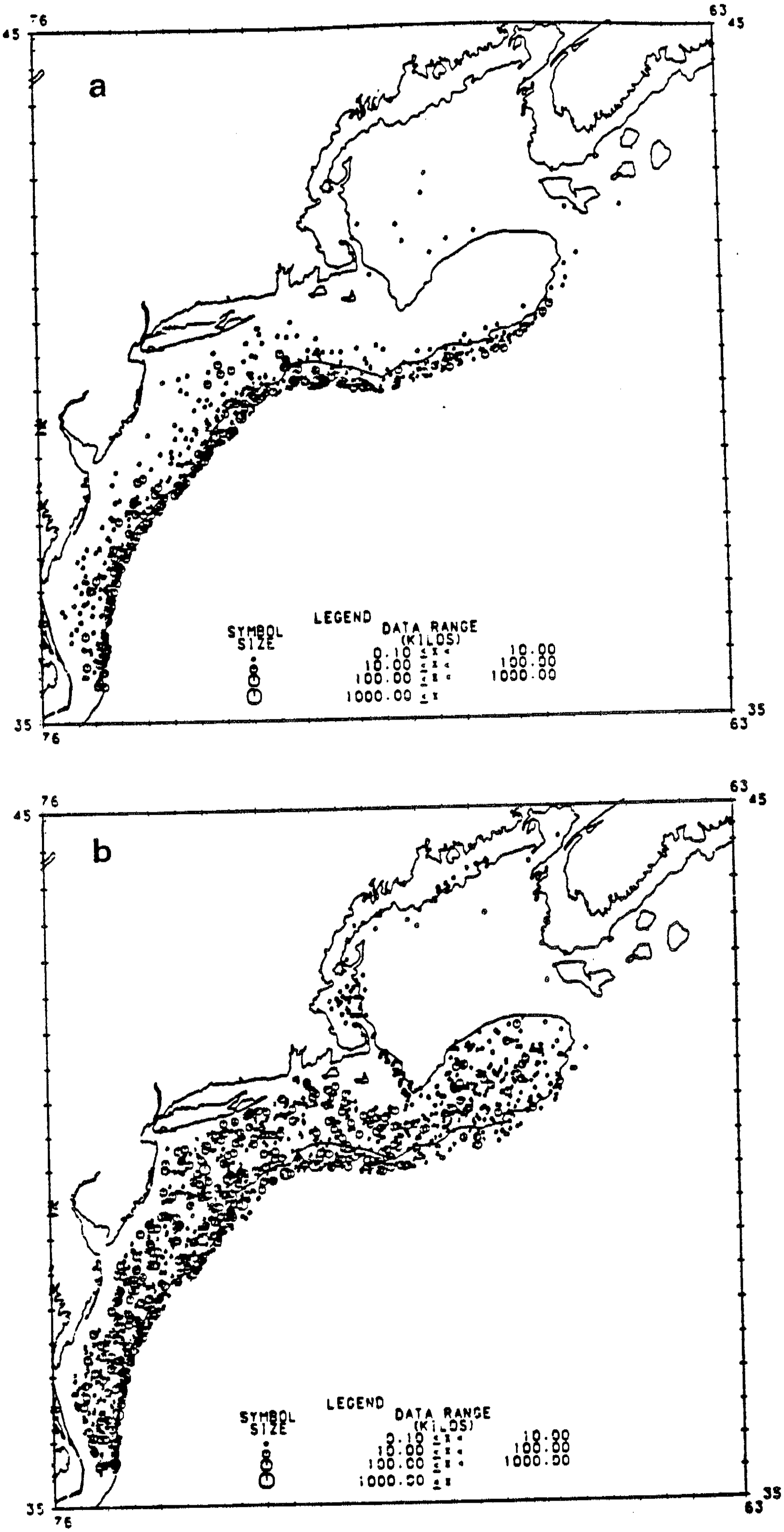


Figure 1. Longfin squid (*Loligo pealei*) bottom trawl survey catch distributions (a) spring and (b) fall (from Chang 1985).

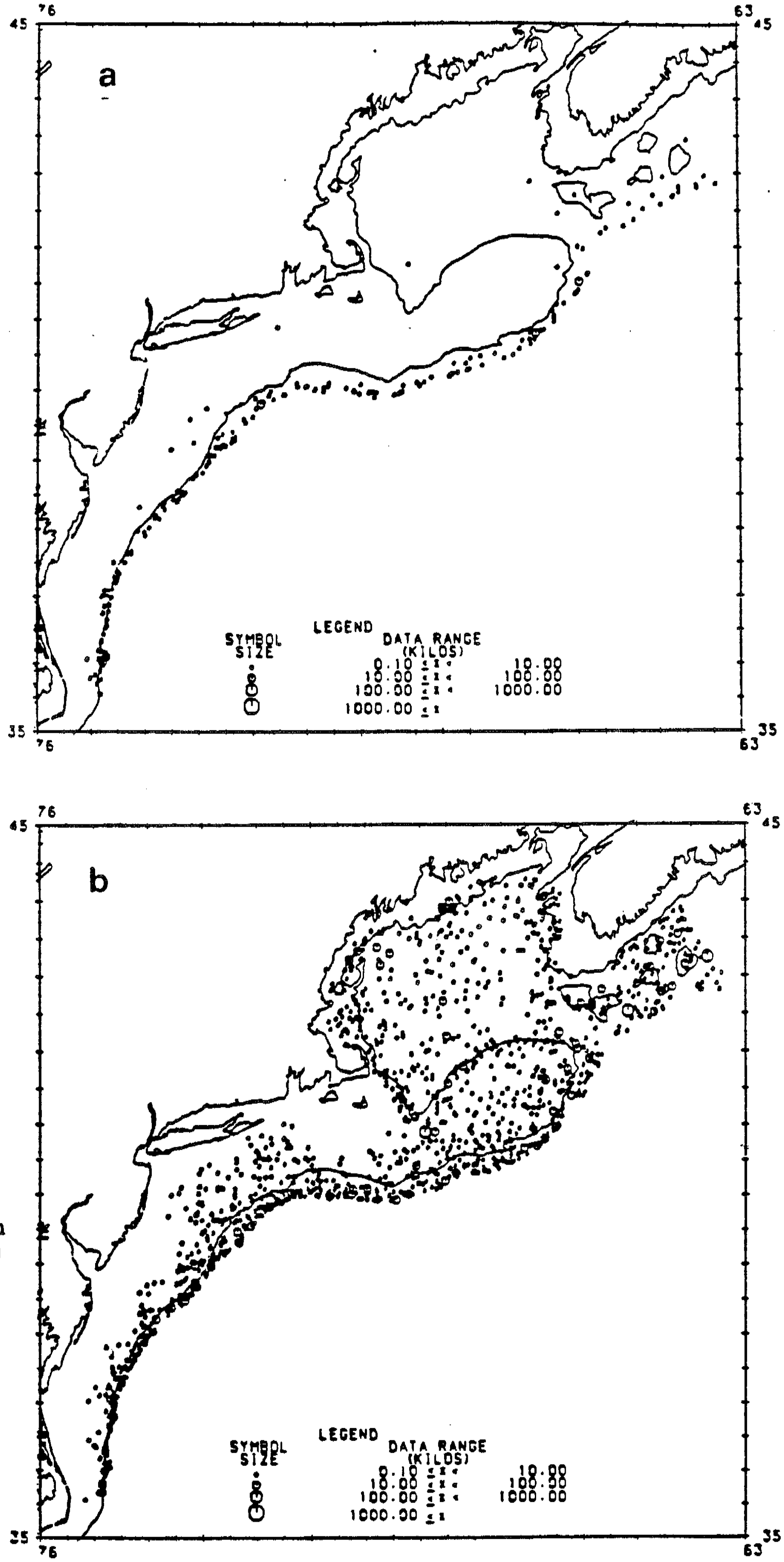


Figure 2. Northern shortfin squid (*Illex illecebrosus*) bottom trawl survey catch distributions (a) spring and (b) fall (from Chang 1985).

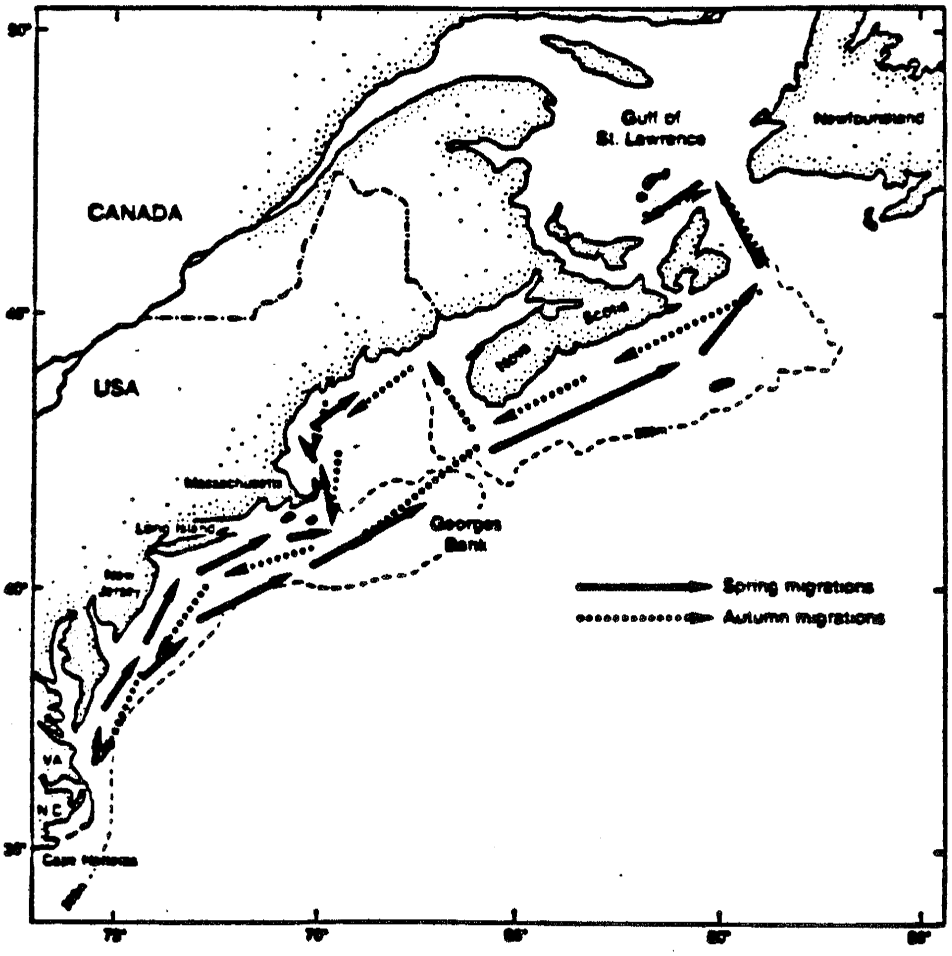


Figure 3. Distribution and movements of Northwest Atlantic mackerel (from Overholtz 1985).

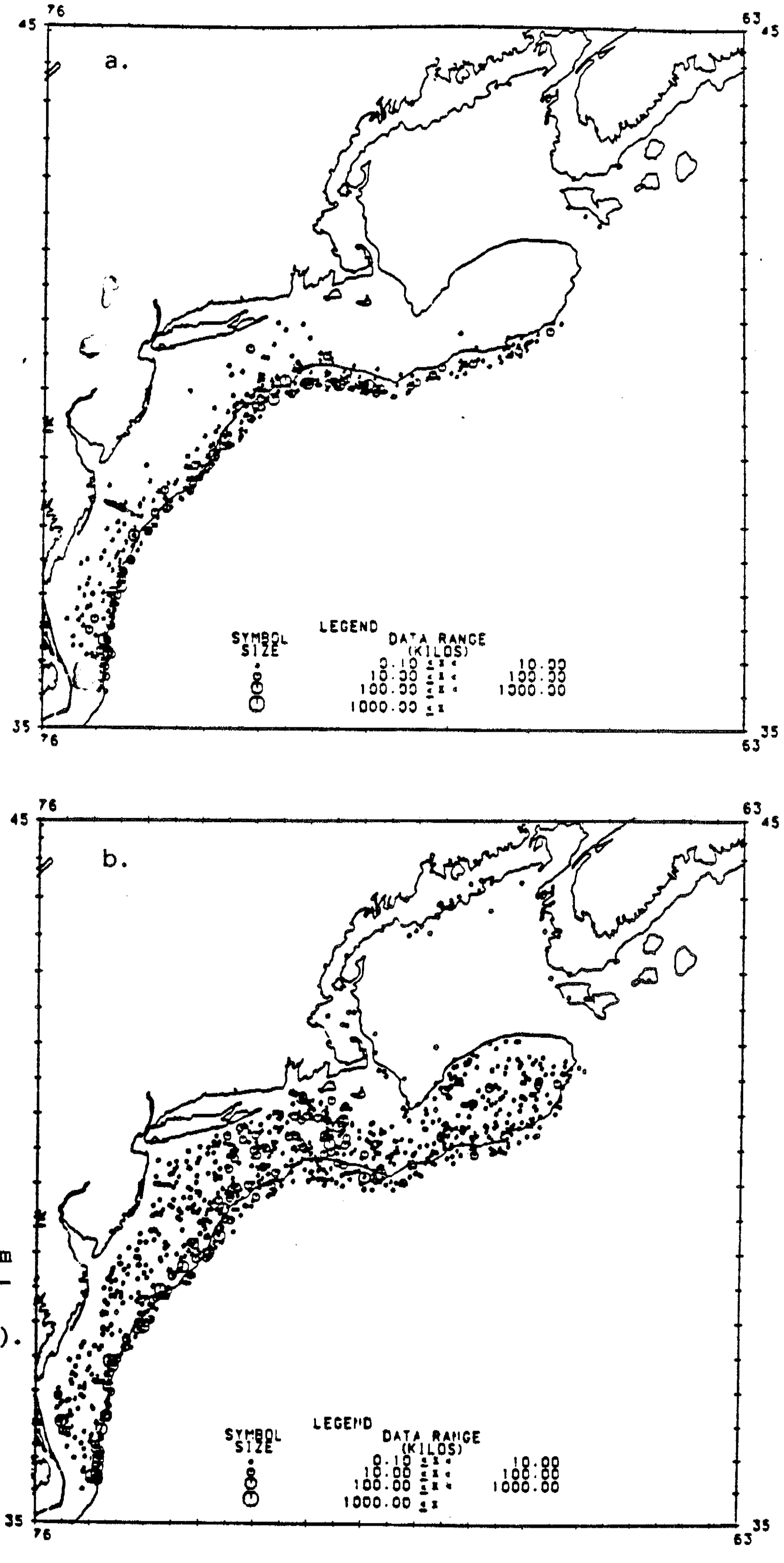
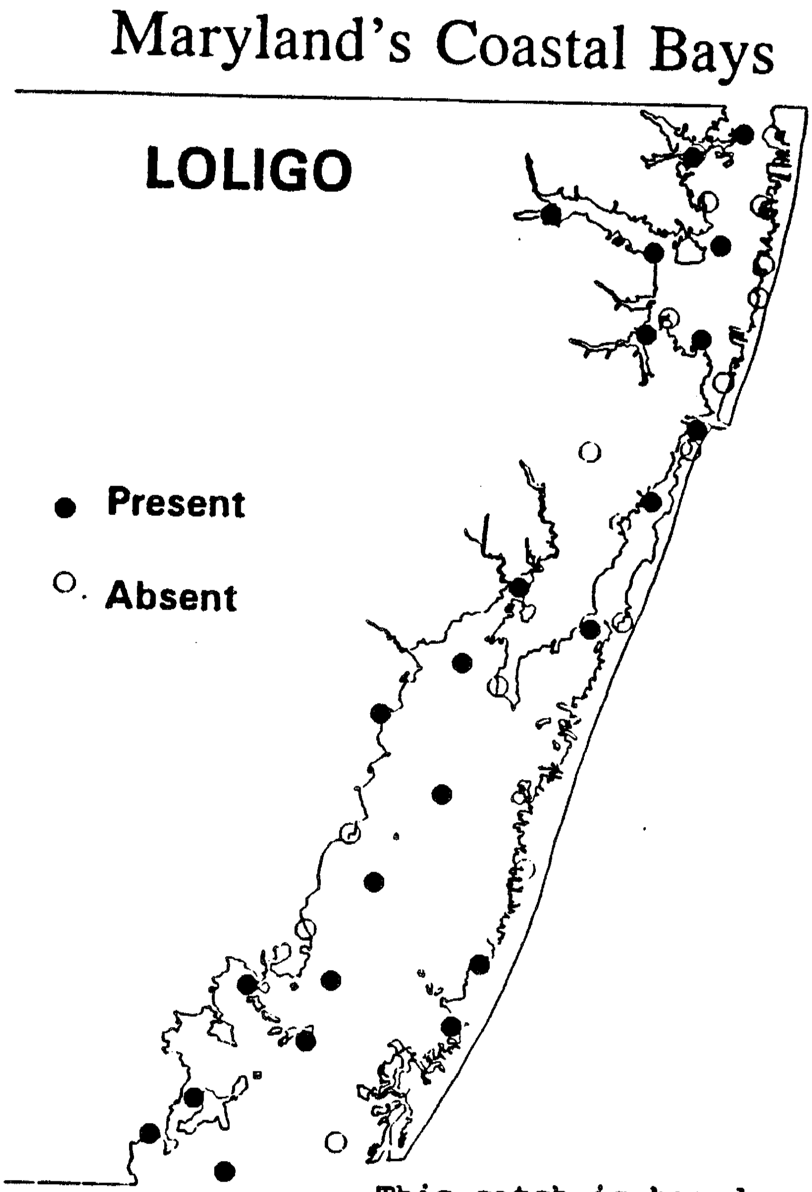


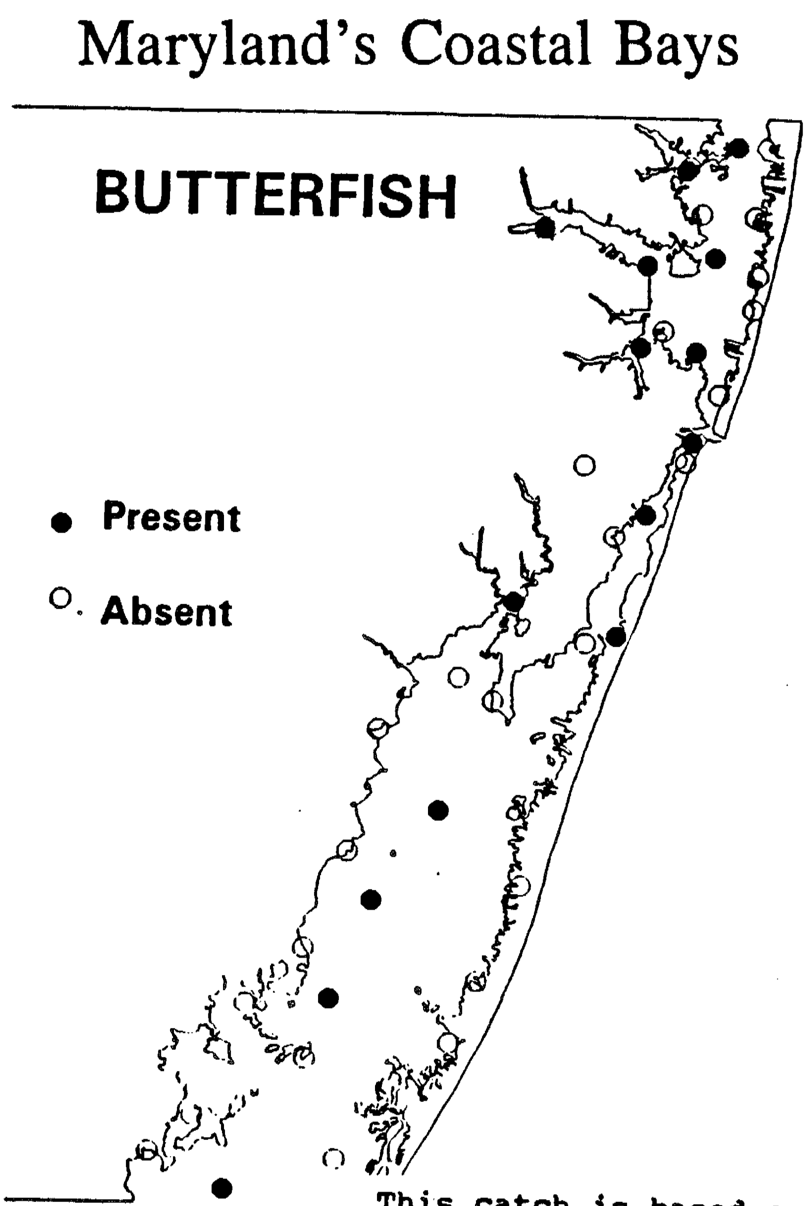
Figure 4. Butterfish bottom trawl survey catch distributions (a) spring and (b) fall (from Chang 1985).



This catch is based on the results of the Coastal Bay Survey, 1972-1992, by a combination of 16 foot semi-balloon trawl and 100 foot seine.

Figure 5. Loligo pealei collected in Maryland's Coastal Bay Survey.

Source: Casey pers. comm.



This catch is based on the results of the Coastal Bay Survey, 1972-1992, by a combination of 16 foot semi-balloon trawl and 100 foot seine.

Figure 6. Butterfish collected in Maryland's Coastal Bay Survey.

Source: Casey pers. comm.

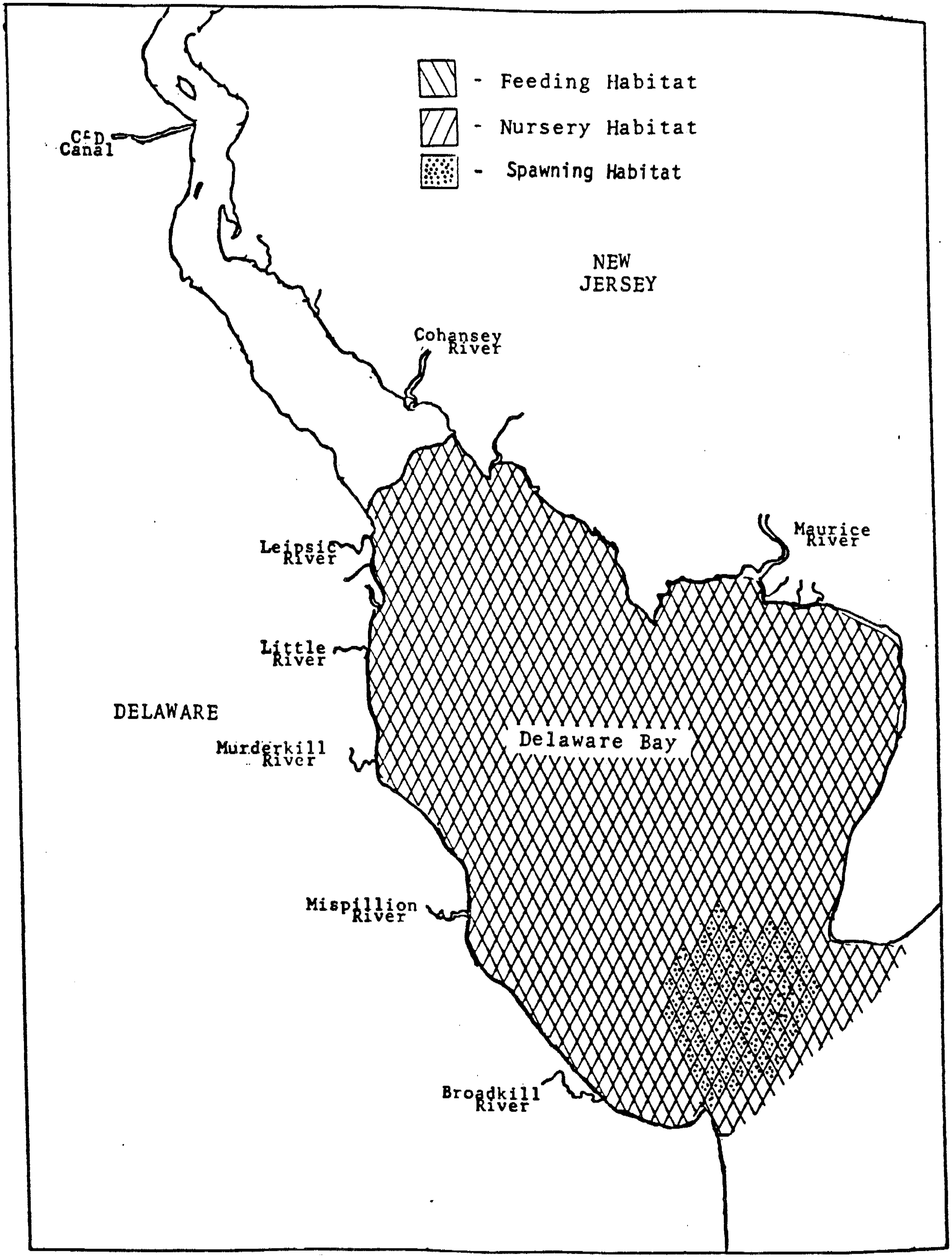


Figure 7. Feeding, nursery and spawning habitat utilized by squid in Delaware waters.

Source: Cole pers. comm.

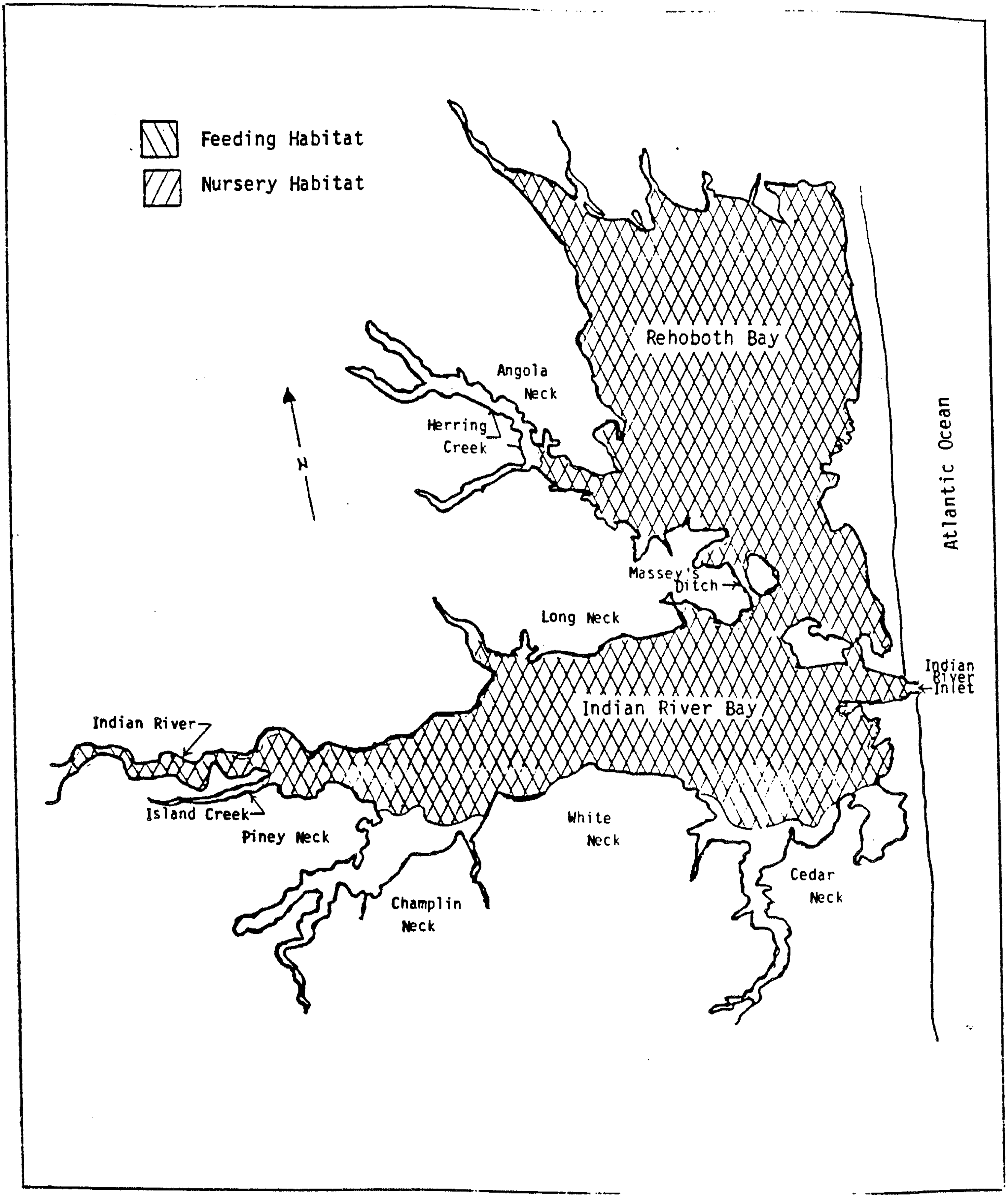


Figure 8 . Feeding and nursery habitat utilized by squid in Rehoboth and Indian River Bays.

Source: Cole pers. comm.

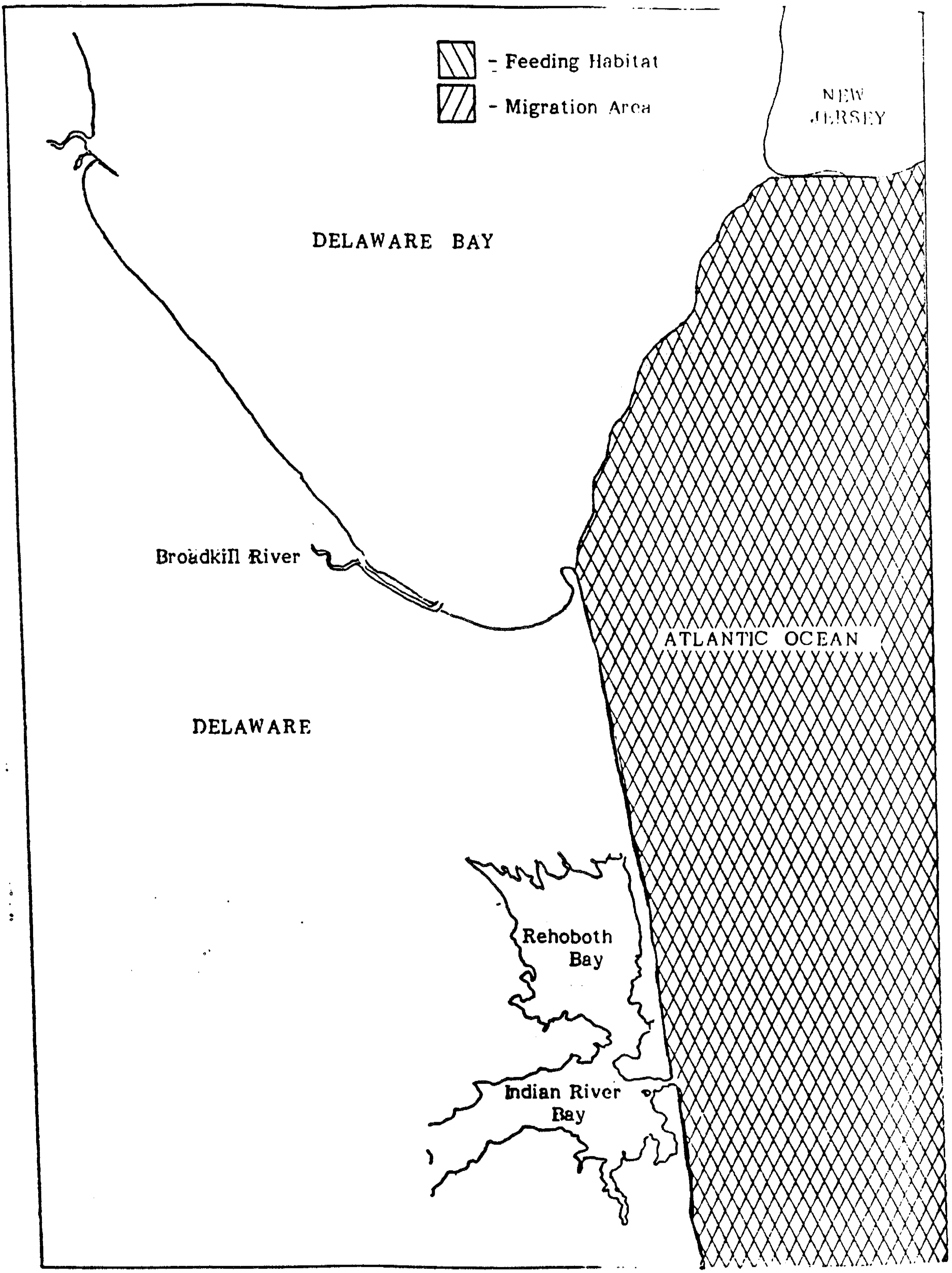


Figure 9 . Feeding and migrational habitat utilized by Atlantic Mackerel in Delaware waters.

Source: Cole pers. comm.

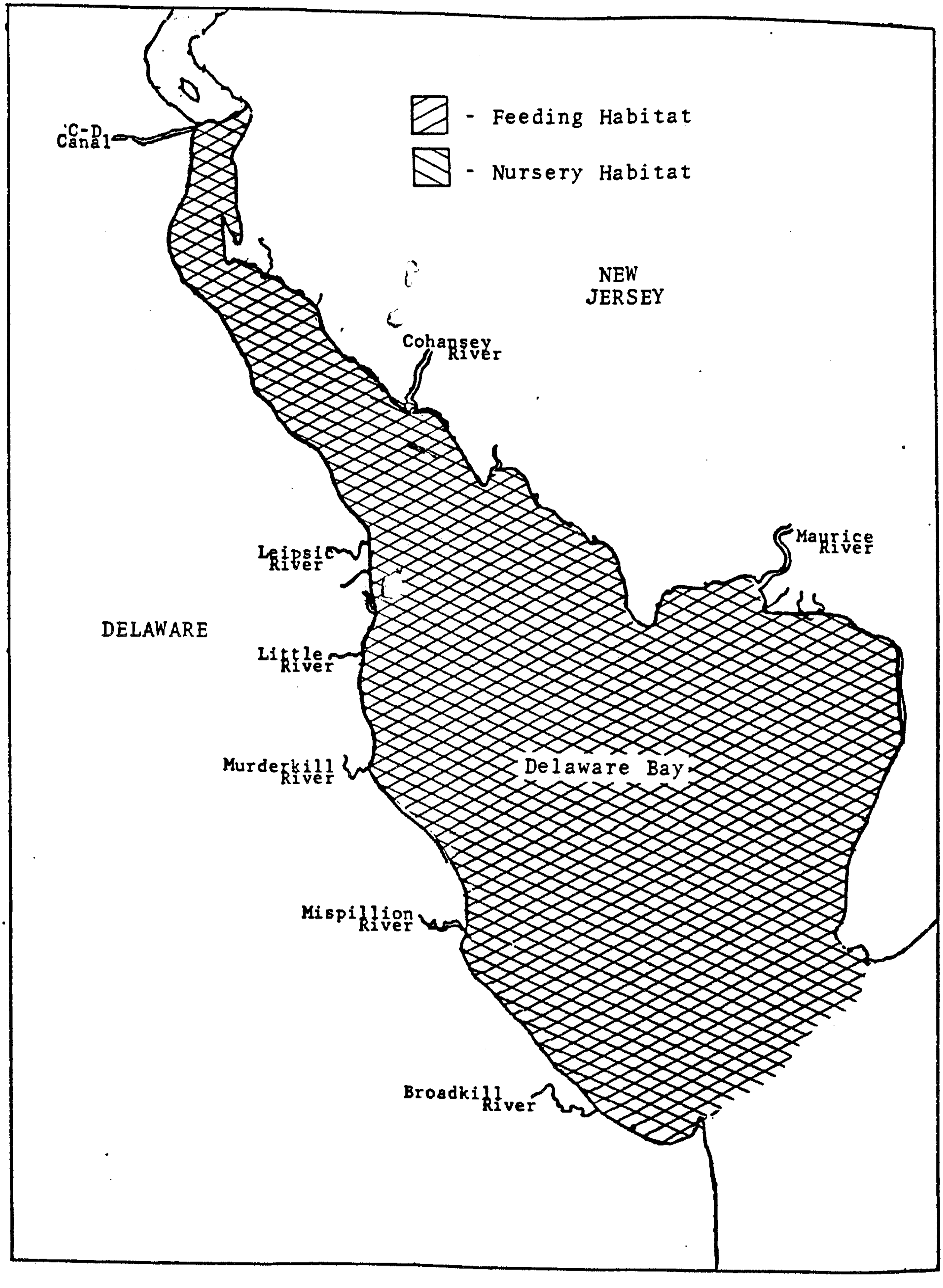


Figure 10. Feeding and nursery habitat utilized by Butterfish in Delaware waters.
Source: Cole pers. comm.

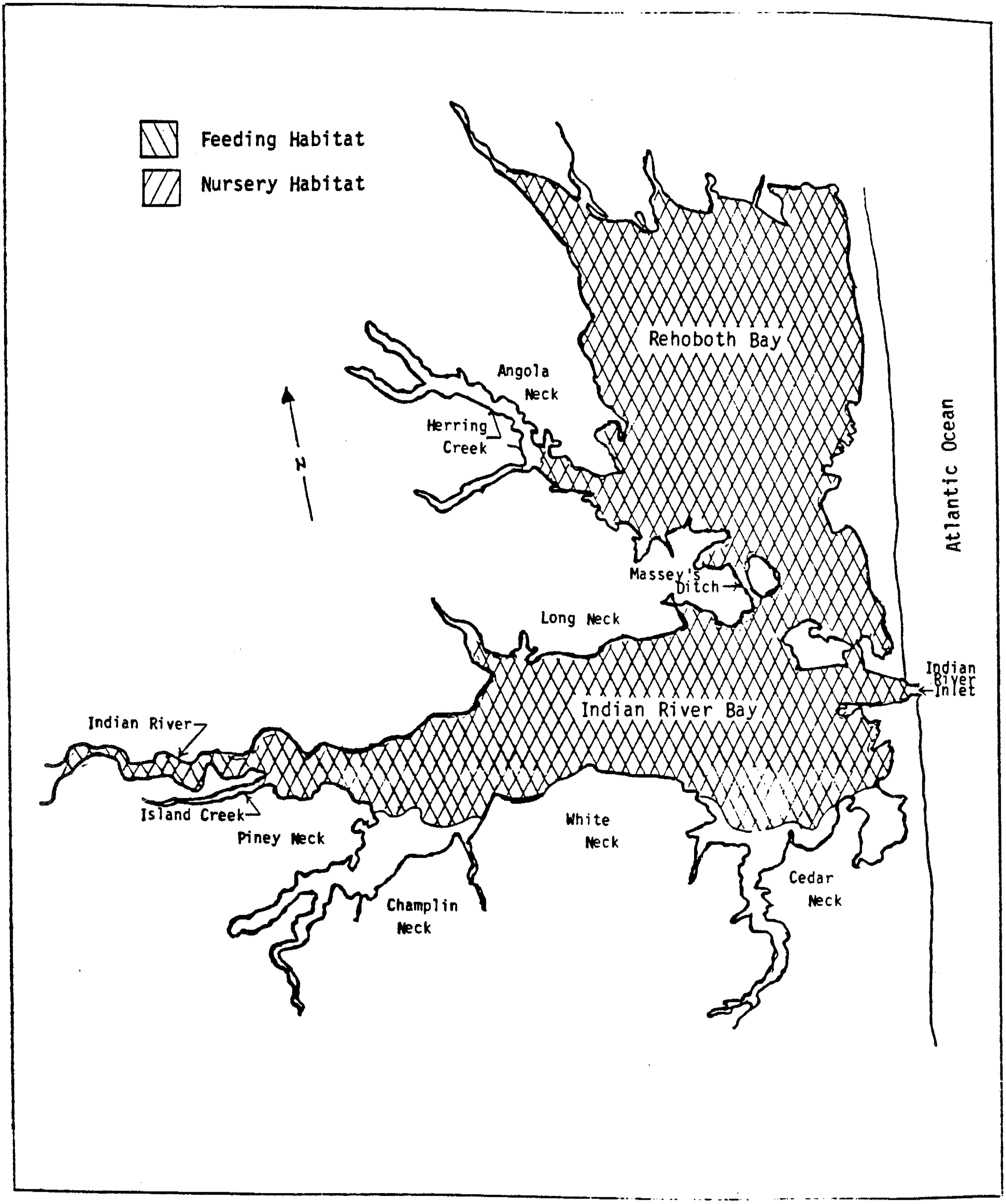


Figure 11. Feeding and nursery habitat utilized by Butterfish in Rehoboth and Indian River Bays.

Source: Cole pers. comm.

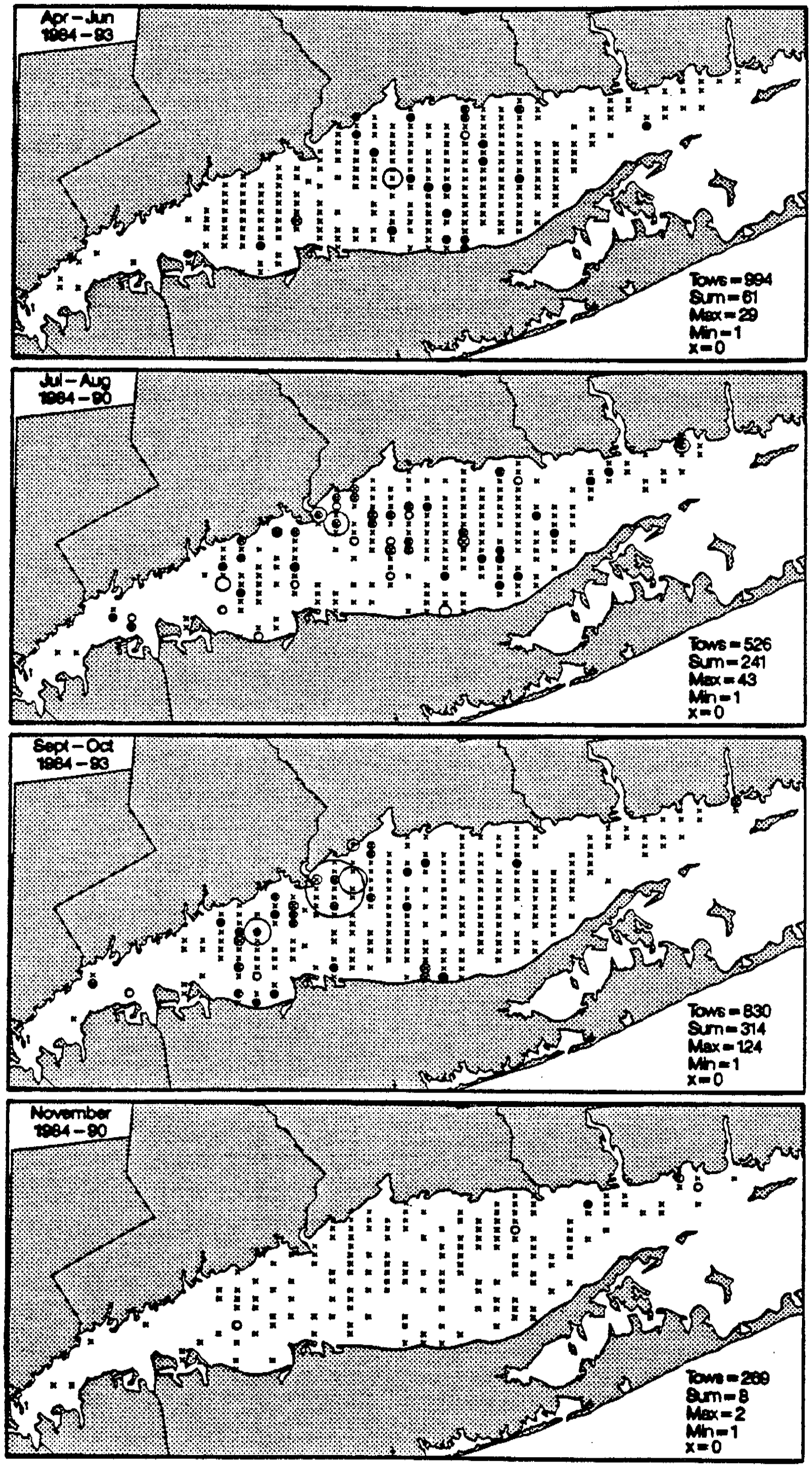


Figure 12. Seasonal distribution of Atlantic mackerel in CT DEP trawl survey of Long Island Sound (n, Max, Min, x refer to the total seasonal catch (n), maximum (Max) and minimum (Min) catches observed and sites sampled where no mackerel were taken (x)).

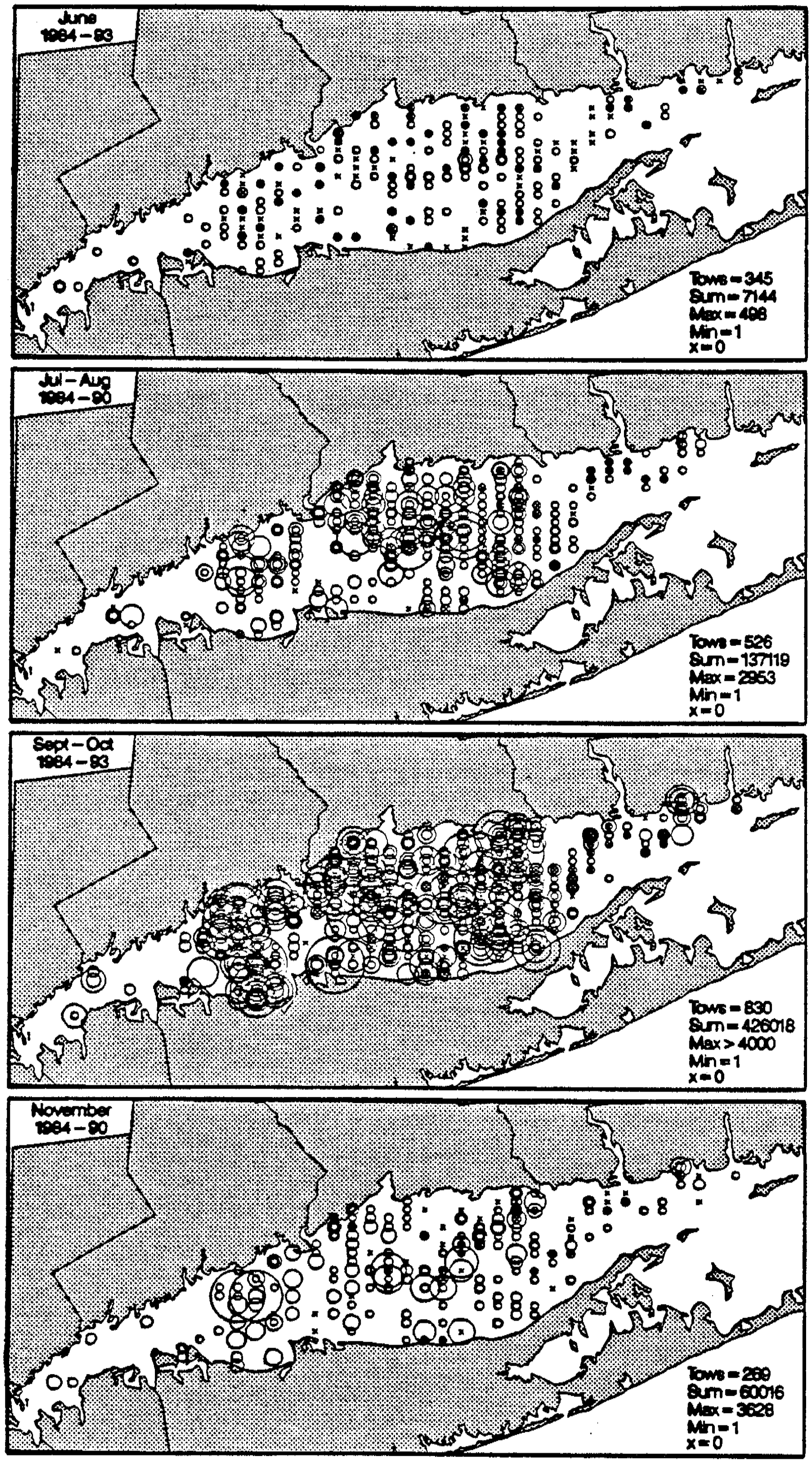


Figure 13.Seasonal distribution of butterfish in CT DEP trawl survey of Long Island Sound (n, Max, Min, x refer to the total seasonal catch (n), maximum (Max) and minimum (Min) catch observed and sites sampled where no butterfish were taken (x)).

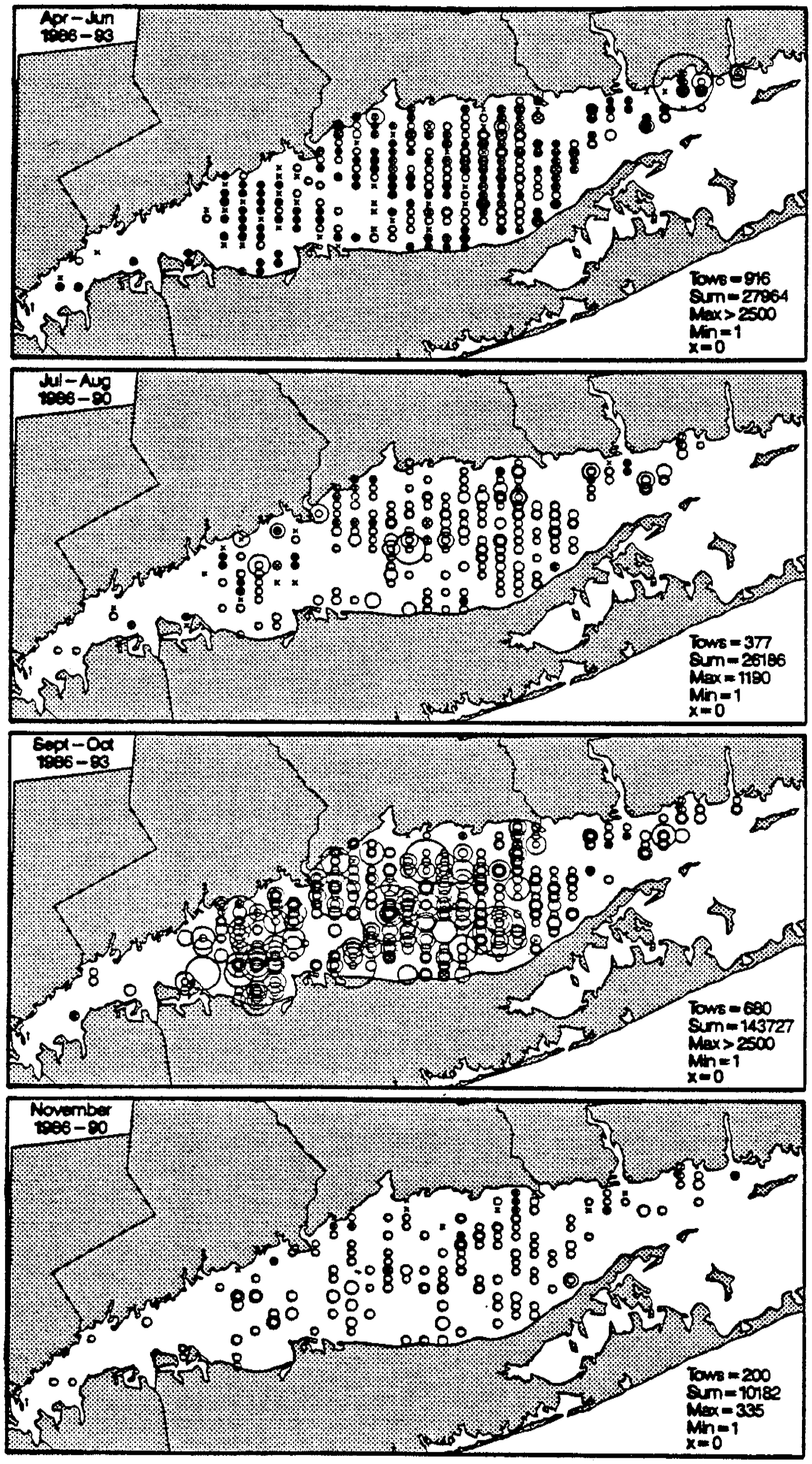


Figure 14.Seasonal distribution of loligo squid in CT DEP trawl survey of Long Island Sound (n, Max, Min, x refer to the total seasonal catch (n), maximum (Max) and minimum (Min) catches observed and sites sampled where no loligo were taken (x)).

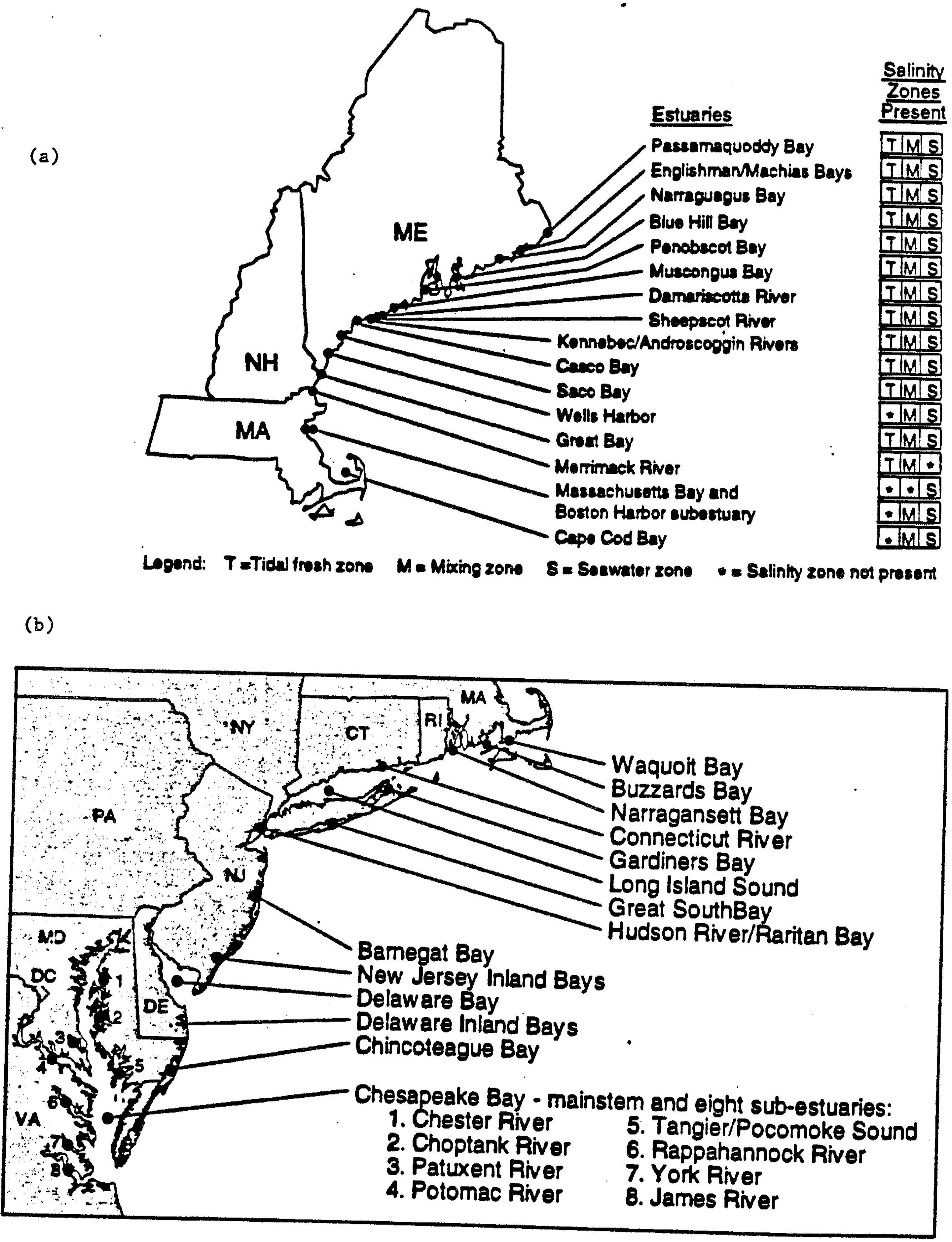


Figure 15. Location of estuaries in NOAA's Estuarine Living Marine Resources Program (a) North Atlantic and (b) Mid-Atlantic.

Source: USDC 1994(a) and (b).

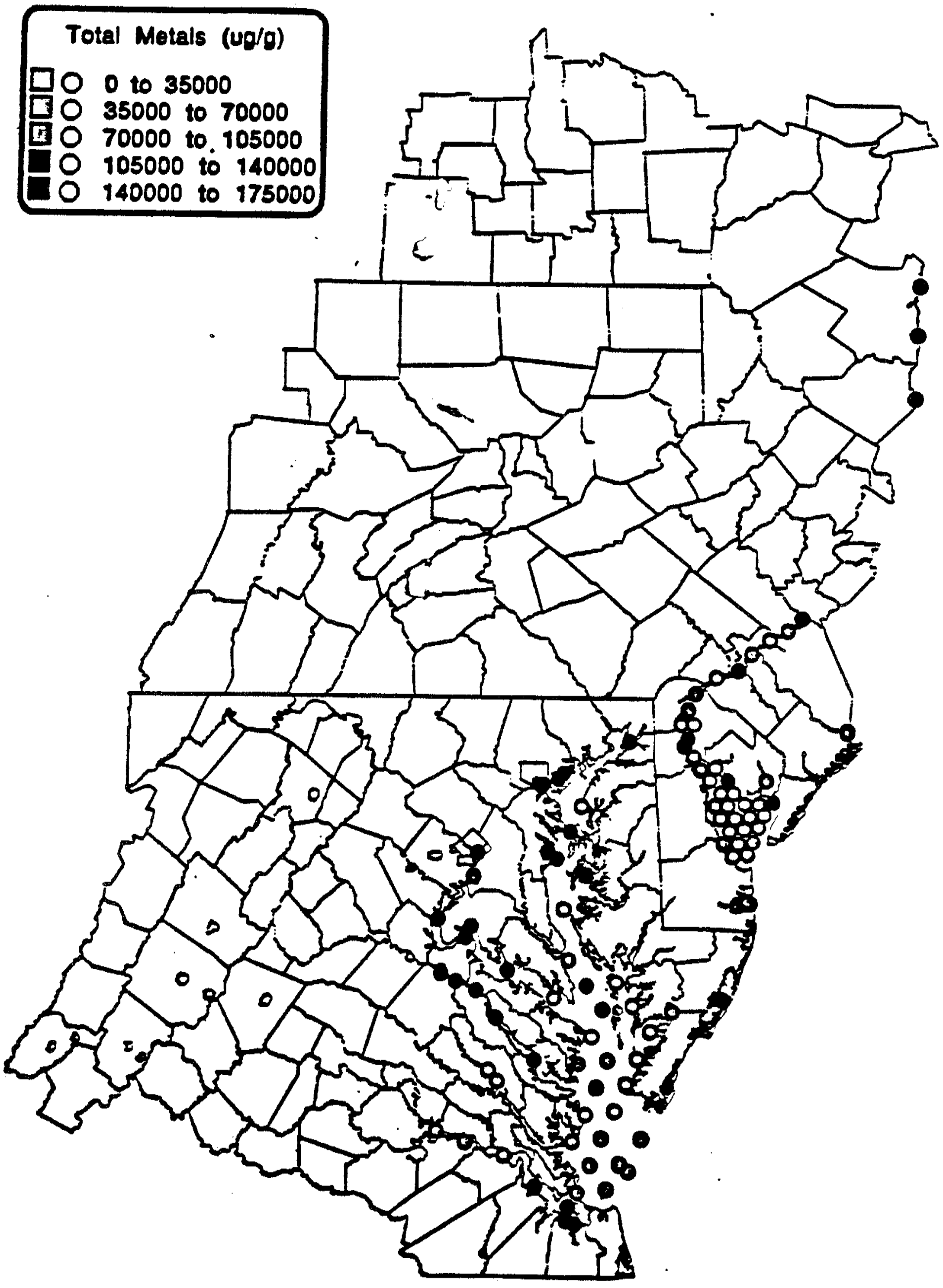


Figure 16. Total metals reported per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-Map data (provided by NOAA/ORCA/SEA).

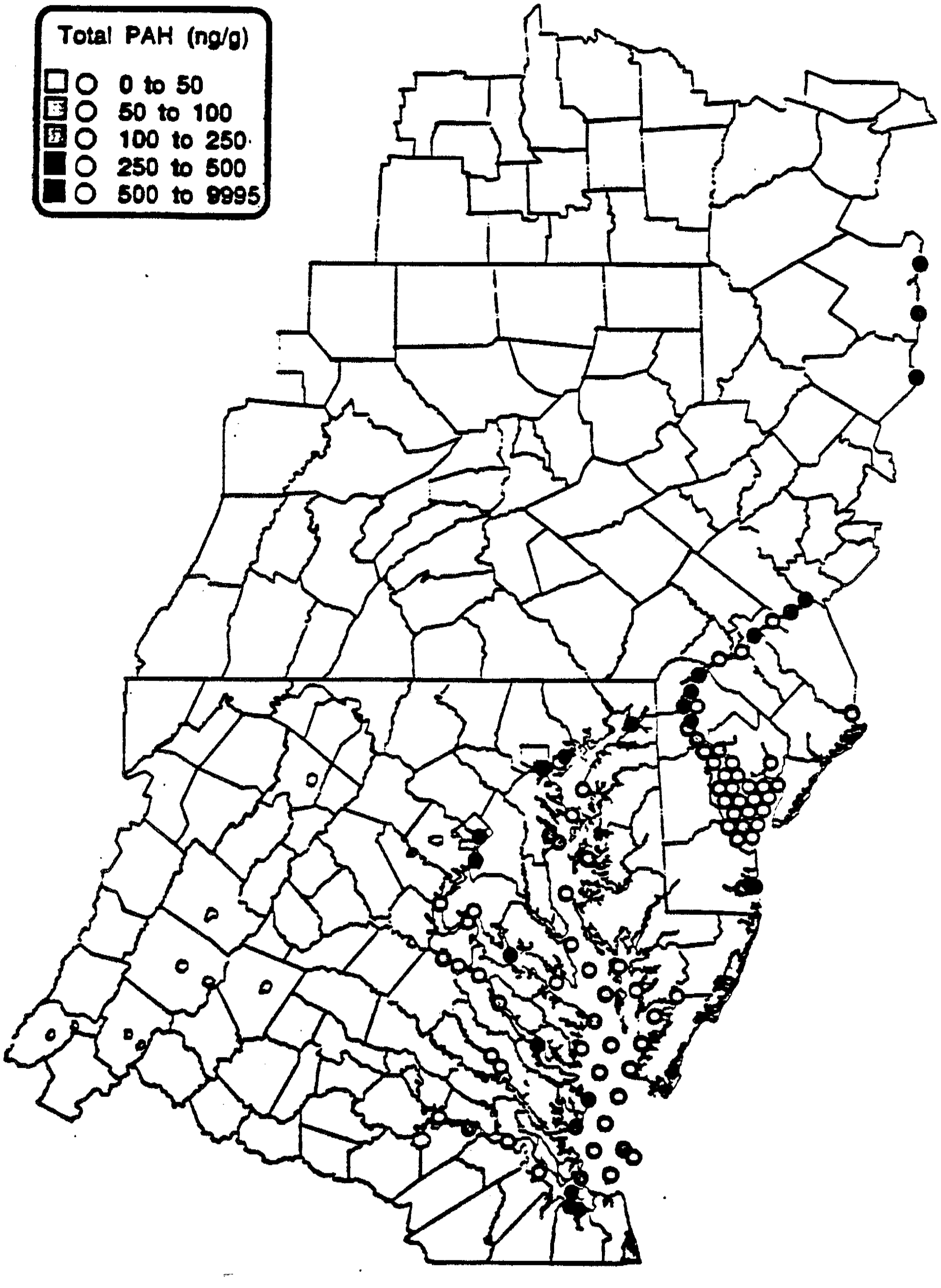


Figure 17. Total polycyclic aromatic hydrocarbons (PAHs) reported per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ ORCA/SEA).

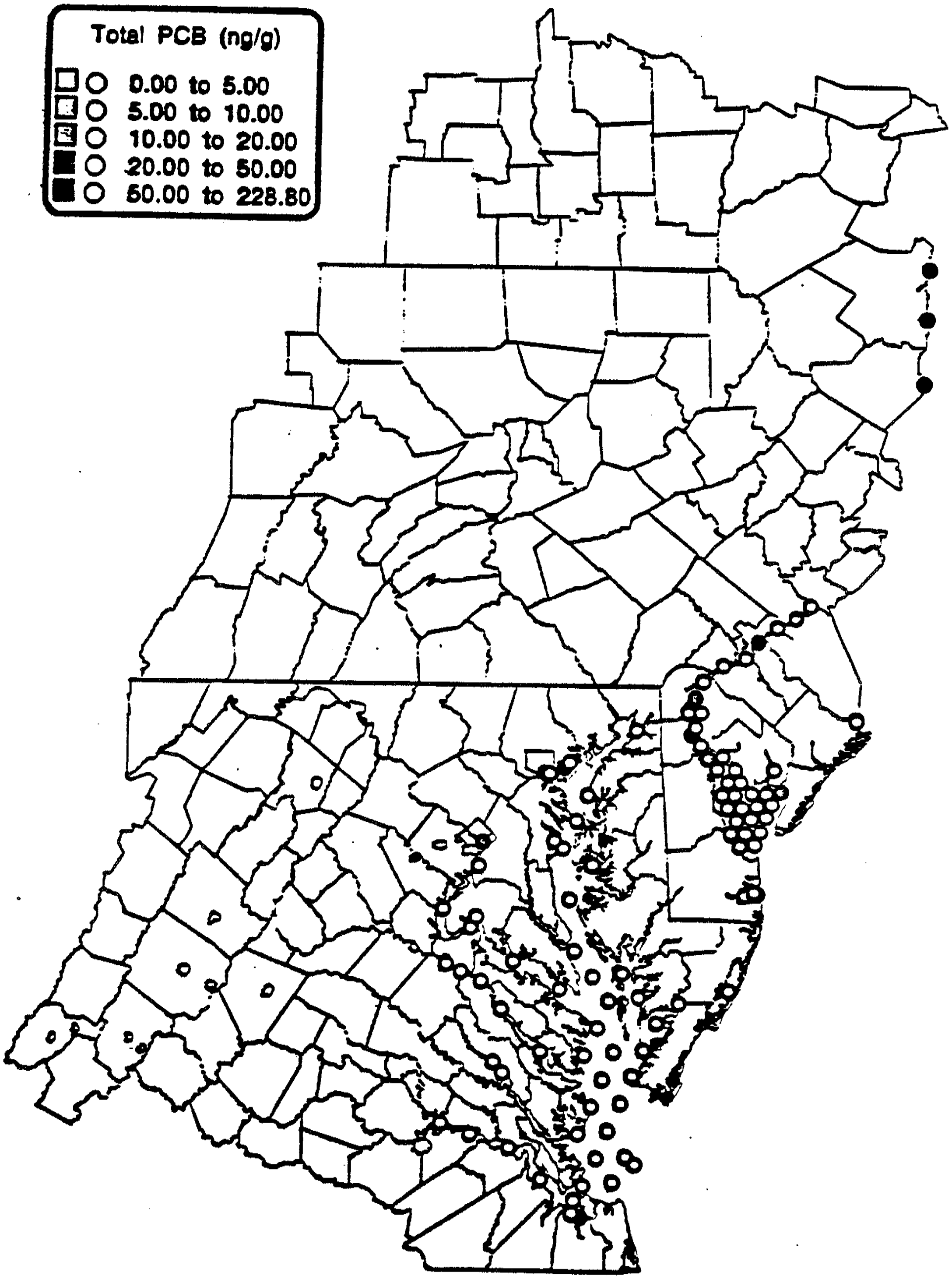


Figure 18. Total polychlorinated biphenyls (PCBs) per gram sediment reported for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ORCA/SEA).

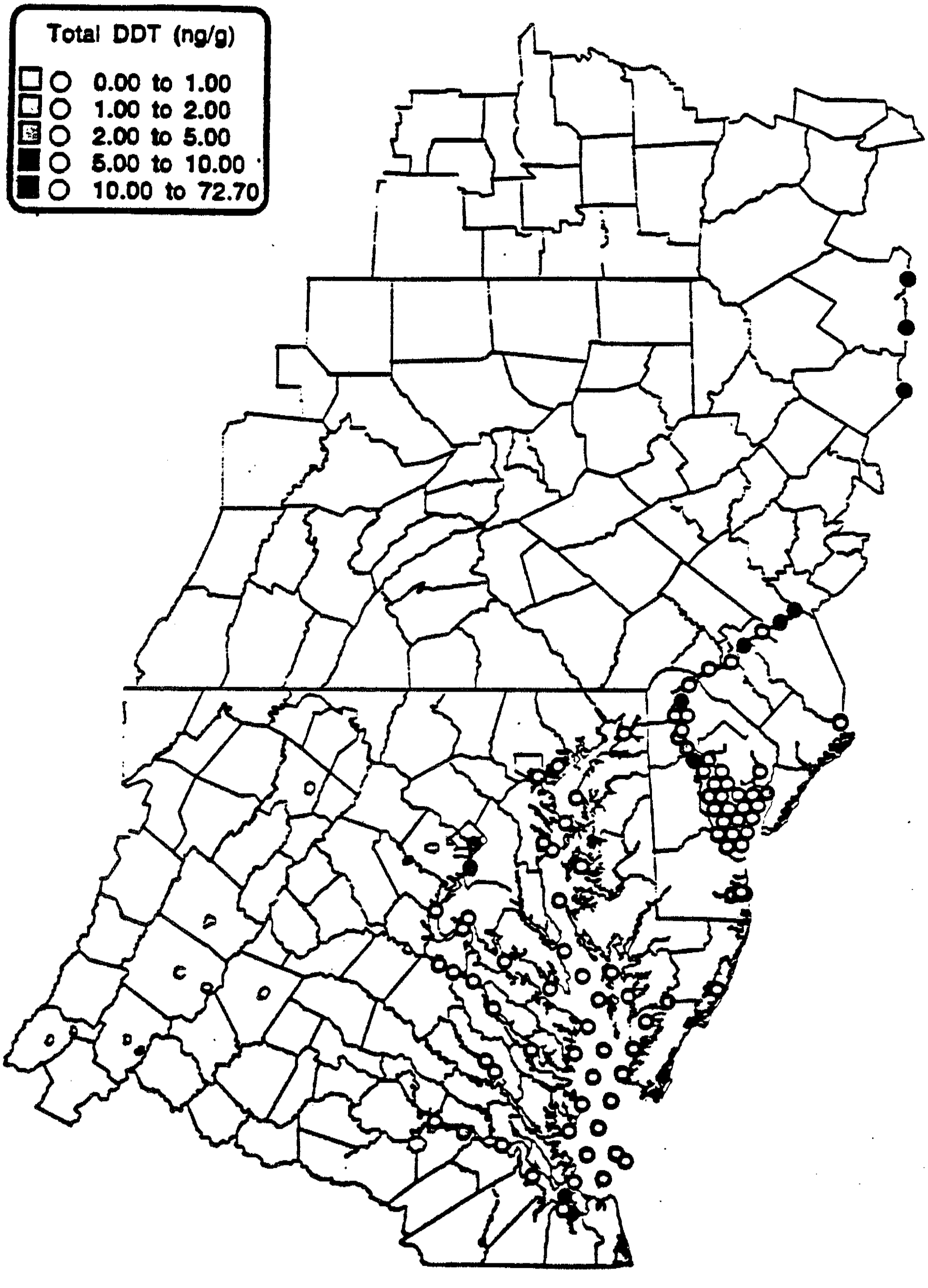


Figure 19. Total DDT (dichloro-diphenyl-trichloroethane) and its metabolites per gram sediment for Chesapeake Bay, Delaware Bay and DE & MD coastal bays by E-map data (provided by NOAA/ORCA/SEA).

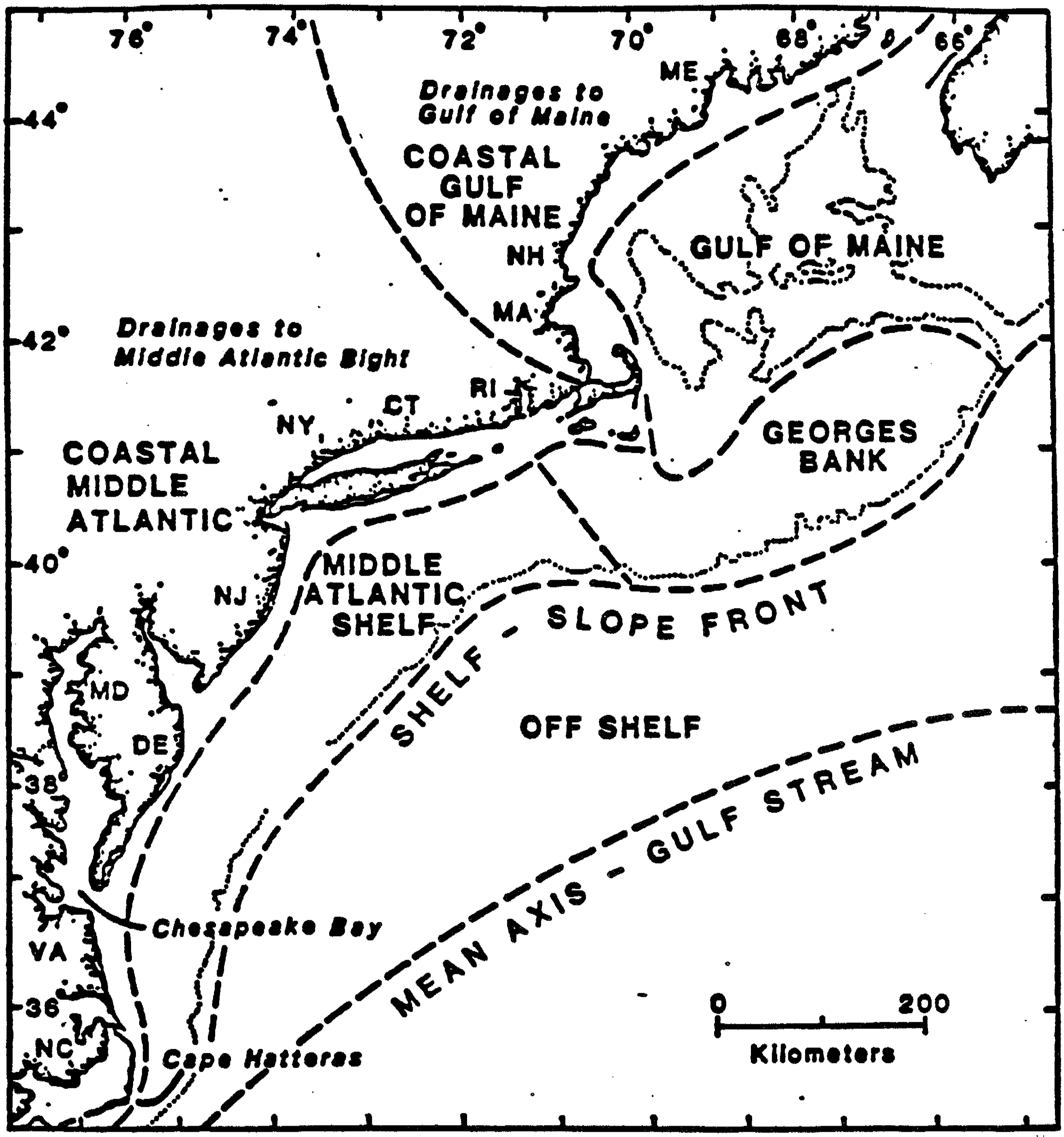


Figure 20. Northeast Regional Action Plan (RAP) Water Management Units.

Source: USDC, 1985 b

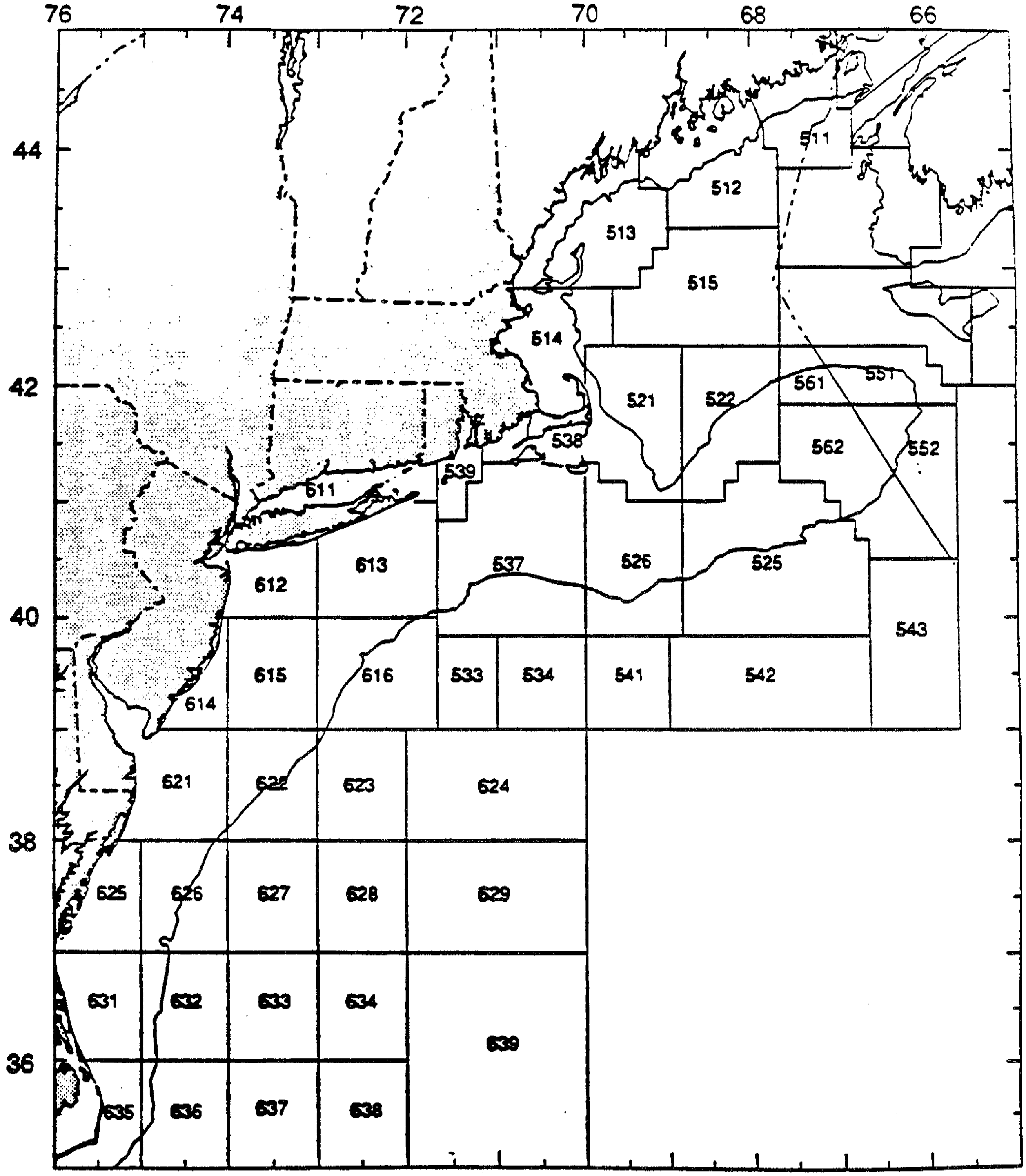


Figure 21. U.S. commercial statistical areas used to report landings in the Northwest Atlantic.

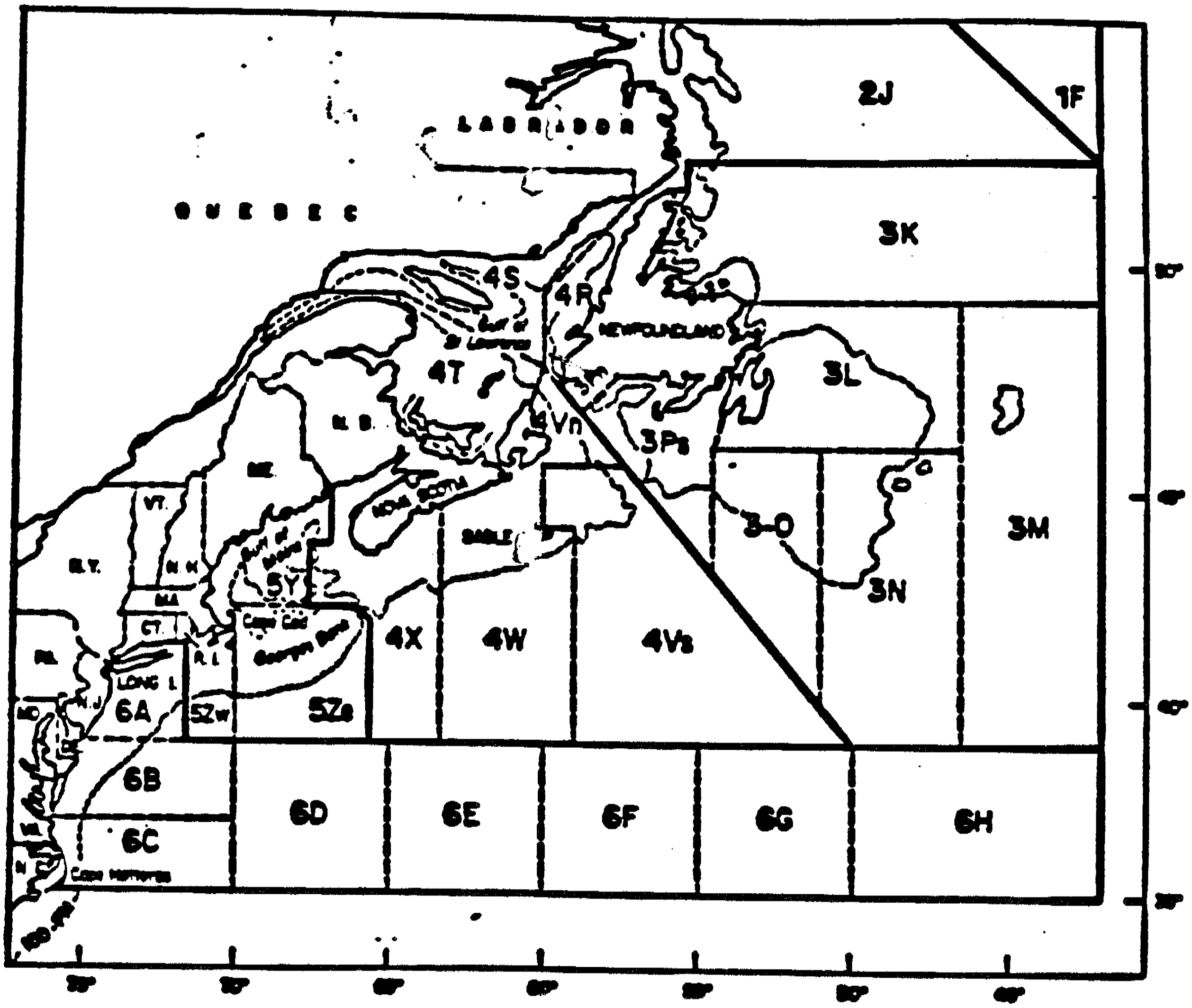
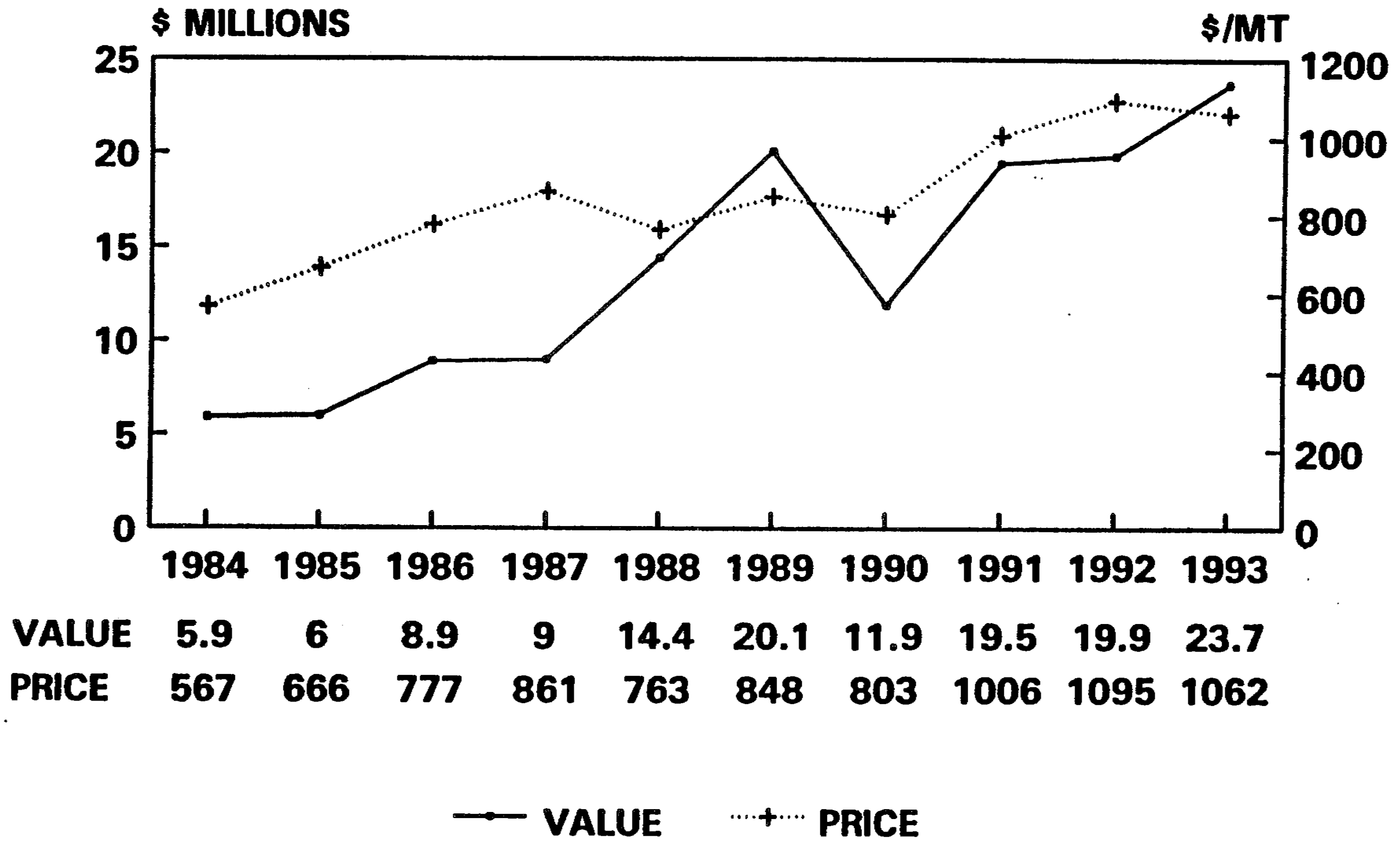


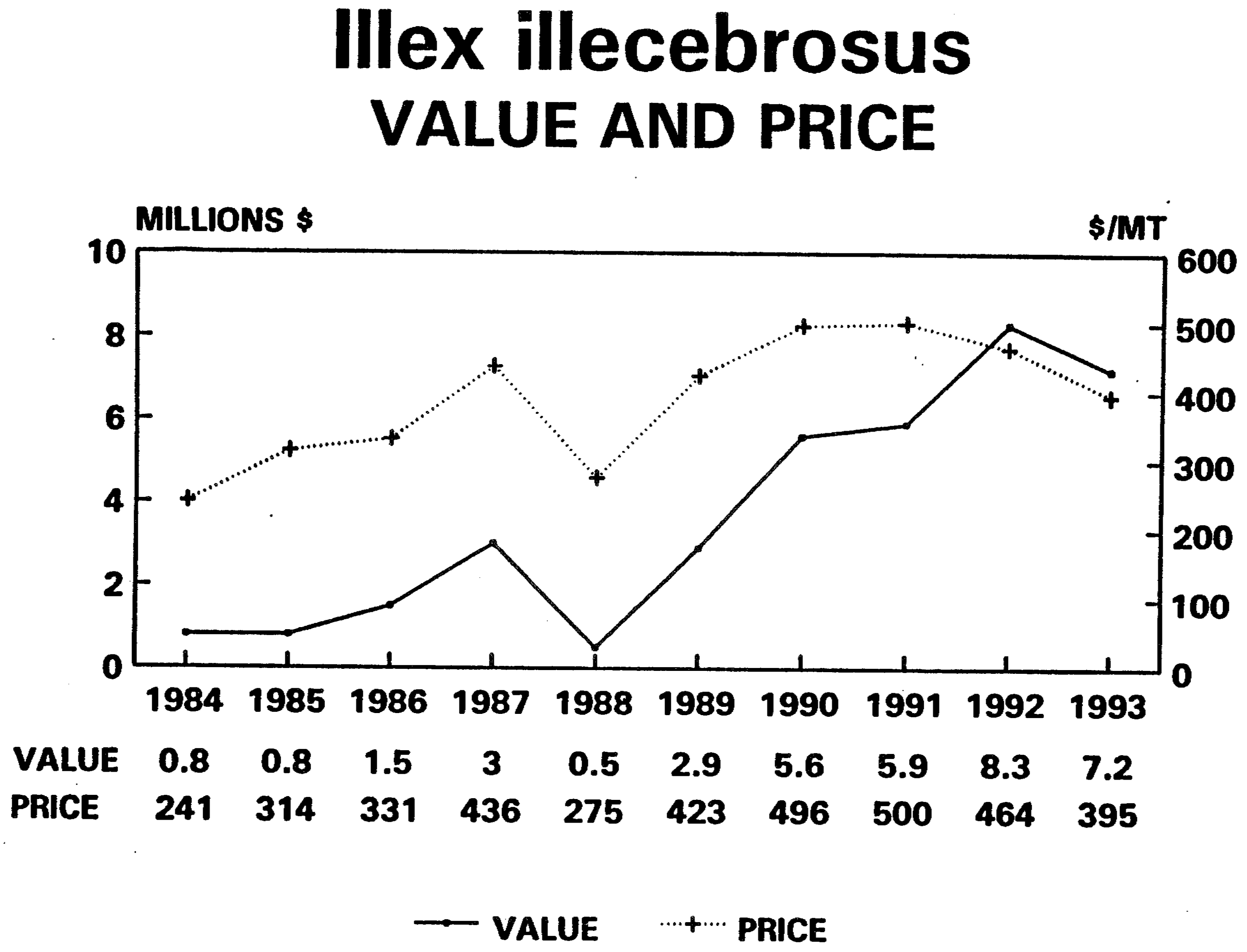
Figure 22. NAFO (formerly ICNAF) statistical reporting areas.

Loligo pealei
VALUE AND PRICE



VALUES ADJUSTED FOR INFLATION (1982 = 100)

Figure 23. Annual value and price of U.S. *Loligo pealei* landings from 1984-1993 (based on unpublished NMFS general canvas data).

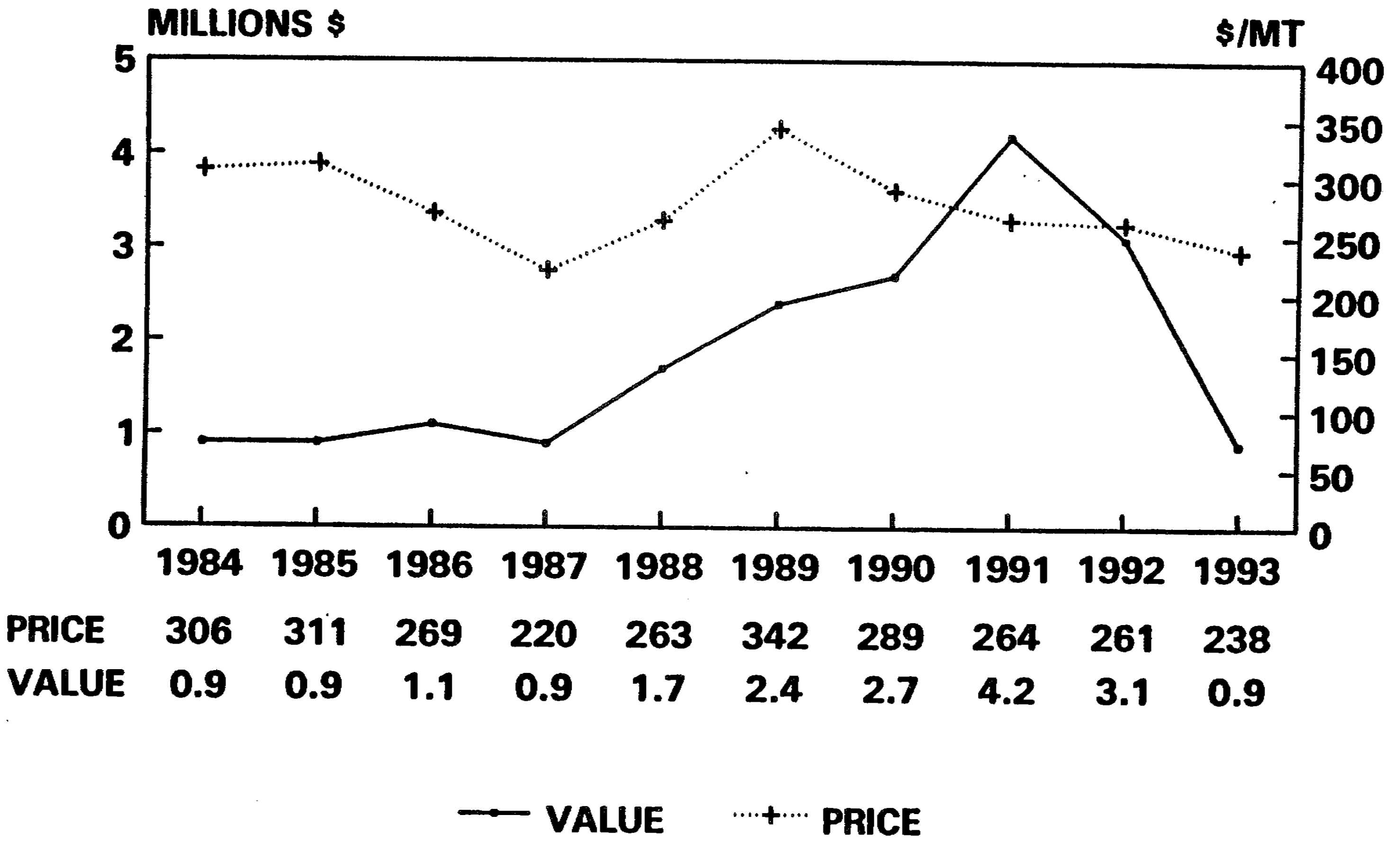


VALUE	0.8	0.8	1.5	3	0.5	2.9	5.6	5.9	8.3	7.2
PRICE	241	314	331	436	275	423	496	500	464	395

VALUES ADJUSTED FOR INFLATION (1982 = 100)

Figure 24. Annual value and price of U.S. *Illex illecebrosus* landings from 1984-1993 (based on unpublished NMFS general canvas data).

ATLANTIC MACKEREL
VALUE AND PRICE

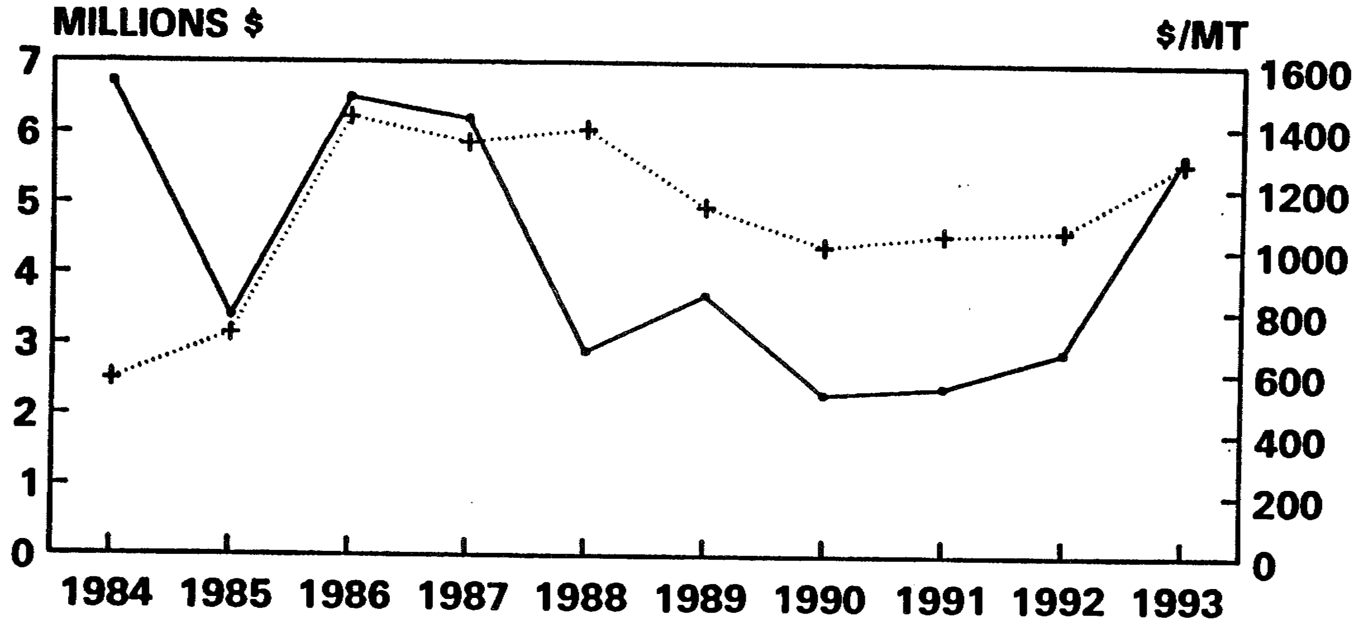


	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PRICE	306	311	269	220	263	342	289	264	261	238
VALUE	0.9	0.9	1.1	0.9	1.7	2.4	2.7	4.2	3.1	0.9

VALUES ADJUSTED FOR INFLATION (1982 = 100)

Figure 25. Annual value and price of U.S. Atlantic mackerel landings from 1984-1993 (based on unpublished NMFS general canvas data).

BUTTERFISH
VALUE AND PRICE



	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PRICE	571	720	1423	1341	1383	1132	1005	1043	1058	1280
VALUE	6.7	3.4	6.5	6.2	2.9	3.7	2.3	2.4	2.9	5.7

VALUES ADJUSTED FOR INFLATION (1982 = 100)

Figure 26. Annual value and price of U.S. Atlantic butterfish landings from 1984-1993 (based on unpublished NMFS general canvas data).

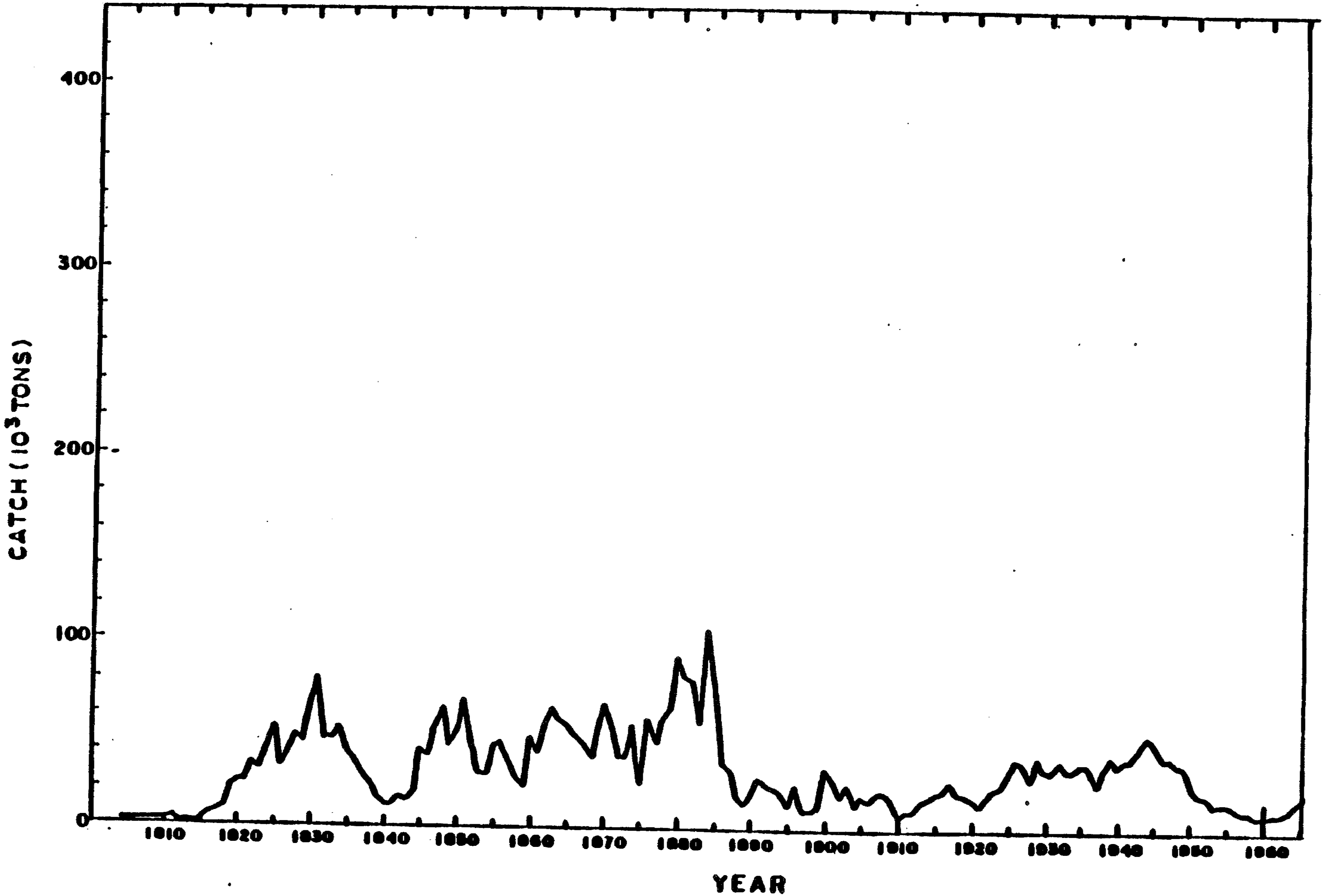


Figure 27. Commercial Atlantic mackerel catch in the Northwest Atlantic Ocean, 1804-1965 (from Hoy and Clark 1967).

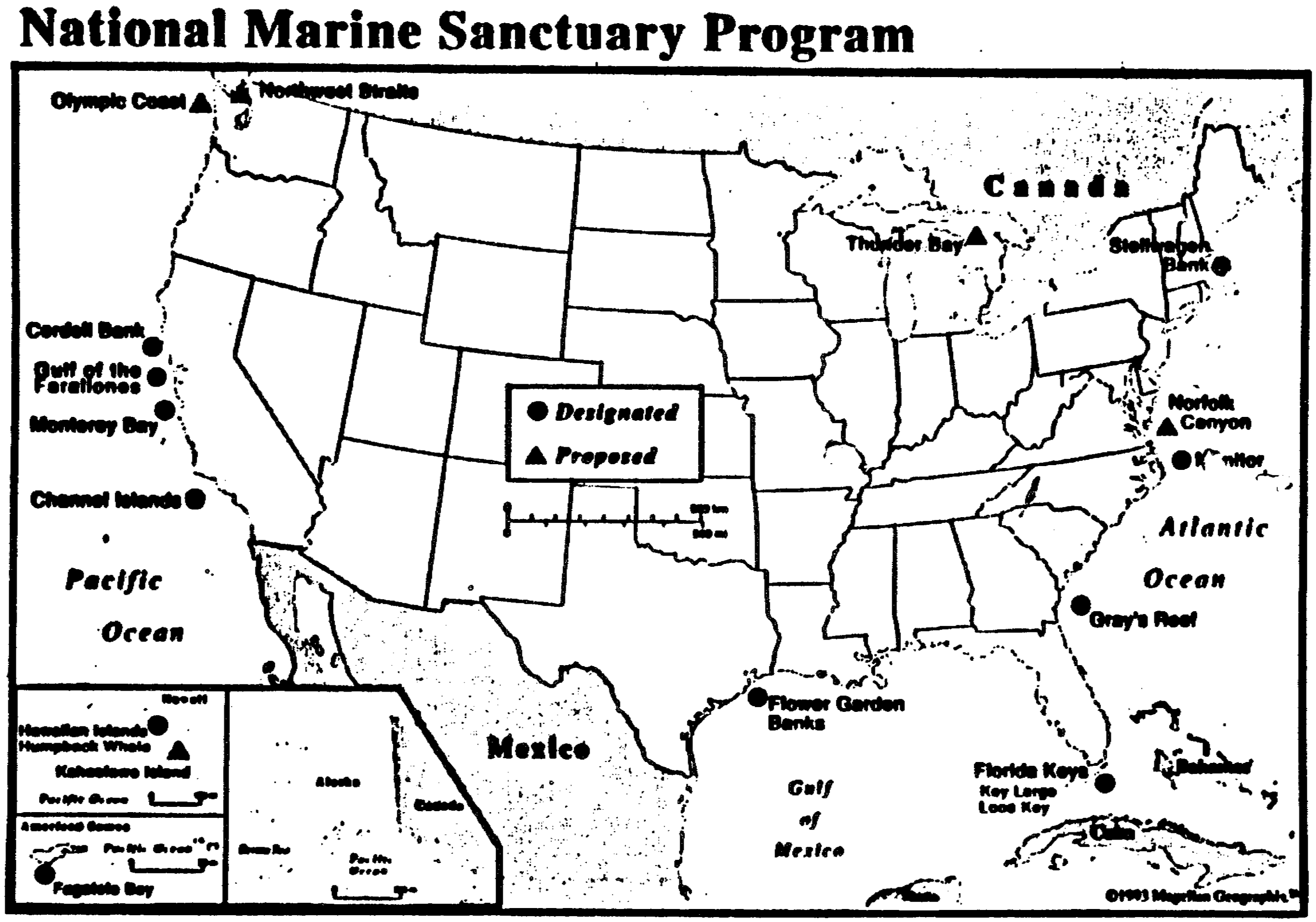


Figure 28. Designated and Proposed National Marine Sanctuaries.

Source: National Marine Sanctuary Program 1993.

APPENDIX 1. ALTERNATIVES TO THE AMENDMENT

1. TAKE NO ACTION AT THIS TIME

1.1. Description

This would mean that the FMP would continue in effect unchanged.

1.2. Beneficial and Adverse Impacts

Adoption of this alternative would mean that the management regime would not be improved in order to further facilitate development of the US fishery. It is likely that over-capitalization in these fisheries would occur under continued open access conditions. Displaced effort due to restrictions recently placed on other fisheries (New England groundfish, summer flounder, etc.) is likely to be transferred into the squid and butterfish fisheries.

2. MORATORIUM ON ENTRY OF ADDITIONAL VESSELS INTO THE ATLANTIC MACKEREL FISHERY

2.1. Description

This alternative would establish a moratorium on entry of additional vessels into the Atlantic mackerel fishery similar to the moratorium on entry into the *Loligo*, *Illex*, and butterfish fisheries in the preferred alternative.

2.2. Beneficial and Adverse Impacts

The US domestic harvest capacity for Atlantic mackerel appears to exceed both the current specification of OY and the new proposed specification of long-term potential yield (currently estimated to be 134,000 mt). However, recent landings have been only a small fraction of the total allowable catch. The development of this industry is hampered primarily by a lack of markets (both domestic and foreign) for Atlantic mackerel (see Chapter 8). Development of foreign and domestic markets are a necessary prerequisite for the growth of the Atlantic mackerel fishery. Infusion of investment capital into the industry for market and infrastructure development could be discouraged if limited entry were implemented at the present time.

3. NO MINIMUM MESH FOR *LOLIGO* FISHERY

3.1. Description

This alternative would eliminate the 1 7/8" minimum codend requirement in the preferred alternative.

3.2. Beneficial and Adverse Impacts

Gear selectivity data for squids in general is lacking. In addition, the survival of escapees is unknown. However, yield per recruit for *Loligo* would increase with increasing mesh size (within the selectivity range). No minimum mesh in the *Loligo* fishery could lead to higher levels of discard of both squid below market size and non-target species.

4. IMPOSE MINIMUM MESH RESTRICTIONS ON DIRECTED BUTTERFISH TRIPS

4.1. Description

This alternative would require vessels with 500 pounds or more of butterfish on board to use a codend of at least 3.0 inches (inside stretch measure, diamond mesh), with all smaller codends stowed.

4.2. Beneficial and Adverse Impacts

High at-sea discards in the butterfish fishery were recognized as a potential problem in this fishery during the scoping process for Amendment 5. Murawski and Waring (1979) concluded that equilibrium yield for Atlantic butterfish would increase from 14,500 mt if a 30-mm (1.2 in) mesh was used to 19,000 mt if a 60-mm (2.4 in) minimum mesh restriction was imposed in the butterfish fishery. The major problem with this alternative is the definition of a directed butterfish trip and the mixed-species nature of the fishery. Butterfish are often taken inadvertently in the *Loligo* fishery which utilizes small mesh (approximately 30-45 mm/1.25-1.75 in). Since significant quantities of butterfish appear to be taken as inadvertent bycatch in the *Loligo* fishery, wasteful discard of fish in excess of the 500 lb threshold could frequently occur. This species is currently considered under-exploited. Any management measure which causes increased discard of dead fish should be avoided.

5. INDIVIDUAL TRANSFERRABLE QUOTAS

5.1. Description

An individual transferrable quota (ITQ) program would operate the same as the preferred alternative, except that the annual quotas would be assigned to individual vessels. Qualifications to participate could be the same as participation under the vessel moratorium. Initial allocations could be made based on sales receipts for the most recent five years, but no vessel could be allocated more than some maximum percentage. Fishermen would be prohibited from fishing for or landing mackerel, squid, or butterfish after their annual allocations had been taken.

5.2. Beneficial and adverse impacts

An ITQ program would allow individual fishermen greater flexibility than any of the quota or seasonal closure based systems. That is, they could fish for mackerel, squid, or butterfish when they wanted to, rather than being controlled by quota or seasonal closures.

As with the other alternatives, fishermen could not fish for (catch and discard as well as catch and land) mackerel, squid, or butterfish after their allocations had been taken. This would require careful management of their allocations to assure that their participation in other small mesh fisheries did not violate their ITQ allocations.

An initial problem is associated with the initial allocation process. A great deal of time would be required to obtain and validate sales records to determine initial allocations. 1992 NMFS weighout data indicate a minimum of 360 vessels could be eligible for allocations. Since not all vessels are captured in the weighout data base, the number could be considerably larger. It might be preferable to continue management of these resources resource without ITQs to protect the resource and introduce an ITQ system subsequently.

ITQs are a relatively new management technique where a total quota is divided into small parts and allocated to individual participants. Individual quotas or shares could be bought, sold or leased so that harvesters have flexibility in planning their fishing activities. Potential advantages of ITQs include increased profits, greater economic stability, improved product quality, improved safety, reduced gear conflicts and losses, elimination of derby-type fisheries, bycatch reduction, an improved investment climate, reduction of market gluts, and reduction in post-harvest waste (Anderson 1992). Potential disadvantages of ITQs include increased high-grading, under-reporting of catch, enforcement costs and problems, creation of a "rich mans club", changes in the makeup of the fishing fleet, and potential inequities of the initial allocation of quota shares due to lack of information (Anderson 1992).

6. EFFORT RESTRICTIONS

6.1. Description

Another management tool used to control exploitation are limits placed on total effort of the fleet. Control may be accomplished through restrictions placed on the number of days at sea for individual vessels such that total effort equals the desired level (i.e., to achieve some prescribed level of fishing mortality). Effort controls have the advantage of reducing exploitation and maintaining a year round fishery without promoting discards. A disadvantage is that without control of entry into the fishery, individual effort would be restricted without controlling total effort exerted by the fleet. Monitoring and enforcement would require the mandatory use of a remote vessel monitoring system which could be difficult and costly to implement.

6.2. Beneficial and Adverse Impacts

Perhaps, the most obvious outcome that could be expected from the implementation of days at sea restriction would be a reduction in fishing mortality. Labor income (variable cost) paid out as a result of reduced days at sea would decrease. Consumer surplus would potentially decline at the beginning of management implementation due to higher prices associated with lower landings, then as greater landings are realized in the future consumer surplus would increase.

There are several problems with effort control as a management tool. First, subtle increases in fishing power of individual fishing vessels could occur which would offset controls placed on days at sea. In addition, implementation and monitoring associated with this alternative could be costly and difficult.

7. MULTI-SPECIES MANAGEMENT OF THE GEAR/EFFORT/FISHERY COMPLEX

7.1. Description

This option integrates a number of the alternatives listed above. This approach would require, at a minimum, the following:

1. Define discrete fishery units (species which co-occur) based on technological and ecological interactions using historical data.

2. Define unit of fishing effort.

3. Compute amount of fishing effort necessary to achieve target exploitation rate.

For discussion purposes, the management regime could operate as follows:

1. Estimate standing stock of species of interest (squid/mackerel/butterfish complex and associated bycatch species from historical data base).

2. From empirical data estimate amount of fishing effort required to achieve target yields and fishing mortality rates for individual species.

3. Compute catch from time/area/mesh units which produces species mix which optimizes net national benefits.

4. Calculate tolerance or desired mix of bycatch of other species.

5. Allocate trips (standardize gear, etc.), make trip or some other basic unit of effort the transferable property unit.

6. No discards at sea allowed.

7. Impose penalties as necessary for take of species at low stock levels or sublegal target species.

8. Track catches and adjust future fishing effort according to stock size and level of recruitment for the biological year.

7.2. Beneficial and Adverse Impacts

Fisheries can be categorized into fishery management units based on species caught, gear, season and area fished. Few if any fishery units which occur in the Mid-Atlantic region operate as single species or single gear units. The otter trawl, which is the principal gear used in the Atlantic mackerel, squid, and butterfish fisheries, is relatively non-selective. An individual tow is likely to capture the target species as well as a number of non-target or secondary species. This often results in the discard of non-target fish which may be regulated by another fishery management plan. For example, a bottom otter trawl tow with small mesh targeted at squid is likely to retain all summer flounder encountered. If the annual quota for summer flounder was completely taken prior to the tow, then all flounder would have to be discarded (many of which would be dead).

One approach to this problem is to define season/area/gear/species complexes upon which to base a multi-species management program. The major problem with this approach is the complex and dynamic nature of both fisheries and the species complexes which support those fisheries. The current understanding of ecosystem dynamics is poorly developed at present. The requisite understanding of these processes along with the metrics necessary to define and manage multi-species complexes will need to be further developed before this becomes a realistic option.

8. ESTABLISH A MINIMUM *LOLIGO* TUBE SIZE

8.1. Description

This alternative would establish a minimum tube (dorsal mantle length) landing size for *Loligo* of 4.0 inches. The intent of the alternative is to prohibit the landing of non-marketable squid.

8.2. Beneficial and Adverse Impacts

This alternative would be included in the amendment independent of a minimum mesh rule. Without a minimum mesh requirement, a minimum size limit would likely cause a large discard problem. Even in conjunction with a minimum mesh rule, a size limit would not be desirable for several reasons. First, recruitment to the fishing gear (selectivity) is not "knife-edged" which means that some squid less than 4.0 inches will always be retained if they are present, even if some minimum mesh was required. That is, some fraction of the squid encountered by the net which are less than the minimum size will be retained. Culling of these undersize animals from the large volume catches of squid at-sea would require a great deal of time and/or labor only to return dead animals to the sea. Consequently, this alternative appears to have little merit.

9. ESTABLISH THE SAME CRITERIA TO QUALIFY FOR A MORATORIUM PERMIT FOR *LOLIGO, ILLEX,* AND BUTTERFISH

9.1. Description

This alternative would establish the same criteria to qualify for a moratorium permit for *Loligo*, *Illex*, and butterfish.

9.2. Beneficial and Adverse Impacts

The preliminary analysis of the number of permitted vessels which landed at various thresholds per trip for *Illex* and *Loligo* squid when examined separately indicated that a smaller number of vessels would qualify for the *Illex* moratorium permit. If the same criteria were used, it is likely that a much larger number of vessels would be eligible to enter the directed fishery for *Illex* squid, many of which were not previously engaged in the directed fishery for *Illex*. This would essentially defeat the purpose of limited entry and would increase the chance for over-capitalization in the industry and dissipation of profits.

APPENDIX 2. REGULATORY IMPACT REVIEW

1. INTRODUCTION

1.1. Purpose

Executive Order 12866, "Regulatory Planning and Review", was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. While the executive order covers a variety of regulatory policy considerations, the benefits and costs of regulatory actions are a prominent concern. Section 1 of the order deals with the regulatory philosophy and principles that are to guide agency development of regulations. The regulatory philosophy stresses that, in deciding whether and how to regulate, agencies should assess all costs and benefits of all regulatory alternatives. In choosing among regulatory approaches, the philosophy is to choose those approaches that maximize net benefits to society.

The regulatory principles in E.O. 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives, such as user fees or marketable permits, to encourage the desired behavior. When an agency determines that a regulation is the best available method of achieving the regulatory objective, it shall design its regulations in the most cost-effective manner to achieve the regulatory objective. Each agency shall assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Each agency shall base its decisions on the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation.

The National Marine Fisheries Service (NMFS) requires the preparation of a Regulatory Impact Review (RIR) for all regulatory actions that either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan. The RIR is part of the process of preparing and reviewing FMPs and provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of E.O. 12866.

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is "economically significant" if it is likely to result in the effects described in item (1) above.

The RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant".

The document also contains an analysis of the impacts of the Plan relative to the Regulatory Flexibility Act and the Paperwork Reduction Act of 1980.

1.2. Description of User Groups

The fishery is described in Sections 7 and 8 of the FMP.

1.3. Problems Addressed by the FMP

The problems to be addressed are discussed in Section 4.2 of the FMP.

1.4. Management Objectives

The objectives of the FMP are:

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.

2. Promote the growth of the US commercial fishery, including the fishery for export.

3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.

4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.

5. Increase understanding of the conditions of the stocks and fisheries.

6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

1.5. Provisions of the FMP

The management measures adopted for public hearing are presented below.

1.5.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

1.5.1.1. Specification of ABC, OY, DAH, DAP, JVP, and TALFF

1.5.1.1.1. General

The fishing year is 1 January - 31 December. For Atlantic mackerel, ABC, OY, DAH, DAP, and JVP and TALFF, if any, and for the squids and butterfish, ABC, OY, DAH, and DAP will be specified annually through an administrative process which requires that the Regional Director (RD), in consultation with the Council, prepare the required estimates as described below and also provide for public comment on those estimates. The estimates for these species may be changed during the year.

1.5.1.1.2. Overfishing definitions

1.5.1.1.2.1. Atlantic mackerel

Overfishing is defined to occur when the catch of Atlantic mackerel exceeds the annual ABC for the species. ABC is the allowable biological catch in US waters for the upcoming fishing year. C is defined as the quantity of mackerel that is expected to be caught in Canadian waters. The total catch of Atlantic mackerel (ABC+C) shall not exceed long term potential catch (LTPC) as defined by the NEFSC. In addition, a spawning stock size (S) at the beginning of the fishing year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt shall be maintained.

It is recognized that the estimate of long-term potential catch may be revised over time. It is the Council's intention that the most recent estimate be used and that such use will not require a plan amendment.

The provision of the FMP concerning setting annual quotas prevents overfishing.

1.5.1.1.2.2. *Loligo*, *Illex*, and butterfish

For purposes of meeting the 602 Guidelines, overfishing for *Loligo pealei* is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1967 to present). This means, for example, that when the 1995 index is available (and thus a 29-year time series exists) that the seventh lowest annual index will be compared to the average of the 1993, 1994 and 1995 indices. If the three year average is below the seventh lowest index, overfishing will be defined as occurring. Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 36,000 metric tons (MSY estimate) based upon information prepared by the Council and included in the SAFE document. This overfishing definition meets the provisions of 602.11(c)(5) in that it:

(1) has sufficient scientific merit;

(2) is likely to result in effective action to prevent overfishing;

(3) provides a basis for objective measurement; and

(4) is operationally feasible.

For purposes of meeting the 602 Guidelines, overfishing for *Illex illecebrosus* is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present). Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 30,000 metric tons (MSY estimate minus a 10,000 metric ton ecological set aside) based upon information prepared by the Council and included in the SAFE document.

For purposes of meeting the 602 Guidelines, overfishing for butterfish is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Science Center's autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present). Quotas for this species are set annually by the Regional Director according to the FMP. Annual quotas can be set within the range of 0 to 16,000 metric tons (MSY estimate) based upon information prepared by the Council and included in the SAFE document.

1.5.1.1.3. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for *Loligo*

Section 303(a)(3) of the MFCMA requires that FMPs assess and specify the OY from the fishery and include a summary of the information utilized in making such specification. OY is to be based on MSY, or on MSY as it may be adjusted for social, economic, or ecological reasons. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. MSY (section 5.4 of the FMP) has been specified at 36,000 mt for *Loligo*.

OY is all *Loligo* harvested pursuant to this FMP. The maximum OY for *Loligo* is 36,000 mt.

The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero.

An additional consideration in the determination of OY for *Loligo* is the seasonal distribution of landings. The seasonal and geographical distribution of *Loligo* landings in the US fishery has undergone significant change since 1983. This raises concerns about both the allocation of the resource between inshore and offshore components of the fishery and the possibility of recruitment overfishing *Loligo* which is considered to be essentially an annual species.

To insure that sufficient escapement from the winter offshore *Loligo* fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass, the Regional Director may establish seasonal quotas. This component of the management program may become part of the real-time assessment and management discussed in Section 1.5.1.2.3.

1.5.1.1.4. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for *Illex*

OY is all *Illex* harvested pursuant to this FMP. The maximum OY for *Illex* is 30,000 mt. The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero.

1.5.1.1.5. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for Atlantic mackerel

The Regional Director, in consultation with the Council, determines annual specifications relating to OY, DAH, DAP, JVP, and TALFF. The Council and Regional Director review yearly the best available biological data pertaining to the stock. ABC is the allowable biological catch in US waters for the upcoming fishing year. C is defined as the quantity of mackerel that is expected to be caught in Canadian waters. The total catch of Atlantic mackerel (ABC+C) shall not exceed long term potential catch (LTPC) as defined by the NEFSC. In addition, a spawning stock size (S) at the beginning of the fishing year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt shall be maintained. The specification of mackerel OY, DAH, DAP, and TALFF (in metric tons) is:

ABC = allowable biological catch in US waters for the upcoming fishing year.

C = estimated mackerel catch (mt) in Canadian waters for the upcoming fishing year.

S = mackerel spawning stock biomass at the beginning of the upcoming fishing year.

LTPC = long term potential catch as specified by the NEFSC (currently estimated at 134,000 mt).

ABC must meet the following constraints:

$ABC <= LTPC - C$ and

$ABC <= S - C - 900{,}000$ mt.

$OY <= ABC$;

$DAH <= OY$.

$DAP <= OY$.

$TALFF <= OY - DAH$.

From the ABC, the Regional Director, in consultation with the Council, determines the OY for the fishing year. The OY represents a modification (reduction) of ABC, based on biological, ecological and economic factors. It is intended to provide the greatest overall benefit to the nation by incorporating all relevant factors. Examples of biological adjustments include, but are not limited to, reductions from ABC to account for availability of mackerel to the US fishery and to minimize fluctuations from year to year that could result from the biomass of a pelagic schooling species such as mackerel. Examples of economic factors include, but are not limited to, the nine factors set forth below. OY will be specified so that ABC is less than or equal to LTPC - C and that ABC is less than or equal to S - C - 900,000 mt. Determining these catches involves estimating both the US and foreign harvesting potential and market demand.

The OY is composed of the estimated Canadian catch, an initial DAH and an initial TALFF (which may be set equal to zero). The Regional Director projects the DAH by reviewing data concerning past domestic commercial landings, domestic recreational catch, projected amounts of mackerel necessary for domestic processing and for joint ventures during the fishing year, and other data pertinent for such a projection.

If the spawning stock size becomes reduced to the point where annual harvests must be reduced below long-term potential catch, each sector of the fishery will be reduced proportionately. Framework measures for the commercial fishery include minimum size limit, trip limits and/or seasonal quotas. Framework measures for the recreational fishery include minimum size limit, possession limits and/or seasonal restrictions.

The JVP component of DAH is the portion of DAH which domestic processors either cannot or will not use. In addition, this specification of OY is based on such criteria as contained in the Magnuson Act, specifically section 201(e), and the application of the following factors:

1. total world export potential by mackerel producing countries;

2. total world import demand by mackerel consuming countries;

3. US export potential based on expected US harvests, expected US consumption, relative prices, exchange rates, and foreign trade barriers;

4. increased/decreased revenues to the US from foreign fees;

5. increased/decreased revenues to US harvesters (with/without joint ventures);

6. increased/decreased revenues to US processors and exporters;

7. increased/decreased US harvesting productivity due to decreases/increases in foreign harvest;

8. increased/decreased US processing productivity; and

9. potential impact of increased/decreased TALFF on foreign purchases of US products and services and US caught fish, changes in trade barriers, technology transfer, and other considerations.

Proposed annual specifications of the ABC and OY and its component amounts are published in the *Federal Register* and provide for a public comment period. The notice will include a discussion of the 9 factors listed above as they apply to the proposed OY. At the close of the public comment period, a notice of final annual specifications with the reasons therefore are published in the *Federal Register.*

The OY may be adjusted by the Regional Director, in consultation with the Council, upward to the ABC at any time during the fishing year. An adjustment may be made to OY to accommodate DAH needs, including when the application of the above factors warrants an adjustment in TALFF. However, TALFF may not be adjusted to a quantity less than that already allocated to and accepted by foreign nations or less than that needed for bycatch. Any adjustments to the OY are published in the *Federal Register* and may provide for a public comment period.

It is recognized that the estimate of long-term potential catch may be revised over time. It is the Council's intention that the most recent estimate be used and that such use will not require a Plan Amendment.

1.5.1.1.6. Specification of ABC, OY, DAH, DAP, JVP, and TALFF for Butterfish

Butterfish maximum OY is 16,000 mt. The Regional Director in consultation with the Council, determines annual specifications relating to OY, DAH, DAP, JVP, and TALFF. The Regional Director reviews yearly the most recent biological data, including data on discards, pertaining to the stock. If the Regional Director determines that the stock cannot support a level of harvest equal to the maximum OY, he would establish a lower ABC for the fishing year. This level represents essentially the modification of the MSY to reflect changed biological circumstances. If the stock is able to support a harvest level equivalent to the maximum OY, the ABC is set at that level.

Section 303(a)(3) of the MFCMA requires that FMPs assess and specify the OY from the fishery and include a summary of the information utilized in making such specification. OY is to be based on MSY, or on MSY as it may be adjusted for social, economic, or ecological reasons. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. MSY (long term potential catch; section 5.4 of the FMP) has been specified at 16,000 mt for butterfish.

The maximum OY for butterfish is 16,000 mt. The annual OY will be set following the procedures set forth in section 1.5.1.2.2.

The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY that will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero. However, if there is a TALFF specified for Atlantic mackerel, in order to reduce waste of butterfish, there will be a butterfish TALFF that shall not exceed 0.08% of the allocated portion of the Atlantic mackerel. Note that the nine factors considered in establishing OY for mackerel do not apply for butterfish because the butterfish TALFF is established for bycatch only in accordance with the preceding percentages.

1.5.1.2. Specification of Management Measures

1.5.1.2.1. Permits and fees

1.5.1.2.1.1. Vessel permits and fees

1.5.1.2.1.1.1. General

Any owner of a vessel desiring to fish for Atlantic mackerel, *Loligo* or *Illex* squid or Atlantic butterfish within the US EEZ for sale, or transport or deliver for sale, any Atlantic mackerel, *Loligo* or *Illex* squid, or Atlantic butterfish taken within the EEZ, must obtain a permit from NMFS for that purpose. *Illex*, *Loligo*, and butterfish vessels must meet the criteria set forth in 1.5.1.2.1.1.2 of the FMP in order to qualify for a moratorium permit.

The owner of a party and charter boat (vessel for hire) must obtain a party or charter boat permit.

A recreational vessel, other than a party or charter boat (vessel for hire), is exempt from the permitting requirement.

A party or charter boat may have both a party or charter boat permit and a commercial permit for Atlantic mackerel or a commercial moratorium permit for squid and butterfish to catch and sell if the vessel meets the commercial vessel qualification requirements set forth in 1.5.1.2.1.1.2 of the FMP. However, such a vessel may not fish under the commercial rules if it is carrying passengers for a fee.

1.5.1.2.1.1.2. Moratorium on entry to the commercial fishery for *Loligo*, *Illex*, and butterfish

There will be a moratorium on entry of additional commercial vessels into the *Loligo* and *Illex* squid and butterfish fisheries in the EEZ. Each State is encouraged to adopt complementary moratorium measures for those participating in the commercial fishery.

Under the moratorium, vessels and moratorium permits together may be bought and sold. The Regional Director must be notified of all sales of vessels and permits. Vessels that involuntarily leave the fishery (for example, vessels that were sunk or burnt) may be replaced with vessels of the same Gross Registered Tonnage (GRT) and overall registered length as the vessel being replaced. Commercial vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length. Permits may not be combined to create larger replacement vessels. The moratorium may be terminated or replaced at any time by FMP amendment.

A vessel is eligible for a moratorium permit in the *Loligo* and butterfish fishery if it meets any of the following criteria:

1. The vessel landed and sold 20,000 pounds of *Loligo* or butterfish (including joint venture landings) in any consecutive 30 day period between 13 August 1981 and 13 August 1993.

2. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person. "Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels.

3. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels.

A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

1. The vessel had five landings (including joint venture landings) of 5,000 pounds (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 and 13 August 1993, or

2. The owner or operator of the vessel purchased recirculating sea water equipment, an on board plate freezer, or a commercial blast freezer by 31 May 1994 (the freezer must be one designed for use on a fishing vessel, not be a residential or similar freezer installed on the boat to meet the eligibility criteria) and have installed the equipment and landed five trips of at least 5,000 lb. prior to the implementation of the final regulations of Amendment 5.

3. The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person. "Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels.

4. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length for commercial vessels.

A refrigerated sea water system is defined as system in which seawater is cooled by mechanical refrigeration and is circulated through bulk tanks which contain fish. Heat is transferred from the fish to the seawater in the tank to the mechanical refrigeration system , thereby cooling the fish. A plate freezer is defined as a system where fish are frozen by contact with refrigerated plates.

Eligibility must be established during the first year of the FMP. In other words, the moratorium permit may not be applied for more than twelve months following the effective date of the final regulations or if a vessel is retired from the fishery. This does not affect annual permit renewals.

Vessel permits issued to vessels that involuntarily leave the fishery may not be combined to create larger replacement vessels.

Applicants for moratorium permits shall provide information with the application sufficient for the Regional Director to determine if the vessel meets the eligibility requirements. Sales receipts or dealer weighout forms signed by the dealer and, for condition 3, a notarized statement from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

1.5.1.2.1.1.3. Commercial fishery incidental catch permit

A vessel that does not qualify for a moratorium permit may land *Loligo*, *Illex*, and/or butterfish if (1) it possesses an incidental catch permit, (2) fishes with a net legal in the directed fishery, (3) lands no more that 2,500 pounds of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and (4) the operator of the vessel files the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

1.5.1.2.1.1.4. Permit application

The owner or operator of a qualified US vessel may obtain the appropriate Federal permit by furnishing on the form provided by NMFS information specifying, at least, the names and addresses of the vessel owner, the name of the vessel, official Coast Guard number, directed fishery or fisheries, gear type or types utilized to take Atlantic mackerel, squid, or butterfish, gross tonnage of vessel, the permit number of any current or previous fishery permit issued to the vessel, radio call sign, registered length of the vessel, engine horsepower, year the vessel was built, type of construction, type of propulsion, navigational aids (e.g., Loran C), type of echo sounder, type of computer, crew size including captain, fish hold capacity (to the nearest 100 lbs), quantity of Atlantic mackerel, squid, or butterfish legally landed during the year prior to the one for which the permit is being applied (documented by sales records), principal State of landing, the home port of the vessel, and number of passengers the vessel may carry (for party and charter boats).

Operators of commercial vessels must also supply information required to establish that the vessels qualify for a permit pursuant to the moratorium. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned.

Applicants for a permit under this FMP must agree, as a condition of issuance of the permit, to fish in accordance with Federal rules whether they are fishing in the EEZ or State waters, unless State rules are more restrictive.

Permits expire: (1) when the owner or operator retires the vessel from the fishery, or (2) on 31 December of each year, or (3) when the ownership of the vessel changes; however, the Regional Director shall authorize continuation of a vessel permit for the Atlantic mackerel, squid, or butterfish fishery if the new owner so requests. Applications for continuation of a permit must be addressed to the Regional Director.

The permit must be carried, at all times, on board the vessel for which it is issued, and must be maintained in legible condition. The permit, the vessel, its gear and catch shall be subject to inspection upon request by any authorized official.

The Federal costs of implementing an annual permit system for the sale of Atlantic mackerel, squid, or butterfish shall be charged to permit holders as authorized by section 303(b) (1) of the Magnuson Act. In establishing the annual fee, the Regional Director will ensure that the fee does not exceed the administrative costs incurred in issuing the permit, as required by section 304(d) of the Magnuson Act. Proper accounting for administrative costs may include labor costs (salary and benefits of permitting officers plus prorated share of secretarial support and supervision at both the NMFS regional and headquarters levels), computer costs for creating and maintaining permit files (prorated capital costs, time share and expendable supplies), cost of forms and mailers (purchase, preparation, printing and reproduction), and postage costs for application forms and permits.

1.5.1.2.1.2. Dealer permits and fees

Any dealer of Atlantic mackerel, squid, or butterfish must have a permit. A dealer of Atlantic mackerel, squid, or butterfish is defined as a person or firm that receives Atlantic mackerel, squid, or butterfish for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport.

An applicant must apply for a dealer permit in writing to the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the applicant desires to have the permit made effective. Applications must contain the name, principal place of business, mailing address and telephone number of the applicant. The Regional Director will notify the applicant of any deficiency in the application. If the applicant fails to correct the deficiency within 15 days following the date of notification, the application will be considered abandoned. Except as provided in Subpart D of 15 CFR Part 904, the Regional Director will issue a permit within 30 days of the receipt of a completed application.

A permit expires on 31 December of each year or if the ownership or the dealer changes. Any permit issued under this section remains valid until it expires, is suspended, is revoked, or ownership changes. Any permit which is altered, erased, or mutilated is invalid. The Regional Director may issue replacement permits. Any application for a replacement permit shall be considered a new permit.

A permit is not transferable or assignable. It is valid only for the dealer to whom it is issued.

The permit must be displayed for inspection upon request by an authorized officer or any employee of NMFS designated by the Regional Director.

The Regional Director may suspend, revoke, or modify, any permit issued or sought under this section. Procedures governing permit sanctions or denials are found at Subpart D of 15 CFR Part 904. The Regional Director may, after publication of a notice in the *Federal Register*, charge a permit fee. Within 15 days after the change in the information contained in an application submitted under this section, the dealer issued the permit must report the change in writing to the Regional Director.

The Regional Director shall recognize State dealer permits in lieu of Federal dealer permits if the permits contain the necessary information and are forwarded to the Regional Director by the appropriate State.

1.5.1.2.1.3. Operator permit and fees

An operator of a vessel with permit issued pursuant to this FMP (either a moratorium permit or a party/charter boat permit) must have an Operator's Permit issued by NMFS. Any vessel fishing commercially for Atlantic mackerel, squid, or butterfish under a moratorium permit or recreationally with a party/charter boat permit must have on board at least one operator who holds a permit. That operator may be held accountable for violations of the fishing regulations and may be subject to a permit sanction. During the permit sanction period, the individual operator may not work in any capacity aboard a federally permitted fishing vessel.

The permit program has the following requirements:

1. Any operator of a vessel fishing for Atlantic mackerel, squid, or butterfish must have an operator's permit issued by the NMFS Regional Director.

2. An operator is defined as the master or other individual on board a vessel who is in charge of that vessel (see 50 CFR 620.2).

3. The operator is required to submit an application, supplied by the Regional Director, for an Operator's Permit. The permit will be issued for a period of up to three years.

4. The applicant would provide his/her name, mailing address, telephone number, date of birth and physical characteristics (height, weight, hair and eye color, etc.) on the application, and would be requested to provide his/her social security number. In addition to this information, the applicant must provide two passport-size color photos.

5. The permit is not transferable.

6. Permit holders would be required to carry their permit aboard the fishing vessel during fishing and off-loading operations and must have it available for inspection upon request by an authorized officer.

7. The Regional Director may, after publication in the *Federal Register*, charge a permit fee.

1.5.1.2.2. Atlantic Mackerel, Squid, and Butterfish FMP Monitoring Committee

The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will be made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office, and the Northeast Fisheries Science Center. The MAFMC Executive Director or his designee will chair the Committee.

The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target harvest level (OY) on Atlantic mackerel, squid, or butterfish is not exceeded. The Committee will also review the gear used to catch Atlantic mackerel, squid, or butterfish to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the fishing rate target and propose such regulations as appropriate, including seasonal quotas in the *Loligo* fishery. Seasonal quotas, if any, will be established prior to the upcoming fishing year.

The Council will receive the report of the Committee and make its recommendations to the Regional Director. The Regional Director will receive the report of the Council and publish his report in the *Federal Register* for public comment by the date specified in the regulations. Following the review period, the Regional Director will set the final quota and other management measure adjustments for the year. If seasonal quotas are established in the *Loligo* fishery, they will be specified as part of the annual quota setting process prior to the upcoming fishing year.

In summary, the steps from the Monitoring Committee for action by the Regional Director are:

1. The Monitoring Committee reviews the data and makes its recommendations to the Mackerel, Squid, and Butterfish Committee.

2. The Mackerel, Squid, and Butterfish Committee consider the recommendations of the Monitoring Committee and makes their recommendations to the Council.

3. The Council considers the recommendations of the Mackerel, Squid, and Butterfish Committee and make their recommendations to the Regional Director.

4. The Regional Director considers the recommendations of the Council and publishes proposed measures in the *Federal Register*.

The Monitoring Committee, Mackerel, Squid, and Butterfish Committee, and Council meetings will all be open to the public and provide an opportunity for public comment. The publication of the Regional Director's proposed action in the *Federal Register* provides an opportunity for public comment at that level.

1.5.1.2.3. Time and area restrictions

Foreign vessels fishing for Atlantic mackerel shall be subject to the applicable time and area restrictions and fixed gear avoidance regulations at 50 *CFR* 611.

The Regional Director may limit the areas where directed foreign fishing and joint venture transfers from US to foreign vessels may take place. Directed foreign fishing must be conducted seaward of at least 20 miles from the shore. The Regional Director, in consultation with the Council, may move the boundary a greater distance from shore and may also establish northern, eastern, and southern boundaries for the area of directed foreign fishing (see 2.3.1 for an explanation). Operations of foreign vessels in support of US vessels (that is, joint ventures) may operate anywhere in the EEZ throughout the management unit unless specific areas are closed to them.

1.5.1.2.4. Minimum mesh requirements for *Loligo*

Owners or operators of otter trawl vessels possessing *Loligo* squid may only fish with nets having a minimum mesh size of 1 7/8" diamond, inside stretch measure, applied throughout the entire net including the body and codend. This minimum mesh size requirement applies to the inner portion of the net and codend. If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail.

The owners or operators of a fishing vessel possessing *Loligo* squid shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the outer portion of a trawl net with a mesh opening of less than 4.5 inch mesh (stretch, inside measure).

Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited, except that a liner may be inserted in the rear portion of the codend which may not extend more than ten meshes forward of the rear most portion of the codend.

Owners or operators of otter trawl vessels possessing *Loligo* squid may not have available for immediate use any net, any piece of net not meeting the minimum mesh requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size requirement. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

(i) it is located below the main working deck from which the net is deployed and retrieved;

(ii) the towing wires, including the "leg" wires, are detached from the net; and

(iii) it is fan-folded (flaked) and bound around its circumference.

(2) A net stowed and lashed down on deck, provided:

(i) it is fan-folded (flaked) and bound around its circumference;

(ii) it is securely fastened to the deck or rail of the vessel; and

(iii) the towing wires, including the leg wires, are detached from the net.

(3) A net that is on a reel and is covered and secured, provided:

(i) the entire surface of the net is covered with canvas or other similar material that is securely bound;

(ii) the towing wires, including the leg wires, are detached from the net; and

(iii) the codend is removed from the net and stored below deck.

(4) Nets that are secured in a manner approved by the Regional Director, provided that the Regional Director has reviewed the alternative manner of securing nets and has published that alternative in the *Federal Register*.

During the months of June, July, August, and September otter trawl vessels participating in the directed fishery for *Illex* shall be exempt from the *Loligo* minimum mesh requirements if they possess *Loligo*. For the purposes of this exemption, the directed *Illex* fishery for this time period shall be defined as otter trawl fishing for *Illex* seaward of the 50 fathom depth contour. Any vessel possessing *Loligo* which fished under the *Illex* exemption must not have available for immediate use any net with mesh sizes less than specified for *Loligo* when the vessel moves landward of the 50 fathom contour. In addition, otter trawl vessels participating in the directed sea herring fishery shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

Since it will be difficult to detect a violation of the minimum mesh net regulation, the penalty for individuals detected of such a violation must be sufficient to provide an adequate deterrent. Since some fishermen may attempt to circumvent the minimum mesh requirement, it is recommended that the penalty for the first offense be a six month loss of moratorium permit and the penalty for a second offense be a one year loss of permit. After imposition and expiration of such a penalty, if the individual fishes without penalty for three consecutive years, the earlier offenses would be expunged from the record.

The minimum net mesh size could be changed annually, if appropriate, following the Atlantic Mackerel, Squid and Butterfish FMP Monitoring Committee process set forth in 1.5.1.2.2 of the FMP. However, the change in minimum mesh size shall become effective one calendar year after the year for which the quota specifications are being made by the Regional Director. Based upon the recommendations of the Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of *Loligo* squid equivalent to the discards with otter trawls given the minimum net mesh requirements. This provision is intended to address the problem that could develop if gear currently not in significant use in the squid fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

1.5.1.2.5. Catch limitations

1.5.1.2.5.1. General

The fishing year for Atlantic mackerel, *Illex*, *Loligo*, and butterfish is the twelve (12) month period beginning 1 January.

The specification of OYs and other values for the squids, Atlantic mackerel, and butterfish are described in Section 1.5.1.1 of the FMP and need not be repeated here. On an annual basis, the Regional Director, based on the recommendations of the Council, and after giving opportunity for public notice and comment, sets initial annual values for the terms specified in Section 1.5.1.1.

On or before 15 October of each year, the Council will prepare and submit recommendations to the Regional Director of the initial annual amounts for the fishing year beginning 1 January, based on information gathered from sources including: (1) for mackerel, results of a survey of domestic processors and joint venture operators of estimated processing capacity and intent to use that capacity; (2) for mackerel, results of a survey of fishermen's trade associations of estimated fish harvesting capacity and intent to use that capacity; (3) landings and catch statistics; (4) stock assessments; and (5) any other relevant scientific information.

By 1 November each year, the Secretary will publish a notice in the *Federal Register* that specifies preliminary initial amounts of OY, DAH, DAP, JVP, and TALFF for Atlantic mackerel. The amounts will be based on information submitted by the Council and from relevant sources including those sources specified above. In the absence of a Council report, the amounts will be based on information from the sources specified and other information considered appropriate by the Regional Director. The *Federal Register* notice will provide for a comment period. The Council's recommendation and all relevant data will be available in aggregate form for inspection at the office of the Regional Director during the public comment period. If the preliminary initial amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 factors set forth in section 1.5.1.1.5 for the species affected.

On or before 15 December of each year, the Secretary will make a final determination of the initial amounts for each Atlantic mackerel, considering all relevant data and any public comments and will publish a notice of the final determination and response to public comments in the *Federal Register*. If the final amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 factors set forth in section 1.5.1.1.5 for the species affected.

Additional adjustments may be made to annual values for OY, DAH, and TALFF for the mackerel fishery during the year. The Regional Director, in consultation with the Council, may modify these values up to

ABC, applying the factors described in Section 1.5.1.1, for the benefit of the nation. The Secretary will publish a notice in the *Federal Register* and provide for comment before such revisions may take effect.

NMFS shall close the US fishery for *Loligo*, *Illex*, mackerel, or butterfish when US fishermen have harvested 80% of the allowable domestic harvest if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure will be in effect for the remainder of the fishing year. If such a closure is necessary, NMFS will provide adequate notice to US fishermen and to the Executive Directors of the New England, Mid-Atlantic, and South Atlantic Fishery Management Councils. During a period of closure, the trip limit for the species for which the fishery is closed is 10% of the weight of the total amount of fish on board for vessels with Loligo/butterfish moratorium permits, Illex moratorium permits or mackerel commercial permits.

Also see 1.5.1.1.4 for a *Loligo* seasonal quota framework provision.

1.5.1.2.5.2. Joint ventures and foreign fishing

The Amendment continues the procedure of permitting joint ventures for Atlantic mackerel on a case by case basis, so long as joint ventures do not result in a negative impact on US harvesters or processors. The Council believes that this is a reasonable approach. In other words, joint ventures are considered on a case by case basis for Atlantic mackerel if such joint ventures would not have a negative impact on the development of the US harvesting and processing sectors.

In order to facilitate development of the US fishery, the Regional Director may impose special conditions on joint ventures and directed foreign fishing activities. Such special conditions may include a ratio between the tonnage that may be caught in a directed foreign fishery relative to the tonnage that may be purchased over-the-side from US vessels and relative to the tonnage of US processed fish that must be purchased by the venture. These conditions will be developed through the annual specification setting process. They may be set as minimums against which applicants may submit proposals. It is the Council's intent that proposals offering the most advantageous arrangements for the US fishery get priority consideration (rather than the available quantities of JVP or TALFF, if any, being distributed among all applicants).

In order to set appropriate levels of required purchases of domestic harvested and processed product, that is, ratios, information on prices and costs must be obtained or estimated. The most important factor is the price of mackerel in the world market. Costs to be considered include the cost of operating the fishing and processing vessels (US and foreign), the foreign fishing fee and observer fee established by NMFS, transportation costs to the foreign market, prices asked by US fishermen for US harvested mackerel, and prices asked by US processors for US processed product. The guiding principle behind the establishment of ratios is to maximize benefits to the US fishing industry. It is expected that the ratios may change from year to year as the prices and costs vary. Input from US harvesters and processors is obtained annually before the ratios are chosen.

1.5.1.2.6. Types of vessels, gear, and enforcement devices

Foreign nations fishing for Atlantic mackerel, squid, or butterfish are subject to the gear restrictions set forth in 50 *CFR* 611.1.50(c).

1.5.1.2.7. Atlantic Mackerel Control Date

When the landings of Atlantic mackerel by US vessels with commercial permits first reached 50% of Allowable Biological Catch the Secretary of Commerce will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. For purposes of this action, landings of Atlantic mackerel by US vessels is defined to include transfer at sea from US vessels to foreign vessels as well as landings at US docks.

1.5.1.2.8. Experimental Fishery

The Regional Director, in consultation with the Executive Director, may exempt any person or vessel from the requirements of this FMP for the conduct of experimental fishing beneficial to the management of the mackerel, squid, or butterfish resources or fisheries.

The Regional Director may not grant such exemption unless it is determined that the purpose, design, and administration of the exemption is consistent with the objectives of the FMP, the provisions of the Magnuson Act, and other applicable law, and that granting the exemption will not:

1. have a detrimental effect on the Atlantic mackerel, squid, or butterfish resource and fishery or cause any quota to be exceeded; or

2. create significant enforcement problems.

Each vessel participating in any exempted experimental fishing activity is subject to all provisions of this FMP except those necessarily relating to the purpose and nature of the exemption. The exemption will be specified in a letter issued by the Regional Director to each vessel participating in the exempted activity. This letter must be carried aboard the vessel seeking the benefit of such exemption.

All experimental activities must be consistent with the harvest rates in the FMP.

It is the Council's intention that experimental fisheries are short-term fisheries to answer specific management questions and are not used to resolve short-comings in existing fishery management plans.

1.5.1.2.9. Transfer at Sea

Only vessels which possess *Loligo, Illex,* or butterfish moratorium permits may transfer their catch at sea.

1.5.1.2.10. Other Measures

Each US fishing vessel shall display its official number on the deckhouse or hull and on an appropriate weather deck. Foreign fishing vessels shall display their International Radio Call Signs (IRCS) on the deckhouse or hull and on an appropriate weather deck. The identifying markings shall be affixed and shall be of the size and style established by NMFS. Fishing vessel means any boat, ship or other craft which is used for, or of a type which is normally used for, fishing, except a scientific research vessel. Fishing vessel includes vessels carrying fishing parties on a per capita basis or by charter which catch Atlantic mackerel, squid, or butterfish for any use.

Vessels conducting fishing operations pursuant to this FMP are subject to the sanctions provided for in the Magnuson Act.

Pursuant to Section 204(b)(12) of the Magnuson Act, if any foreign fishing vessel for which a permit has been issued has been used in the commission of any act prohibited by section 307 of the Magnuson Act the Secretary may, or if any civil penalty imposed under section 309 of the Magnuson Act has not been paid and is overdue the Secretary shall: (a) revoke such permit, with or without prejudice to the right of the foreign nation involved to obtain a permit for such vessel in any subsequent year; (b) suspend such permit for the period of time deemed appropriate; or (c) impose additional conditions and restrictions on the approved application of the foreign nation involved and on any permit issued under such application, provided, however, that any permit which is suspended pursuant to this paragraph for nonpayment of a civil penalty shall be reinstated by the Secretary upon payment of such civil penalty together with interest thereon at the prevailing US rate. Foreign nations fishing for Atlantic mackerel, squid, or butterfish are subject to the incidental catch regulations set forth at 50 *CFR* 611.13, 611.14, and 611.50.

The Regional Director may place sea samplers aboard vessels if he determines a voluntary sea sampling system is not giving a representative sample from the mackerel, squid, or butterfish fisheries.

1.5.1.3. Specification and Sources of Pertinent Fishery Data and Real-time Assessment and Management Framework Measures

1.5.1.3.1. General

Section 303(a)(5) of the MFCMA requires at least information regarding the type and quantity of fishing gear used, catch by species in numbers of fish or weight thereof, areas in which fishing was engaged in, time of fishing, and number of hauls must be submitted to the Secretary. In order to achieve the objectives of this FMP and to manage the fishery for the maximum benefit of the US, it is necessary that, at a minimum, the Secretary collect on a continuing basis and make available to the Councils: (1) Atlantic mackerel, squid and butterfish catch, effort, and ex-vessel value and the catch and ex-vessel value of those species caught in conjunction with this species complex for the commercial fishery provided in a form that analysis can be performed at the trip, water area, gear, month, year, principal (normal) landing port, landing port for trip, and State levels of aggregation; (2) catch and effort for the recreational fishery; (3) biological (e.g., length, weight, age, and sex) samples from both the commercial and recreational fisheries; and (4) annual and fully comparable NMFS bottom trawl surveys for analyses of both CPUE and age/size frequency. It is mandatory that these data be collected for the entire management unit on a compatible and comparable basis.

It is intended that the reporting requirements in this FMP are identical with those required by the Summer Flounder, Northeast Multispecies, and Atlantic Sea Scallop FMPs, so that fishermen and dealers do not need to file duplicate reports.

States are encouraged to implement equivalent fishery data collection systems for the development of a coordinated statistics gathering effort.

Foreign fishermen are subject to the reporting and recordkeeping requirements in 50 CFR 611.

1.5.1.3.2. Commercial vessels

Commercial logbooks must be submitted, at a minimum, on a monthly basis by Federal moratorium permit holders in order to monitor the fishery. The Secretary may implement additional data collection procedures. Real-time assessment and management of the *Loligo* and *Illex* resources may be necessary due to the risk of overfishing stocks comprised of only a single cohort. During year one of the management program, the Regional Director shall specify the data elements and reporting time frames necessary to establish a real-time assessment and management program for the annual squid species. In addition, the Council will investigate the feasibility and costs and benefits of implementing such a management system in year two of the management program.

1.5.1.3.3. Party and charter boats

Operators of party and charter boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total amount in pounds and numbers of each species taken; date(s) fished; number of trips; duration of trip; locality fished; crew size; landing port; number of anglers carried on each trip; and discard rate.

1.5.1.3.4. Dealers

In order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity of Atlantic mackerel, *Loligo*, *Illex*, and butterfish purchased (in pounds), and the name and permit number of the vessels from whom the Atlantic mackerel, *Loligo*, *Illex*, and butterfish was purchased.

Buyers that do not purchase directly from vessels are not required to submit reports under this provision. Dealers should report only those purchases from vessels (fishermen with commercial moratorium permits).

1.5.1.3.5. Processors

Section 303(a)(5) of the MFCMA requires at least estimated processing capacity of, and the actual processing capacity utilized by US fish processors must be submitted to the Secretary. The Secretary may implement necessary data collection procedures through amendments to the regulations.

1.5.1.3.6. Falsification of data

Vessel owners or operators or dealers who falsify data in order to qualify for a moratorium permit will lose their vessel or dealers permit.

2. REGULATORY IMPACT ANALYSIS

The impacts of the adopted management measures are presented at continuation.

2.1. ANALYSIS OF BENEFICIAL AND ADVERSE IMPACTS OF ADOPTED MANAGEMENT MEASURES

2.1.1. The FMP Relative to the National Standards

2.1.1.1. Conservation and management measures shall prevent overfishing while achieving, on a continuous basis, the optimum yield from each fishery

The best scientific information available indicates that squid, mackerel, and butterfish are not currently overfished. Harvests at the OY levels described in the FMP should not endanger future harvests at comparable levels. Overfishing has been defined (section 1.5.1.1.2). The provisions of the FMP concerning setting annual quotas prevents overfishing.

2.1.1.2. Conservation and management measures shall be based upon the best scientific information available

The FMP is based on the best and most recent scientific information.

2.1.1.3. 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 in close coordination

The FMP meets the requirements of this standard by simultaneously managing Atlantic mackerel, *Loligo*, *Illex*, and butterfish in a complementary manner. The FMP also takes into account the catch of mackerel outside US waters. This Amendment expands the geographical limits of the management unit to the geographical range of the squid species *Loligo pealei* and *Illex illecebrosus* and butterfish (*Peprilus triacanthus*) including the Gulf of Mexico.

2.1.1.4. 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 a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges

The OY and DAH estimates described in the FMP will accommodate all US demand for squid, Atlantic mackerel, and butterfish in the commercial and recreational fisheries without prejudice to residents of any

State. The seasonal movements and distributions of these species make it extremely unlikely that fishermen of any State could harvest the DAH before the species become available to other US fishermen.

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

The FMP permits growth of the US fishery up to maximum biological levels. The only restrictions placed on US fishermen are the overall quotas, and the permitting requirement. No measures would change the economic structure of the industry or the economic conditions under which the industry operates.

2.1.1.6. Conservation and management measures shall take into account and allow for variations and contingencies in, fisheries, fishery resources, and catches

The FMP anticipates fluctuations in species abundance and expected trends in demand for mackerel, the squids, and butterfish.

2.1.1.7. Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication

The FMP is consistent with and complements, but does not duplicate, management measures contained in other FMPs and PMPs.

2.2. METHODOLOGY AND FRAMEWORK FOR ANALYSIS

For the alternatives considered in the plan, an analysis of expected benefits was conducted. In an ideal situation, as data permit, discounting can be employed to transform future benefits and costs into present values. The net yield steam over time associated with different alternatives would be employed to evaluate and compare impacts. The benefits or value of the change in output are interpreted as the change in the consumers' and producers' surplus in the commercial sector. For recreational fisheries, consumer surplus can be estimated by the travel cost, contingent valuation, etc. Unfortunately, the issues addressed in the Amendment cannot be quantified due lack of data. The analysis employed in the document is qualitative in nature, however, it is intended to analyze the directional effect of the course of actions and the effects on the fishery industry. A summary of the incremental benefits and costs of all major alternatives is presented at the end of the document.

2.3. PREFERRED ALTERNATIVES

2.3.1. Entry limitations in the squid and butterfish fisheries

Limited Entry as a Discretionary Provision of a Plan

The MFCMA (Section 303(b)(6)) provides that a fishery management plan may establish a system for limiting access to a managed fishery in order to achieve Optimum Yield if, in developing such a system, the Council and the Secretary take into account six factors. A discussion of those factors and their application to the proposed limited entry program for the squid and butterfish fishery follows:

A. Present participation in the fishery.

There were 3,061 vessels with Federal commercial permits issued pursuant to the Atlantic Mackerel, Squid, and Butterfish FMP in 1993. The hold capacity of those vessels was approximately 49,600 mt. Based on unpublished NMFS weighout data, 277 vessels landed Atlantic mackerel, 383 vessels landed *Loligo* squid, 54 vessels landed *Illex* squid and 310 vessels landed Atlantic butterfish in 1993 (Tables 35-38 of the FMP). Roughly two thirds of the vessels who reported landing any *Loligo* (260 out of 383) accounted for 99% of the catch. About one third of the total number of vessels reporting *Loligo* landings accounted for 90% of the catch. For Atlantic mackerel, 58 of the 277 vessels (21%) who reported landing mackerel accounted for 95% of the catch. For *Illex*, 18 out 54 vessels (33%) which reported landing any *Illex* accounted for 99% of the total. Finally, 40% of the total number of vessels that reported landing any butterfish accounted for 90% of the catch.

Discussion on the number of vessels that would qualify for the squid and butterfish moratoria examined above are based on the Northeast Fishery Science Center weighout files. These files cover the States from Maine through Virginia. They do not cover North Carolina and south. Vessels in the sample States may not be included in the weighout. In addition vessels that could qualify for the moratoria by having transferred to foreign vessels through joint ventures are not included in the weighout. Therefore, the number of vessels indicated as qualifying should be considered a low estimate.

Using *Loligo* as an example, only 10% of the vessels which possessed Federal Atlantic mackerel, squid, and butterfish permits reported landing at least one pound of *Loligo* in 1993 based on NMFS weighout data. Of this 10%, about one third landed 90% of the catch.

Those vessels who have legitimately been involved in the directed fisheries for *Loligo*, *Illex*, and butterfish will not be excluded. Under the qualifying criteria for a *Loligo*/butterfish moratorium permit, approximately 400 vessels should qualify based on NMFS weighout data. Under the Illex criteria, approximately 60 vessels should qualify (based on NMFS weighout data). Those which took small quantities in the past will be able to continue to do so under the bycatch provisions of this Amendment. However, further expansion of entry into the directed fisheries will be controlled, thus over-capitalization will be avoided. The number of vessels which landed greater than 2500 pounds per trip of *Loligo*, butterfish, or *Illex* , but did not qualify under the moratoria criteria is currently unknown.

B. Historical fishing practices in, and dependence on, the fishery.

The squid and butterfish resources were utilized almost exclusively by the distant water foreign fishing fleets prior to the passage of the Magnuson Act. The process of Americanization of the fishery began in the early 1980's. Since then the harvest capacity of the domestic fleet has grown such that the *Loligo* resource is considered fully utilized (NMFS 1994). NMFS, in 1994, classified the *Illex* and butterfish resources as under-exploited. However, if demand continues to increase and market opportunities improve for these species, full utilization could be rapidly achieved given current fleet harvest capacity.

C. The economics of the fishery.

A description of the economics of the fishery is given in Chapter 8 of the FMP. In terms of value, the east coast squid fisheries are by far the most important squid fisheries in the US. The combined value of the east coast squid catch in 1991 was $35.6 million. This amounted to 85% of the total value of all squid landed in the United States in 1991. The US component of this fishery has grown steadily over the last decade. It is one of the few fisheries on the east coast of the US that is not severely overfished or over-capitalized. The Council seeks to limit entry into these fisheries to insure that this does not occur.

The ultimate goal of limited entry is to achieve optimum yield. The current hold capacity of the fleet is sufficient to sustain current fishing levels and potential future increases due to growth in demand. If entry is not limited, profits would likely be dissipated due to the increase among fishery participants in the industry. Furthermore, potential over-capitalization of the fleet could occur. The issue of over-capitalization is of considerable importance especially in the squid industry. This fishery requires vessels that are capable of catching, handling, and processing large quantities of animals while meeting market product quality standards.

With the implementation of this management, existing vessels would not be forced out of the fishery as long as other minimum standards established in the fishery are met. In the long term, market forces would aid in reaching an equilibrium level as far as the number of participants in the industry is concerned. Given the current characteristics of the fishery, the implementation of limited entry would be expected to have a positive impact on net benefits in the long term by preventing over-capitalization, dissipation of profits and achieving optimum yield.

D. The capability of fishing vessels used in the fishery to engage in other fisheries.

There are three types of vessels engaged in the squid and butterfish fisheries. These include large vessels which catch and process large volumes of the product while fishing offshore, the inshore vessels which target squid on a seasonal basis, and vessels which take squid and butterfish as bycatch while targeting other species. The vast majority of the catch is taken by the first two categories. These vessels depend heavily on squid fishing and have few if any alternative fisheries to engage in.

E. The cultural and social framework relevant to the fishery.

A Draft Fishery Impact Statement (FIS) for this Amendment (McCay *et al.* 1994) is available as a separate document. The draft FIS presents information on the importance of the Atlantic mackerel, squid, and butterfish species complex to ports from Chatham, MA through Wanchese, NC. In addition, it describes the other species harvested in those ports, and population and employment data for the counties in which the ports are located.

In Massachusetts, the two ports examined were New Bedford and Chatham where Atlantic mackerel, squid, and butterfish are of minor importance. However, one notable exception is the reliance of the inshore trap fisheries on *Loligo*. *Loligo* accounted for less than 0.05% of the value of all species landed in New Bedford and 2.4% of the Chatham landings in 1992. However, there has been a dramatic shift to the reliance of the inshore trap fisheries on *Loligo* over the past two decades. *Loligo* accounted for greater than 90% of the value of the Chatham trap fisheries in 1993.

The value of the fishing industry of Rhode Island was estimated to be greater than $85 million in 1992. Squid was the number one species caught in Rhode Island in 1992 with 42.7 million pounds landed. Rhode Island was the leading state in squid landings in the US, accounting for 38% of the national total. Two ports, Point Judith and Quonset Point, accounted for 95% of the squid landed in Rhode Island during 1992. Three ports make up the bulk of all fishery landings in Rhode Island: Point Judith, Quonset Point, and Newport. *Loligo* was very important to Pt. Judith in 1992 where the species ranked second by value and accounted for 15.3% of the value of all species landed.

In Stonington, CT, squid (unclassified with respect to species) ranked fourth in value of all species landed in 1992. Butterfish and Atlantic mackerel were of minor importance. Squid were of particular importance to the otter trawl fishery accounting for 12.9% of the value of the landings by that gear. In addition, mackerel were important to the gill net fleet there.

Loligo squid were very important to the New York fleet which included the ports of Montauk, Shinnecock and Greenport. *Loligo* was the most important species in this area accounting for 16.2% of the total value of landings in these ports. Butterfish and Atlantic mackerel were of minor importance.

Illex and *Loligo* squid are major components of the landings in Cape May, NJ ranking second and third by value at that port in 1992. Combined they accounted for almost 20% of the value of the landings there in 1992. *Loligo* are taken year round by this fleet, with *Illex* being targeted from May through October. Atlantic mackerel accounted for 1.6% of the value of Cape May landings in 1992. *Illex*, *Loligo*, and Atlantic mackerel accounted for 56.2% of the value of all fish landed by the otter trawl fleet based in Cape May. This port has come to rely more heavily on squid resources in recent years. Atlantic mackerel are targeted according to price and availability.

South of New Jersey, Atlantic mackerel, squid and butterfish are of minor importance relative to the ports from Cape May northward. For example, *Loligo* squid ranked 19th in the value of fish landed in Ocean City Maryland in 1992, accounting for 0.2% of the value. The same pattern was observed for the ports of Hampton Roads, VA and Wanchese, NC.

F. Any other relevant consideration.

The management program is designed to avoid overfishing of the stock complex. The proposed program of limited entry is expected to promote conservation and economic efficiency by avoiding overfishing and overcapitalization in the fishery. Such program will promote resource stability and industry efficiency which is in the best interest of the fishing community and the nation.

2.3.2. Elimination of TALFF and joint ventures for the squids and butterfish

There has been no *Loligo* TALFF since 1986, no *Illex* TALFF since 1987, and no butterfish TALFF since 1990 (only as bycatch in the mackerel fishery). There have been no *Loligo or Illex* joint ventures approved since 1987, and no butterfish ever. The US fishery has demonstrated it can harvest substantial quantities of these species if abundance and demand are adequate.

The harvesting capacity of the fleet is adequate to harvest the maximum allowable catches. This is one of the reasons that the Council is proposing a moratorium on entry into the fisheries. It is inconsistent to limit entry for United States vessels and allow foreign fishing.

Eliminating TALFF and joint ventures in the FMP will simplify the annual specification setting process. It is a procedure that has been utilized in the Summer Flounder and Bluefish FMPs. The domestic squid and butterfish fisheries have developed to the point where it is now appropriate in those fisheries.

Clearly, elimination of TALFF and joint ventures will eliminate potential income to the US Federal government from permit and poundage fees. However, that income is intended to offset NMFS and Coast Guard costs in managing the foreign fishing program. If there is no foreign fishing program those costs will not be incurred, so the revenue will not be needed.

From the late 1960's to the early 1980's, foreign fleets were harvesting the bulk of *Loligo* and *Illex* caught in US waters. However, since 1987, there have been no directed foreign landings of these two species. Landing estimates indicate that for the period 1983-1993 the domestic and foreign landings of *Loligo* and *Illex* were 88% and 12%, respectively. For the period 1987-1993, almost 100% of the *Loligo* and *Illex* harvested in EEZ waters were landed by the domestic fleet. The increase in the harvesting capability of the US fleet is due to the implementation of new managerial and technical aspects associated with the fishery since the mid-1980's which has been the prime driving force of the landing success of the domestic fleet.

The foreign fleet has not been considerably involved in the harvesting of *Loligo* and *Illex* for the last decade. This leads to the conclusion that the proposed elimination of TALFF and joint ventures for *Loligo* and *Illex* would not have adverse effects on the harvesting capability of the US fleet.

Foreign butterfish landings have averaged about 1 mt since 1988. Domestic landings in recent years have been substantially below historical average yields. The implementation of the proposed management measure is not expected to adversely impact the fishery. The intent of the proposed regulation is to maintain the traditional use and ultimately preserve the squid and butterfish stocks.

A potential benefit from TALFF and joint ventures is the ability to place domestic products in the international market. However, given the existing characteristics of the squid and butterfish fishery and international market requirements associated with the these products, there is no obvious additional benefit that could be derived from having either TALFF or joint ventures as it relates to further market penetration.

The elimination of TALFF and joint ventures is not expected to alter components on the cost side and it is expected to maintain the historical catch of the domestic fleet.

2.3.3. Minimum mesh size for *Loligo*

The Council's industry advisors report that some fishermen use liners so small that they retain *Loligo* below marketable size and the *Loligo* are then discarded. The result is biological and economic waste. This measure is intended to eliminate the use of very small liners in the *Loligo* fishery.

The advisors report that 1 7/8" mesh codends are in general use in the fishery (by the fishermen that do not use the very small liners). They state that the 1 7/8" mesh allows the very small *Loligo* to escape so they can grow to a marketable size.

Unpublished NEFSC sea sampling data for 1991 indicate that 80% of the tows that caught *Loligo* used liners. However, those trips represent only a small fraction of total *Loligo* landings and may not be representative of the directed *Loligo* fishery. Because of the poor coverage of the directed Loligo fishery in the sea sampling program, it is difficult to document the actual extent of current liner use and subsequently to evaluate the impact of a minimum mesh rule in this fishery.

No mesh selectivity studies have been conducted for *Loligo pealei*. However, Lange (1980) calculated the theoretical gains in yield per recruit for *Loligo pealei* for 45, 60, and 90 mm codend mesh sizes based on unpublished Japanese mesh selection factors for a closely related species of *Loligo* from the eastern Atlantic Ocean. The analysis was based upon a Ricker equilibrium yield model and was based on the typical seasonality observed in the fishery at that time. Yield under different mesh regulations was estimated based a selection factor of 1.92. This selection factor implies an L_{50} of 8.6 cm (3.4 in) for 45 mm (1.77 in) mesh, 11.5 cm (4.5 in) for 60 mm (2.4 in), and 17.3 cm (6.8 in) for 90 mm (3.5 in) mesh.

Yield per recruit estimates for the 60 and 90 mm meshes were consistently greater than for the 45 mm mesh for all levels of F when M was assumed to be less than 0.13. Lange (1980) concluded that an increase in mesh size from 45 to 60 mm would not significantly reduce the short-term yield, and further that the yield per recruit would be significantly increased by the resulting increase in the size at entry to the fishery.

The minimum mesh rule for *Loligo* has two exemptions specified in the Amendment. The first is the exemption for directed *Illex* trips seaward of the 50 fathom contour during the months of June through September. This exemption was included because of concerns raised by fishermen that a small bycatch of *Loligo* can be expected in the *Illex* fishery. Since mesh smaller than 1 7/8 " is in general use in the *Illex* fishery, these vessels would be in violation of the minimum mesh rule for *Loligo.* Industry advisors testified that the *Loligo* bycatch is very small and that almost all of the *Illex* fishing during this period occurs outside of the 50 fathom depth contour. Table 26 supports the notion that the directed *Illex* fishery retains a small bycatch of *Loligo.* In addition, most of the *Loligo* are inshore at this time and would not be subject to exploitation by smaller mesh under this exemption. The overall effect of this exemption appears to be positive and should have no measurable effect on the partial recruitment vector for *Loligo*. The second exemption is for the sea herring fishery. Industry advisors testified that this fishery is very clean but does retain a small bycatch of *Loligo*. Since mesh sizes less than those specified for *Loligo* are commonly be used in the herring fishery, these vessels also would be in violation of the *Loligo* mesh rule. The effect is expected to be similar to that of the *Illex* exemption.

The incorporation of this management option in this Amendment is the direct response of concerns raised by fishermen in the industry. It is intended to decrease biological and economic waste due to the harvest of non-marketable animals and ultimately to result in higher yield per recruit. While Lange's analysis indicated an increase in yield per recruit with mesh sizes up to 90 mm, the analysis was based upon the assumption that *Loligo* live greater than one year. Her analysis was found to be sensitive to the value of natural mortality assumed. The values chosen are presumably too low given that *Loligo* are now known to live only one year. Updated estimates of changes in yield per recruit, size composition and selectivity data are needed to properly evaluate the potential benefits of increasing the mesh beyond the size proposed in this Amendment. Future assessments should estimate increases in yield associated with various mesh sizes based on recently published age and growth data for *Loligo*. Since this is a framework measure, a mesh size greater than the one currently proposed could then be implemented pending the outcome of those analyses.

Major changes on net benefits from the implementation of this measure can not be fully quantified given existing information. This measure provides that the minimum mesh size may be adjusted as part of the annual quota setting process, so that, if future research shows that another size is more appropriate, the minimum mesh requirement may be adjusted without a plan Amendment. Increase in operating costs are not expected to occur from the implementation of this measure; potential positive benefits include decrease in economic waste derived from harvesting non-marketable animals and increase in yield over time.

2.3.4. Revised Atlantic mackerel specification limits

Since 1983 the FMP has provided limits within which the allowable catch of Atlantic mackerel may be set. The current FMP specifies that the catch may not exceed the amount which results in a fishing mortality rate of $F_{0.1}$ while, at the same time, the spawning stock biomass must be maintained at 600,000 mt or greater. As a result of high recruitment combined with relatively low fishing rates in recent years, the adult stock biomass has grown to the point that the Allowable Biological Catch (ABC) has risen to 850,000 mt under the current quota specification guidelines. However, the NEFSC has advised the Council to keep harvest levels at or below 200,000 mt because of the volatile nature of a pelagic schooling species such as Atlantic mackerel.

As part of the preparation of this Amendment, it was considered appropriate to review the mackerel specification parameters so that they would yield biologically appropriate catch limits, rather than relying on the essentially informal advise of the NEFSC. The NEFSC felt that the gap between the estimated mackerel biomass and recent catch levels was so great that they should allocate their resources to other species. As a result, no formal stock assessment has been conducted since 1991.

The issue, therefore, was reviewed by the Council's Scientific and Statistical Committee (SSC) at a meeting on April 19, 1994. The SSC recommended revising the spawning stock biomass threshold from 600,000 mt to 900,000 mt based on a review of updated spawning stock and recruitment data. The SSC also recommended that ABC not exceed the long term potential catch as estimated by the NEFSC (currently 134,000 mt). Those SSC recommendations were adopted by the Council for this Amendment.

The effect of these recommendations is to lower the maximum ABC, but the new level is still well above any catches taken by the US recreational and commercial fisheries during the 20th century. The new strategy is more conservative than the current FMP, but is considered appropriate given the long-term history of the fishery. Based on historical data (Figure 24 of the FMP), whenever the catch has exceeded about 100,000-150,000 mt, the catch dropped significantly in the next few years.

Considering the fact that both the recreational and commercial harvest of Atlantic mackerel have been far below the proposed maximum ABC, it is expected that the anticipated costs in terms of reduced economic surpluses in the producer, consumer and recreational sectors will be very small. Furthermore, the establishment of management alternatives on "healthy stocks" such as the Atlantic mackerel, would enhance the long term stability of the fishery by preventing overfishing. Preventing stock collapse and reduction of potential overfishing would lead to positive changes in net benefits.

2.3.5. Revised *Loligo* MSY

Since the beginning of MFCMA management the *Loligo* MSY has been 44,000 mt (as it was previously under ICNAF). Among other factors, this was based on an estimated 18 month life span.

SAW-17 produced a new *Loligo* assessment which revised the life span to 12 months. This assessment included the recommendation that MSY be set at 36,000 mt. The assessment cautioned that catches in excess of 30,000 mt may only be achieved during years of high abundance. This information will be taken into consideration during the annual specification of OY.

The proposed MSY for *Loligo* is well below historical high domestic yields. The proposed MSY takes into consideration recently revised biological parameters for the species. This in turn, is expected to enhance the long term stability of the fishery. The impact on net benefits from the implementation of this option is expect to be positive since it should prevent overfishing.

2.3.6. Seasonal *Loligo* allocations

There are essentially two *Loligo* fisheries, an offshore winter fishery and a spring-summer inshore fishery. The inshore fishery generally coincides with the primary spawning season.

In the 1970's and early 1980's when the foreign fishery was active, most of the catch was made from November through March. This was considered to negatively impact the inshore (largely southern new England trap) fishery such that the FMP was amended to change the fishing year from the calendar year to a 1 April - 31 March year. With the end of the foreign fishery the fishing year was respecified as the calendar year.

The increased US catch of *Loligo* can be attributed largely to increased activity in offshore winter fishery that emulates the old foreign fishery. There is concern that this may negatively impact the inshore fishery similar to the foreign fishery. Table 39 and 40 of the FMP summarize the seasonal distribution of *Loligo* landings by month and quarter for the periods 1983-1992 and 1992, respectively. There clearly has been a seasonal shift in landings patterns with a sharp reduction observed in the third quarter of 1992 compared to the historical average (1983-92). This Amendment would allow the Regional Director to implement seasonal quotas to minimize these impacts. An additional benefit of seasonal quotas would be to assure that an adequate portion of the stock would be allowed to spawn.

Seasonal quotas, if any, will be implemented as part of the annual quota setting process which is initiated by the Monitoring Committee and will be specified before the beginning of the fishing year. Seasonal quotas could be established in a variety of ways, including monthly, bimonthly, or quarterly quotas. Their purpose would be to limit what the offshore fishery could take in the fist six months of the calendar year, but that fishery would have another opportunity during the October through December period. One option would be to establish quarterly harvest quotas for *Loligo*. The annual quota, which could be specified in the range of 0-36,000 metric tons, could be divided into quarterly components based on the historical seasonal distribution of landings as illustrated in Table 39 of the FMP. The directed fishery could operate unrestrained until 80% of the quarterly quota was reached and then a trip limit could be imposed until the end of that quarter. The trip limit would allow the continued harvest of *Loligo* taken as bycatch in other fisheries which would otherwise have to be discarded.

This component of the management program would allow for a more equitable distribution of landings among fishing seasons. The evaluation of potential seasonal allocations related to each specific fishery requires biological, social and economic data which are limited at the present time. As a result, the costs and benefits associated with seasonal allocations can not be fully addressed at this point. However, displacement of fishermen would be avoided by allowing historical allocations to continue.

It is expected that individuals involved in different aspects of the *Loligo* fishery and the nation as a whole would benefit from a comprehensive analysis of the expected benefits and costs associated with this regulatory alternative. The enactment of a framework addressing seasonal *Loligo* allocations is expected to have positive benefits by allowing an equitable seasonal allocation of the resource.

2.4. ALTERNATIVE TO THE AMENDMENT

2.4.1. Take no action at this time

2.4.1.1. Description

This would mean that the FMP would continue in effect unchanged.

2.4.1.2. Evaluation

Adoption of this alternative would mean that the management regime would not be improved in order to further facilitate development of the US fishery. It is likely that over-capitalization in these fisheries would occur under continued open access conditions. Displaced effort due to restrictions recently placed on other fisheries (New England groundfish, summer flounder, etc.) is likely to be transferred into the squid and butterfish fisheries. The result from the implementation of this alternative would likely be: 1) dissipation of rent from these fisheries, 2) potential displacement of fishermen, and 3) overfishing, thus, insuring that OY could not be achieved under any open access management scheme. The overall result from this action would likely be that net benefits be affected in a negative manner.

2.4.2. Moratorium on entry of additional vessels into the Atlantic mackerel fishery

2.4.2.1. Description

This alternative would establish a moratorium on entry of additional vessels into the Atlantic mackerel fishery similar to the moratorium on entry into the *Loligo*, *Illex*, and butterfish fisheries in the preferred alternative.

2.4.2.2. Evaluation

The US domestic harvest capacity for Atlantic mackerel appears to exceed both the current specification of OY and the new proposed specification of long-term potential yield (currently estimated to be 134,000 mt). However, recent landings have been only a small fraction of the total allowable catch. The development of this industry is hampered primarily by a lack of markets (both domestic and foreign) for Atlantic mackerel (see Chapter 8 of the FMP). Development of foreign and domestic markets are a necessary prerequisite for the growth of the Atlantic mackerel fishery. Infusion of investment capital into the industry for market and infrastructure development could be discouraged if limited entry were implemented at the present time. Economic gains through the potential influx of new capital, along with new market developments could potentially aid in achieving better utilization of industry resources, and ultimately increase net benefits.

2.4.3. No minimum mesh size for *Loligo* fishery

2.4.3.1. Description

This alternative would eliminate the 1 7/8" minimum codend requirement in the preferred alternative.

2.4.3.2. Evaluation

Gear selectivity data for squids in general is lacking. In addition, the survival of escapees is unknown. However, yield per recruit for *Loligo* would increase with increasing mesh size (within the selectivity range). No minimum mesh in the *Loligo* fishery could lead to higher levels of discard of both squid below market size and non-target species. Prolonged harvesting and discard of small non-marketable animals results in both economic and biological waste, which would likely affect net benefits in a negative manner.

2.4.4. Impose minimum mesh size restrictions on directed butterfish trips

2.4.4.1. Description

This alternative would require vessels with 500 pounds or more of butterfish on board to use a codend of at least 3.0 inches (inside stretch measure, diamond mesh), with all smaller codends stowed.

2.4.4.2. Evaluation

High at-sea discards in the butterfish fishery were recognized as a potential problem in this fishery during the scoping process for Amendment 5. Murawski and Waring (1979) concluded that equilibrium yield for Atlantic butterfish would increase from 14,500 mt if a 30-mm (1.2 in) mesh was used to 19,000 mt if a 60-mm (2.4 in) minimum mesh restriction was imposed in the butterfish fishery. The major problem with this alternative is the definition of a directed butterfish trip and the mixed-species nature of the fishery. Butterfish are often taken inadvertently in the *Loligo* fishery which utilizes small mesh (approximately 30-45 mm/1.25-1.75 in). Since significant quantities of butterfish appear to be taken as inadvertent bycatch in the *Loligo* fishery, wasteful discard of fish in excess of the 500 lb threshold could frequently occur. This species is currently considered under-exploited. Any management measure which causes increased discard of dead fish should be avoided. Since most of the butterfish harvest occurs as a bycatch of the *Loligo* fishery, imposing a minimum mesh size for butterfish trips larger than the currently used mesh size in the *Loligo* fishery could inadvertently affect net profits for these vessels.

2.4.5. Individual transferrable quotas

2.4.5.1. Description

An individual transferrable quota (ITQ) program would operate the same as the preferred alternative, except that the annual quotas would be assigned to individual vessels. Qualifications to participate could be the same as participation under the vessel moratorium. Initial allocations could be made based on sales receipts for the most recent five years, but no vessel could be allocated more than some maximum percentage. Fishermen would be prohibited from fishing for or landing mackerel, squid, or butterfish after their annual allocations had been taken.

2.4.5.2. Evaluation

An ITQ program would allow individual fishermen greater flexibility than any of the quota or seasonal closure based systems. That is, they could fish for mackerel, squid, or butterfish when they wanted to, rather than being controlled by quota or seasonal closures.

As with the other alternatives, fishermen could not fish for (catch and discard as well as catch and land) mackerel, squid, or butterfish after their allocations had been taken. This would require careful management of their allocations to assure that their participation in other small mesh fisheries did not violate their ITQ allocations.

An initial problem is associated with the initial allocation process. A great deal of time would be required to obtain and validate sales records to determine initial allocations. 1992 NMFS weighout data indicate a minimum of 360 vessels could be eligible for allocations. Since not all vessels are captured in the weighout data base, the number could be considerably larger. It might be preferable to continue management of these resources resource without ITQs to protect the resource and introduce an ITQ system subsequently.

ITQs are a relatively new management technique where a total quota is divided into small parts and allocated to individual participants. Individual quotas or shares could be bought, sold or leased so that harvesters have flexibility in planning their fishing activities. Potential advantages of ITQs include increased profits, greater economic stability, improved product quality, improved safety, reduced gear conflicts and losses, elimination of derby-type fisheries, bycatch reduction, an improved investment climate, reduction of market gluts, and reduction in post-harvest waste (Anderson 1992). Potential disadvantages of ITQs include increased high-grading, under-reporting of catch, enforcement costs and problems, creation of a "rich mans club", changes in the makeup of the fishing fleet, and potential inequities of the initial allocation of quota shares due to lack of information (Anderson 1992).

2.4.6. Effort restrictions

2.4.6.1. Description

Another management tool used to control exploitation are limits placed on total effort of the fleet. Control may be accomplished through restrictions placed on the number of days at sea for individual vessels such that total effort equals the desired level (i.e., to achieve some prescribed level of fishing mortality). Effort controls have the advantage of reducing exploitation and maintaining a year round fishery without promoting discards. A disadvantage is that without control of entry into the fishery, individual effort would be restricted without controlling total effort exerted by the fleet. Monitoring and enforcement would require the mandatory use of a remote vessel monitoring system which could be difficult and costly to implement.

2.4.6.2. Evaluation

Perhaps, the most obvious outcome that could be expected from the implementation of days at sea restriction would be a reduction in fishing mortality. Labor income (variable cost) paid out as a result of reduced days at sea would decrease. Consumer surplus would potentially decline at the beginning of management implementation due to higher prices associated with lower landings, then as greater landings are realized in the future consumer surplus would increase.

There are several problems with effort control as a management tool. First, subtle increases in fishing power of individual fishing vessels could occur which would offset controls placed on days at sea. In addition, implementation and monitoring costs associated with this alternative could be costly and difficult. The net benefit of this alternative can not be fully addressed, however, it is likely that at the present time (no limited entry) the cost of implementing the alternative would exceed the benefits derived from it.

2.4.7. Multi-species management of the gear/effort/fishery complex

2.4.7.1. Description

This option integrates a number of the alternatives listed above. This approach would require, at a minimum, the following:

1. Define discrete fishery units (species which co-occur) based on technological and ecological interactions using historical data.

2. Define unit of fishing effort.

3. Compute amount of fishing effort necessary to achieve target exploitation rate.

For discussion purposes, the management regime could operate as follows:

1. Estimate standing stock of species of interest (squid/mackerel/butterfish complex and associated bycatch species from historical data base).

2. From empirical data estimate amount of fishing effort required to achieve target yields and fishing mortality rates for individual species.

3. Compute catch from time/area/mesh units which produces species mix which optimizes net national benefits.

4. Calculate tolerance or desired mix of bycatch of other species.

5. Allocate trips (standardize gear, etc.), make trip or some other basic unit of effort the transferable property unit.

6. No discards at sea allowed.

7. Impose penalties as necessary for take of species at low stock levels or sublegal target species.

8. Track catches and adjust future fishing effort according to stock size and level of recruitment for the biological year.

2.4.7.2. Evaluation

Fisheries can be categorized into fishery management units based on species caught, gear, season and area fished. Few if any fishery units which occur in the Mid-Atlantic region operate as single species or single gear units. The otter trawl, which is the principal gear used in the Atlantic mackerel, squid, and butterfish fisheries, is relatively non-selective. An individual tow is likely to capture the target species as well as a number of non-target or secondary species. This often results in the discard of non-target fish which may be regulated by another fishery management plan. For example, a bottom otter trawl tow with small mesh targeted at squid is likely to retain all summer flounder encountered. If the annual quota for summer flounder was completely taken prior to the tow, then all flounder would have to be discarded (many of which would be dead).

One approach to this problem is to define season/area/gear/species complexes upon which to base a multi-species management program. The major problem with this approach is the complex and dynamic nature of both fisheries and the species complexes which support those fisheries. The current understanding of ecosystem dynamics is poorly developed at present. The requisite understanding of these processes along with the metrics necessary to define and manage multi-species complexes will need to be further developed before this becomes a realistic option. Net benefits associated with this alternative can not be fully addressed at this time.

2.4.8. Establish a minimum *Loligo* tube size

2.4.8.1. Description

This alternative would establish a minimum tube (dorsal mantle length) landing size for *Loligo* of 4.0 inches. The intent of the alternative is to prohibit the landing of non-marketable squid.

2.4.8.2. Evaluation

This alternative would be included in the amendment independent of a minimum mesh rule. Without a minimum mesh requirement, a minimum size limit would likely cause a large discard problem. Even in conjunction with a minimum mesh rule, a size limit would not be desirable for several reasons. First, recruitment to the fishing gear is not "knife-edged" which means that some squid less than 4.0 inches will always be retained if they are present. Culling the large volume catches of squid at-sea would require a great deal of time and/or labor only to return dead animals to the sea. Consequently, this alternative appears to have little merit.

2.4.9. Establish the same criteria to qualify for a moratorium permit for *Loligo, Illex,* and butterfish

2.4.9.1. Description

This alternative would establish the same criteria to qualify for a moratorium permit for *Loligo*, *Illex*, and butterfish.

2.4.9.2. Evaluation

The preliminary analysis of the number of permitted vessels which landed at various thresholds per trip for *Illex* and *Loligo* squid when examined separately indicated that a smaller number of vessels would qualify for the *Illex* moratorium permit. If the same criteria were used, it is likely that a much larger number of vessels would be eligible to enter the directed fishery for *Illex* squid, many of which were not previously engaged in the directed fishery for *Illex*. This would essentially defeat the purpose of limited entry, would increase the chance for over-capitalization in the industry and dissipation of profits.

2.5. SUMMARY AND EXPECTED NET IMPACT OF PROPOSED ACTION

The purpose of this summary is to briefly describe the expected economic impact of the preferred actions. A summary of impacts of all alternatives presented in this amendment are documented in Table RIR-1. The analysis utilized to evaluate the economic impact of the various proposed alternatives is qualitative in nature. However, it provides the basis for making well reasoned management decisions.

The first alternative deals with entry limitations in the squid and butterfish fisheries. At the present time the hold capacity of the fleet is capable of sustaining current fishing levels and potential future increases due to growth in demand. If limited entry is not implemented, optimum yield might not be achieved, profits would likely be dissipated among the participants in the fishery and potential over-capitalization of the fleet might occur.

The alternative dealing with the elimination of TALFF and joint ventures for squids and butterfish is not expected to affect the current fishing capability of the domestic fleet. Close to 100% of the *Loligo* landings in the past seven years have been made by the domestic fleet. Therefore, it is expected that the implementation of this alternative would have no effect on the way the fishery behaves at the present time. In the case of butterfish, TALFF and joint ventures have never existed. Therefore, no changes from current practices are expected as a consequence of this management alternative. The elimination of TALFF and joint ventures is not expected to alter components of the cost side, and it is expected to maintain the historical catch of the domestic fleet by eliminating any possibility of a TALFF.

The intent of the proposed action dealing with the establishment of a minimum mesh size for *Loligo* is to avoid overfishing of small non-marketable animals. This alternative is more difficult to justify due to the lack of appropriate biological data. However, the Council's industry advisors report that the 1 7/8" net is mostly in use in the industry (by fishermen who do not use very small liners) and would allow for small animals to escape. Theoretically, this will result in higher yield per recruit. Increase in operating costs are not expected to occur from the implementation of this measure; potential positive benefits include a decrease in biological and economic waste derived from harvesting non-marketable animals and increased yields over time.

Action number four deals with revised Atlantic mackerel specification limits. Currently, the commercial and recreational harvest of Atlantic mackerel are far below the proposed maximum allowable catches. This action is expected to prevent overfishing and the collapse of this pelagic schooling species. Benefits from improved utilization of the resource would allow for continual utilization of this fishery. The costs in terms of reduced economic surplus in the producer, consumer and recreational sectors are expected to be minimal.

Action number five deals with revised *Loligo* MSY. In this case, the proposed MSY is well below historical yields and above the catch in the US fishery. The new MSY is the result of the new SAW assessment, which takes into consideration new biological information pertaining to the species. This action is expected to secure the long-term benefits from this fishery by utilizing the best information available to manage the stock. This in turn should enhance the long term biological and economic viability of the fishery.

The action dealing with establishing a framework for seasonal *Loligo* allocations, is expected to lay down alternative management plans with the intention to better assess and manage the two existing *Loligo* fisheries: the off-shore winter fishery and the spring-summer inshore fishery. This action is expected to increase net benefits by preserving historical allocations, avoid fishermen displacement and enhance the spawning potential of the species.

Table RIR-1. Summary of All Alternatives

Preferred Alternatives	Economic Effects
Entry limitations in the squid and butterfish fisheries	Avoid over-capitalization and potential dissipation of profits
Elimination of TALFF and joint ventures for squids and butterfish	Maintain historical catch of the domestic fleet. No changes in components of the cost side are expected
Minimum mesh size for *Loligo*	Decrease economic waste derived from harvesting non-marketable animals; increases over time in yields are expected; increases in operating costs are not expected; may increase net benefits
Revised Atlantic mackerel specification limits	May increase net benefits due to reduction in overfishing and stock collapse prevention
Revised *Loligo* MSY	May increase net benefits due to overfishing prevention
Frameworked seasonal *Loligo* allocations	May increase net benefits by preserving historical allocations, avoid fishermen displacement and enhance the spawning potential of the species

Rejected Alternatives	Economic Effects
Take no action at this time	May decrease net benefits, since potential economic gains from increases over time in catches, harvesting efficiency and general improvement in the resources would be lost
Moratorium on entry of additional vessels into the Atlantic Mackerel fishery	Economic gains through the potential influx of new capital and market developments could affect future benefits in a positive way
No minimum mesh for *Loligo* Fishery	Economic waste from discard of non-marketable animals might decrease net benefits
Impose minimum mesh restrictions on directed butterfish trips	Net benefits in the *Loligo* fishery may decrease
Individual transferable quotas	Cannot be fully evaluated
Effort restrictions	Effects on net benefits can not be fully addressed. However, the cost of implementing this alternative at the present time might exceed benefits derived from it
Multi-species management of the gear/effort/fishery complex	Net benefits cannot be fully address
Establish a minimum *Loligo* tube size	Costs associated with increase use of labor might overshadow benefits derived from it
Establish the same criteria to qualify for a moratorium permit for *Loligo*, *Illex* and butterfish	May decrease net benefits, potential for overcapitalization and dissipation of profits exits

MAJOR RULE DETERMINATION

The analysis described above, even thought qualitative in nature, shows that if the described management measures were to be enacted, they would not constitute a "major rule" under the criteria described in E.O. 12866 [p.RIR-1]. Furthermore, these actions would not have a significant economic impact on a substantial number of small entities.

3. Other E.O. 12866 Requirements

The FMP should not have an annual effect of $100 million or more. Based on unpublished NMFS weighout data (Maine through Virginia) the 1993 total commercial value for Atlantic mackerel was estimated at $1,305,349, $29,592,591 for *Loligo*, $8,522,558 for *Illex*, and $6,797,472 for butterfish.

The Amendment is not expected to lead to an increase in costs or prices to consumers. Recreational anglers will not be impacted by the Amendment. Commercial landings of all the species covered in this amendment (with the exception of butterfish) fishery have increased steadily since the FMP was originally implemented in 1978 (Tables 20,24,27 and 30 of the FMP).

US exports for all the species included in this amendment have increased in recent years. US exports of mackerel (all species- the species cannot be separated in the data) were 659 mt ($779,000) in 1987 and increased to 20,671 mt ($19,717,000) in 1994 (USDC 1987a and 1994c). U.S. exports of squid (all species-the species cannot be separated in the data) were 7,449 mt ($11,938,000) in 1987 and increased to 48,968 mt ($58,527,000) in 1995 (USDC 1987a and 1994c). Desegregated export data shows that US exports of *Loligo* increased from 13,082 mt ($19,079,000) in 1989 to 29,652 mt ($31,923,000) in 1994 (USDC 1989a and 1994c). US exports of butterfish increased from 1,148 mt ($2,330,000) in 1990 to 1,785 mt ($3,451,000) in 1994 (USDC 1991 and 1994c). It must be recognized that the exported tonnage is included in the landings data for all species.

It seems clear that the US fishery is expanding. The adjustments to the management regime through Amendment 5 should improve the environment within which the fishery is operating and, therefore, facilitate further improvement in the fishery.

Impacts are analyzed in section 9.2 of the FMP.

The FMP should not have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of US based enterprises to compete with foreign based enterprises in domestic or export markets.

4. Impacts of the Plan relative to the Regulatory Flexibility Act

4.1. Regulatory Flexibility Analysis

4.1.1. Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to minimize the adverse impacts from burdensome regulations and record keeping requirements on small businesses, small organizations, and small government entities. The impacts of the proposed action on the fishing industry and the economy as a whole were discussed in sections 2.3, 2.4 and 2.5 above. The following discussion of impacts centers specifically on the effects of the proposed action on small businesses.

4.1.2. Determination of significant economic impact on a substantial number of small entities

According to guidelines on regulatory analysis of fishery management actions, a "substantial number" of small entities is more than 20 percent of those small entities engaged in the fishery (NMFS 1994a). The Small Business Administration (SBA) defines a small business in the commercial fishing activity as a firm with receipts of up to $2.0 million annually. Refer to part A of section 2.3.1 for a description of the vessels participating in the fishery.

The majority of the vessels in the Atlantic mackerel, squid, and butterfish fishery may readily qualify as small entities according to the SBA criteria. Given that the proposed action will affect many of the vessels, the "substantial number" criteria will be meet.

At the present time there is no annual permit requirement for recreational fishing vessels taking any of the species addressed in the FMP within US waters. The USDC (1992) estimated that in 1991 about 16 million trips were taken by marine recreational anglers in the Mid-Atlantic and 7.5 million in the North Atlantic regions. Intercept surveys show that 3.15% of the anglers interviewed indicated that they preferred or sought Atlantic Mackerel as the primary species targeted in the North Atlantic region. That is, an estimated 236,660 angler trips (all modes) in the North Atlantic were nominally directed at Atlantic mackerel in 1991. In the Mid-Atlantic, Atlantic Mackerel accounted for approximately 2% of the estimated total number of fish caught (all modes), and 14% in the North Atlantic. Neither butterfish or squid are targeted by recreational anglers in the Mid-Atlantic or North Atlantic regions.

Economic impacts on small business entities are considered to be "significant" if the proposed action would result in any of the following: a) a reduction in annual gross revenues by more than 5 percent; b) an increase in total costs of production by more than 5 percent as a result of an increase in compliance costs; c) an increase in compliance costs as a percent of sales for small entities at least 10 percent higher than compliance costs as a percent of sales for large entities; d) capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or, e) as a "rule of thumb," 2 percent of small businesses entities being force to cease business operations (NMFS 1994a).

4.1.2.1. Entry limitations in the squid and butterfish fisheries

This action is not likely to have potential effects on the revenues of the subject small entities. Under the preferred Alternative, the landing requirement to qualify for the *Loligo* and butterfish vessel moratorium is that the owner or operator of the vessel landed and sold 20,000 pounds of *Loligo* or butterfish (including joint venture landings) in any consecutive 30 day period between 13 August 1981 and 13 August 1993. Under this criteria, 398 vessels would qualify. Under the preferred Alternative, the landing requirement to qualify for the *Illex* vessel moratorium is that the owner or operator of the vessel had 5 landings (including joint venture landings) of 5,000 pounds of *Illex* (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 - 13 August 1993. Under this criteria, 54 vessels would qualify. Both of the qualifying criteria examined above would limit entry to vessels that demonstrate sustained participation in the fishery and have participated in the fishery during the period when the fishery began Americanization. Therefore, vessels which have legitimately been involved in the directed fisheries for *Loligo* and butterfish, and *Illex*, will not be excluded. Those vessels which took small quantities in the past will be able to continue to do so under the bycatch provisions of this Amendment. However, further expansion of entry into the directed fisheries will be controlled, thus overcapitalization will be avoided.

Discussion on the number of vessels that would qualify for the squid and butterfish moratoria examined above are based on the Northeast Fishery Science Center weighout files. These files cover the States from Maine through Virginia. They do not cover North Carolina and south. Vessels in the sample States may not be included in the weighout. In addition vessels that could qualify for the moratoria by having transferred to foreign vessels through joint ventures are not included in the weighout. Therefore, the number of vessels indicated as qualifying should be considered a low estimate.

4.1.2.2. Elimination of TALFF and joint ventures for squids and butterfish

This action is not likely to have potential effects on the revenues of the subject small entities. There has been no *Loligo* TALFF since 1986, no *Illex* TALFF since 1987, and no butterfish TALFF since 1990 (only as bycatch in the mackerel fishery). There have been no *Loligo or Illex* joint ventures approved since 1987, and no butterfish ever. The US fishery has demonstrated it can harvest substantial quantities of these species if abundance and demand are adequate. The elimination of TALFF and joint ventures is not expected to alter components on the cost side and it is expected to maintain the historical catch of the domestic fleet.

4.1.2.3. Minimum mesh size for *Loligo*

This regulation is not expected to have significant potential effects on gear costs of the subject small entities. The Council's industry advisors report that some fishermen use liners so small that they retain *Loligo* below marketable size which are discarded. The result is biological and economic waste. This measure is intended to eliminate the use of very small liners in the *Loligo* fishery. The advisors report that 1 7/8" mesh codends are in general use in the fishery (by the fishermen that do not use the very small liners). They state that the 1 7/8" mesh allows the very small *Loligo* to escape so they can grow to a marketable size. Those vessels which participate in the directed *Illex* fishery are exempted to the mesh requirement during months when a small bycatch of *Loligo* occurs at specific depths under the bycatch provisions of this plan. This action is expected to increase the total commercial yield. Although not precisely quantifiable, this alternative could result in an increase of revenues for some small vessels.

4.1.2.4. Revised Atlantic mackerel specifications limits

The proposed regulation addressing revised Atlantic mackerel specification limits is not likely to have potential effects on the revenues of the subject small entities. Since 1983 the FMP has provided limits within which the allowable catch of Atlantic mackerel may be set. The current FMP specifies that the catch may not exceed the amount which results in a fishing mortality rate of $F_{0.1}$ while, at the same time, the spawning stock biomass must be maintained at 600,000 mt or greater. As a result of high recruitment combined with relatively low fishing rates in recent years, the adult stock biomass has grown to the point that the Allowable Biological Catch (ABC) has risen to 850,000 mt under the current quota specification guidelines. However, the NEFSC has advised the Council to keep harvest levels at or below 200,000 mt because of the volatile nature of a pelagic schooling species such as Atlantic mackerel.

The impacts of the proposed revised Atlantic mackerel specification limits on the recreational fishery are also expected to be negligible. Since 1987 recreational mackerel landing have varied without trend from 1,100 mt in 1982 to 4,700 mt in 1987. The average recreational landings of mackerel from Virginia to Maine for the 1979-1991 period was 3,394 mt. It is being proposed in the Amendment that 10,000 mt of mackerel be allocated to the recreational fishery. This figure would come out of the total mackerel specification limit. The proposed 10,000 mt allocation for the recreational fishery is three times the average recreational landings from Maine to Virginia for the 1979-1991 period. Considering the fact that both the recreational and commercial harvest of Atlantic mackerel have been far below the proposed maximum ABC, it is expected that the anticipated effects on revenues of the subject small entities be negligible. Furthermore, the establishment of management alternatives for "healthy stocks" such as the Atlantic mackerel, should enhance the long term stability of the fishery by preventing overfishing.

4.1.2.5. Revised *Loligo* MSY

The proposed regulation addressing the revision of *Loligo* MSY is not expected to have potential effects on the revenues of the subject small entities. The proposed MSY for *Loligo* is well above historical high domestic yields. The proposed MSY takes into consideration recently revised biological parameters for the species. This in turn, is expected to enhance the long term stability of the stock and fishery.

4.1.2.6. Frameworked seasonal *Loligo* allocations

The framework seasonal *Loligo* allocations would have no immediate effects on the fishery. The framework would address potential issues related to seasonal quotas, gear restrictions, and seasons to establish the measures that can be implemented through the framework procedure. The potential effects of measures implemented through the framework will be analyzed when they are proposed.

4.1.3. Explanation of why is the action being considered

Refer to the section on Problems for Resolution of the amendment document.

4.1.4. Objectives and legal basis for the rule

Refer to the section on Management Objectives of the amendment document. The Magnuson Fishery Conservation and Management Act of 1976 provides the legal basis for the rule.

4.1.5. Demographic analysis

Refer to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan, as amended.

4.1.6. Cost analysis

Refer to the section on Regulatory Impact Analysis and Summary and Expected Net Impact of proposed Action in the RIR.

4.1.7. Competitive effects analysis

The industry is primarily formed by small businesses (harvesters and processors). There are no large businesses involved in the industry, therefore, there are no disproportional small versus large business effects. There are no disproportional cost of compliance among the affected small entities.

4.1.8. Identification of overlapping regulations

The proposed action does not create regulations that conflict with any State regulations or other federal laws.

4.1.9. Conclusions

The preceding Regulatory Flexibility Analysis indicate that the proposed regulations in this amendment do not result in "significant impacts" on a substantial number of small businesses.

5. Paperwork Reduction Act of 1980

The Paperwork Reduction Act concerns the collection of information. The intent of the Act is to minimize the Federal paperwork burden for individuals, small business, State and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government.

Base on vessel permit statistics, it is assumed that most individuals holding operator permits for summer flounder, multispecies and scallops would also hold operator permits for squid, Atlantic mackerel and butterfish. It is also expected than since most of the vessels operators already submit logbooks reports under the Northeast Multispecies, Scallop, and Summer Flounder FMPs, the implementation of this plan would not affect the reporting process to any significant extent. This Amendment does not change the vessel permitting requirements of the existing FMP.

6. Impacts of the Plan relative to Federalism

The Amendment does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 12612.

APPENDIX 3. FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)

1. COVER SHEET

Responsible Agency
Mid-Atlantic Fishery Management Council

Cooperating Agencies
Atlantic States Marine Fisheries Commission
New England Fishery Management Council
South Atlantic Fishery Management Council
National Marine Fisheries Service/National Oceanic and Atmospheric Administration

Title of Action
Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries

Contact Person
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Designation of the Statement
Final Environmental Impact Statement

Abstract

The proposed action, authorized under the Magnuson Fishery Conservation and Management Act of 1976, as amended (Magnuson Act), will revise management of the Atlantic mackerel, squid, and butterfish fisheries in the US Exclusive Economic Zone (EEZ). The action will, among other things, prevent overfishing while promoting the growth of the US commercial fishery. It will provide a data collection and reporting system and a procedure for adjusting management measures annually. The proposed action will have no adverse impact on the physical environment and will strengthen efforts to work with other Federal and State agencies to conserve and manage Atlantic mackerel, squid, butterfish and their habitats. The proposed management measures will produce long term benefits, allowing the fishery to develop fully and providing the data necessary to continue the fisheries indefinitely in a controlled manner.

Comment Due Date
Comments on the statement were required by 23 January 1995.

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C. SUMMARY

C.1. BACKGROUND.

The Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries (FMP) modified by this Amendment was implemented on 1 April 1983. The current management unit is all Atlantic mackerel, *Loligo pealei*, *Illex illecebrosus*, and butterfish under US jurisdiction, excluding the Gulf of Mexico and the Caribbean Sea. The objectives of the FMP are:

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.

2. Promote the growth of the US commercial fishery, including the fishery for export.

3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.

4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.

5. Increase understanding of the conditions of the stocks and fisheries.

6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

The fishing year for Atlantic mackerel, *Illex* and *Loligo* squid, and butterfish is the twelve (12) month period beginning 1 January.

Management Measures.

The management measures adopted by the Council are:

1. Revise the management unit to be all Atlantic mackerel (*Scomber scombrus*), *Loligo pealei*, *Illex illecebrosus*, and butterfish (*Peprilus triacanthus*) under US jurisdiction.

2. For *Loligo*, Maximum Sustainable Yield (MSY) and maximum Optimum Yield (OY) are set at 36,000 metric tons (mt) and Joint Venture Processing (JVP) and Total Allowable level of Foreign Fishing (TALFF) are set equal to zero.

3. For *Illex*, MSY and maximum OY remain at 30,000 metric tons (mt), but JVP and TALFF are set equal to zero.

4. For Atlantic mackerel the Allowable Biological Catch (ABC) in US waters for the upcoming fishing year is that quantity of mackerel that could be caught in US and Canadian waters minus the estimated catch in Canadian waters and maintain a spawning stock size in the year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt. Additionally, the ABC may not exceed the Long-Term Potential Catch, as estimated by the Northeast Fisheries Science Center, minus the estimated catch in Canadian waters. Domestic Annual Harvest (DAH), both the commercial and recreational components, Domestic Annual processing (DAP), JVP, and TALFF will be estimated as with the current FMP, except that no formula will be used to estimate the recreational catch.

5. For butterfish, MSY and maximum OY remain at 16,000 metric tons (mt), but JVP and TALFF are be set equal to zero. However, if there is a TALFF specified for Atlantic mackerel, in order to reduce waste of butterfish, there will be a TALFF that shall not exceed 0.08% of the allocated portion of the Atlantic mackerel TALFF.

6. To insure that sufficient escapement from the winter offshore *Loligo* fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass, the Regional Director may establish seasonal quotas based upon the recommendations of the Atlantic Mackerel, Squid, and Butterfish Monitoring Committee and the Council. Seasonal quotas, if any, will be specified as part of the annual quota setting process prior to the upcoming fishing year.

7. Any owner of a vessel desiring to fish for Atlantic mackerel, *Loligo* or *Illex* squid or Atlantic butterfish within the US EEZ for sale, or transport or deliver for sale, any Atlantic mackerel, *Loligo* or *Illex* squid, or Atlantic butterfish taken within the EEZ, must obtain a permit from NMFS for that purpose. *Illex*, *Loligo*, and butterfish vessels must meet the criteria set forth in 9.1.2.1.1.2 in order to qualify for a moratorium permit.

8. The owner of a party and charter boat (vessel for hire) must obtain a party or charter boat permit.

9. A vessel is eligible for a moratorium permit in the *Loligo* and butterfish fishery if it meets any of the following criteria:

A. The vessel landed and sold 20,000 pounds of *Loligo* or butterfish in any 30 consecutive day period of *Loligo* or butterfish (including joint venture landings) between 13 August 1981 and 13 August 1993; or

B. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

C. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

10. A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

A. The vessel had five landings (including joint venture landings) of 5,000 pounds of *Illex* (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 and 13 August 1993; or

B. have purchased recirculating sea water equipment, an on board plate freezer or commercial blast freezer by 31 May 1994 and installed this equipment and have landed five trips of at least 5,000 lb.of *Illex* prior to the implementation of the final regulations of Amendment 5; or

C. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

D. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

11. A vessel that does not qualify for a *Loligo*/butterfish or *Illex* moratorium permit may land *Loligo*, *Illex*, and/or butterfish if (1) it possesses an incidental catch permit, (2) fishes with a net legal in the directed fishery, (3) lands no more that 2,500 pounds of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and (4) the operator of the vessel files the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

12. Any dealer of Atlantic mackerel, squid, or butterfish must have a permit. A dealer of Atlantic mackerel, squid, or butterfish is defined as a person or firm that receives Atlantic mackerel, squid, or butterfish for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport .

13. An operator of a vessel with permit issued pursuant to this FMP must have an Operator's Permit issued

by NMFS. Any vessel fishing commercially for Atlantic mackerel, squid, or butterfish under a *Loligo* and butterfish moratorium permit, an *Illex* moratorium permit, a mackerel permit, an incidental catch permit or with a party/charter boat permit must have on board at least one operator who holds a permit. That operator may be held accountable for violations of the fishing regulations and may be subject to a permit sanction. During the permit sanction period, the individual operator may not work in any capacity aboard a federally permitted fishing vessel.

14. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will be made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office, and the Northeast Fisheries Science Center. The MAFMC Executive Director or his designee will chair the Committee. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target harvest levels (OY) for Atlantic mackerel, squid, or butterfish are not exceeded. The Committee will also review the gear used to catch Atlantic mackerel, squid, or butterfish to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the harvest targets and propose such regulations as appropriate, including seasonal quotas in the *Loligo* fishery.

15. Owners or operators of otter trawl vessels possessing one pound or more of *Loligo* squid may only fish with nets having a minimum mesh size of 1-⅞" diamond, inside stretch measure, applied throughout the entire net including the body and codend. This minimum mesh requirement applies to the inner portion of the net and codend. The owner or operator of a fishing vessel shall not use any device, gear or material including but not limited to nets, net strengtheners, ropes, lines, or chaffing gear on the outer portion of the trawl net with a mesh opening of less than 4.5" mesh (stretch , inside measure). If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail. During the months of June, July, August, and September otter trawl vessels fishing for *Illex* seaward of the 50 fathom curve shall be exempt from the *Loligo* mesh requirement. Vessels participating under the Illex exemption which possess *Loligo* must not have available for immediate use nets below the minimum mesh sizes described above when the vessel is landward of the 50 fathom curve. In addition, vessels participating in the directed fishery for sea herring shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

16. When the landings of Atlantic mackerel by US vessels with commercial permits first reached 50% of ABC, the Secretary of Commerce will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. However, the Council reserves the right to modify this percentage should the exercise of it's judgement so dictate. For purposes of this action, landings of Atlantic mackerel by US vessels are defined to include transfer at sea from US vessels to foreign vessels as well as landings at US docks.

17. Commercial logbooks must be submitted, at a minimum, on a monthly basis by Federal permit holders in order to monitor the fishery. The Secretary may implement additional data collection procedures. Real-time assessment and management of the *Loligo* and *Illex* resources may be necessary due to the risk of overfishing stocks comprised of only a single cohort. During year one of the management program, the Regional Director shall specify the data elements and reporting time frames necessary to establish a real-time assessment and management program for the annual squid species. In addition, the Council will investigate the feasibility and costs and benefits of implementing such a management system in year two of the management program.

18. Operators of party and charter boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total amount in pounds and numbers of each species taken; date(s) fished; number of trips; duration of trip; locality fished; crew size; landing port; number of anglers carried on each trip; and discard rate.

19. In order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity

of Atlantic mackerel, *Loligo, Illex,* and butterfish purchased (in pounds), and the name and permit number of the vessels from whom the Atlantic mackerel, *Loligo, Illex,* and butterfish was purchased.

20. Section 303(a)(5) of the MFCMA requires that at least estimated processing capacity of, and the actual processing capacity utilized by US fish processors must be submitted to the Secretary.

21. Only vessels with moratorium permits may transfer *Loligo, Illex,* or butterfish at sea.

22. Vessel owners or operators or dealers who falsify data in order to qualify a vessel under a moratorium will lose their vessel or dealers permit.

The adopted provisions are presented in detail in Section 9.1. The alternatives to the adopted measures are discussed in Appendix 1 of the Amendment.

Management Alternatives Considered but not Adopted.

The Council considered a number of other alternatives during the development of this FMP that were not adopted for public hearing purposes.

1. Take no action at this time. This would mean that the FMP would continue in effect unchanged.

2. Moratorium on entry of additional vessels into the Atlantic mackerel fishery.

3. No minimum mesh for *Loligo* fishery.

4. Impose minimum mesh restrictions on directed butterfish trips.

5. Individual transferrable quotas.

6. Effort restrictions.

7. Multi-species management of the gear/effort/fishery complex.

8. Establish a minimum *Loligo* tube size.

9. Establish the same criteria to qualify for a moratorium permit for *Loligo, Illex,* and butterfish.

C.2. MAJOR CONCLUSIONS.

The conclusions are fully described in section 9.2 of the FMP.

C.2.1. Entry limitations in the squid and butterfish fisheries.

The MFCMA (Section 303(b)(6)) provides that a fishery management plan may establish a system for limiting access to a managed fishery in order to achieve Optimum Yield if, in developing such a system, the Council and the Secretary take into account six factors. A discussion of those factors and their application to the proposed limited entry program for the squid and butterfish fisheries is fully addressed in section 9.2 of the FMP.

A. Present participation in the fishery.

B. Historical fishing practices in, and dependence on, the fishery.

C. The economics of the fishery.

D. The capability of fishing vessels used in the fishery to engage in other fisheries.

E. The cultural and social framework relevant to the fishery.

F. Any other relevant considerations.

C.2.2. Elimination of TALFF and joint ventures for the squids and butterfish.

There has been no *Loligo* TALFF since 1986, no *Illex* TALFF since 1987, and no butterfish TALFF since 1990 (only as bycatch in the mackerel fishery). There have been no *Loligo or Illex* joint ventures approved since 1987, and no butterfish ever. The US fishery has demonstrated it can harvest substantial quantities of these species if abundance and demand are adequate.

The harvesting capacity of the fleet is adequate to harvest the maximum allowable catches. This is one of the reasons that the Council is proposing a moratorium on entry into the fisheries. It is inconsistent to limit entry for United States vessels and allow foreign fishing.

The elimination of TALFF and joint ventures is not expected to alter components on the cost and it is expected to maintain the historical catch of the domestic fleet. This proposed management measure would have a positive impact on net benefits to the nation in the long term.

C.2.3. Minimum mesh size for *Loligo.*

The Council's industry advisors report that some fishermen use liners so small that they retain *Loligo* below marketable size and the *Loligo* are then discarded. The result is biological and economic waste. This measure is intended to eliminate the use of very small liners in the *Loligo* fishery.

The advisors report that 1 7/8" mesh codends are in general use in the fishery (by the fishermen that do not use the very small liners). They state that the 1 7/8" mesh allows the very small *Loligo* to escape so they can grow to a marketable size.

The minimum mesh rule for *Loligo* has two exemptions specified in the Amendment. The first is the exemption for directed *Illex* trips seaward of the 50 fathom contour during the months of June through September. This exemption was included because of concerns raised by fishermen that a small bycatch of *Loligo* can be expected in the *Illex* fishery. Since mesh smaller than 1 7/8 " is in general use in the *Illex* fishery, these vessels would be in violation of the minimum mesh rule for *Loligo.* Industry advisors testified that the *Loligo* bycatch is very small and that almost all of the *Illex* fishing during this period occurs outside of the 50 fathom depth contour. Table 26 supports the notion that the directed *Illex* fishery retains a small bycatch of *Loligo.* In addition, most of the *Loligo* are inshore at this time and would not be subject to exploitation by smaller mesh under this exemption. The overall effect of this exemption appears to be positive and should have no measurable effect on the partial recruitment vector for *Loligo*. The second exemption is for the sea herring fishery. Industry advisors testified that this fishery is very clean but does retain a small bycatch of *Loligo*. Since mesh sizes less than those specified for *Loligo* are commonly be used in the herring fishery, these vessels also would be in violation of the *Loligo* mesh rule. The effect is expected to be similar to that of the *Illex* exemption.

C.2.4. Revised Atlantic mackerel specification limits.

Since 1983 the FMP has provided limits within which the allowable catch of Atlantic mackerel may be set. The current FMP specifies that the catch may not exceed the amount which results in a fishing mortality rate of $F_{0.1}$ while, at the same time, the spawning stock biomass must be maintained at 600,000 mt or greater. As a result of high recruitment combined with relatively low fishing rates in recent years, the adult stock biomass has grown to the point that the Allowable Biological Catch (ABC) has risen to 850,000 mt under the current quota specification guidelines. However, the NEFSC has advised the Council to keep harvest levels at or below 200,000 mt because of the volatile nature of a pelagic schooling species such as Atlantic mackerel.

The effect of these recommendations is to lower the maximum ABC, but the new level is still well above any catches taken by the US recreational and commercial fisheries during the 20th century. The new strategy is more conservative than the current FMP, but is considered appropriate given the long-term history of the fishery. Based on historical data (Figure 24), whenever the catch has exceeded about 100,000-150,000 mt, the catch dropped significantly in the next few years.

Considering the fact that both the recreational and commercial harvest of Atlantic mackerel have been far below the proposed maximum ABC, it is expected that the anticipated costs in terms of reduced economic surpluses in the producer, consumer and recreational sectors will be very small. Furthermore, the establishment of management alternatives for "healthy stocks" such as the Atlantic mackerel, should enhance the long term stability of the fishery by preventing overfishing. The prevention of overfishing and potential stock collapse will lead to positive changes in net benefits.

C.2.5. Revised *Loligo* MSY.

Since the beginning of MFCMA management, the *Loligo* MSY has been 44,000 mt (as it was previously under ICNAF). Among other factors, this was based on an estimated 18 month life span.

SAW-17 produced a new *Loligo* assessment which revised the life span to 12 months. This assessment included the recommendation that MSY be set at 36,000 mt. The assessment cautioned that catches in excess of 30,000 mt may only be achieved during years of high abundance.

The proposed MSY for *Loligo* is well above historical high domestic yields. The proposed MSY takes into consideration recently revised biological parameters for the species. This in turn, is expected to enhance the long term stability of the fishery. The impact on net benefits from the implementation of this option is expected to be positive since it should prevent overfishing.

C.2.6. Frameworked seasonal *Loligo* allocations.

There are essentially two *Loligo* fisheries, an offshore winter fishery and a spring-summer inshore fishery. The inshore fishery generally coincides with the primary spawning season.

Seasonal quotas could be established in a variety of ways, including monthly, bimonthly, or quarterly quotas. Their purpose would be to limit what the offshore fishery could take in the first six months of the calendar year, but that fishery would have another opportunity during the October through December period. One option would be to establish quarterly harvest quotas for *Loligo*. The annual quota, which could be specified in the range of 0-36,000 mt, could be divided into quarterly components based on the historical seasonal distribution of landings as illustrated in Table 39. The directed fishery could operate unrestrained until 80% of the quarterly quota was reached and then a trip limit could be imposed until the end of that quarter. The trip limit would allow the continued harvest of *Loligo* taken as bycatch in other fisheries which would otherwise have to be discarded.

This component of the management program would allow for a more equitable distribution of landings among the various sectors of the fishery. The evaluation of potential seasonal allocations related to each specific fishery requires biological, social and economic data which are limited at the present time. As a result, the costs and benefits associated with seasonal allocations cannot be fully addressed at this point. However, displacement of fishermen would be avoided by allowing historical allocations to continue.

It is expected that individuals involved in different aspects of the *Loligo* fishery and the nation as a whole would benefit from a comprehensive analysis of the expected benefits and costs associated with this regulatory alternative. The enactment of a framework addressing seasonal *Loligo* allocations is expected to have positive benefits by allowing an equitable seasonal allocation of the resource.

C.2.7. No Transfer at Sea by Non-Moratorium Vessels.

The provision included in the plan which prohibits non-moratorium vessels from transferring at sea is intended to preserve the integrity and intent of the limited entry program. The plan allows for non-moratorium vessels to land 2,500 pounds or less of *Loligo, Illex* or butterfish per trip. This provision was added to prevent a discard problem by non-moratorium vessels from occurring . However, non-moratorium vessels could circumvent the moratorium by transferring their catch at sea . Therefore, the Council has chosen to include the no transfer at sea by non-moratorium vessels provision to prevent this .

C.2.8. Loss of Permit for Falsification of Data.

During the course of the development of this Amendment, concern was expressed by many that individuals may falsify their landing records in order to qualify for a moratorium permit. To discourage this from occurring, the Council has chosen to provide for the loss of permit if an individual falsifies records or data to qualify for a moratorium permit. This applies to both dealer and moratorium permits. This provision should discourage this activity from occurring, and should help to insure that only qualified vessels will receive moratorium permits.

C.2.9. Fishery Impact Statement.

A Draft Fishery Impact Statement (FIS) for this Amendment (McCay *et al.* 1994) is available as a separate document. The draft FIS presents information on the importance of the Atlantic mackerel, squid, and butterfish species complex to ports from Chatham, MA through Wanchese, NC. In addition, it describes the other species harvested in those ports, and population and employment data for the counties in which the ports are located.

In Massachusetts, the two ports examined were New Bedford and Chatham where Atlantic mackerel, squid, and butterfish are of minor importance. However, one notable exception is the reliance of the inshore trap fisheries on *Loligo*. *Loligo* accounted for less than 0.05% of the value of all species landed in New Bedford and 2.4 % of the Chatham landings in 1992. However, there has been a dramatic shift to the reliance of the inshore trap fisheries on *Loligo* over the past two decades. *Loligo* accounted for greater than 90% of the value of the Chatham trap fisheries in 1993.

The value of the fishing industry of Rhode Island was estimated to be greater than $85 million in 1992. Squid was the number one species caught in Rhode Island in 1992 with 42.7 million pounds landed. Rhode Island was the leading state in squid landings in the US, accounting for 38% of the national total. Two ports, Point Judith and Quonset Point, accounted for 95% of the squid landed in Rhode Island during 1992. Three ports make up the bulk of all fishery landings in Rhode Island: Point Judith, Quonset Point, and Newport. *Loligo* was very important to Pt. Judith in 1992 where the species ranked second by value and accounted for 15.3% of the value of all species landed.

In Stonington, CT, squid (unclassified with respect to species) ranked fourth in value of all species landed in 1992. Butterfish and Atlantic mackerel were of minor importance. Squid were of particular importance to the otter trawl fishery accounting for 12.9% of the value of the landings by that gear. In addition, mackerel were important to the gill net fleet there.

Loligo squid were very important to the New York fleet which included the ports of Montauk, Shinnecock and Greenport. *Loligo* was the most important species in this area accounting for 16.2% of the total value of landings in these ports. Butterfish and Atlantic mackerel were of minor importance.

Illex and *Loligo* squid are major components of the landings in Cape May, NJ ranking second and third by value at that port in 1992. Combined they accounted for almost 20% of the value of the landings there in 1992. *Loligo* are taken year round by this fleet, with *Illex* being targeted form May through October. Atlantic mackerel accounted for 1.6% of the value of Cape May landings in 1992. *Illex*, *Loligo*, and Atlantic mackerel accounted for 56.2% of the value of all fish landed by the otter trawl fleet based in Cape May. This port has come to rely more heavily on squid resources in recent years. Atlantic mackerel are targeted according to price and availability.

South of New Jersey, Atlantic mackerel, squid and butterfish are of minor importance relative to the ports from Cape May northward. For example, *Loligo* squid ranked 19th in the value of fish landed in Ocean City Maryland in 1992, accounting for 0.2% of the value. The same pattern was observed for the ports of Hampton Roads, VA and Wanchese, NC.

Clearly, there will be impacts from the adopted plan. However, if overfishing is to be prevented, mortality must be controlled. The adopted management measures are considered the most reasonable to achieve the fishing mortality targets available at this time. The moratorium is included to increase probability of compliance with the management program in the near term, because it provides a mechanism for participants to share in the recovery of the resource rather than having the dividend dissipated over additional vessels that could enter the fishery. This technique was used to great success with the surf clam fishery.

In terms of the consultative requirement of this provision of the Magnuson Act, since the management unit of the FMP is these four species in US waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the US - Canadian border, the South Atlantic and New England Councils were invited and did designate members of their Councils to the Mid-Atlantic Council's Committee, the oversight committee for this FMP. Additionally, both Councils were invited to appoint industry advisors to the Mid-Atlantic Council Advisory Panel.

C.2.10. Summary.

The above items are the major measures for this Amendment. These resources have become Americanized under the previous management of this FMP and now the intent is not to allow the over-exploitation or over-capitalization of these fisheries. This Amendment is intended to allow the continued orderly development and to make certain that the resources are there on a long term basis to provide the necessary yields.

Clearly, there will be impacts from this Amendment. Overfishing must be prevented and habitat destruction must be minimized. Preventing uncontrolled growth in these fisheries should assist both those goals.

The greatest impact to fishermen would come with no action. With only the existing management measures in place, it is quite likely that the resources will become overfished and over-capitalized. The adopted management measures are considered the most reasonable program to prevent overfishing and over-capitalization at this time (section 9.2). The moratorium is included to increase the probability of compliance with the management program in the near term, as well as providing a mechanism for participants to share in the resource rather than having the dividend of effective management dissipated over additional vessels that could enter the fishery. This technique was used to great success with the surf clam fishery.

It must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendment, will allow such a study to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) may have potential negative economic impacts in the short run. However, it is believed that the preferred alternative will have the least negative potential impacts in the short term (possibly none at all) and the greatest benefits (in the form of the stabilized resource) in the long term. The only potential short term negative impacts of the preferred measures are to those fishermen that might desire to fish for squids or butterfish in the future, but do not qualify based on their lack of historical landings. The only other potential short term negative impact could be that if there were markets for the higher ABC's for mackerel and *Loligo*, lowering those numbers would result in short term impacts. However, since the current ABC's have not been approached, there is no real impact.

C.3. AREAS OF CONTROVERSY.

There were a number of controversial issues associated with this Amendment during its development. The public review process and several rounds of hearings took nearly nine months. Among the more significant areas of controversy were the proposals to establish a moratorium on the entry of additional vessels. The selected alternative includes immediate moratoriums on vessels fishing directly for both squids and butterfish. Atlantic mackerel entry will be restricted as soon as the fishery takes one-half the ABC. The hearings are summarized and included as appendices 4 and 5.

C.4. ISSUES TO BE RESOLVED.

None of these four resources are overfished at this time. The two squids have had their associated fisheries developing rapidly during the last decade. Truly these fisheries have become Americanized. The main goal of this Amendment is not to allow the fleet development by Americans to replace the excess harvesting capacity available when foreign nationals were fishing the US EEZ. This concern is very real and is the major genesis of problems with the New England groundfish fishery which is greatly over-capitalized and grossly overfished. The alternatives were developed after extensive public discussion and debate, and all parties acknowledge that the adoption of these management measures may have significant impact on potential future fisheries and the associated human environment. Several proposed management measures were revised in response to impacts identified during the course of the public discussion of the proposed management measures. If the proposed management scheme is adopted and reveals unforeseen negative impacts, these will be evaluated and responded to in future Amendments.

C.5. MITIGATION.

There are no issues in the proposed management measures for this Amendment that require mitigation at this time. The NMFS (marine mammals, sea turtles, and shortnose sturgeon) and Fish and Wildlife Service (birds) were asked to initiate the Endangered Species Act Section 7 consultation process as soon as the Amendment was available for public hearings. The NMFS agreed with the Council's DEIS conclusions that the management activities in Amendment 5 will tend to reduce contacts with endangered and threatened turtle species and marine mammals based on control of unrestricted growth of fishing activity. In addition, since a "not likely to adversely affect" determination was made on Amendment 4 of this FMP, no new information on takes of marine mammals or sea turtles has been attributed to these fisheries (Rittgers pers. comm.). The only new information for consideration since implementation of Amendment 4 is the designation of right whale critical habitat for Cape Cod Bay, the Great South Channel, and waters adjacent to the Georgia and Florida coasts, in June 1994. The NMFS reviewed the information on Amendment 5 and right whale critical habitat and concluded that implementation of Amendment 5 will not be likely to affect right whale critical habitat. Therefore, NMFS concurred with the determination that the Amendment 5 and associated fisheries activities carried out under this FMP, are not likely to adversely affect (NLA) threatened and endangered species under NMFS' jurisdiction. The U.S. Fish and Wildlife Service concluded that the FMP will have "no impact" on seabirds (Nickerson pers. comm.).

D. PURPOSE AND NEED

D.1. OVERCAPITALIZATION SHOULD BE AVOIDED.

The fishery currently has more than sufficient capacity to harvest all the allowable biological catch (ABC). This FMP was initially designed to encourage US fishermen to harvest underutilized resources. The US fishery has grown to where there is now no need for foreign harvests, and additional investment by US fishermen will only dissipate any profits for existing fishermen who have invested heavily to build this fishery.

D.2. ADDITIONAL MANAGEMENT MEASURES ARE NECESSARY FOR *LOLIGO AND ILLEX.*

Both of these two fisheries have become completely Americanized. No foreign harvests of either of these animals have occurred since 1987. Domestic harvests for both species are approaching the MSY levels. At present, the Regional Director can only close the fishery if the quotas are exceeded. This management alternative may not be the best solution for the continued smooth and efficient operation of these fisheries.

D.3. BUTTERFISH BYCATCH DISCARD MORTALITY MAY BE INHIBITING SUFFICIENT GROWTH SUCH THAT ACHIEVEMENT OF MAXIMUM SUSTAINABLE YIELDS ARE PREVENTED.

Sea sampling data for 1989, 1990, and 1991 indicate that as much butterfish (by weight) is discarded as is landed. This may be a partial explanation for why there have been relatively low levels of butterfish landings over the past several years in light of very favorable stock assessments. Adequate resource has been consistently identified to have landings at the MSY level (16,000 metric tons), however actual landings have only been around one quarter this level. Availability for fishermen was thought to have been the explanation in the past. However, sea sampling data indicate that discards may be having a significant impact on the resource.

D.4. LACK OF DATA.

National Standard 2 states that "measures shall be based upon the best scientific information available". Although recreational and commercial catch data have been adequate to formulate and implement management measures, data collection should be improved, in order to allow for better management in the future. An improved data base will allow the Council to more finely tune the management system to the needs of the fishery. These data are necessary to assess the impact and effectiveness of management measures, as well as monitor fishing mortality and increases in stock size to determine if additional amendments to the FMP will be necessary.

D.5. MIXED SPECIES FISHERY.

The Mid-Atlantic mixed species fishery relies principally on summer flounder, scup, black sea bass, yellowtail flounder, winter flounder, butterfish and *Loligo*, as either directed or bycatch in other directed fisheries. Many of these species are also components of the southern New England trawl fisheries since stock migrations occur between the Mid-Atlantic and New England areas. Generally, fishing activities follow these species as they make annual migrations from south to north and from offshore to inshore waters. Many of the above identified species in this mixed fishery are overexploited. Directed effort from some of the above species has been switched to species managed in this FMP. The above complicates the identification of appropriate and effective management strategies and thus requires close coordination of regulatory measures in order to properly manage this species assemblage.

D.6. POSSIBLE SPATIAL AND TEMPORAL CONFLICTS BETWEEN THE RECREATIONAL AND COMMERCIAL FISHERIES.

Recreational fishermen report that trawling in near shore waters reduces the availability of mackerel to party boats so that successful trips cannot be made within the time available for party boat trips.

D.7. INTERNAL WATERS PROCESSING PROJECTS.

There is concern that internal waters processing projects authorized by the States may conflict with the management measures of this FMP.

Problems D.6 and D.7 are inter-related in that, while foreign processing vessels in an IWP project must be in the Territorial Sea or internal waters, the US fishing vessels generally fish in the EEZ, but relatively close to shore. This issue was studied by the Council's Scientific and Statistical Committee (SSC), which concluded that available data were inconclusive to determine whether the IWP fishing negatively impacted on recreational fishing opportunities. Since no new information has been developed since the SSC review, these problems will not be addressed in this Amendment.

D.8. HABITAT DEGRADATION.

Atlantic mackerel, *Loligo*, and butterfish are continental shelf species that spend significant portions of their lives in coastal waters. These species generally make inshore and northern migrations during warm months and are found in tidal bays and sounds as well as the ocean environment. Those same areas are known to be increasingly affected by coastal development (e.g., dredging, marinas, docks, etc.) and the related declines in habitat quality and quantity. This increase in habitat degradation plays an important role in Atlantic mackerel, *Loligo* and butterfish population health.

E. ALTERNATIVES INCLUDING THE PROPOSED ACTION

E.1. DESCRIPTION OF PROPOSED MANAGEMENT MEASURES.

The Council adopted management measures of this Amendment are presented in detail in Section 9.1. The alternatives to the adopted measures are discussed in Appendix 1 of the Amendment. The management measures adopted by the Council are:

1. Revise the management unit to be all Atlantic mackerel (*Scomber scombrus*), *Loligo pealei*, *Illex illecebrosus*, and butterfish (*Peprilus triacanthus*) under US jurisdiction.

2. For *Loligo*, Maximum Sustainable Yield (MSY) and maximum Optimum Yield (OY) are set at 36,000 metric tons (mt) and Joint Venture Processing (JVP) and Total Allowable level of Foreign Fishing (TALFF) are set equal to zero.

3. For *Illex*, MSY and maximum OY remain at 30,000 metric tons (mt), but JVP and TALFF are set equal to zero.

4. For Atlantic mackerel the Allowable Biological Catch (ABC) in US waters for the upcoming fishing year is that quantity of mackerel that could be caught in US and Canadian waters minus the estimated catch in Canadian waters and maintain a spawning stock size in the year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt. Additionally, the ABC may not exceed the Long-Term Potential Catch, as estimated by the Northeast Fisheries Science Center, minus the estimated catch in Canadian waters. Domestic Annual Harvest (DAH), both the commercial and recreational components, Domestic Annual processing (DAP), JVP, and TALFF will be estimated as with the current FMP, except that no formula will be used to estimate the recreational catch.

5. For butterfish, MSY and maximum OY remain at 16,000 metric tons (mt), but JVP and TALFF are be set equal to zero. However, if there is a TALFF specified for Atlantic mackerel, in order to reduce waste of butterfish, there will be a TALFF that shall not exceed 0.08% of the allocated portion of the Atlantic mackerel TALFF.

6. To insure that sufficient escapement from the winter offshore *Loligo* fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass, the Regional Director may establish seasonal quotas based upon the recommendations of the Atlantic Mackerel, Squid, and Butterfish Monitoring Committee and the Council. Seasonal quotas, if any, will be specified as part of the annual quota setting process prior to the upcoming fishing year.

7. Any owner of a vessel desiring to fish for Atlantic mackerel, *Loligo* or *Illex* squid or Atlantic butterfish within the US EEZ for sale, or transport or deliver for sale, any Atlantic mackerel, *Loligo* or *Illex* squid, or Atlantic butterfish taken within the EEZ, must obtain a permit from NMFS for that purpose. *Illex*, *Loligo*, and butterfish vessels must meet the criteria set forth in 9.1.2.1.1.2 in order to qualify for a moratorium permit.

8. The owner of a party and charter boat (vessel for hire) must obtain a party or charter boat permit.

9. A vessel is eligible for a moratorium permit in the *Loligo* and butterfish fishery if it meets any of the following criteria:

A. The vessel landed and sold 20,000 pounds of *Loligo* or butterfish in any 30 consecutive day period of *Loligo* or butterfish (including joint venture landings) between 13 August 1981 and 13 August 1993; or

B. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

C. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

10. A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

A. The vessel had five landings (including joint venture landings) of 5,000 pounds of *Illex* (that is, landed 5 trips of at least 5,000 pounds) between 13 August 1981 and 13 August 1993; or

B. have purchased recirculating sea water equipment, an on board plate freezer or commercial blast freezer by 31 May 1994 and installed this equipment and have landed five trips of at least 5,000 lb.of *Illex* prior to the implementation of the final regulations of Amendment 5; or

C. the vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same or less GRT and vessel registered length for commercial vessels); or

D. Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same GRT and vessel registered length.

11. A vessel that does not qualify for a *Loligo*/butterfish or *Illex* moratorium permit may land *Loligo*, *Illex*, and/or butterfish if (1) it possesses an incidental catch permit, (2) fishes with a net legal in the directed fishery, (3) lands no more that 2,500 pounds of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and (4) the operator of the vessel files the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

12. Any dealer of Atlantic mackerel, squid, or butterfish must have a permit. A dealer of Atlantic mackerel, squid, or butterfish is defined as a person or firm that receives Atlantic mackerel, squid, or butterfish for a commercial purpose from the owner or operator or a vessel issued a moratorium permit pursuant to this FMP for other than transport .

13. An operator of a vessel with permit issued pursuant to this FMP must have an Operator's Permit issued by NMFS. Any vessel fishing commercially for Atlantic mackerel, squid, or butterfish under a *Loligo* and butterfish moratorium permit, an *Illex* moratorium permit, a mackerel permit, an incidental catch permit or with a party/charter boat permit must have on board at least one operator who holds a permit. That operator may be held accountable for violations of the fishing regulations and may be subject to a permit sanction. During the permit sanction period, the individual operator may not work in any capacity aboard a federally permitted fishing vessel.

14. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will be made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office, and the Northeast Fisheries Science Center. The MAFMC Executive Director or his designee will chair the Committee. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will annually review the best available data including, but not limited to, commercial and recreational catch/landing statistics, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, VPA results, target mortality levels, beneficial impacts of size/mesh regulations, as well as the level of noncompliance by fishermen or States and recommend to the Council Committee commercial (annual quota, minimum fish size, and minimum mesh size) and recreational (possession and size limits and seasonal closures) measures designed to assure that the target harvest levels (OY) for Atlantic mackerel, squid, or butterfish are not exceeded. The Committee will also review the gear used to catch Atlantic mackerel, squid, or butterfish to determine whether gear other than otter trawls needs to be regulated to help assure attainment of the harvest targets and propose such regulations as appropriate, including seasonal quotas in the *Loligo* fishery.

15. Owners or operators of otter trawl vessels possessing one pound or more of *Loligo* squid may only fish with nets having a minimum mesh size of 1-⅞" diamond, inside stretch measure, applied throughout the entire net including the body and codend. This minimum mesh requirement applies to the inner portion of the net and

codend. The owner or operator of a fishing vessel shall not use any device, gear or material including but not limited to nets, net strengtheners, ropes, lines, or chaffing gear on the outer portion of the trawl net with a mesh opening of less than 4.5" mesh (stretch , inside measure). If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail. During the months of June, July, August, and September otter trawl vessels fishing for *Illex* seaward of the 50 fathom curve shall be exempt from the *Loligo* mesh requirement. Vessels participating under the Illex exemption which possess *Loligo* must not have available for immediate use nets below the minimum mesh sizes described above when the vessel is landward of the 50 fathom curve. In addition, vessels participating in the directed fishery for sea herring shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

16. When the landings of Atlantic mackerel by US vessels with commercial permits first reached 50% of ABC, the Secretary of Commerce will immediately announce in the *Federal Register* a control date for possible entry limitation into the Atlantic mackerel fishery. However, the Council reserves the right to modify this percentage should the exercise of it's judgement so dictate. For purposes of this action, landings of Atlantic mackerel by US vessels are defined to include transfer at sea from US vessels to foreign vessels as well as landings at US docks.

17. Commercial logbooks must be submitted, at a minimum, on a monthly basis by Federal permit holders in order to monitor the fishery. The Secretary may implement additional data collection procedures. Real-time assessment and management of the *Loligo* and *Illex* resources may be necessary due to the risk of overfishing stocks comprised of only a single cohort. During year one of the management program, the Regional Director shall specify the data elements and reporting time frames necessary to establish a real-time assessment and management program for the annual squid species. In addition, the Council will investigate the feasibility and costs and benefits of implementing such a management system in year two of the management program.

18. Operators of party and charter boats with Federal permits issued pursuant to this FMP must submit logbooks monthly showing at least name and permit number of the vessel; total amount in pounds and numbers of each species taken; date(s) fished; number of trips; duration of trip; locality fished; crew size; landing port; number of anglers carried on each trip; and discard rate.

19. In order to monitor the fishery and enable the Regional Director to forecast when a closure will be needed, dealers with permits issued pursuant to this FMP must submit weekly reports showing at least the quantity of Atlantic mackerel, *Loligo*, *Illex*, and butterfish purchased (in pounds), and the name and permit number of the vessels from whom the Atlantic mackerel, *Loligo*, *Illex*, and butterfish was purchased.

20. Section 303(a)(5) of the MFCMA requires that at least estimated processing capacity of, and the actual processing capacity utilized by US fish processors must be submitted to the Secretary.

21. Only vessels with moratorium permits may transfer *Loligo, Illex,* or butterfish at sea.

22. Vessel owners or operators or dealers who falsify data in order to qualify a vessel under a moratorium will lose their vessel or dealers permit.

E.2. EVALUATION OF THE PROPOSED ACTION.

The preferred management measures are evaluated in section 9.2 of the FMP.

E.3. ALTERNATIVES TO THE PROPOSED ACTION.

The non-preferred management measures are evaluated in appendix 1 of the FMP. The following nine alternatives differ from the adopted action alternative described in section E.1 (EIS) and section 9.1 (FMP):

1. Take no action at this time. This would mean that the FMP would continue in effect unchanged.

2. Moratorium on entry of additional vessels into the Atlantic mackerel fishery.

3. No minimum mesh for *Loligo* fishery.

4. Impose minimum mesh restrictions on directed butterfish trips.

5. Individual transferrable quotas.

6. Effort restrictions.

7. Multi-species management of the gear/effort/fishery complex.

8. Establish a minimum *Loligo* tube size.

9. Establish the same criteria to qualify for a moratorium permit for *Loligo, Illex,* and butterfish.

Some of these nine alternatives are single item specific while others combine multiple management measures. There are nine specific alternatives because the Council considered them as separate entities over time. There is no belief that all of the alternatives will have the same impact on fishing mortality. The Council solicited public comments on all of the non-preferred alternatives. Of course, the overall sociological characterization of the various ports and fisheries that are described in the Fishery Impact Statement of the FMP are applicable to these non-preferred alternatives. The public hearing process provided significant input as to the sociological impacts of the various alternatives and the hearings are summarized in appendices 4 and 5.

F. AFFECTED ENVIRONMENT

The distribution and habitat requirements of mackerel, squid, and butterfish are described in section 6 of the FMP. The description of the fisheries can be found in section 7 of the FMP. The economics of the mackerel, squid, and butterfish fisheries are described in section 8 of the FMP. The social characterization of the mackerel, squid, and butterfish fisheries can be found in the Fishery Impact Statement of the FMP which is section 9.2.10.

G. ENVIRONMENTAL CONSEQUENCES

The analysis of impacts is conducted with specific reference to the guidance presented in NOAA Manual 216-6 regarding the determination of environmental significance. Section 13(b) presents 5 criteria against which the proposed action and any alternatives should be evaluated.

G.1. WILL THE PROPOSED ACTION BE REASONABLY EXPECTED TO JEOPARDIZE THE LONG-TERM PRODUCTIVE CAPABILITY OF ANY STOCKS THAT MAY BE AFFECTED BY THE ACTION?

G.1.1. Proposed Action (entry limitations in the squid and butterfish fisheries, elimination of TALLF and joint ventures of squids and butterfish, minimum mesh size for *Loligo*, revised Atlantic mackerel specification limits, revised *Loligo* MSY, and frameworked seasonal *Loligo* allocations, and minimum tube size limit for *Loligo*).

None of these four species are currently overfished nor have the landings exceeded the MSY levels since the implementation of the MFCMA. The revised *Loligo* MSY, and specifications for Atlantic mackerel are lowered and therefore more risk averse in the potential for the allowance of overfishing.

Mesh restrictions and minimum tube size for *Loligo* would have a moderate conservation effect. The effects of a mesh requirement would impact only small, very young (perhaps up to three months) squid. The age/size structure of the current stocks and fisheries is poorly understood. The longevity of both species of squids has very recently been reduced to only one year and thus the actual size at each month is not that well delineated. It is known however, that minimum mesh size and minimum tube size will encourage fishermen from targeting on schools of small individuals that would need to be discarded. While the proposed mesh is quite small, it is currently the commonly used mesh in the fishery, and it will codify regulations that prevent fishermen from moving to even smaller mesh. Minimum size and mesh size requirements should generally increase yield/recruit, increase standing stock biomass/recruit, and increase the number of fish alive and able to spawn. Thus any mesh is seen as beneficial if it decreases discards of any juvenile fishes and invertebrates.

The proposed actions of this Amendment will place these four specie's resources under more management. Overfishing will be prevented and the fisheries will eventually be maintained at maximum sustainable yield levels. Other proposed actions provide for the acquisition of critical data and information to improve future management. A framework adjustment procedure is incorporated in the Amendment to allow changes to be made in the management measures as new and better information is acquired. It is important to note that the cooperation of State governments is essential if these species are to be successfully managed throughout their range.

These measures may force some commercial fishermen to divert their activities to other fisheries. Which fisheries may be switched to is very uncertain but a knowledge of the directed fisheries and the species composition of the catch, as well as, the predator prey interaction would all be germane to any speculation. The following material is condensed from the Amendment.

A summary of species landed on otter trawl trips landing at least 2,500 lbs of *Loligo* in 1992 is given in Table 23. The total weight of *Loligo* landed based on the 2,500 lb threshold represented 93.8% of total *Loligo* landings for the year. *Loligo* accounted for 48.9% of the weight landed on these trips. More than half (51.9%) of the value of these trips was attributed to *Loligo*. The top five species in terms of weight landed in association with *Loligo* on these trips were silver hake, Atlantic mackerel, scup, butterfish and *Illex*. In terms of value, the top five associated species were silver hake, summer flounder, scup, butterfish and Atlantic mackerel.

A summary of species landed on otter trawl trips landing at least 50,000 lbs of *Illex* in 1992 is given in Table 26. The total weight of *Illex* landed based on the 50,000 lb threshold represented 96% of total *Loligo* landings for the year. Compared to the *Loligo* fishery, trips directed at *Illex* landed predominantly that species with relatively little bycatch. *Illex* accounted for 97.7% of the weight landed on these trips and 92.7% of the value. The top five species landed, in both weight and value, in association with *Illex* on these trips were butterfish, *Loligo* squid, swordfish, goosefish (angler) and bluefish.

A summary of species landed on otter trawl trips landing at least 10,000 lbs of Atlantic mackerel in 1992 is given in Table 28. The total weight of Atlantic mackerel landed based on the 10,000 lb threshold represented 86% of total Atlantic mackerel landings for the year. Atlantic mackerel accounted for 61.2% of the weight landed on these trips but only 31.5% of the value. The top five species landed in terms of weight in association with Atlantic mackerel on these trips were Atlantic herring, *Loligo* squid, silver hake, scup, and butterfish. In terms of value, the top five species were *Loligo* squid, silver hake, scup, butterfish, and Atlantic herring.

A summary of species landed on otter trawl trips landing at least 500 lbs of butterfish in 1992 is given in Table 32. The total weight of butterfish landed based on the 500 lb threshold represented 91.6% of total butterfish landings for the year. Butterfish accounted for only 8.3% of the weight landed on these trips and 8.8% of the value. The top five species landed in association with butterfish on these trips were *Loligo*, silver hake, *Illex*, Atlantic mackerel, and scup. In terms of value, the top five species were *Loligo*, silver hake, summer flounder, scup, and *Illex*. These data illustrate the non-directed nature of the butterfish fishery.

Generally, sorting of otter trawl caught fish is begun immediately after redeployment of the net. Marketable species are sorted by size category and placed on ice as rapidly as possible. Once the valuable catch is stored, undersized fish and non-marketable bycatch are generally shoveled or picked overboard. Several hours may lapse before discarded fish are returned to the sea, resulting in high discard mortality rates.

Fishery discards (juvenile fish and unmarketable species) are difficult to monitor accurately since they are obviously unavailable to port samplers. The operational problems of estimating the size/age composition and magnitude of discards at sea can be great (Murawski 1985). Data on fishery discards (if available at all) are expensive to obtain by direct observation and are generally imprecise relative to landings information. Fish catches may be discarded for a variety of reasons including: undersized individuals of marketable species, undesirable species, specimens damaged, specimens infected with parasites, and bycatch or trip quotas. The amount of discards in relation to landings is influenced by a variety of factors including: net mesh size, season, area fished, the age or size structure of the population, and the particular regulatory scheme in place. Factors significantly influencing the survival of discarded fish include: degree of net damage, duration of trawl tow, time on deck, handling stress, temperature, water depth and fish size (Murawski 1985).

The NMFS contracted with the Manomet Bird Observatory to place observers on US boats beginning in 1989 to collect a variety of data on the vessels, personnel, and catch. Unfortunately very little sea sampling data on these fisheries are available. There are no observer data available for the catch and discard from the large freezer-trawlers that take the majority of the landings.

In general, the species that coexist with these four species were also the species that commonly appeared in the directed fisheries. The landings data that are summarized above reflect market value and not necessarily the actual catch from a specific trawl. The ecological niche that these four species inhabit includes their prey and predators and would be much better represented with observer data. Since observer data are not available for these fisheries, the ecological niche is better described from an understanding of the prey and predators.

Loligo are known to feed on small fish including silver hake, butterfish, mackerel, herring, and menhaden, and also on squid and crustaceans. However it is difficult to identify the species of fish eaten or to quantify the diet because squid do not swallow their prey whole (Langton and Bowman 1977).

Bluefish, sea ravens, spiny dogfish, and the Atlantic angel shark are known to be major *Loligo* predators. The fourspot flounder, witch flounder, roughtail stingray, and white hake are also known to prey on *Loligo*. In many cases, squid remains in the stomach of fish are only identified as "squid" without reference to species. It is likely that some of these are *Loligo* and there are at least 42 other species of "squid"- eating fish in addition to those identified above (Langton and Bowman 1977).

The ecological relationships between squid and other species are complex. The food of *Illex* consist of primary, secondary and tertiary consumers while they themselves are prey species to a variety of predators. Food habits of squid are difficult to quantify because they do not swallow their prey whole. They are known to prey on fish and crustaceans such as krill. As they grow, the diet of *Illex* changes from one dominated by crustaceans to one composed largely of fish (Langton and Bowman 1977) . Cannibalism is common and larger specimens in particular are known to prey heavily on others of their own species (Vinogradov 1984).

Illex are a major source of food for marine carnivores. Adults are heavily preyed on by porpoises, whales, and numerous pelagic fishes (e.g., tuna and swordfish). Other known predators of *Illex* are the fourspot flounder, goosefish, and bluefish. *Illex* is probably eaten by a substantially greater number of fish, however, partially digested animals are often difficult to identify and are simply recorded as squid remains, with no reference to the species. There are at least 47 other species of fish that are known to eat "squid" (Langton and Bowman 1977).

Mackerel are opportunistic feeders and prey most heavily on crustaceans such as copepods, krill, and shrimp. They also feed on squid, and less intensively on fish and ascidians (Langton and Bowman 1977).

Mackerel have been identified in the stomachs of a number of different fish. They are preyed upon heavily by whales, dolphins, spiny dogfish, silver hake, white hake, weakfish, goosefish, Atlantic cod, bluefish, and striped bass. They also comprise part of the diet of swordfish, red hake, Atlantic bonito, bluefin tuna, blue shark, porbeagle, sea lamprey, and shortfin, mako and thresher sharks (Langton and Bowman 1977).

Young butterfish feed primarily on jellyfish (Horn 1970), and ctenophores and salps (Haedrich 1967). The diet of adult butterfish includes other small fish, squid, crustaceans, polychaetes, tunicates and chaetognaths (Bigelow and Schroeder 1953, Leim and Scott 1966, Nichols and Breder 1927, Maurer and Bowman 1975).

As is typical of a small, schooling, pelagic finfish, butterfish are subject to predation by a number of larger species. Haddock, silver hake, swordfish, bluefish, weakfish, goosefish, sand tiger, porbeagle, and red hake are several species which are known to consume butterfish specifically. Butterfish are also preyed upon by squid and may be a significant part of their food since seasonal distribution patterns of *L. pealei* are similar to butterfish (Tibbetts 1975).

The proposed action is also intended to rectify species diversity and abundance problems that have been increasing over the past decade. The proposed action will enable these four species to maintain themselves, and will hopefully prevent the type of species replacement (by less desirable species like skates and rays) that has occurred on Georges Bank and elsewhere after major targeted species have been cropped by fishing pressure. The problem of species replacement is becoming a great concern for the holistic approach to ecosystem management. The 1994 autumn bottom trawl survey conducted by NEFC showed a continuing dominance of cartilaginous fish (dogfish, skates, and rays). Nearly three fourths of the survey's total weight was of cartilaginous species whereas catches of the three "traditional" groundfish species (cod, haddock, and yellowtail flounder) comprised only 3% of the total (USDC 1994a).

The importance of biological diversity cannot be understated. The synergistic effects of the sum of the world's biota is directly responsible for maintaining the gaseous composition of the atmosphere, regulating the world's hydrology, generating and maintaining soils and nutrients, detoxifying wastes, driving biogeochemical cycles, controlling pest epidemics, and providing plant pollination, thus making human life on Earth possible. In addition, select species are used by humans to enhance the quality of life. For example, many plants contain active ingredients which are used in pharmaceuticals. Humans also use species for food and shelter. Almost all of these "ecosystem services" are at present irreplaceable by technology. Technologies to replace lost elements of biological diversity are extremely limited if not non-existent (Atlantic Biodiversity Center 1994).

At this moment, human activities are inadvertently forcing species and populations into extinction at an unprecedented rate. How fast is this diversity disappearing? Harvard's Cradoord Laureate ecologist E. O. Wilson, conservatively estimated that the annual extinction rate in 1990 was 4,000 to 6,000 species per year. To put this into perspective, this rate of extinction is 10,000 times faster than the "background" or normal rate of extinction. Moreover, this may even be faster than the rate of extinction that occurred during the Cretaceous-Triassic extinctions (i.e. the dinosaur extinctions) over 65 million years ago. Biodiversity is in a constant state of being created and destroyed through the process of extinction and speciation. But speciation, a process which takes thousands of years, is not keeping pace with extinction. The result is our present stat of increasing global biotic impoverishment (Atlantic Biodiversity Center 1994).

The issue of biological diversity, or biodiversity, is a general term referring to an extremely complex ecological issue. It is often defined simply as "the variety and variability of life" or "the diversity of genes, species, and ecosystems" (Council on Environmental Quality 1993). In fact, biodiversity does comprise the variation between and among major ecological elements, but the significance of that diversity is not communicated by these definitions.

Biodiversity is a new and more explicit expression of one of the fundamental concepts of ecology, popularly stated as "everything is connected to everything else." Emerging concern about biodiversity reflects an empirically based recognition of the fundamental interconnections within and among various levels of ecological organization. Ecological organization, and therefore biodiversity, is a hierarchically arranged continuum, and reduction of diversity at any level will have effects at the other levels (CEQ 1993).

Fundamental to our understanding of biodiversity is the recognition that the biological world is not a series of unconnected elements, and that the richness of the mix of elements and the connections between those elements are what sustains the system as a whole (CEQ 1993).

In the past, biologists relied upon measurements of species diversity or species richness -- simple measures of the number or distribution of species in a given area -- to describe biodiversity. However, these measures do not consider the issues of ecosystem and genetic diversity and typically treat all species alike, whether native or introduced, common or rare (CEQ 1993).

Concern for biodiversity is often misinterpreted as a desire to maximize the diversity (usually species diversity) of every area. In fact, managing for maximum diversity might actually impoverish natural biodiversity. For example, introducing small-scale habitat disturbances might increase local biodiversity by favoring the spread of opportunistic, "weedy" species. However, the same activity may decrease the available habitat for species at risk regionally, and regional or global biodiversity may be diminished (CEQ 1993).

The CEQ (1993) report list six main factors the contribute to the decline of biodiversity. These six main factors are: physical alteration, pollution, overharvesting, introduction of exotic species, disruption of natural processes, and global climate change. Of course, these six factors all have the overpopulation problem (section F.3) at their root.

This FMP Amendment is designed to prevent the overharvesting of these four resources. The prevention of overfishing is the requirement of the first National Standard of the MFCMA and the only real factor that affects biodiversity that the Fishery Management Councils can control. The Councils make recommendations to the Secretary of Commerce in the FMPs (section 6.6) for ways to minimize or stop the effects of pollution on the species managed, however at this time these are only recommendations. It is hoped that with reauthorization of the MFCMA in 1995 that Congress will give more authority to the Councils and NMFS for ways to conserve fishery habitats and reduce the impacts of pollution. The other four factors are really out of the purview of the fishery management process.

G.1.2. No Action.

The no action alternative will jeopardize the long-term productive capability of these four species, which could lead to a stock collapse. This is especially true for Atlantic mackerel and *Loligo* since the ABC's for these two species are lowered significantly with this Amendment due to new scientific understandings (Amendment section 5.4). The NMFS (USDC 1993) estimates that the long-term potential catch for Atlantic mackerel at 134,000 mt, butterfish at 16,000 mt, *Loligo* at 44,000 mt, and *Illex* at 30,000 mt -- all of which are worth millions and millions of dollars (FMP section 8). These resources can not be allowed to become overfished, as has happened to nearly every other fishery resource in the Northwest Atlantic.

The no action alternative will also have negative impacts on other species and habitat. The purpose and need section (D) of this EIS identifies problems of the mixed species fishery, the increasing fishing pressure, and habitat degradation, all problems that will be beneficially helped by implementation of management measures for these four species. Marine mammal and seabird predation upon squid is substantial. Kenney *et al.* (1985) estimated that between 154,000 mt and 224,000 mt of squid were consumed off the northeast U.S. annually by whales and dolphins. These four species are also important in the diets of commercially and recreationally important large pelagic species (tunas, billfish, and sharks) which migrate to the continental shelf to forage on concentrations of schooling prey (Dean pers. comm.). Dean was representing the U.S. Advisory Committee to ICCAT's position that should these four species become overfished that the entire trophic relationships with large pelagic species and other commercially and recreationally important species could be upset.

G.1.3. Other Alternatives.

Adoption of the alternatives other than the proposed action may increase the likelihood that management measures may jeopardize the long-term productive capability of this resource and reduce biodiversity. In general, the other alternatives could be combined in order to meet the FMP objectives, but it is not a requirement since most of the alternatives being considered are perceived as "stand-alone" alternatives. From the commercial fishing segment, it is possible that a restrictive quota, or specific mesh or specific fish size measures could each be used to meet the objectives but it is the Councils belief that the specific combination of commercial measures adopted as the preferred alternative will do the least environmental harm. For example, if only a quota was imposed, it is highly likely that there would be a rush to harvest, with more small fish and more of other species bycatch occurring. All the preferred management measures are frameworked so that overfishing can be prevented. Annually a Monitoring Committee will evaluate the fishery relative to the target exploitation rates and make recommendations for the frameworked management measures. The frameworked management measures are the key to successful prevention of overfishing and are the items that will protect the long-term productive capability of the Atlantic mackerel, butterfish, and squid stocks.

It is anticipated that improved data collection, including the permitting and reporting requirements of the FMP, will allow quantitative economic studies to be conducted in future amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) may have negative economic impacts. However, it is believed that the preferred frameworked alternatives will have the least negative impacts in the short term and the greatest benefits (in the form of stable resources) in the long term in a reasonable time frame (10 years).

G.1.3.1. List of Non-Preferred Alternatives.

1. Take no action at this time. This would mean that the FMP would continue in effect unchanged.

2. Moratorium on entry of additional vessels into the Atlantic mackerel fishery.

3. No minimum mesh for *Loligo* fishery.

4. Impose minimum mesh restrictions on directed butterfish trips.

5. Individual transferrable quotas.

6. Effort restrictions.

7. Multi-species management of the gear/effort/fishery complex.

8. Establish a minimum *Loligo* tube size.

9. Establish the same criteria to qualify for a moratorium permit for *Loligo, Illex,* and butterfish.

Some of these nine alternatives are single item specific while others combine multiple management measures. There are nine specific alternatives because the Council considered them as separate entities over time. There is no belief that all of the alternatives will have the same impact on fishing mortality. The Council solicited public comments on all of the non-preferred alternatives. Of course, the overall sociological characterization of the various ports and fisheries that are described in the Fishery Impact Statement of the FMP are applicable to these non-preferred alternatives. The public hearing process provided significant input as to the sociological impacts of the various alternatives and the hearings are summarized in appendices 4 and 5.

G.2. WILL THE PROPOSED ACTION BE REASONABLY EXPECTED TO ALLOW SUBSTANTIAL DAMAGE TO THE OCEAN AND COASTAL HABITATS?

G.2.1. Proposed Action.

The proposed action includes numerous references to the importance of suitable habitats for healthy stocks of these four species. While there is no information proving that harvest does affect habitats, there is ample evidence that other human activities affect these species and their essential habitats. On that basis, this EIS and the FMP Amendment anticipates a closer working relationship with State and Federal agencies empowered to make decisions that could affect the habitat of these species. That Council and NMFS responsibility is especially important in nearshore waters. Mackerel, butterfish and *Loligo* are dependent on estuaries and coastal bays, which are often the same waters affected by dredging, discharges, run-off, water diversions, and other permitted and unpermitted actions by the 60 million people living in the Atlantic coastal region.

There is considerable awareness of the potential impact of otter trawling on the ocean bottom habitat. The South Atlantic Council (1988) in its Amendment 1 for the snapper/grouper fishery prohibited the use of trawl gear to harvest snapper/grouper in the directed fishery south of Cape Hatteras and north of Cape Canaveral. That Council based the trawl prohibition on habitat destruction and the desire to prevent overfishing of vermillion snapper. Their main concern was the destruction of sponge-coral habitat and did not address the effect of trawling on other types of ocean environment.

There are no known coral-sponge habitats north of Cape Hatteras which is where these fisheries are prosecuted. The issue of ocean bottom habitat degradation caused by trawling is largely an unknown at this time. The very few published papers that do exist deal with specific habitats. It is important to note that when habitat damage is described it is often from as little as one tow of trawl gear through the study area (Van Dolah *et al.* 1987 and SAFMC 1988). Under commercial fishing conditions, the bottom would be fished over and over until the catches from such an area become unprofitable. Under such conditions, habitat damage could be expected to be much greater than would occur with towing through the area once. Obviously, more research efforts are likely to be directed towards this issue in the future.

National marine sanctuaries are allowed to be established under the National Marine Sanctuaries Act of 1973. Currently there are 11 designated marine sanctuaries (Figure 28) that creates a system that protects over 14,000 square miles (National Marine Sanctuary Program 1993).

There are two designated national marine sanctuaries in the area covered by the FMP: the *Monitor* National Marine Sanctuary off North Carolina, and the Stellwagen Bank National Marine Sanctuary off Massachusetts. There are currently five additional proposed sanctuaries, but only one, the Norfolk Canyon is on the east coast.

The *Monitor* National Marine Sanctuary was designated on 30 January 1975, under Title III of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA). Implementing regulations (15 CFR 924) prohibit deploying any equipment in the Sanctuary, fishing activities which involve "anchoring in any manner, stopping, remaining, or drifting without power at any time" (924.3 (a)), and "trawling" (924.3 (h)). The Sanctuary is clearly designated on all National Ocean Service (NOS) charts by the caption "protected area." This minimizes the potential for damage to the Sanctuary by fishing operations. Correspondence for this sanctuary should be addressed to: *Monitor* NMS, NOAA, Building 1519, Fort Eustis, VA 23604.

The NOAA/NOS issued a proposed rule on 8 February 1991 (56 FR 5282) proposing designation under MPRSA of the Stellwagen Bank National Marine Sanctuary, in Federal waters between Cape Cod and Cape Ann, Massachusetts. On 4 November 1992, the Sanctuary was Congressionally designated. Implementing regulations (15 CFR 940) will become effective following Congressional review. Commercial fishing is not specifically regulated by Stellwagen Bank regulations. Correspondence for this sanctuary should be addressed to: Stellwagen Bank NMS, 14 Union Street, Plymouth, MA. 02360.

Details on sanctuary regulations may be obtained from the Chief, Sanctuaries and Reserves Division (SSMC4) Office of Ocean and Coastal Resource Management, NOAA, 1305 East-West Highway, Silver Spring, MD 20910.

In summary, habitat alteration by the fishing activities themselves is perhaps the least understood of the important environmental effects of fishing (National Research Council 1994). Alterations to resource habitats due to fishing may result from the loss of habitats of non-target species, such as species encrusting cobbles, or of other epibenthic habitats, which may be important nursery areas for juvenile fish; from the alteration of nutrient levels and bottom sediment, including destruction of habitat by bottom trawling, dredging, and other fishing and processing operations; and from the generation of suspended debris that can have lethal effects long after fishing activities have ceased.

G.2.2. Other Alternatives.

None of the other alternatives are expected to allow substantial damage to the ocean and coastal habitats. The preferred alternative is the most desirable because of the frameworked measures designed to achieve the target exploitation rates. Most of the preferred and non-preferred management measures (i.e. permitting, reporting, fish size, possession limit, season and harvest limits) simply do not affect ocean and coastal habitats.

G.3. WILL THE PROPOSED ACTION BE REASONABLY EXPECTED TO HAVE A SUBSTANTIAL ADVERSE IMPACT ON PUBLIC HEALTH AND SAFETY?

None of the alternatives are expected to have an adverse impact on public health or safety. Obviously, these species are afflicted with various parasites and disease. Fin rot disease may be the most common among the fish and is most often associated with stressful environmental conditions. Fish from polluted waters are subject to increased prevalence of disease. Atlantic mackerel, butterfish, *Loligo* and *Illex* are exposed to the full range of human activities during their lifetime. They are exposed to extensive, detrimental amounts of toxic organic and inorganic contaminants, such as heavy metals, PCBs, and petroleum hydrocarbons in the various physical compartments of the marine ecosystem (section 6.2). Most research on the toxicological effects of various contaminants in fish in general, and these species, in particular is recent and ongoing. While more research is certainly necessary on toxicological effects associated with these species (section 6.4.2.) none of the alternatives are expected to have a differential adverse impact on public health or safety. In fact, heightened awareness and improved data collection will occur with the implementation of this Amendment. The proposed action will not create situations that would have an adverse impact on public health and safety.

G.4. WILL THE PROPOSED ACTION BE REASONABLY EXPECTED TO ADVERSELY AFFECT AN ENDANGERED OR THREATENED SPECIES OR MARINE MAMMAL POPULATION?

G.4.1. Proposed Action.

The proposed action, because of the control placed on unrestricted growth of fishing activity will tend to reduce contacts with endangered and threatened turtle species and marine mammals. The NMFS (marine mammals, sea turtles, and shortnose sturgeon) and Fish and Wildlife Service (birds) were asked to initiate the Endangered Species Act Section 7 consultation process as soon as the Amendment was available for public hearings. The NMFS agreed with the Council's DEIS conclusions that the management activities in Amendment 5 will tend to reduce contacts with endangered and threatened turtle species and marine mammals based on control of unrestricted growth of fishing activity. In addition, since a "not likely to adversely affect" determination was made on Amendment 4 of this FMP, no new information on takes of marine mammals or sea turtles has been attributed to these fisheries (Rittgers pers. comm.). The only new information for consideration since implementation of Amendment 4 is the designation of right whale critical habitat for Cape Cod Bay, the Great South Channel, and waters adjacent to the Georgia and Florida coasts, in June 1994. The NMFS reviewed the information on Amendment 5 and right whale critical habitat and concluded that implementation of Amendment 5 will not be likely to affect right whale critical habitat. Therefore, NMFS concurred with the determination that the Amendment 5 and associated fisheries activities carried out under this FMP, are not likely to adversely affect (NLA) threatened and endangered species under NMFS' jurisdiction. The U.S. Fish and Wildlife concluded that the FMP will have "no impact" on seabirds (Nickerson pers. comm.).

Numerous species of marine mammals and sea turtles occur in the northwest Atlantic Ocean. The most recent comprehensive survey in this region was done from 1979-1982 by the Cetacean and Turtle Assessment Program (CETAP), at the University of Rhode Island (University of Rhode Island 1982), under contract to the Minerals Management Service (MMS), Department of the Interior. The following is a summary of the information gathered in that study, which covered the area from Cape Sable, Nova Scotia, to Cape Hatteras, North Carolina, from the coastline to 5 nautical miles seaward of the 1000 fathom isobath.

Four hundred and seventy one large whale sightings, 1547 small whale sightings and 1172 sea turtles were encountered in the surveys (Table 41). The "estimated minimum population number" for each mammal and turtle in the area, as well as those species currently included under the Endangered Species Act, were also tabulated.

The CETAP (University of Rhode Island) concluded that both large and small cetaceans were widely distributed throughout the study area in all four seasons, and grouped the 13 most commonly seen species into three categories, based on geographical distribution. The first group contained only the harbor porpoise, which is distributed only over the shelf and throughout the Gulf of Maine, Cape Cod, and Georges Bank, but probably not southwest of Nantucket. The second group contained the most frequently encountered baleen whales (fin, humpback, minke, and right whales) and the white-sided dolphin. These were found in the same areas as the harbor porpoise, and also occasionally over the shelf at least to Cape Hatteras or out to the shelf edge. The third group indicated a "strong tendency for association with the shelf edge" and included the grampus, striped, spotted, saddleback, and bottlenose dolphins, and the sperm and pilot whales.

Loggerhead turtles were found throughout the study area, but appeared to migrate north to about Massachusetts in summer and south in winter. Leatherbacks appeared to have had a more northerly distribution. CETAP hypothesized a northward migration of both species in the Gulf Stream with a southward return in continental shelf waters nearer to shore. Both species usually were found over the shoreward half of the slope and in depths less than 200 feet. The northwest Atlantic may be important for sea turtle feeding or migrations, but the nesting areas for these species generally are in the South Atlantic and Gulf of Mexico.

This problem may become acute when climatic conditions result in concentration of turtles and fish in the same area at the same time. These conditions apparently are met when temperatures are cool in October but then remain moderate into mid-December and result in a concentration of turtles between Oregon Inlet and Cape Hatteras, North Carolina. In most years sea turtles leave Chesapeake Bay and filter through the area a few weeks before the fishery becomes concentrated. Efforts are currently under way (by VIMS and the US Fish and Wildlife Service refuges at Back Bay, Virginia, and Pea Island, North Carolina) to more closely monitor these mortalities due to trawls. Fishermen are encouraged to carefully release turtles captured incidentally and to attempt resuscitation of unconscious turtles as recommended in the 1981 *Federal Register* (pages 43976 and 43977).

The only other endangered species occurring in the northwest Atlantic is the shortnose sturgeon (*Acipenser brevirostrum*). The Councils urge fishermen to report any incidental catches of this species to the Regional Director, NMFS, One Blackburn Drive, Gloucester, MA 01930, who will forward the information to persons responsible for the active sturgeon data base.

The range of these four managed species and the above mentioned marine mammals and endangered species overlap and there always exists a potential for an incidental kill. Except in unique situations, such accidental catches should have a negligible impact on marine mammal or abundances of endangered species, and the Councils do not believe that implementation of this FMP will have any adverse impact upon these populations.

G.4.1.1. Sea Turtles.

Attempts were made to put these fisheries/sea turtle interaction into perspective of other sources of mortality for these endangered turtle species. The Congressionally mandated report *Decline of the Sea Turtles: Causes and Prevention* (NRC 1990) states that "Of all the known factors, by far the most important source of deaths was the incidental capture of turtles (especially loggerheads and Kemp's ridleys) in shrimp trawling. This factor acts on the life stages with the greatest reproductive value for the recovery of sea turtle populations."

Mortality associated with other fisheries and with lost or discarded fishing gear is much more difficult to estimate than that associated with shrimp trawling, and there is a need to improve these estimates (NRC 1990). This report identified possible turtle losses from the winter trawl fishery north of Cape Hatteras (about 50-200 turtles per year); the historical Atlantic sturgeon fishery, now closed, off the Carolinas (about 200 to 800 turtles per year); and the Chesapeake Bay passive-gear fisheries (about 25 turtles per year). Considering the large numbers of fisheries from Maine to Texas that have not been evaluated and the problems of estimating the numbers of turtles entangled in the 135,000 metric tons of plastic nets, lines, and buoys lost or discarded annually, it seems likely that more than 500 loggerheads and 50 Kemp's ridleys are killed annually by nonshrimp fisheries (NRC 1990). These other fishery operations, lost fishing gear, and marine debris are known to kill sea turtles, but the reported deaths are only about 10% of those caused by shrimp trawling. Dredging, entrainment in power-plants intake pipes, collisions with boats, and the effects of petroleum-platform removal all are potentially and locally serious causes of sea turtle deaths. However these collectively amount to less than 5% of the mortality caused by shrimp trawling (NRC 1990).

The NRC report (1990) concludes that all species of marine turtles need increased protection under the Endangered Species Act and other relevant legislation. While the report does not recommend specific conservation measures for these fisheries, the recommendations for the shrimp trawling are germane. The NRC report (1990) recommended TEDs, 60 minute winter tow-time limits, and limited time/area closure for turtle "hot spots". At this time, there are five sea turtle Recovery Plans in place that include the loggerhead turtle (October 1991), green sea turtle (October 1991), leatherback sea turtle (April 1992), the Kemp's ridley sea turtle (August 1992) and the hawksbill sea turtle (December 1993). Of the six "Actions Needed" that are identified by the Recovery Plan to achieve recovery of loggerheads is item 5: "minimize mortality from commercial fisheries."

G.4.1.2. Shortnose Sturgeon.

Shortnose sturgeon (*Acipenser brevirostrum*) is an additional endangered species that may be caught incidentally in the trawl fisheries. Sturgeon will be included in the Incidental Take Statement of the pending Biological Opinion. As shortnose sturgeon are generally associated with the estuarine environment, rather than the truly marine environment, it is anticipated that the gear and fishing locations of these fisheries will rarely encounter shortnose sturgeon. The Shortnose Sturgeon Recovery Team is nearly finished with a draft recovery plan.

G.4.1.3. Marine Mammals.

Marine mammals are managed under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Marine mammals have been historically important in the US both as targets for commercial harvests and in ecological interactions with commercial fisheries. Some scientific attention was given to marine mammals as early as 1851 when Matthew F. Maury of the US Navy's Depot of Charts and Instruments published his whale charts based upon whaler's logs and records of sightings. The US Fish Commission, after its creation in 1871, gave more attention to marine mammals, commissioning, for example, Starbuck's 1878 "History of the American Whale Fishery". The omnibus series entitled "The Fisheries and Fishery Industries of the United States" by G. B. Goode and Associates in 1884 described fisheries for the great whales as well as smaller whales (e.g. pilot whales, bottlenose dolphins and bottlenose whales) in the North Atlantic (USDC 1993).

In addition to these direct fisheries, there was also interest in the indirect effects of marine mammals on other fisheries. Goode also described the destructiveness of marine mammals to fisheries, a theme the US Commissioner of Fisheries used in 1889 in supporting a fish meal factory to be built in Woods Hole. The commissioner speculated that the 20 tons of predators such as porpoises, skates, and dogfish that the proposed factory would process annually "should present a marked influence upon the supply of edible fishes". The interest of the US Fish Commission was primarily in terms of fisheries, and little biological study appears to have been done of marine mammals in this region beyond the taxonomic studies of Frederick True starting in the 1880's. For example, he provided written instructions to the lighthouse keepers on "the best means of collecting and preserving specimens of whales and porpoises" (USDC 1993).

With the declining importance of the US harvests of east coast species of marine mammals in the late 1800's and early 1900's, the incentive for systematic scientific study of the species inhabiting northeastern US waters declined. In the 1930's and 1940's, Remington Kellogg at the Smithsonian and William Schevill at Harvard undertook taxonomic studies, but it was not until the late 1940's that cetacean biology began to be investigated more systematically. Then Schevill began a series of investigations at the Woods Hole Oceanographic Institution of cetacean acoustics that are still continuing. In the early 1970's, several other researchers began studying marine mammals in this region. The results of this earlier work was addressed in 1979 when the US Marine Mammal Commission sponsored a workshop to help define research needed for the study of marine mammals on the US east and Gulf coasts and in 1989 at a NMFS-sponsored workshop on Gulf of Mexico marine mammal research needs (USDC 1993).

These workshops set a research agenda that was immediately addressed by agencies such as the Minerals Management Service and the NMFS. During the 1980's, several institutions in the northeast developed active research programs which have resulted in a body of knowledge that is being drawn upon in developing management approaches for several critical marine mammal issues in the region. In the 1990's, increased attention has been focused on the characterization of marine mammal fauna of the US Gulf of Mexico and the Mid-Atlantic Bight (USDC 1993).

Thirty-five species of marine mammals range the US Atlantic and Gulf of Mexico waters (32 whales, dolphins and porpoises, two seal species and one manatee). Their status is poorly known, but some, like the right whale, Mid-Atlantic coastal bottlenose dolphin, and harbor porpoise, are under stresses that may affect their survival (USDC 1993). Brief summaries below for selected species give data on distribution, current and historical abundance and population trends.

Bottlenose Dolphin.

The number of discrete stocks of bottlenose dolphins is unknown, although there appear to be offshore and coastal types, possibly forming two distinct populations. There are no comprehensive population estimates, but abundance in the Gulf of Mexico is 35,000 - 40,000 in waters of 100 fathoms or less. Nearshore aerial surveys between Cape Hatteras and Nova Scotia in 1979 -82 suggest a northeast US total of 10,000 - 13,000 individuals. However, a large die-off of bottlenose dolphins in 1987 - 88 may have resulted in a 50% or greater decline in the nearshore and offshore types. An offshore survey from New Jersey to Cape Hatteras in 1987 found about 1,050 - 7,500 which were assumed to be of the coastal type (USDC 1993).

Pilot Whale.

Two species of pilot whales occur in the North Atlantic, the shortfin pilot whale in the south and the longfin in the north. The range of the two species overlaps seasonally in the Mid-Atlantic region of the western North Atlantic. The longfin pilot whale occurs northward into Canadian and the Greenland waters and eastward to Europe: it is subject to an ongoing harvest around the Faroe Islands and incidental capture in several fisheries in the US and Canadian waters. The shortfin pilot whale may be subject to a low level of bycatch in several US fisheries. Population structure and general life history of both species is very poorly known. Abundance has been estimated for the longfin pilot whale in the eastern North Atlantic (750,000) and for the continental shelf region of the western North Atlantic (roughly 11,000; USDC 1993).

Fin Whale.

Fin whales, listed as endangered under the ESA, are probably the most numerous large cetaceans in temperate waters of the western North Atlantic Ocean. They range widely throughout the continental shelf in all seasons, but most sightings occur from the Great South Channel on Cape Cod, north throughout the southwest Gulf of Maine. Stock structure and total abundance are unknown. An estimate of abundance off the northeast coast in 1979 - 82 was 5,200 in spring and 1,500 in winter. Important research and management questions are whether separate stocks exist, the location of calving grounds and annual calf production, and the location of the wintering grounds for the northwest Atlantic population.

Humpback Whale.

The humpback whale is listed as endangered. Reasonably discrete summer stocks occur in the Gulf of Maine, Gulf of St. Lawrence, and the waters of Newfoundland-Labrador, west Greenland, Iceland, and Norway. The estimated population is about 5,100 whales. Along the northeast coast, humpbacks frequent the Great South Channel, Georges Bank, Stellwagon Bank, and Jeffreys Ledge during summer. A minimum estimate of the population prior to commercial whaling (about 1865) was 4,400 - 4,700 humpbacks. Entanglement with fishing gear and sporadic toxin-induced die-offs are problems for the species. In recent years the number of sightings of young humpbacks in the Mid-Atlantic region has increased, generally in the areas of the Chesapeake and Delaware Bays (USDC 1993). A Recovery Plan exists for this species.

Right Whale.

Northern right whales occur on the continental shelf from Florida to Nova Scotia. The endangered western Northern Atlantic stock is the only northern hemisphere right whale population with a significant number of individuals (300 - 350) -- the other stocks being virtually extinct. The pre-eighteenth century population may have been as high as 10,000, and, if so, the current population is more than 95% depleted. Individual identification, satellite tagging, genetic analysis, and the use of video cameras to document behavior are new research methods that have been applied in recent years. Many questions, however, remain. Among them are the location of the summering grounds for 30% of the population and wintering grounds for 80% of the population. Human impacts (net entanglements and ship strikes) are affecting some 60% of the population and may be inhibiting recovery. Two areas important to the northern right whale, the summer feeding grounds off the New England coast and the winter calving area along the Georgia and northern Florida coast, have been proposed as critical habitat (USDC 1993). In June of 1994 a final rule was published that identified the summer feeding grounds in New England and the winter calving grounds off the Georgia and Florida coasts as critical habitat. A Recovery Plan exists for this species.

Harbor Porpoise.

The northwestern Atlantic harbor porpoise is found from Newfoundland, Canada, to Florida. It is hypothesized that there are three populations: Newfoundland, Gulf of St. Lawrence, and Gulf of Maine-Bay of Fundy. However, there is not enough evidence to test this hypothesis against the alternative of a single population. Summer aggregations occur in the Gulf of Maine, Gulf of St. Lawrence, and the east coast of Newfoundland. The winter distribution is poorly understood. The 1991 - 92 population estimate of the Gulf of Maine population is 47,200 (95% CI 32,800 - 68,000). No useful estimates of abundance for the other populations exist. The average estimate of annual mortality by the US Gulf of Maine sink gillnet fishery from 1990 and 1992 is about 1,700 (range 900 - 2,400). These estimates do not include bycatch from fisheries south of Cape Cod or north of the US border. The estimated bycatch of the other two populations is largely unknown, though some new data do exist for the Bay of Fundy, which are currently being analyzed (USDC 1993).

Harbor Seal.

Harbor seals, year-round residents of Maine and eastern Canada, are seasonal-winter residents in southern New England. Harbor seal numbers have apparently increased in recent years, due primarily to protection under the MMPA. Recent surveys suggest that 26,000 harbor seals occur in the Gulf of Maine, and they are increasing. Bycatch levels are relatively low, and major concerns are competition with fisheries and periodic disease outbreaks (USDC 1993).

Beaked Whales.

There are four species of beaked whales in the northwest Atlantic, however little is known on their distribution, biology, and population structure. Based on cetacean surveys conducted during the early 1980's and 1990's, these species are distributed along the shelf edge (2,000 m), principally along the southern edge of Georges Bank and associated with oceanographic fronts and Gulf Stream meanders. Population estimates for these species are not available. Determination of minimum abundance estimates will require substantial survey effort in shelf-edge waters and waters seaward to at least the Gulf Stream off the northeast US and eastern Canada coasts (USDC 1993).

The gears managed under this FMP are in all three categories of the final List of Fisheries for 1994 for the taking of marine mammals by commercial fishing operations under section 114 of the Marine Mammal Protection Act (MMPA) of 1972 (*Federal Register* 43818-43826). Section 114 of the MMPA establishes an interim exemption for the taking of marine mammals incidental to commercial fishing operations and requires NMFS to publish and annually update the List of Fisheries, along with the marine mammals and the number of vessels or persons involved in each fishery, arranging them according to categories, as follows:

1. A fishery that has a frequent incidental taking of marine mammals;

2. A fishery that has an occasional incidental taking of marine mammals; or

3. A fishery that has a remote likelihood, or no known incidental taking, of marine mammals.

In Category I there is documented information indicating a "frequent" incidental taking of marine mammals in the fishery. "Frequent" means that it is highly likely that more than one marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period. The foreign mackerel trawl fishery (when it existed) is in this category and involves the: common dolphin (*Delphinus* delphis), bottlenose dolphin (*Tursiops truncatus*), Risso's dolphin (*Grampus griseus*), pilot whale (*Globicephala spp.*) and the Atlantic whitesided dolphin (*Lagenorhynchus acutus*). This amendment definitely reduces the desirability to foreign nations fishing since the ABC's are lowered from over one million tons annually to only 134 thousand metric tons. Thus, the preferred alternatives are beneficial to marine mammals.

In Category II there is documented information indicating an "occasional" incidental taking of marine mammals in the fishery, or in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is a likelihood of at least an "occasional" incidental taking in the fishery. "Occasional" means that there is some likelihood that one marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period, but that there is little likelihood that more than one marine mammal will be incidentally taken. Among the fisheries included in this FMP, only the domestic Atlantic mackerel fishery (excluding the Gulf of Maine) is a Category II fishery. There are an estimated 203 vessels in this fishery. This fishery interacts with the common dolphin, Risso's dolphin, and pilot whales. The preferred alternative is beneficial to marine mammals because it allows the frameworking of a control date which could limit uncontrolled growth in this fishery.

In Category III there is information indicating no more than a "remote likelihood" of an incidental taking of a marine mammal in the fishery or in the absence of information indicating the frequency of incidental taking of marine mammals, other factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, and species and distribution of marine mammals in the area suggest there is no more than a remote likelihood of an incidental take in the fishery. "Remote likelihood" means that it is highly unlikely that any marine mammal will be incidentally taken by a randomly selected vessel in the fishery during a 20-day period. The Gulf of Maine Atlantic mackerel trawl fishery, the squid trawl fishery, and the mixed species trawl fishery are all considered Category III fisheries. These fisheries have 30, 250 and greater than 1000 vessels in them respectively. The squid fisheries interact with all the species that the foreign mackerel fishery interacted with, with the exception of bottlenose dolphins. The other two fisheries had no documented marine mammal species involved, according to the *Federal Register* notice. With the limitations on new vessel entry into the squid and butterfish fisheries in the preferred alternative, there should be a beneficial impact of the preferred alternative management on the marine mammal populations of the east coast.

This final list will remain in effect until the interim exemption established under section 114 of the MMPA becomes obsolete. The MMPA was amended on 30 April 1994 and section 118 was created to govern the taking of marine mammals incidental to commercial fishing operations. The provisions of section 118 will replace the current interim exemption system (section 114), when regulations are put into effect, no later than 1 September 1995. Included in the implementation will be a revised List of Fisheries, a revised set of classification criteria, and new implementing regulations, based on the provisions of section 118, to replace those provisions currently in effect.

G.4.1.4. Seabirds.

Pelagic seabirds may also come into contact with these fisheries. Total densities of seabirds over the continental shelf and slope in the mid-Atlantic region are relatively low compared to the shelf and shelf break area off New England (Milliman and Wright 1987). Most of the following information is taken from the Mid-Atlantic Research Plan (1994) and Peterson (1963). Fulmars occur as far south as Virginia in late winter and early spring. Shearwaters, storm petrels (both Leach's and Wilson's), jaegers, skuas and some terns pass through this region in their annual migrations. Gannets and phalaropes occur in the Mid-Atlantic during winter months. Eight gulls breed in eastern North America and occur in shelf waters off the northeastern US. These gulls include: glaucous, Iceland, great black-backed, herring, laughing, ring-billed, Bonaparte's and Sabine's gulls and black-legged caduceus. Royal and sandwich terns are coastal inhabitants from Chesapeake Bay south to the Gulf of Mexico. The Roseate tern is listed as endangered under the ESA, while the Least tern is considered threatened (Safina pers. comm.). Of course, our national symbol, the bald eagle is listed as endangered under the ESA, and is a bird of aquatic ecosystems. Literally translated, its Latin name, *Haliaeetus leucocephalus*, means white-headed sea eagle (*Federal Register* 1994, 35584). Prey of esturine inhabiting bald eagles is likely to include the long-finned squid, butterfish and mackerel (D'Amico pers. comm.)

Butterfish, Atlantic mackerel and long-finned squid are all important prey for the Common and Roseate terns (Safina 1987, Safina *et al.* 1988, and Safina *et al.* 1990). Safina *et al.* (1988) note that few other seabird studies have measured ambient food levels among foraging birds, but many studies which have examined food provisioning to chicks and reproductive performance in seabirds have found results similar to theirs. Laying dates, clutch sizes, growth, and fledgling success of seabirds have been linked to food availability by a number of workers. Safina *et al.* (1988) recorded that prey fish were more abundant in 1984 than it was in 1985 and noted that reproductive productivity of terns was greater in 1984 for most parameters measured. Although they studied productivity for only two seasons, the results suggest that prey population fluctuations may limit reproductive success in the terns they studied.

Safina *et al.* (1990) noted that observing prey deliveries at nest cannot address the question of how foraging birds select prey or foraging habitat from the rang of possibilities. However, the variability they found show tat either prey availability or birds' selection criteria changes, and that prey availability or selection varies differently between the two tern species, Common and Roseate, they studied. Some prey species may have their own consistent internal rhythms (or influencing factors) which make them differentially susceptible to tern predation on a daily time scale.

A definitive analyses of the importance of these four species for the diets of pelagic seabirds and marine mammals has not yet been conducted. Alaska Sea Grant (1994) sponsored a workshop in 1993 entitled *Is It Food* which addressed the importance of Alaskan fish prey for marine mammal and seabird declines. A similar workshop for Northwest Atlantic interactions would be quite germane.

G.4.2. No Action.

No action may jeopardize the continued existence of the threatened or endangered species mentioned above because there will be uncontrolled, unlimited fishing pressures on the species managed by the FMP. As noted earlier, these four species are very important in the diets of some seabirds, marine mammals, and various fishes. Since the resources are not currently overfished and the biomass is healthy, the availability of these four species for food for these other populations is sufficient. Preventing overfishing of Atlantic mackerel, squid and butterfish thus will be beneficial to some seabirds and certain species of marine mammals. The return of the foreign mackerel fishery will definitely result in more interactions with marine mammals.

G.4.3. Other Alternatives.

It is likely that none of the non-preferred alternatives will pose a direct substantial damage to threatened or endangered species. Adoption of some of the non-preferred alternatives other than the proposed action could possibly inhibit the continued existence of any of the threatened or endangered species mentioned above because there will be uncontrolled, unlimited fishing pressures on these four species. Only the preferred alternative has all the various commercial and recreational measures frameworked to allow the achievement of the prevention of overfishing. More fishermen (i.e. without the moratorium) rushing for limited resources may definitely have negative impacts on threatened and endangered marine life. These four resources need conservation which in turn will be beneficial to seabirds, marine turtles, and marine mammals in general. The return of the foreign mackerel fishery will definitely result in more interactions with marine mammals.

G.5. WILL THE PROPOSED ACTION BE REASONABLY EXPECTED TO RESULT IN CUMULATIVE ADVERSE EFFECTS THAT COULD HAVE A SUBSTANTIAL EFFECT ON THE TARGET RESOURCE SPECIES OR ANY RELATED STOCKS THAT MAY BE AFFECTED BY THE ACTION?

G.5.1. Proposed Action

The proposed action will be expected to result in cumulative beneficial effects on the target resource and other associated non targeted species that are greatly overfished. Given the Congressional mandate (National Standard 1 of the MFCMA) to prevent overfishing the conservation and management of this resource must occur. The increasing level of fishing mortality that has been gradually occurring during the past decade, and which could greatly increase with the addition of numerous New England groundfish boats could drive these resources to a level where the spawning stock biomass is reduced and recruitment overfishing occurs. The maximum sustainable yields would then not be achievable. Unquestionably, the human impacts may be significant in the short term, if the resources is not used for short term economic gain. However, with the populations stabilized, and harvesting occurring around MSY, the maximum long term economic gains to the

Nation, will be achieved.

As stated above, some switching of target species may occur and the prediction of the fishermen's behavior is very difficult, however species of fish which are truly caught as a bycatch with these four species may likely sustain an increase in fishing effort as effort is stabilized at the effort level associated with MSY. Very few trawl-targeted species in the Northwest Atlantic are underfished, but it is the underfished species like Atlantic mackerel, skates, and dogfish which may be targeted by fishermen as efforts increase to reduce overfishing on many presently targeted species.

The proposed action has been selected to reduce short and long term impacts on the resource. The management measures will prevent excessive mortality and improve stock health. Related activities directed to State and Federal regulatory agencies may offer indirect benefits to essential habitats for these species.

The socio-economic impacts of the proposed action potentially could be significant (section 9 Fishery Impact Statement). This is merely a result of the stabilization of fishing mortality necessary to prevent overfishing. However, the management system incorporated in the proposed action is flexible so that management measures may be adjusted annually. Further, the moratorium on entry of additional commercial vessels into the squid and butterfish fisheries will enable the fishermen who absorb the impact of the management regime to make predictive management decisions under the stock stabilization, rather than having benefits dissipated among new entrants, as is always the case in an open access fishery.

G.5.2. No Action.

No action would allow for foreign fishing nations to return for Atlantic mackerel and have a negative impact on US fishermen and marine mammals. It would also allow for significantly more Atlantic mackerel and *Loligo* to be harvested than is presently thought advisable (Amendment section 5.4). The prevention of overfishing will benefit these four resources and the entire ecosystem (especially species that prey on these four species (sections G.1 and G.4) that Atlantic mackerel, squid and butterfish are a part of, as well as the human environment that would be more profitable under effective fishery management.

G.5.3. Other Alternatives.

The critical aspect of the preferred management measure is the frameworked nature of the commercial and recreational measures that prevent overfishing. The cumulative adverse effects for these four resources and other related species that may be affected by the proposed management will be minimized with the preferred alternative. Obviously, these four resources should not be overfished, and thus the beneficial aspects of abundant Atlantic mackerel, squid and butterfish (i.e. prey) for other species is greatest with the frameworked preferred measures. Most of the non-preferred alternatives will not allow direct substantial damage to occur to the environment on a cumulative basis.

G.6. ADDITIONAL ENVIRONMENTAL CONSEQUENCES OF MANAGEMENT ALTERNATIVES.

There are six objectives for this FMP:

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.

2. Promote the growth of the US commercial fishery, including the fishery for export.

3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.

4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.

5. Increase understanding of the conditions of the stocks and fisheries.

6. Minimize harvesting conflicts among US commercial, US recreational, and foreign fishermen.

All six of these objectives will contribute to positive environmental benefits, in that they will contribute towards preventing overfishing for these four resources which will also contribute towards a well-balanced, healthy ecosystem.

The Council has adopted the following management measures for this FMP which would be implemented as described is section E.1:

1). Entry limitations in the squid and butterfish fisheries.

2). Elimination of TALFF and joint ventures for the squids and butterfish.

3). Minimum mesh size for *Loligo*.

4). Revised Atlantic mackerel specification limits.

5). Revised Loligo MSY.

6). Frameworked seasonal *Loligo* allocations.

7). No Transfer at Sea by Non-Moratorium Vessels.

8). Loss of Permit for Falsification of Data.

The above items are the major measures for this Amendment. These resources have become Americanized under the previous management of this FMP and now the intent is not to allow the over-exploitation or over-capitalization of these fisheries. This Amendment is intended to allow the continued orderly development and to make certain that the resources are there on a long term basis to provide the necessary yields.

Clearly, there will be impacts from this Amendment. Overfishing must be prevented and habitat destruction must be minimized. Preventing uncontrolled growth in these fisheries should assist both those goals.

The greatest impact to fishermen would come with no action. With only the existing management measures in place, it is quite likely that the resources will become overfished and over-capitalized. The adopted management measures are considered the most reasonable program to prevent overfishing and over-capitalization at this time (EIS section E.2). The moratorium is included to increase the probability of compliance with the management program in the near term, as well as providing a mechanism for participants to share in the resource rather than having the dividend of effective management dissipated over additional vessels that could enter the fishery. This technique was used to great success with the surf clam fishery.

It must be recognized that a standard cost/benefit analysis was not developed on the Amendment because the requisite data were not available. It is anticipated that improved data collection, including the reporting requirement of the Amendment, will allow such a quantitative study to be conducted in future Amendments. It must also be recognized that all alternatives (including most particularly, the no action alternative) may have potential negative economic impacts in the short run. However, it is believed that the preferred alternative will have the least negative potential impacts in the short term (possibly none at all) and the greatest benefits (in the form of the stabilized resource) in the long term. The only potential short term negative impacts of the preferred measures are to those fishermen that might desire to fish for squids or butterfish in the future, but do not qualify based on their lack of historical landings. The only other potential short term negative impact could be that if there were markets for the higher ABC's for mackerel and *Loligo*, lowering those numbers would result in short term impacts. However, since the current ABC's have not been approached, there is no real impact.

Permitting and reporting should have no environmental consequences. The moratorium on entry of new commercial vessels will have only beneficial environmental consequences. The minimum mesh size will have beneficial environmental consequences for these four resources and other species that may prey on them or be part of the mixed fishery with *Loligo*. Many more small *Loligo* will escape with a minimum mesh than are currently being caught and discarded with the mesh nets currently in use. Increased survival of small *Loligo* will not only directly benefit *Loligo* but will also be quite advantageous to the overall ecosystem to which they are often an important prey item. Fishermen have indicated that they will use larger mesh to harvest squid. Other species that are part of the mixed trawl catch that are discarded dead also will benefit as the mesh is increased from the current size.

The Council, working through a Monitoring Committee, will evaluate the success of the FMP relative to the overfishing and other goals and propose adjustments to the management system. Additional measures would be implemented by the Regional Director based on the recommendations of the Council as described in section E.1.

Of the non-preferred alternatives identified in FMP Appendix 1, only the no action alternative and the individual transferable quota would have significantly different environmental consequences to those measures in the preferred alternative package.

Clearly the no action alternative is indefensible from a biological or environmental point of view. These resources could be overfished with negative ecosystem consequences.

The ITQ alternative would have significant positive environmental consequences. Paramount among these benefits is the incentive to conserve and shepherd a natural resource because an individual has a stake in its future. The importance of this motivation cannot be overemphasized given the depleted condition in which so many of our living marine resources exist. Incentives under most existing management systems are simply to harvest as much as possible today, for tomorrow the resource may be gone, or harvested by someone else. Issuing harvest rights which last indefinitely engenders a corresponding concern among users that the health of the fishery resource be maintained indefinitely.

G.7. ECONOMIC EFFECTS OF THE ALTERNATIVES.

G.7.1. Proposed Action.

The economic characteristics of the fishery are presented in section 8 of the FMP. The benefits and costs of the proposed actions addressed in this FMP and FEIS are evaluated in section 9.2 (Analysis of Beneficial and Adverse Impacts of Adopted Management Measures), in Appendix 1 (Alternatives to the Amendment), and in Appendix 2 (Regulatory Impact Review).

G.8. FEDERAL AGENCIES THAT MAY BE AFFECTED.

The Federal Agencies that may be affected by this proposed Amendment include:

Dept. of Army Civil Works: scheduling of dredging projects, discharge of dredged materials, identification of aquatic borrow sites.

Dept. of Army Regulatory 1404 Program: issuing of permits for water development projects (e.g. dredging, filling, bulkheading, construction of piers, and installation of piles).

Environmental Protection Agency: Section 401 -- individual state review of 404 discharges, Section 402 -- point source discharges, Section 404 -- discharge of dredge or fill into waters of the U.S., Section 208. Marine Protection, Research, and Sanctuaries Act. Ocean Dumping, RCA, Superfund.

Minerals Management Service: Outer Continental Shelf Land Act, Hydrocarbon Exploration and Development, Hard Mineral Mining.

Dept. of Commerce: Endangered Species Act, Marine Mammals Protection Act, Coastal Zone Management Act.

H. LIST OF PREPARERS

The Amendment was prepared by a team of fishery managers and scientists with special expertise in the squid, mackerel and butterfish resources including:

Mid-Atlantic Council Mackerel, Squid, and Butterfish Committee - Mid-Atlantic Council members Tom McVey (Chair, NJ), Alan Weiss (PA), Tony Dilernia (NY), James Gilford (MD), Gil Radonski (VA), Brian Rothschild (MD), and Richard Rosenman (DOS) and New England Council member James McCauley.

Mid-Atlantic Council Mackerel, Squid, and Butterfish Industry Advisory Subcommittee - Charles Bergman (NJ), Sal Ruggiero (NJ), Fred Ascoli (NJ), Lars Axelsson (NJ), Jeff Reichle (NJ), James Harris (NJ), Albert Adams (DE), Mark Simonitsch (MA), Bill Quinby (MA), Brian Sweeney (RI), and James A. Ruhle (NC).

MAFMC staff - David R. Keifer, Dr. Thomas B. Hoff, Richard J. Seagraves, Dr. Christopher M. Moore, Clayton E. Heaton, and José L. Montañez.

I. REFERENCES, TABLES, AND FIGURES ARE ALL FROM THE FMP.

J. AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE EIS WERE SENT.

(Appendix A)

K. RESPONSE TO COMMENTS. (Appendix 6)

APPENDIX A.

Last Name	First Name	Address 1	Address 2	City	State	Zip
& Johnson, Inc.	Axelsson	P.O. Box 180		Cape May	NJ	08204
& P.Barbera	N.Clark	Town Dock, Inc.	P.O. Box 608	Narragansett	RI	02882
(011)5th C.G. Dis	Cmdr.,	Federal Bldg. Room 401	431 Crawford St.	Portsmouth	VA	23705
Abrams	Robert	520 Davie St.		Westbury	NY	11590-5908
Adams	Albert	RD 1 Box 406		Milford	DE	19963
Affairs Library	Marine	Washburn Hall	Univ. of RI	Kingston	RI	02881
Agnello	Richard	Economics Dept.	Univ. of Delaware	Newark	DE	19711
Agric. Counselor		Embassy German Fed. Rep.	4645 Reservoir Rd.,NW	Washington	DC	20007-1998
Allen	Kenneth	448 N. Connecticut Ave.		Atlantic City	NJ	08401
Allen	Richard	35 Bliss Rd.		Wakefield	RI	02879
Allen	Rick	Borden Clam Products	Box 994 Ocean Drive	Cape May	NJ	08204
Alley	Dick	The Fisherman	121 So. Compo Rd	Westport	CT	06880
Alspach	Thomas	295 Bay St., Suite One	PO Box 1358	Easton	MD	21601
Ambrico	Donald	3030 Emmons Ave.		Brooklyn	NY	11235
Amory	Charles	L.D. Amory Seafood Co.	101 South King Street	Hampton	VA	23669
Anderson	Eric	Dept. of Economics	Old Dominion Univ.	Norfolk	VA	23529
Anderson	Lee	College of Marine Studies	University of Delaware	Newark	DE	19716
Anderson	Tom	705 Tall Oaks Dr		Brick	NJ	08724
Andrae	John	PO Box 358		Port Republic	NJ	08241
Ardolino	Fred	2345 Knapp St.		Brooklyn	NY	11229
Armani	Jerry	393 Stanhope St.		Brooklyn	NY	11237
Asbury Park Press		703 Mill Creek Rd		Manahawkin	NJ	08050
Asbury Park Press		John Geiser, Out. Writer	Box 1550	Neptune	NJ	07754
Ascoli	Capt. Fred	3 Rabbit Run		Cape May	NJ	08204
Atl.Fish.Mgt.Coun	South	Southpark Bldg.,Suite 306	1 Southpark Circle	Charleston	SC	29407
Auld	Don	MD Sportfish Advisory Com	11501 Crows Nest Road	Clarksville	MD	21019
Auletta	Thomas	43 Idolstone Ln		Matawan	NJ	07747
Axelsson	Harry	738 Shunpike Road		Cape May	NJ	08204
Axelsson	Lars	705 Hughes Ave		N. Cape May	NJ	08204
Bacek	Tracy	PO Box 202		Barnegat Light	NJ	08006
Bader	D.	1442 East 13th St		Brooklyn	NY	11230
Bain III	Claude M	Suite 102 Hauser Bldg.	968 Oriole Dr. South	Virginia Beach	VA	23451
Baird	Charles	RD 2 Box 321		Milton	DE	19968
Baker, Town Mngr.	Stewart	Town Office	4026 Main St.	Chincoteague	VA	23336
Balcom	Nancy	Sea Grant Marine Adv. Prg	1084 Shennecossett Rd	Groton	CT	06340-6097
Bandes	Bruce	Bandes & Byrnes	Main Street	Oakdale	NY	11769
Bannick	Bruce	7 Galley Street		Jamestown	RI	02835
Barnes	John	Ampro Fisheries Company	PO Box 319	Reedville	VA	22539
Barr	Capt. E.W.	PO Box 866		Urbanna	VA	23175
Basmajian	Don	228 St. John Ave.		Erma	NJ	08204
Bates	Robert G.	Seafood Industrial Park	34 Jefferson Ave.	Newport News	VA	23607
Beal	Kenneth	NOAA Fisheries - F/NER5	One Blackburn Drive	Gloucester	MA	01930
Beckwith, Jr.	Ernest E.	Dept of Env. Protection	State Office Bldg, Rm 255	Hartford	CT	06115

Last Name	First Name	Address 1	Address 2	City	State	Zip
Behlman	Wade	59 Audrey's Lane		Marston Mills	MA	02648
Behlmen	Wade	59 Audreys Lane		Marstons Mills	MA	02648
Beideman	Terri L.	PO Box 579		Barnegat Light	NJ	08006
Beidman	Nelson R	10th St. & Bay Ave.		Barnegat Light	NJ	08006
Bennett	Al	Bridgeport Post	341 Fairland Dr.	Fairfield	CT	06430
Bennett	Scott	Box AX		Amagansett	NY	11930
Berens	Raymond	Philadelphia Press	One East Penn Sq., Ste813	Philadelphia	PA	19107-2708
Berg	Erling	1235 Lafayette		Cape May	NJ	08204
Bergmann	Charlie	PO Box 464		Rio Grand	NJ	08242
Bermudez	Linda	1415 East 16th Street		Brooklyn	NY	11230
Birke	R.	216 E. Shore Drive		Massapequa	NY	11758
Blakeslee	Jerry	117 Morris Ave.		Milton	DE	19968
Blount	Willis	F/V Ruthie B	56 Vesper Lane	Nantucket	MA	02554
Bochenek, PhD	Eleanor	Sea Grant Marine Adv Serv	1623 Whitesville Rd	Toms River	NJ	08755
Bogan	Howard	7 Kings Path		Brielle	NJ	08730
Bogan	Raymond	605 Beacon Blvd.		Sea Girt	NJ	08750
Bonilla	Jennifer	PO Box 2564		New York City	NY	10009
Borden	David	Div. of Fish & Wildlife	Government Center	Wakefield	RI	02879
Bovykin	Yu.	Fisheries Attache	1609 Decatur St., NW	Washington	DC	20011
Boyce	Leo	108 Moriches Ave		Mastic	NY	11950
Boyle	Paul	Deputy Director	Aquarium for Wildlife Con	Brooklyn	NY	11224
Bozek	Robert	Atl Pro Boatmans Assn.	154 Hendrickson Ave.	Rockville Centre	NY	11570
Brame	Dick	ACCA	1994 Eastwood Road	Wilmington	NC	28403
Bramhall	David	106 Chicago Blvd.		Sea Girt	NJ	08750
Brancaleone	Joseph	4 Flume Rd		Magnolia	MA	01930
Branin	Joseph	172 Linden Ave	P.O. Box 53	Highlands	NJ	07732
Branstetter, Ph.D	Steve	2816 Eagle Run Circle		Clearwater	FL	34620
Braun	Erik	National Marine Fish Serv	62 Newtown Ln, Room 203	E.Hampton	NY	11937
Breitweiser	Charles	677 Snow Drop Ct.		Morgansville	NJ	07751
Brennan	William	Dept of Marine Resources	State House Station 21	Augusta	ME	04333-0021
Bright	William	615 Goshen Rd.		Cape May Crthse	NJ	08210-1501
Brindley	James	12 Seameadow Dr		Parkertown	NJ	08087
Brown	Jed	MSRC SUNY Stony Brook		Stony Brook	NY	11794-5000
Brown, Director	Dr. Brad	Southeast Fisheries Cntr.	75 Virginia Beach Dr	Miami	FL	33141
Brunisholz	Robert	PO Box 441		Califon	NJ	07830
Bryant	LtCMDR Ross	US Coast Guard 5th Dist.	431 Crawford St.	Portsmouth	VA	23704-5004
Bryson	John	40 McBry Dr.		Dover	DE	19901
Buck	Eugene	Cong. Resrch Service-ENR	Library of Congress	Washington	DC	20540-7450
Buckmaster	Linda	National Fisherman	PO Box 908	Rockland	ME	04841
Bullard	Buddy	805 West Fifth St.		Hampton	SC	29924
Bunting	David	307 Dorchester St.		Ocean City	MD	21842
Burger	John	PO Box 428		Dover	DE	19901
Burgess	Robert D.	Snow's Doxsee Inc.	994 Ocean Drive	Cape May	NJ	08204

Last Name	First Name	Address 1	Address 2	City	State	Zip
Burkland	Richard	Montauk Fish Dock	PO Box 2048	Montauk	NY	11954
Burnett-Kurie	Karen	IPSSR, UNH	Hood House, 89 Main St	Durham	NH	03824-3577
Burnley	Eric	2408 Hayloff Lane		Virginia Beach	VA	23456
Calos, PAF	Angela	Public Affairs Officer	1335 East-West Highway	Silver Spring	MD	20910
Cangialosi	Carl	28 Lawrence Ave		Holbrook	NY	11741
Cantwell	Maria	1520 Longworth HOB	ATTN: Amy Robins	Washington	DC	20515
Cape Fisheries	Atlantic	P.O. Box 555		Cape May	NJ	08204
Caputi	Gary	118 Harding Drive		Bricktown	NJ	08724
Carlson	Sten	Box 445		Wellfleet	MA	02667
Carmines	George S	103 Rens Road		Poquoson	VA	23662-1611
Carpenter	Steve	Burlington Co. Times	Route 130	Willingboro	NJ	08046
Carr	Sam	50 Broadview Drive		Tiverton	RI	02878
Carrington	Floyd	20 Ocean Ave.	PO Box 3016	East Quogue	NY	11942
Carroll	Bill	Ferncrest International	PO Box 642	Narragansett	RI	02882
Casey	Jack	120 Knowles Way Ext	Suite 101	Narragansett	RI	02882
Cassell	Jodi	World Wildlife Fund	1250 24th Street, NW	Washington	DC	20037
Castro	Kathy	URI Fisheries Center	East Farm	Kingston	RI	02881
Cerbone	Dominick	168 Fordham St		City Island	NY	10464
Chandler	LeeAnne	300D Robinson Hall	University of Delaware	Newark	DE	19716
Cheryl	Waldman	Cong. Info. Serv.	4520 East West Hwy.	Bethesda	MD	20814-3389
Chiles	David	128 East North st		Bethlehem	PA	18018
Chincoteague		Chamber of Commerce	MADDOX Blvd	Chincoteague	VA	23336
Clairmont	Robert	U.S. Small Business Adm.	409 3rd St., Suite 7800	Washington	DC	20416-3110
Clam Co.	Eastern	Sam Barrington	255 MacArthur Drive	New Bedford	MA	02740
Coastal Law Cntr.	Ocean &	School of Law-Librarian	Univ. of Oregon	Eugene	OR	97403-1221
Coates	Philip	Div. of Marine Fisheries	100 Cambridge St.	Boston	MA	02202
Coble	Howard	403 Cannon Building	ATTN: Ed Lee	Washington	DC	20515
Cocoros	Raymond	2127 35th St.		Long Isl. City	NY	11105-2101
Coffman	Danny G	RT #1 Box 2	Chapel View	Lewes	DE	19958
Cohen	Daniel	PO Box 555		Cape May	NJ	08204
Cohen	Max	21 Locust Lane		Cape May Crthse	NJ	08210
Colabella	Joe	602 Green Ave.		Bielle	NJ	08730
Cole	John	Fishermen's Co-op Dock	P.O. Box 1314	Pt.Pleasnt Bch	NJ	08742
Cole	Richard	Dept Nat'l Res.&Env.Cont.	PO Box 1401	Dover	DE	19903
Cole	Willard	US Fish & Wildlife	PO Box 972	Morehead City	NC	28557
Collins & Sons	Jack	37 Hawley Ave		West Islip	NY	11795
Colvin	Gordon	Dept. of Env. Cons.	SUNY Bldg. #40	Stony Brook	NY	11790
Connelly	John	25 Jacksonville Rd		Towaco	NJ	07082
Conner	Charles	MA Div. of Marine Fish.	790 Fisher Rd.	N. Dartmouth	MA	02749
Connolly	Jerry	PO Box 1932		Gloucester	MA	01930
Conover	Dr. David	Marine Science Res. Cntr.	State Univ. of NY	Stony Brook	NY	11790-5000
Conti	Carmen	216 43rd St.		Sea Isle City	NJ	08243
Cookingham	Russell	P.O. Box 1037		Monument Beach	MA	02553

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Cooper	Robert	9 Osprey Nest Rd.	P.O. Box 131	Greenport	NY	11944
Coppa	Michael	600 Millman Blvd.		Del Haven	NJ	08251
Cordes	Albert	1036 Idaho Ave		Cape May	NJ	08204
Corey	Roger	Agri.;Div.	US Int'l Trade Comm.	Washington	DC	20436
Corp	Marquest	7908 Bayshore Drive		Margate	NJ	08402
Corp of Engineers	US Army	Reg. Branch, Norfolk Dist	803 Front St	Norfolk	VA	23510-1096
Corps of Engineer	US Army	Wanamaker Building	100 Penn Square East	Philadelphia	PA	19107-3390
Creed	Carolyn	220 Burlington Court		Flemington	NJ	08822
Crossman	Ken	USDC/NOAA Enforcement	1 Blackburn Drive, Rm.206	Gloucester	MA	01930
Crowell	Peter F.	P.O. Box 362		Scituate	MA	02066
Csulak	Frank	NMFS, Sandy Hook Lab	74 McGruder Rd.	Highlands	NJ	07732
Daily Press		Skip Miller	7505 Warwick Blvd.	Newport News	VA	23607
Daniels	Joey	PO Box 369		Wanchese	NC	27981
Davis	Tom	2 Avon Ct		Dix Hills	NY	11746
Dawson	James	3008 Haucks Mill Rd		Monkton	MD	21111
DeMaula, Jr.	Anthony	22600 Main Rd		Cutchogue	NY	11935-1265
DeVito	Larry	Caleb & Haley	#14 Futon Fish Market	New York	NY	10038
Deare	Andy	2659 Beaver Dam Rd.		Pt. Pleasant	NJ	08742
Degener	Richard	The Press & Sunday Press	1 South Main Street	Cape May Crthse	NJ	08210
Delanoy	Neil	90 Cedar Point Dr.		West Islip	NY	11795
Denney	John P.	5 Blackhawk Rd.		Billerica	MA	01821
Desfosse	Joseph	VA Inst. of Marine Scienc	PO Box 1346	Gloucester Pt.	VA	23062
Di Vincenzo	Mark	Daily Press, Inc.	PO Box 746	Newport News	VA	23607
DiCosimo	Jane	North Pacific Fish Coucil	PO Box 103136	Anchorage	AK	99510
DiDanielle	Danny	P.O. Box 787		Montauk	NY	11954
DiLernia, Prof.	Anthony	Ofce of Marine Education	Kingsborough College	Manhattan Bch	NY	11235
Dickel	Barry	Bahia Marina, Inc.	2107 Herring Way	Ocean City	MD	21842
Dickerson	Gary	101 Marcy Place		Bricktown	NJ	08724
Dickson	Gary	4 Bergen Ave		Hampton Bays	NY	11946
Dodson	Donald K	National Westminster Bank	1 N. Main Street	Cape May Crthse	NJ	08210
Doernte	Harry	5 Saunders Dr		Poquoson	VA	23662
Doherty	CDR T.	Fifth Coast Guard Dist.	431 Crawford St.	Portsmouth	VA	23705
Dominion Lobster	Old	c/o Carl Meixner	3166 S. Main Street	Chincoteague	VA	23336
Dominion Lobster	Old	426 Whiton Road		Neshanic	NJ	08853-4201
Dorman	Robert	Rt. 3, Box 258		Lewes	DE	19958
Doss	Ken M.	211 Choctaw Rd.		Brunswick	GA	31525-9265
Douglas	Jim	Marine Resource Comm	PO Box 756	Newport News	VA	23607
Doxsee, Jr.	Robert L	Doxsee Sea Clam Co.	50 Bayside Dr.	Point Lookout	NY	11569
Drew	Steve	Fisheries Observer Prog.	Manomet Bird Ob. Box 1770	Manomet	MA	02345
Drewer, Jr.	Vernon			Saxis	VA	23427
Drucker	Dr. Milton	Kingsborough Comm. Coll.	2001 Oriental Blvd.	Brooklyn	NY	11235
Drury	Lt. C.L.	New York State DEC	Region 2-Law Enf. Box 251	E.Nassau	NY	12062
DuPaul	William	Dept. of Advisory Serv.	VIMS	Gloucester Pt.	VA	23062

Last Name	First Name	Address 1	Address 2	City	State	Zip
Dulemba	John	Seafood Network Inc.	94 Heritage Lane	Chatham	MA	02633
Dunlop	Bob	59 Lincoln Rd		Montauk	NY	11954-5007
Dunnigan	Jack	ASMFC	1776 Mass. Ave, NW, #600	Washington	DC	20036
Durkas	Susan	131 East Prospect Ave.		Woodbridge	NJ	07095
Dyer	Larry	PO Box 2407		Amagansett	NY	11930
Dykstra	Jacob	1001 Nicholwood Dr.	Apt. 205	Raleigh	NC	27605-3220
Eakes	Bob	PO Box 98		Buxton	NC	27920
East Hampton Star		153 Main St		East Hampton	NY	11937
Eastlake	Gordon	P.O. Box 197		Wachapreague	VA	23480
Egerter	Bill	1107 St. Louis Ave.		Pt. Pleasant	NJ	08742
Egerter	William	208 Harvard Ave		Pt.Pleasant Bch	NJ	08742
Eldredge	Ernest	Chatham Fisheries	PO Box 1407	West Chatham	MA	02669
Ellen W. Corp.		Eastern Shore Seafood Pr.	P.O. Box 38	Mappsville	VA	23407
Ellenton	Dave	World Wide Trading	26 Locust St., Suite 2	Danvers	MA	01923
England	Marilyn	Scully Science Center	306 South Bay Ave	Islip	NY	11751
Epstein	Jan	204 Lee's Lane		Mays Landing	NJ	08330
Ethridge	Capt. Rex	PO Box 91		Wanchese	NC	27981
Etzel	Richard	Fairview Ave		Montauk	NY	11954
Eutsler	Jeffrey	PO Box 51		Ocean City	MD	21842
Evans	Amos F	Old Inlet Bait and Tackle	P.O. Box 129	Rehoboth	DE	19971
Fagin	Dan	Newsday, Environ. Writer	235 Pinelawn Rd.	Mellville	NY	11747
Falk	James M.	College of Marine Studies	Univ. of Delaware	Lewes	DE	19958
Fant	Stephen	40 Walsh Ave.		Auburn	MA	01501
Farley	Sen. Hugh T	NY State Senate	412 Leg. Off. Bldg.	Albany	NY	12247
Farnham	Dan	Box 2242		Montauk	NY	11954
Farnham	Paul	Montauk Fish Dock	PO Box 2048	Montauk	NY	11954
Fee	Russ	66 Douglas Street	Sugarmill Woods	Homosassa	FL	34446
Feinberg	William	Feinberg Dee, & Feinberg	554 Broadway	Bayonne	NJ	07002
Feller	Fred	417 Croatan Hills Rd.		Virginia Beach	VA	23451-3684
Ferrera	Jack	356 Arthur St.		Freeport	NY	11520
Fields	Jack	Merchant Marine & Fisher.	2228 Rayburn HOB	Washington	DC	20515
Figurski	Robert	The Trust Company of NJ	35 Journal Square	Jersey City	NJ	07306
Finke	Joe	29 July Ave.		Bayville	NY	11709
Fish & Game Assn	NASSAU Co.	P.O. Box 245		Rockville Centre	NY	11570
Fish Mgmt. Co.	Pacific	Metro Center, Suite 420	2000 SW First Ave.	Portland	OR	97201
Fish Mgmt. Co.	W. Pac.	1164 Bishop ST.	Room 1405	Honolulu	HI	96813
Fish. Mgmt. Co.	N.Pacif.	PO Box 103136		Anchorage	AK	99510
Fish. Mgt. Co.	Carib.	268 Ave Munoz Rivera 1108		San Juan	PR	00918
Fish. Mgt. Co.	Gulf	5401 W. Kennedy Blvd.		Tampa	FL	33607
Fisher	Wayne	11940 Old Buckingham Rd		Midlothian	VA	23113
Fisheries Coord.	Virginia	US Fish & Wildlife	P.O. Box 480	White Marsh	VA	23183
Fisheries Instit.	National	1525 Wilson Boulevard	Suite 500	Arlington	VA	22209
Fisherman's Dock		Coop	P.O. Box 1314	Pt. Pleasant Bch	NJ	08742

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Fishery Mngmt Cou	New Engl	Suntaug Office Park	5 Broadway (Route 1)	Saugus	MA	01906
Fitzpatrick	James	Cape May Star and Wave	513 Washington Mall	Cape May	NJ	08204
Flannigan	Pat	P.O. Box 32	Mid-Atl. Fisheries Inc.	Swarthmore	PA	19081
Flimlin, Jr.	Gef E.	Ocean Co. Ext. Serv.	Rt. 527 Agr. Cntr.	Toms River	NJ	08753
Fordham	Sonja	Center for Marine Conserv	1725 DeSales St NW Su 500	Washington	DC	20036
Foster	Bill	PO Box 212		Hatteras	NC	27943
Foster	William	PO Box 212		Hatteras	NC	27943
Foster, III	John W S	Tidewater Adm	Tawes State Off Bldg.	Annapolis	MD	21401
Fote	Thomas P	22 Cruiser Ct.		Toms River	NJ	08753
Francis	Woody	Baltimore Army Corps	10 S. Howard St., 8th Fl	Baltimore	MD	21201
Frangipane	Philip	78 Lawrence Ave		Brooklyn	NY	11230
Fredericksen	Pete	34 Stockton Lake Blvd		Manasquan	NJ	08736
Freeman	Bruce	Box 1204		Normandy	NJ	08739
Fricke, F/CM1	Peter	NMFS	1335 East-West Highway	Silver Spring	MD	20910
Fulcher	Mitchell	11 Delavan St		East Hampton	NY	11937
Fullilove	James	National Fisherman	PO Box 908	Rockland	ME	04841-0908
G-OLE-2, Fish Enf	Comandant	U.S. Coast Guard HQ	2100 2nd St., SW	Washington	DC	20593-0001
Gabriel	Wendy	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Gallagher	William	508 Carroll Fox Rd		Brick	NJ	08724
Gallimore	Richard	P.O. Box 350		Beach Haven	NJ	08008
Gant	Randy	10 Artic Ocean Drive		Brick	NJ	08723
Garfield	Curt	Salt Water Sportsman	280 Summer St.	Boston	MA	02210
Garnache	Charles	754 Pool Road		Biddleford	ME	04005
Garrell	Martin	Dept of Physics, Box 701	Adelphi Univ. Garden City	Long Island	NY	11530
Garvey	Chris	15 Trail Road		Hampton Bays	NY	11946
Garvilla	Joseph	PO Box 53		Powellville	MD	21852
Gavin	Arthur J	1022 Crew Lane		Manahawkin	NJ	08050
Gaw	Edward	Merritt	PO Box 5225	Lighthouse Pt	FL	33064
Gehan	Shaun	Seafares Int.	5201 Auth Way	Camp Springs	MD	20746
Geiser	John	1863 Barbee Lane		Wall	NJ	07719
Geld	Gene	793 Pinewood Drive		Elkins	PA	19027
Getz	Tim	1508 Stage Coach Rd		Seavill	NJ	
Ghigliotty	David J.	804 Bayview Ave.		Barnegat Light	NJ	08006
Giaramita, Jr.	Joseph	28 Bay 41 St #1		Brooklyn	NY	11214
Gibson	Barry	4 Puritan Road		Beverly	MA	01915
Gifford Marine		18 N. Franklin Blvd.		Pleasantville	NJ	08232
Gilford	Dr.James	7003 Glen Court		Frederick	MD	21701
Gillelan	M.Elizabeth	NOAA Chesapeake Bay Ofc.	410 Severn Ave , Ste 107A	Annapolis	MD	21403
Gillen	Patrick	25 Ryder Ave		Dix Hills	NY	11746
Gilzinger	Robert H.	The Gorton Group	128 Rogers Street	Gloucester	MA	01930
Giunta	Dennis	3 Browning Drive		Greenlawn	NY	11740
Glas	George	Nat'l Party Boat Owners	All. 181 Thames St.	Groton	CT	06340
Glickberg	Howard	2127 Broadway		New York	NY	10023

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Gloege	Wayne	151 Ocean. Tch. Bldg.	Univ. of Washington	Seattle	WA	98195
Glowka	Arthur	60 Round Hill Drive		Stanford	CT	06903
Gocial	Morris	Certified Public Accnt's	Fox Pavilion-Suite 529	Jenkintown	PA	19046
Goell	Nancy K.	P.O. Box 1493		East Hampton	NY	11937
Goetze	Albert	5830 Hopkins Neck Rd		Easton	MD	21601
Golden, Jr.	Robert	Ebasco Environmental	160 Chubb Avenue	Lyndhurst	NJ	07071
Goldsborough	Bill	Ches. Bay Foundation	162 Prince George St.	Annapolis	MD	21401
Good	Keith	New York Post	210 S. St.	New York	NY	10002
Goodale	Hannah	Fisheries Mgt., NMFS/NOAA	One Blackburn Drive	Gloucester	MA	01930-2298
Goodger	Tim	NMFS Oxford Lab.	Railroad Ave.	Oxford	MD	21654
Gordon	Cindy	Issues Management	105 Campus Drive	Princeton	NJ	08540
Gordon	Wally	Mid-Atlantic Foods	PO Box 367	Pocomoke City	MD	21851
Gordon	William	Sandy Hook Field Station	Bldg. #22	Fort Hancock	NJ	07732
Goyeneche	Fernando	712W 175 St. Apt 2C		New York	NY	10033
Grabowski	Stephen	NMFS Northwest Fish. Cnt	2725 Montlake Blvd.E.	Seattle	WA	98112
Graham	Bruce	256 Louvick St		Norfolk	VA	23503
Greenly	David	RD 2 Box 447		Lincoln	DE	19960
Grimes	Churchil	NMFS SE Fish. Ctr.	3500 Delwood Beach Rd.	Panama City	FL	32407
Guinn	Sonny	10448 Azeala Rd		Berlin	MD	21811
Haas	John	PO Box 270		Seaside Park	NJ	08752
Habron	Geoffrey	907 Washington Blvd	2nd Floor	Oak Park	IL	60302
Haines	Marty	1450 Church St.		Rahway	NJ	07065
Halavik	Tom	US Fish & Wildlife Serv.	P.O. Box 307	Charlestown	RI	02813
Halbrunner	Wayne	713 Shunpike Rd		Cape May	NJ	08204
Hallock	Lance	P.O. Box 358		Stonington	ME	04681
Halperin	Laurie	Center for Marine Cons.	306A Buckroe Ave	Hampton	VA	23664
Hamburg	Dan	114 Cannon HOB	ATTN: Kate Anderton	Washington	DC	20515
Hamer	Paul	611 Chelsa Road		Absecon	NJ	08201
Hamilton, Jr.	Robert	527 Main St		Greenport	NY	11944
Hamilton, Jr.	Robert	527 Main St.		Greenport	NY	11944
Hanna	Susan	Dept. Resource Economics	Oregon State Univ.	Corvallis	OR	97331-3601
Hanrahan	Brian	269 Howard Ave		Rochelle Park	NJ	07662
Harrell	Samuel	RR 2 Box 215-K		Georgetown	DE	19947
Harrington	Kerry	PO Box 224		Berlin	MD	21811
Harris	Jim	338 Lakeview Lane		Cape May	NJ	08204
Hasbrouck	Emerson	Suffolk Coop Marine Prog	39 South Avenue	Riverhead	NY	11901
Hastings	Jay	1111 3rd Ave. Bldg.	Suite 3305	Seattle	WA	98101
Haven Fish Co.Inc	New	34 Saginaw Trail		Guilford	CT	06437
Havens, Jr.	William	PO Box 1992		East Hampton	NY	11937
Hawkins	Jeff	Div. of Marine Fisheries	PO Box 1507	Washington	NC	27889
Haynie	Allen W.	Zapata-Haynie Corp.	P.O. Box 175	Reedville	VA	22539
Helm	Ray	35 Tuthill Pt Rd		East Moriches	NY	11940
Hickman	David	940 Shirley Avenue		Cape May	NJ	08204

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Hill	Tom	Atl.& Pacific Marine Cons	27 Ferry Street	Gloucester	MA	01930
Hillhouse	Roger	1222 80th St. South		St. Petersburg	FL	33707
Hinman	Ken	Nat's Coal. Marine Cons.	3 West Market Street	Leesburg	VA	22075
Hoffman	Larry	PA Fish&Boat Comm	PO Box 67000	Harrisburg	PA	17106
Hogan, Jr.	Philip	1299 Globe Ave.		New York	NY	11003
Holder	Mark	8021 Ocean Pines		Berlin	MD	21811
Holliday F/SR1	Dr. Mark	Resource Stat. Div. NMFS	1335 East-West Highway	Silver Spring	MD	20910
Hopkins	D.Douglas	EDF	257 Park Ave South	New York	NY	10010
Hopkins	Terry	554 Blackstrap Rd.		Falmouth	ME	04105
Horn	John	110 SouthBayview Ave		Seaside Park	NJ	08752
Houde	Edward D	Ches. Bio. Lab Univ of MD	P.O. Box 38	Solomons	MD	20688
Houston	Len	Army Corp of Eng, Env. Br	26 Federal Plaza	New York	NY	10278-0090
Huba	Greg	30 Eagle Nest Terrace		S.Kingston	RI	02879
Hughes	William	241 Cannon HOB	ATTN: Ashley Evans	Washington	DC	20515
Humphreys, Jr.	H.R.			Weems	VA	22576
Hutchins	Eric	702 South Rd		Wakefield	RI	02879
Hutchinson	Robert	The Virginian Pilot	150 W. Brambleton Ave.	Norfolk	VA	23510
Hutto	Earl	2435 Rayburn HOB	ATTN: Delisa Harmon	Washington	DC	20515
Island Fisherman	Long	14 Ramsey Rd		Shirley	NY	11967
Island Sportsman	Long	Mr. Bill Shaber	Box 242	Patchogue	NY	11722
Jacangelo	Dominic	Senator Owen Johnson	23-24 Argyle Square	Babylon	NY	11702
Jackson	Patricia	Lower James River Assoc.	PO Box 110	Richmond	VA	23201
Jackson	Robert	6074 Worcester Hwy		Snow Hill	MD	21863
Jann	Roger	228 Catharine St.		Philadelphia	PA	19147
Jensen	Arne	512 Shun Pike Rd.		Cape May	NJ	08204
Jensen	W. Peter	Tawes State Office Bldg.	580 Taylor Ave.	Annapolis	MD	21401
Johnson	Charles	194 Connetquot Dr.		Oakdale	NY	11769
Johnson	Gail	RFD #1, Box 321		South Harpswell	ME	04079
Johnson	Tom	Greenpeace	1436 U Street	Washington	DC	20009
Jones	Andrew	PO Box 2088		Montauk	NY	11954
Jones	Dr. Cynthia	Old Dominion University	AMRL	Norfolk	VA	23529
Jones	Susan	Commercial Fisheries News	PO Box 37	Stonington	ME	04681
Julian	Joseph P	Julian's Bait Shop	PO Box 302	Atl. Highlands	NJ	07716
Kamienski	Don	10 McCay Drive		Roebling	NJ	08554
Kaminsky	James	75 Woodcliff Dr.		Mattituck	NY	11952
Kanopka	John	3622 Princeton Dr. N.		Wantagh	NY	11793
Kanyuk	Dennis	593 Maude St		S. Hempstead	NY	11550
Kaplan	Eugene	148 Waterview St		Northport	NY	11768
Karanozinski	Andrew	7713 Central Ave		Sea Isle City	NJ	08243
Kearney, Jr.	Steve	79 Laurel Dr.		Massapequa Park	NY	11762
Keene	Harry M.	Route 4, Box 286		Easton	MD	21601
Kelleher	John	14 Brookridge Rd		Cape May Crthse	NJ	08210
Kennerly, Jr.	Harold B	1115 Woodland Rd.		Salisbury	MD	21801

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Kenney	Heidi	Warwick Cove Marine	2 Seminole	Warwick	RI	02886
Kensler	Mike	Chesapeake Bay Found.	100 W. Plume Ctr, #701	Norfolk	VA	23510
Kessinger	R.	926 Hayes St		Boldwin	NY	11510
Kieser	Fred	209 Bellevue Rd		Oakdale	NY	11769
Kim Bay Co., Inc		P.O. Box 51		Ocean City	MD	21842
King	Jim	220 East Mill Rd.		Mattituck	NY	11952
Kingston	Jack	1229 Longworth HOB	ATTN: Triece Ziblut	Washington	DC	20515
Kircher	Peggy	LGL Alaska Rsrch Assoc	4175 Tudor Centre Dr, 101	Anchorage	AK	99508
Kirkeberg	Eirik	Tacony Rd.		Wildwood	NJ	08260
Kislowski	Sigmund	2607 Felter Lane		Bowie	MD	20715
Kisseli	Kenneth	103 Cartagena Dr		Brick	NJ	08723
Klinefelter	G.R.	21 West Main St.		Ephrata	PA	17522
Knisell	Ralph	100 W. Mantua Avenue		Wenonah	NJ	08090
Koehn	John	104 Campus Dr.		Princeton	NJ	08540
Kopel	Ty	Borden, Inc.	180 E. Broad St, 23rd Fl	Columbus	OH	43215
Kornahrens	Richard	14 Holly Tree Lane		East Islip	NY	11730
Koury	Peter	18 North Main St.	P.O. Box 778	Cape May Crthse	NJ	08210
Kozak	Linda	Access Unlimited, Inc	326 Center Ave, Suite 202	Kodiak	AK	99615
Krusa	David	Rt 2	Box 234	Montauk	NY	11954
Kuhnle	Alfred	117-26 228th Street		Cambria Heights	NY	11411
Kunz	Nancy	Dept of State CZMP	162 Washington Ave	Albany	NY	12231
Kurkul	Pat	NOAA Fisheries - F/NER72	One Blackburn Drive	Gloucester	MA	01930
LaMonica	Peter A.	Cape May Canners, Inc.	PO Box 158, Indian Trl.	Cape May	NJ	08204
LaRosa	Leo	19 Arcadia Ave.		Reading	MA	01867
Laaksonen	Will	VA Charterboat Assoc.	RT 2, Box 3D	Onancock	VA	23417
Lagace	Louis	3567 Main Rd.		Tiverton	RI	02878
Lambert	Gregory	Room H2-513	US House of Represent.	Washington	DC	20515
Lambie	James T.	6 Ripley Lane		South Belmar	NJ	07719
Lancaster	H. Martin	2436 Rayburn HOB	ATTN: Skip Smith	Washington	DC	20515
Langreney	Fabrice	NACLS	9200 Basil Crt Suite 306	Landover	MD	20785
Larson	Kirk	East 13th Street		Barnegat Light	NJ	08006
Laske	Ed	20 Iroquois Place		Massapequa	NY	11758
Lasprogata	Joe	2413 Whitby Rd		Havertown	PA	19803
Laudeman	Keith	Cold Spring Fish & Sup.Co		Cape May	NJ	08204
Laudeman	Wally	Cold Spring Fish	& Supply Co.	Cape May	NJ	08204
Law Enforcement	NMFS	PO Box 4304		Salisbury	MD	21803-4304
Law Enforcement	NMFS	PO Box 277		Newport News	VA	23607
Law Enforcement	NMFS	PO Box 1869		Elizabeth City	NC	27906-1869
Lawrence	Geoffrey	Community Media, Inc.	25 W. Central Ave., Box93	Pearl River	NY	10965
Lazar	Naji	Coastal Fisheries Lab	1231 2nd Succotash	Wakefield	RI	02879
LeCates	Harry L	222 Ann Ave		Rehoboth Bch	DE	19971
LeCates	John	222 Ann Ave.		Rehoboth Beach	DE	19971
Legislative Comm.	NY State	on Water Resoure Needs-LI	11 Middleneck Rd. Sui.213	Great Neck	NY	11021

Last Name	First Name	Address 1	Address 2	City	State	Zip
Leonard	Donald	PO Box 378		Chincoteague	VA	23336
Leonard	Thomas	Cape May County Library	30 West Mechanic St.	Cape May Crthse	NJ	08210
Lerman	Matthew	454 Beach 143rd St		Neponsit	NY	11694
Levin	Fred	Levin Marine Supply	PO Box 44	Fairhaven	MA	02719
Library		Rosenstiel School	4600 Rickenbacker Causewy	Miami	FL	33149
Library	NMFS	Panama City Lab	3500 Delwood Beach Rd	Panama City	FL	32408
Library	Regional	Dept of Fish. & Oceans	Box 5667, St. Johns, Nfld	Canada A1C 5X1		
Lick	Bob	831 State Rd		West Grove	PA	19390
Lighthouse Marina		P.O. Box 705		Barnegat Lt	NJ	08006
Lind	William	1974 East 37th St		Brooklyn	NY	11234
Lindroth	Albert	182 Miller Ave.		Freeport	NY	11520
Lipcius	Dr. Rom	VIMS College of Wm & Mary	School of Marine Science	Gloucester Point	VA	23062
Livingston	Dick	NOAA/NMFS Law Enforcement	617 Hwy 71 Bldg 2	Brielle	NJ	08730
LoPerfido	Tony	911 83rd Street		Brooklyn	NY	11228
LoVerde	Eugene A	NMFS, Statistics	PO Box 143	Toms River	NJ	08753
Locandro	Dr.Roger	26 Grafton Rd	Frog Hollow Hog Farm	Stockton	NJ	08559
Loe	Roy	PO Box 76		Gwynn	VA	23066
Lofstad, Jr.	Rick	c/o Inlet Seafood	PO Box 2148	Montauk	NY	11954
Looft	Edward	20 Tracy Lane		East Islip	NY	11730
Lord	Richard	118 Park Ave		Hobocken	NJ	07030
Lore	Joseph C	Box 21		Ridge	MD	20680
Loret	John	Science Museum of LI	1526 North Plandome Rd	Manhasset	NY	11030
Lund	Warren O	997 Ocean Drive		N. Cape May	NJ	08204
MacDonald	Joel	NOAA Fisheries - GCNE	One Blackburn Drive	Gloucester	MA	01930
MacKeil	Louis	PO Box 702		W. Hyannisport	MA	02672
MacLean	Malcolm O.	240 Causeway		Lawrence	NY	11559
MacMillan	Joseph	60 Atlantic Ave.		W. Sayville	NY	11796
Madsen	Stephanie	Aleutian Seafood Proc. As	Box 701	Unalaska	AK	99685
Malchoff	Mark H.	Cornell University Lab	39 Sound Ave.	Riverhead	NY	11901
Maliszewski	Ed	214 Ernston Rd.		Parlin	NJ	08859
Mallari	Ana	123 Edgewood Ave.		San Francisco	CA	94117
Manchester	Francis	Point Trap Co.	1728 Main Rd	Tiverton	RI	02878
Mangano	James	Box 140		Amagansett	NY	11930
Manning	Richard	Staten Is.Fed.of Sprtsmen	263 Lincoln Ave.	Staten Island	NY	10306
Manzari	Nicholas	60 Bandolier Ln		West Bayshore	NY	11706
Marconi	Capt.Thomas	219 Kensington Rd.		Lynbrook	NY	11563
Maresca	Joe	1 Wellington Rd		Merrick	NY	11566
Marine Laboratory	Mote	Davis Library	1600 Thompson Parkway	Sarasota	FL	34236-1096
Marine Product Bd	Virginia	554 Denbigh Blvd, Suite B		Newport News	VA	23602-4240
Marion	Ron	Basic American Foods	309 Battles Street	Brockton	MA	02401
Marks	Peter	8 Doxee Place		Islip	NY	11751
Marks	Rick	National Fisheries Instit	1525 Wilson Blvd. Ste.500	Arlington	VA	22209
Martin	David	Martin Fish Co.	Box 51	Ocean City	MD	21842

Last Name	First Name	Address 1	Address 2	City	State	Zip
Martin	James	National Westminster Bank	450 Tilton Rd	Northfield	NJ	08225
Martin	Robert L	Lock Drawer 179		Bellefonte	PA	16823
Masin	William	Flamingo Rd.		Montauk	NY	11954
Mason	John	Dept. of Env. Cons.	SUNY Bldg. #40	Stony Brook	NY	11790
Mathews	James	Room H2-513	US House of Represent.	Washington	DC	20515
Mattera	Fred	28 Knowles Lane		West Kingston	RI	02892-1119
Mayflower Int.		P.O. Box 324		Wenham	MA	01984-0624
Maynard	Al	East Coast Fish. Ass'n	192 Ballard Ct. Suite 202	Virginia Beach	VA	23462
Mazurie	John	121-50th st.		Sea Isle City	NJ	08243
Mazza	John	Continental Capri Inc.	250 Jackson Street	Englewood	NJ	07631
McBride	Capt. Joe	PO Box 1908		East Hampton	NY	11937
McCauley	Jim	30 Woodman's Trail		Wakefield	RI	02879
McCay	Bonnie J	Dept. of Human Ecology	Cook College, PO Box 231	New Brunswick	NJ	08903
McCloy	Thomas W.	Div Fish, Game, Wildlife	CN 400	Trenton	NJ	08625
McCullough	Charles	PO Box 351022		Palm Coast	FL	32135-1022
McDaniels	Donald	1052 Shunpike Rd.		Cape May	NJ	08204
McElroy	Paul	Charter Ind. Magazine	PO Box 375	Stuart	FL	34995
McGarrigle, Jr.	Harry	2401 W. Brigantine Ave.		Brigantine	NJ	08203
McGuigan	Bruce	Box 157B, Route 3		Selbyville	DE	19975
McHugh	Dr. J.L.	c/o Vinson Hall	6251 Old Dominion Drive	McLean	VA	22101
McKeen	Michael	Box 184		Crosswicks	NJ	08515
McKown	Kim	NY State Env. Conservat.	SUNY Bld #40	Stony Brook	NY	11790-2356
McQuillan	Dan	PO Box 854		Mattapoisett	MA	02739
McSweeney	Philip	118 Old Stone Highway		East Hampton	NY	11937
McVey	Thomas	813 Seashore Rd		Cape May	NJ	08204
McWeeney	Leo	174 Bellvue Ave		Newport	RI	02840
Mears	Harold	NOAA Fisheries - F/NE04	One Blackburn Drive	Gloucester	MA	01930
Meberg	Dave	403 Anchorage Way		Freeport	NY	11520
Medeiros	Arthur	CT Comm Fishermen	236 N Water St	Stonington	CT	06378
Medved, PhD	Dr. R.J.	Great Circle Fisheries	78-A Park Place	East Hampton	NY	11937
Meier	Mike	VA Marine Resource Comm	PO Box 756	Newport News	VA	23607
Mendonsa	George	Tallman & Mack Trap Co.	Spring Wharf, PO Box 88	Newport	RI	02840
Meredith	Russell	NMFS/NOAA	201 Varick St. Rm. 731	New York	NY	10014
Merrill	Jeff	918 Houston St		South Plainfield	NJ	07080-2109
Metzner	Rebecca	521 N. King St.	Saville Apt 102	Wilmington	DE	19801
Middleton	Mark	PO Box 192		East Marion	NY	11939
Middleton	Robert	Minerals Mgmt Serv - 644	Pkwy Atrium Bdg 381 Elden	Herndon	VA	22070-4817
Midgette	Donald	Marine Safety Ofc.Hampton	200 Granby Mall	Norfolk	VA	23510
Miguell	Celerina	229 Cannon Building		Washington	DC	20575
Mihale	John	153 California Place N.		Island Park	NY	11558
Miles	John R.	J.H. Miles & Co., Inc.	Box 178	Norfolk	VA	23501
Miller	Dr. Gary	Advanced Aquacultural Tec	PO Box 426	Syracuse	IN	46567
Miller	Mort	NMFS- Univ. S.Bldg.	1335 East-West Highway	Silver Spring	MD	20910

Last Name	First Name	Address 1	Address 2	City	State	Zip
Miller	Richard	PO Box 816		East Quogue	NY	11942
Millikin	Mark	NMFS, F/CM2	1335 East West Highway	Silver Spring	MD	20910
Miranda	J.L.	3923 Highwood Ct		Washington	DC	20007
Mirkovich	Nick	PO Box 168		Aransas Pass	TX	78335
Mitchell	Ed	67 Hillcrest Ave.		Wethersfield	CT	06423
Mizzele	Joe	1409 Gabriele Dr		Norfolk	VA	23502
Moffa	Michael	M. Moffa & Son Seafood	Box 748 Coles Mill Rd.	Franklinville	NJ	08322
Mombelardi	Ray	401 Valley Way		Bricktown	NJ	08723
Monaghan	Rick	NC Div. Marine Fisheries	PO Box 769	Morehead City	NC	28557
Montfort	John	Box 358	207 Sunset Blvd.	Barnegat Light	NJ	08006
Moran	Bob	NFI Suite 500	1525 Wilson Boulevard	Arlington	VA	22209
Morse	Peter	62 Tuttle Lane		Greenland	NH	03840
Mott	Bill	Marine Fish Conserv. Net.	1725 Desales NW	Washington	DC	20036
Muhlbaier	Craig	c/o Farm Credit S.Jersey	PO Box 188	Bridgeton	NJ	08302
Muller	Dr. Wm.	37 West 10th Ave.		Deer Park	NY	11729
Murawski	Steve	NEFC/NMFS	Water Street	Woods Hole	MA	02543
Murchelano	Robert	Northeast Fisheries Cntr	166 Water Street	Woods Hole	MA	02543
Murray, Jr.	John	PO Box 387		Brielle	NJ	08730
Musick	Dr. Jack	VIMS		Gloucester Pt.	VA	23062
Myers	Richard	Eastern Shore Seaf. Prod.		Mappsville	VA	23407
NAFO		PO Box 638	Dartmouth, N.S.	Canada B2Y 3Y9		
NMFS		Statistics Investigations	P.O. Box 125	Greenbackville	VA	23356
Nardi	George	25 Adams St		Holbrook	MA	02343
Nash	James	19 Priest Blvd.		Rio Grande	NJ	08242
Neilson	Howard	604 Arlington Lane North		Forked River	NJ	08731
Nicholls	Bruce	Wadland & Nicholls	265 Franklin Street	Boston	MA	02110-3109
Nickerson	Howard	Offshore Mariner's Assoc.	114 MacArthur Dr.	New Bedford	MA	02740
Nolan	John&Laurie	Box 2124		Montauk	NY	11954
O'Connell	Tory	Marine Fisheries Sect/AFS	304 Lake St., Room 103	Sitka	AK	99835
O'Connor	Michael	Boston Herald, Outdoor Ed	1 Herald Square	Boston	MA	02106
O'Hara	Joe	1919 Marlin Dr.		Ocean City	MD	21842
O'Hara and Sons	F.J.	145 Northern Ave		Boston	MA	02210
O'Malley	Jim	East Coast Fisheries	PO Box 649	Naragansett	RI	02882
O'keefe	Jim	563 Sunny Ave.		Sommers Point	NJ	08244
Ocean, Inc.	Scan	33 Crafts Rd.		Glouester	MA	01930
Oches	Arthur	1 Muriel Place		Manasquan	NJ	08736
Odierno	Linda	NJ Dept of Agriculture	CN 330, Rm. 200	Trenton	NJ	08625
Odlin	Arthur	210 A Pine St.		S. Portland	ME	04106
Odlin	Jim	PO Box 288		Portland	ME	04112
Office	Comm.	College of Wm. & Mary	VIMS	Gloucester Pt.	VA	23062
Offshore Fish Asn	Atl.	P.O. Box 3001		Newport	RI	02840
Ofiara	Douglas	Inst. of Marine & Coastal	Cook College, PO Box 231	New Brunswick	NJ	08903-0231
Olsen	Paul	c/o Sea Grant Commun.	VIMS	Gloucester Point	VA	23062

Last Name	First Name	Address 1	Address 2	City	State	Zip
Olsen	Rolf	2042 Marshland Dr.		Charleston	SC	29414
Osmundsen	Sig	Sig's Dock, Inc.	704 W. Montgomery Ave.	Wildwood	NJ	08260
Ottmann	Barry	7017 Sandringham Ct.		Raleigh	NC	27613
Ouellette , CGLO	LCDR D.	National Marine Fisheries	8484 Georgia Ave., Ste415	Silver Spring	MD	20910
Outten	Bill	Tawes State Office Bldg.	580 Taylor Ave.	Annapolis	MD	21401
Overton	Ellen	1825 Connecticut Ave., NW	Rm 627 Universal South	Washington	DC	20235
Paladino	Thomas	2332 Royce St		Brooklyn	NY	11234
Pallone	Frank	241 Cannon HOB	ATTN: Jed Brown	Washington	DC	20515
Palmer	Steve	2647 Haddonfield Rd.		Pennsauken	NJ	08110
Parker, Esq.	Barry T.	3 Greentree Ctr Suite 401	Rt. 73 & Greentree Rd.	Marlton	NJ	08053
Parsons	H. Dale	7 Vermont Ave		Lewes	DE	19958
Paschall	Allan	2137 E. Admiral Drive		Virginia Beach	VA	23451
Patterson, Jr.	Jack	Patterson, Jrs., Inc.	PO Box 332	Barnegat Light	NJ	08006
Peabody	William	22552 James River Dr.		Carrollton	VA	23314
Penello	Julian	2928 Replica Lane		Portsmouth	VA	23703
Pennypacker	Norman	Sea Watch	242 S Rehoboth Blvd	Milford	DE	19963
Perra	Paul	Atl. States Marine Fisher	1776 Mass Ave NW Suite600	Washington	DC	20036
Peterson	Allen	NOAA Fisheries	NEFC Water Street	Woods Hole	MA	02543
Peterson	Ralph	Squid Mack Freezers	6 North Industrial Blvd	Bridgeton	NJ	08302
Phanz	Allen	Box 212		East Hampton	NY	11937
Phillips	James H.	1021 Cedar Ridge Ct.		Annapolis	MD	21403
Phillips	Mark S.	F/V Illusion	217 4th St.	Greenport Village	NY	11944
Piecewicz	Ed	PO Box 49		N.Dighton	MA	02764
Plante	Janice M.	Commercial Fisheries News	1183 Taughannock Blvd.	Ithaca	NY	14850
Pleickhardt	John	15 Leach St.		Lyn	NY	11563
Poffenberger	Brian	Senator B. Mikulski	709 Hart Office Bldg. NE	Washington	DC	20510
Pollock	Susan	National Fisherman	65 Langdon St.	Cambridge	MA	02138
Pollum	Michael	217 N Princeton Ave.		Swarthmore	PA	19081
Power	Greg	NMFS, Woods Hole Lab	166 Water Street	Woods Hole	MA	02543
Powers	Collin	PO Box 10009	629 East Main St., 6th fl	Richmond	VA	23240
Pride	Bob	Fisheries Mngmt Committee	2105 Turnberry Cove	Virginia Beach	VA	23454
Pruitt	William	Marine Res. Comm.	P.O. Box 756	Newport News	VA	23607
Pt. Judith Fishmn		Cooperative Assoc., Inc.	P.O. Box 730	Narragansett	RI	02882
Puskas	Frances	1202 Central Ave.	PO Box 191	Barnegat Light	NJ	08006
Puskas, Jr.	Louis	PO Box 191		Barnegat Light	NJ	08006
Quillen	Samuel M	Nanticoke Seafood Co.,Inc	W. Harbor Rd.	Nanticoke	MD	21840
Quinby	Bill	Mayglower Int'l	PO Box 234	Wenham	MA	01984
Quinn	Adeline	1 Ocean Blvd		Lido Beach	NY	11561
RCG Fisheries		5 Beach Road East		Old Saybrook	CT	06475
RI Seafd. Council		212 Main St #3		Wakefield	RI	02879
Radio	WWQQ	News Director	721 Market St., Suite 101	Wilmington	NC	28401
Radonski	Gilbert	51 Pepper Tree Ct		Warrenton	VA	22186-3002
Randolph	Jack	304 Nottingham Dr.		Colonial Heights	VA	23834

Last Name	First Name	Address 1	Address 2	City	State	Zip
Ratti	Bryan	1502 Lake Chrystal Dr.	Apartment C	West Palm Beach	FL	33411
Ravenel, Jr.	Arthur	231 Cannon HOB	ATTN: Thomas Henderson	Washington	DC	20515
Redmayne	Peter	Seafood Leader	1115 N.W. 46th Street	Seattle	WA	98107
Rees	Jeff	Borden, Inc	180 East Broad Street	Columbus	OH	43215
Reeve	Ian	3235 Emmons Ave		Brooklyn	NY	11235
Regenstein	Dr. J.M.	112 Rice Hall	Cornell Univ.	Ithaca	NY	14853-5601
Regional Director		NOAA Fisheries - F/NER	One Blackburn Drive	Gloucester	MA	01930
Reichle	Jeff	Lund's Fisheries	977 Ocean Drive	Cape May	NJ	08204
Reitz	Capt Doug	62 Laurel Lane		West Kingston	RI	02892
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Box 547	Narragansett	RI	02882
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Box 624	Cape May	NJ	08204
Reporting Spec.	Fishery	NMFS, Statistics Inv.	U.S. Custom House	New Bedford	MA	02740
Reporting Spec.	Fishery	NMFS, Rm 217 Fed. Bldg.	P.O. Box 708	Rockland	ME	04841
Reporting Spec.	Fishery	NMFS-Statistics Branch	PO Bldg. Thames St.	Newport	RI	02840
Reporting Spec.	Fishery	NMFS-Statistics Branch	29C Stage Harbor Rd	Chatham	MA	02633
Rhoads	Dusty	2361 Fire Lane N		Southampton	NJ	08088
Rhodes	Dusty	2361 Fire Lane North		Southampton	NJ	08088
Richard	G.	Dep. Min. of Fisheries	P.O. Box 2223	Halifax, N.S.		B3J 3C4
Richardson	George	Blount Seafood Corp.	Box 327	Warren	RI	02885
Richford	George	2150 Hendrickson St		Brooklyn	NY	11234
Rideout	Steve	US Fish & Wildlife Serv.	300 Westgate Center Dr	Hadley	MA	01035-8613
Ridge	Duncan	38 Shore Rd		E. Setauket	NY	11733
Riffe	Donald E	Old Salt Seafood	8978 Glebe Park Dr	Easton	MD	21601
Rins	Burton	Ruggiero Seafood	1137 Dickinson Ave	Yardley	PA	19067
Risdon	Frank	The Gorton Group	Gorton Rd, PO Box 309	Millville	NJ	08332
Ristori	Allan	1552 Osprey Court		Manasquan Park	NJ	08736
Robbins	Neil	7711 Roberts Ave		Sea Isle City	NJ	08243
Roberts	Fred	Deep Water Fleet, Inc.	376 Vanderbilt Blvd.	Oakdale	NY	11769-2038
Roberts	Mark	PO Box 99		Jonesport	ME	04649
Robinson F/NW02	William	NMFS	Bin C15700	Seattle	WA	98115
Robson	Ron	1447 Rt. 83		Cape May CourtHse	NJ	08210
Rodia, Jr.	Louis A.	6 N Main St		Cape May Crthse	NJ	08210
Rodrigues	Kathi L.	NOAA Fisheries - F/NER72	One Blackburn Drive	Gloucester	MA	01930
Roman	Gordon	Captree Boatmens Assoc.	17 Laurel Road	Freeport	NY	11520
Rose	Arthur	4 Francis St		Westport	MA	02790
Rose	Benny	712 Pilgrim Plaza		N. Cape May	NJ	08204
Rosenman	Richard	Dept of State Room 5806	2205 C Street NW	Washington	DC	20520
Ross	Bob	8 Janes Road		Boxford	MA	01921
Rothschild	Dr. Brian	Chesapeake Bio Lab	Univ. of MD	Solomons	MD	20688-0038
Ruais	Rich	PO Box 447		Salem	NH	03079
Rubelmann	Robert	Rt.3	Box 308	Cambridge	MD	21613
Rubin	Bernie	Chincoteague Seafood	PO Box 21	Chincoteague	VA	23336
Rubins	Jonathan	PO Box 3821		West Palm Beach	FL	33402-3821

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Rucky	Robert	15 Hunting Lane		East Islip	NY	11730
Ruggiero	Sal	96 Fairmont Ave		Chester	NJ	07930
Rugolo	Dr. Louis	MD Dept Nat. Res.	B-3 Tawes State Ofc. Bldg	Annapolic	MD	21401
Ruhle	James	PO Box 302		Wanchese	NC	27981
Ryder	Richard	14 Teal Rd.		Rio Grande	NJ	08242
Safina	Carl	National Audobon Society	306 S Bay Ave	Islip	NY	11751
Sampson	Mark	10418 Exeter Rd.		Ocean City	MD	21842-9792
Sapp, Sr.	Robert L	Box D-14 River Village		Millsboro	DE	19966
Savadove	Larry	Jersey Shore Newsmagazine	1816 Long Beach Blvd	Surf City	NJ	08008
Savage	Ricks E.	11824 Parfin Drive		Berlin	MD	21811
Sawyer, III	Henry B	Kiawah-Seabrook Seafood	3966 Bohicket Road	Charleston	SC	29455
Schaefer F/CM	Richard	NMFS, SSMC Bldg 1	1335 East-West Highway	Silver Spring	MD	20910
Scheible	Capt. Bruce	23 Wynne Rd.		Ridge	MD	20680
Schick	Francis	7147 Marsden St		Philadelphia	PA	19135
Schill, Exec.Dir.	Jerry	NC Fisheries Assoc.	PO Box 12303	New Bern	NC	28561
Schmidt	Ray	185 Blue Point Rd.		Oakdale	NY	11769
Schumann	Chris	1 Bow Oarsmans Rd		East Hampton	NY	11937
Schwab	Fred	87 Old Farm Road		Levittown	NY	11756
Sciabarra	Joseph	31 Ross Lane		Sinai	NY	11766
Scott	Karl	312 Oxford Dr.		Savannah	GA	31405
Sea Grant Legal	Louisiana	170 Law Center	LSU	Baton Rouge	LA	70803-1018
Sea Watch Int'l.	M. Burns	8978 Glebe Park Drive		Easton	MD	21601
SeaCove, Inc.	Atlantic	402 "C" Street		Boston	MA	02210
Seafood, Inc.	Phillips	Saul Phillips	PO Box 817	Barnegat Light	NJ	08006
Seamans	Dick	NOAA Fisheries - F/NER7	One Blackburn Drive	Gloucester	MA	01930
Seawave Corp.		PO Box 400		Rio Grande	NJ	08242
Seminara, Esq.	Joseph F	Wolff, Seminara & Mitberg	230 Park Ave.,Suite	New York	NY	10017
Serrone	Nat	881 Annette Dr.		Wantagh	NY	11793
Shackelford, Jr.	L.K.	PO Box 422		Hampton	VA	23669
Shepherd	Gary	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Sherba, Jr.	John S	F/V Shearwater	16 Susan Lane	Green Creek	NJ	08219
Shinnecock Fish		Dock Inc	PO Box 728	Hampton Bays	NY	11946
Shoemaker	Dale E.	145 Winter Street		Bridgewater	MA	02324
Siegel	Al	41 Millbrook Drive		Stony Brook	NY	11790
Siegel	Lou	Shore Environmental Assc.	P.O. Box 202	Massapequa	NY	11758
Siegel	Melvyn	American Swordfish Assoc.	7908 Bayshore Dr.	Margate	NJ	08402
Simmons	George	F/V Shearwater	814 Weekslanding Rd	Cape May	NJ	08204
Simmons	Marion R.	PO Box 10		Walterboro	SC	29488
Simonitsch	Mark	Nantucket Sound Fish Pier	84 Doane Rd.	Chatham	MA	02633
Sinning	John	PO Box 724		Southold	NY	11971
Skjevelano	Jorgen	U.S. Fish & Wildlife	1825 Virginia St.	Annapolis	MD	21401
Slikas	Vincent	87-34 95 st.		Woodhaven	NY	11421
Sloan	Stephen	Confed Atl Charter Boats	230 Park Av, Suite 1221	New York	NY	10169

Last Name	First Name	Address 1	Address 2	City	State	Zip
Sminkey	Tom	VA Inst. Marine Science		Gloucester Pt.	VA	23062
Smith	Art	PO Box 399		Wanchese	NC	27981
Smith	Bruce	416 Hulse Ave		Brick	NJ	08724
Smith	Eric	Dept of Env. Protection	Marine Fisheries, Box 719	Old Lyme	CT	06371
Smith	LeAnn	88 Amityville St.		Islip Terrace	NY	11752
Smith	Mrs. Edward	7605 Worcester Highway		Newark	MD	21841
Smith	Robert D	46 Woodcock Trail		Charlestown	RI	02813
Smith	Ronal	460 Gills Neck Rd.		Lewes	DE	19958
Smith	Terry	Northeast Fisheries Centr	166 Water Street	Woods Hole	MA	02543
Smith	Tom	7605 Worcester Hwy		Newark	MD	21841
Solberg	Rob	3601 Somerset Dr.		Seaford	NY	11783
Spingler	Kevin	The Stony Brook School	Route 25A	Stony Brook	NY	11790
Spitsbergen	Dennis	NC Div of Marine Fish	PO Box 769	Morehead City	NC	28557
Stallings	Jack	611 Goldsboro ave		Virginia Beach	VA	23451
State Univ.	Oregon	Library-Serials		Corvallis	OR	97331
Stavis	Fred	Stavis Seafoods, Inc.	148 Northern Ave.	Boston	MA	02210
Stavis	Norman	North Coast Seafoods	12-14 Fargo St	Boston	MA	02210
Steimle	Clair	US Dept of Commerce NOAA	Sandy Hook Lab	Higlands	NJ	07732
Stelle	William	Merchant Marine & Fisher.	1334 Longworth HOB	Washington	DC	20515
Stensland	John	Fisherman's Supply		Pt. Pleasant	NJ	08742
Stephens	Harry C.	237 Cabots Creek Drive		Myrtle Beach	SC	29577
Stevens	Lorelei	PO Box 655		West Harwich	MA	02671
Stevenson	Barbara	Suite 313	Two Portland Fish Pier	Portland	ME	04101
Stevenson	Douglas	Cntr for Seafarers Rights	241 Water St.	New York	NY	10038
Steves	Gale	Home Magazine	1633 Broadway, 41st floor	New York	NY	10019
Stock	Karl	F/V Terri-Kris, Inc.	862 West Shore Dr.	Brigatine	NJ	08203
Stolpe Exec. Dir.	Nils E.	3840 Terwood Dr.		Doylestown	PA	18901
Stott III	Charles	1406 Bayvine Ave	Box 23	Barnegat Light	NJ	08006
Stotz	Richard	East St. & Mass. Ave.		Cape May	NJ	08204
Strand	Dr. Ivar	Univ of MD Ag & Res. Dept	2200 Symons Hall	College Park	MD	20742
Strattman	Steve	72 N. Lakeshore Drive		Manahawkin	NJ	08050
Street	Michael W.	NC Div. Marine Fisheries	PO Box 769	Morehead City	NC	28557-0769
Strombom	Dan B.	Rutgers Cooperative Ext.	4 Moore Road	Cape May Crthse	NJ	08210
Studds	Gerry E.	Merchant Marine & Fish.	1334 Longworth HOB	Washington	DC	20515
Suisan Kaisha Ltd	Nippon	Bank of CA Center	900 Fourth Ave., 30F	Seattle	WA	98164
Sullivan	John	245 E. Main St.		Gloucester	MA	01930
Sullivan	Michael	Westminister Press	1280 Ritchie Rd.	Capital Hghts	MD	20743
Sullivan	Patrick	PO Box 1028		East Hampton	NY	11937
Sutton	Alex	IOLAR Enterprises	PO Box 919	Remsenburg	NY	11960
Swagler	Jim	1662 Yakana Rd		Towsown	MD	21204
Sweeney	Brian A.	Seafreeze Ltd.	100 Davisville Pier	N. Kingstown	RI	02852
Swenson	Carl	1201 Ocean Ave.	Apt. 78	Sea Bright	NJ	07760
Tadick	Vincent	Josh H. Carter Co.	33-34 Fulton Fish Market	New York	NY	10038

Last Name	First Name	Address 1	Address 2	City	State	Zip
Tamimie	David	USCGR	245 Hampton Rd.	King of Prussia	PA	19406
Taormina	Anthony	7090 SE Lillian Crt.		Stuart	FL	34997
Targett	Nancy	College of Marine Studies	University of DE	Lewes	DE	19958
Tatem	Damon	PO Drawer 429		Nags Head	NC	27959
Taylor	Gene	215 Longworth HOB	ATTN: Stephen Peranich	Washington	DC	20515
Terceiro	Mark	NMFS/NEFC	166 Water Street	Woods Hole	MA	02543
Testaverde	Sal	11 Lakeridge Drive		Georgetown	MA	01833
Tharp	Robert	283 North St		West Creek	NJ	08092
Thomas	Randi	US Tuna Foundation	1101 17th St.N.W.Suite609	Washington	DC	20036
Thompson	Capt. Paul	95 Acorn Lane		Cape May Court Hse	NJ	08210
Tillett	Billy	PO Box 383		Wanchese	NC	27981
Times	Sakonnet	East Bay Window Section	1 Bradford St	Bristol	RI	02809
Timmons, Editor	Dale	Coastal Fisherman	9747 Golf Course Rd.	Ocean City	MD	21842
Tomorowiez	Dr Jacek	Polish Embassy, Econ. Co.	1503 21st St. N.W	Washington	DC	20036
Touris	Arthur	Touris Products Inc	34 Fifth St.	Pelham	NY	10803
Townsend	Chester	Sandy Landing		Dagsboro	DE	19939
Traber, Jr.	Frederic	300 E. Myrtle Rd.		Wildwood Crest	NJ	08260
Travelstead	Jack	Marine Res. Comm.	PO Box 756	Newport News	VA	23607
Tribbitt, Sr.	Robert L.	RD 2, Box 5		Frankford	DE	19945
Truex	Leroy	P.O. Box 727		Manahawkin	NJ	08050
Tully	William	39 Canoe Place Rd.		Hampton Bays	NY	11946
Tweedy, Jr.	Groege	168 Sumpwams Ave		Babylon	NY	11702
Ulanski	Prof. Stan	Dept of Geology	James Madison Univ.	Harrisonburg	VA	22807
Ulsh	Stephen	PA Fish & boat Commission	PO Box 67000	Harrisburg	PA	17106-7000
Unlimited, Inc.	Access	PO Box 2436		Port Angels	WA	98362
Unsoeld	Jolene	1527 Longworth HOB	ATTN: Jim Hoff	Washington	DC	20515
Valliere	April	Division of Fish & Wldlif	Succotash Rd	Wakefield	RI	02879
Vansant	Ron	8 E. Sunrise Rd		Petersburg	NJ	08270
Verbanas	Capt. Bill	2614 Whittier Dr		Wilmington	DE	19808
Vessels, Inc.	Atlantic	P.O. Box 178		Norfolk	VA	23501
Village Dock	Viking	19th Street	Box 458	Barnegat Lt	NJ	08006
Vincent	Raoul	18 Argyle Drive		Northport, LI	NY	11768
Voss, Jr.	Leonard	210 N. Street		Smyrna	DE	19977
Wadelton	Peter	PO Box 1174		Mattituck	NY	11952
Wadsworth	John	15 First St.		Waterford	CT	06385
Wagner	Eric	AT & T Communication	340 Mt. Kemble Ave. S200	Morristown	NJ	07960
Wagner	Joe	10 Woodbine-Ocean View Rd		Ocean View	NJ	08230
Waidman	Alan	611 Roosevelt Blvd		Marmora	NJ	08223
Walker, III	Wm E	57 Eastwood Rd		Media	PA	19063
Wall	Fred	68 Bay Breeze Dr.		Toms River	NJ	08753
Wallace	David	P.O. Box 1895		Salisbury	MD	21801
Wallo	Ron	RR2 Box 86 D		Dagsboro	DE	19939
Walsh	Laurence	P.O. Box 199		Barnegat Light	NJ	08006

Last Name	First Name	Address 1	Address 2	City	State	Zip
Walter	Robert J	Box 497		Cape May	NJ	08204
Wanchese Fish Co.		Box 369		Wanchese	NC	27981
Wang	Stanley	NOAA Fisheries - F/NER51	One Blackburn Drive	Gloucester	MA	01930
Ward	Charles	2332 Bayville Road		Virginia Beach	VA	23455
Ward	Lester	9308 Eclipse Drive		Suffolk	VA	23433
Wark	Kevin	1508 Bayview Ave		Barnegat Light	NJ	08006
Water Seafoods	Deep	Box 144A East Lake Dr.		Montauk	NY	11954
Watson	A. Wayne	10222 Golf Course Rd.		Ocean City	MD	21842
Watson	Edward	420 Fidler Rd		Woodbine	NJ	08270
Weber	Rick	C/O South Jersey Marina	PO Box 641	Cape May	NJ	08204
Weeks	Stevensn	410 Front Street	PO Drawer 360	Beaufort	NC	28516
Weeks	Theodore	6 Irongate Lane		Medford	NJ	08055
Wehner	Diane E.	c/o USEPA, Rm 3137-C	26 Federal Plaza	New York	NY	10278
Weis	Nancy B.	4002 Golfview Dr.		Newark	DE	19702
Weisberg	Richard	509 Nassau Ave		Freeport	NY	11520
Weiss	Alan	Blue Water Fishing Tackle	211 Boro Line Rd.	King of Prussia	PA	19406
Welch	Ed	Cong. Martin Lancaster	2436 Rayburn Hse. Ofc Blg	Washington	DC	20515
Wells	William	PO Box 600		Seaford	VA	23696
Wertz	Charles	160 Gordon Plance		Freeport	NY	11520
West	Katy	NCDMF	1424 Carolina Ave	Washington	NC	27889
West	Susan	North Carolina Fisheries	PO Box 183	Buxton	NC	27920
Wheat	Max	NY Marine Ed. Assn.	333 Bedell St.	Freeport	NY	11520
Whitted F/CM2	Shirley	NOAA/NMFS Room 8237	1335 East West Highway	Silver Spring	MD	20910
Wiegand	Robert	2034 East 73rd St		Brooklyn	NY	11234
William	Roy	41 River Edge Rd.		River Edge	NJ	07661
Williams	Chris	11 Canal Way		Hampton Bays	NY	11946
Williams	James	PO Box 1308		Hampton Bays	NY	11946
Williams, F/CM1	Loretta	NMFS/NOAA, Rm. 8490	1335 East-West Highway	Silver Spring	MD	20910
Wilson	Doug	Axelsson & Johnson	993 Ocean Drive	Cape May	NJ	08204
Wilson	Jennifer	428 Monticello Blvd		Alexandria	VA	22305
Witek	Charles	1075 Tooker Ave		W.Babylon	NY	11704
Woodley-Miller	Cheryl	NMFS, Charleston Lab	PO Box 12607	Charleston	SC	29412
Wurster	Richard	245 Fifth Ave		West Cape May	NJ	08204
Wypyszinski	Alex	PO Box 231 Cook College	Rutgers Univ.	New Brunswick	NJ	08903
Young	Ayanna	Greenpeace USA	1436 U Street, N.W.	Washington	DC	20009
Young	Don	Fisheris Mngmt Subcommitt	2331 Rayburn HOB	Washington	DC	20515

APPENDIX 4. PUBLIC HEARING SUMMARIES

12 December 1994, Norfolk, VA

There was a public hearing held on 12 December 1994 at the Lake Wright Quality Inn, Norfolk, VA, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Hearing moderator and Council member James Douglas convened the hearing at 7:10 pm. There were 5 members of the public present.

Mr. Keifer, Council staff, reviewed the provisions of Amendment 5.

Tim Daniels questioned the 5,000 pound moratorium qualification threshold. He has a squid, mackerel, and butterfish permit, but has not been catching squid and butterfish because he has been fishing with a large mesh net because of regulations from other FMPs, so he will not be able to qualify.

James Rhule said that the bycatch allowance for boats that do not qualify for moratorium permits should be increased. He has concerns about the *Loligo* minimum net mesh. He is concerned about seasonal quotas for *Loligo*; he believes that environmental factors govern the extent of the inshore migration. He feels that there are two stocks of *Loligo* separated by a line running east of Cape May, New Jersey. (See Attachment 1)

Billy Carl Tillet believes the present fleet can catch the *Loligo* MSY. He is concerned about the minimum net mesh, and prefers 1.75" with a tolerance with no restrictions on chaffing gear. The net regulations should be simplified because of the problems with measuring a large squid net.

Charles Amory urged that the Council listen to the comments of Messrs. Rhule and Tillet.

The hearing was closed at approximately 8:20 pm.

13 December 1994, Ocean City, MD

There was a public hearing held on 13 December 1994 at the Dunes Manor, Ocean City, MD, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. The hearing moderator was Council member William Outten. Dave Keifer represented the Mid-Atlantic Council staff. There were no members of the public present.

14 December 1994, Cape May Courthouse, NJ

There was a public hearing held on 14 December 1994 at the Cape May County Extension Office in Cape May Courthouse, NJ on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Hearing moderator and Council member Gary Caputi convened the hearing at 7:10 pm. There were 16 members of the public present.

Mr. Keifer, Council staff, reviewed the provisions of Amendment 5.

Jim Pickering believes the *Illex* moratorium qualification criteria are too restrictive. He prefers Alternative #9.

Dan Cohen recommended that the *Loligo* seasonal quota provision should be dropped because it is not based on scientific evidence. He supports the *Illex* moratorium qualification criteria, but recommended that the eligibility window be increased from 1988 - 1993 to 1982 - 1993, thereby including the boats that worked on the joint ventures but have not been in the fishery since the Council phased out the joint venture program. He believes the penalty for operator permit violations is too severe and should be set by the courts. He recommended the Council consider Jim Rhule's comments on gear and also recommended net certification.

Lars Axelsson is concerned that the overfishing definition relies too heavily on the NEFSC fall bottom trawl survey. (See Attachment 2)

Jeff Reichle (Lund's Fisheries) said the fishery is over capitalized. He recommended a study of how many boats can go into the fishery.

Mike Genovese (*White Dove II*) supported expanding the *Illex* eligibility window. He said that if there is a concern about spawning, the fishery should be closed rather than using seasonal quotas. He believes the mackerel OY is too high.

Sal Ruggiero asked about the FMP implementation process. He is concerned about the harvest of small *Loligo*. More research should be done and there is a lack of data. He does not want to create an inshore - offshore conflict. He recommended the industry create a fund so data could be obtained and to privately fund research.

Jack Deveneau stated that the *Loligo* seasonal quota provision creates an inshore/offshore conflict; the inshore availability problem is caused by the environment. The *Illex* eligibility window should be 1982 - 1993. Industry representatives should be included in the Monitoring Committee process.

John Koegler (Thousand Fathom Club of South Jersey, Inc.) recommended that the Council determine whether the inshore mackerel stocks are overfished. Squid and butterfish are forage for bluefish and tuna. The recreational fishermen are not being considered. (See Attachment 3)

Dan Cohen noted that mackerel commercial landings have been decreasing and commercial fishermen are not taking mackerel from the recreational fishermen.

The hearing was closed at approximately 8:00 pm.

20 December 1994, Long Branch, NJ

There was a public hearing held on 20 December 1994 at the Hilton in Long Branch, NJ, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Council member and hearing moderator Tom McVey convened the hearing at 7:05 pm. Those present were Hannah Goodale (NMFS), Terry Smith (NEFC), Jim Gilford (MAFMC) and Carol Stevenson, who served as recording secretary. There were 4 members of the public in attendance.

Mr. Keifer, Council staff, reviewed the provisions of Amendment 5.

Sal Ruggierio said that having been part of the industry advisory body, he believes that all concepts that went into the Amendment had been discussed. He said *Loligo* landings have been small. He stated that the most squid landed domestically is 22,000 mt. Restricting mesh size would allow for escapement and prevent conflicts between inshore/offshore. Squid has the most potential in fisheries left in the world, and he thinks a full time industry committee should be put in place to discuss issues as they come up to prevent any negative effects. He added that by requiring permits for dealers and catchers that it would create money that should go towards research. He thought the industry should be made responsible. He said that Council should not allow any new entrants into the fishery because the fishery cannot handle any more vessels. He added that squid is one of the last major resources that have not been depleted. He stated that the Amendment should be put into effect as is written. He feels that the industry can maintain the fishery for many years to come. (See Attachment 4)

Charlie Bergmann of Axelsson & Johnson in Cape May stated that mesh restrictions in the *Loligo* fishery are a good idea and that it can boost economics in the fishery. He is in favor of joint ventures with foreigners, who helped Americanize the fishery in the first place.

Danny Cohen, F/V Kelsey M. Felt that closed seasons for inshore/offshore should be removed from the Plan. As for the *Illex* moratorium, agreed to go back to the beginning of the fishery and not start with 1988. He supports a moratorium on *Loligo* and butterfish. He feels the penalty is too heavy for operator permit violations. He supports the minimum mesh in the *Loligo* fishery and also supports limited entry. He also feels that the *Illex* fishery should not begin until June 15th.

The hearing was closed at 7:37 pm.

12 December 1994, Riverhead, NY

There was a public hearing held on 12 December 1994 at the Cornell Cooperative Extension Office of Suffolk County in Riverhead, NY, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Council member and hearing moderator Tony DiLernia opened the hearing at 7:30 pm. There were approximately 30 members of the public present. Also present was Council member John Mason.

Mr. Seagraves, Council staff, reviewed the provisions of Amendment 5.

Richard Jones, Pontos Fisheries Inc., questioned what the recent landings have been relative to the MSY and OY specifications proposed for *Loligo*.

Charles Weimar, Rianda S Fisheries Inc., was concerned about the fairness of the limited entry qualifying criteria. He was concerned that he might not qualify.

Stuart Foley, Atlantis Fisheries, questioned if the control dates had been changed.

Mark Phillips, F/V Illusion, supported Alternative #9, that is, that the qualifying criteria for moratorium permits be the same for *Loligo*, *Illex*, and butterfish. Short of that, he favored elimination of the entry date or qualification if landings occurred anytime prior to Aug 13, 1993. He felt the *Illex* fishery was being given to a small number of people. He felt more boats should be allowed to enter the *Illex* fishery.

Brad Lain, representing East Hampton Bayman's Association, had no comment on *Illex*. He said inshore trap fishermen wanted to be part of the Atlantic mackerel fishery, but questioned the validity of the stock assessment for Atlantic mackerel. He stated that the inshore trap fishery is an important food fishery, not a bait fishery. He said the inshore trap fishery for *Loligo* has experienced serious decline since the mid-1980's. He observed that this decline seems to coincide with expansion of the offshore *Loligo* fishery. He stated that inshore stock availability has dwindled in recent years. Providing "adequate escapement" is not enough. He felt only a small amount of squid were returning inshore. Domestic annual harvest should be set such that the inshore fishery can exist. With respect to butterfish, the directed fishery inshore is small but important to the inshore fishermen. Feels there is a large discard problem in the offshore fishery. Supports a small domestic harvest of butterfish to insure stock stability. Supports mandatory sea sampling of fishery. Butterfish should not be permitted to be sold as bait.

Rick Lofstead, F/V Evening Prayer Inc., supported Alternative #9, where the qualifications for *Loligo*, *Illex*, and butterfish moratorium permits are the same. He would like the opportunity to catch *Illex* if he wants to. He felt the preferred alternative would limit the *Illex* fishery to too few a number of vessels (30-50). He felt the Plan was unfair to processors.

Mel Moss, Shinnecock Co-op, questioned why the Council was considering limited entry for this fishery. He felt it was possible for the boats which qualified for the *Illex* fishery to control the whole squid fishery. He supported Alternative #9 where the qualifying criteria for moratorium permits for all three species are the same. He opposed ITQs and questioned the language in section 9.1.2.1.1.2. He opposed state by state quotas and questioned if anything would be left for the inshore fishery under the proposed seasonal quota.

John Mason questioned the validity of the MSY estimates for both *Loligo* and *Illex*. Felt the numbers are no good.

Richard Jones said the seasonal quota was unworkable since squid availability changes rapidly.

Charles Wertz was totally opposed to the mesh size for *Loligo*, said it won't work. He suggested leaving the mesh size to be used up to the fishermen. He supported the minimum tube size alternative. He questioned the validity of the landings statistics, stating that the actual catch may be much higher. No one can count fish in the ocean, get rid of the 36,000 mt for *Loligo* and find out what we really catch using logbook data and go from there. He favored excluding the Georges Bank groundfish fleet from the squid fisheries.

Larry Dyer supported the alternative which allowed 80% of a quarterly quota to be caught and then impose trip limits.

Jim Mangano felt that 36,000 mt MSY for *Loligo* was just an arbitrary number and he was opposed to the quota.

Pat Wetzel stated that quota should be equally distributed across all months.

The hearing was closed at 9:30 pm.

13 December 1994, Galilee, RI

There was a public hearing held on 13 December 1994 at the Dutch Inn in Galilee, RI, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Hearing moderator and Council member Tom McVey convened the hearing at 7:15 p.m.. There were approximately 100 members of the public present.

Mr. Seagraves, Council staff, presented the provisions of Amendment 5.

Richard Goodwin, Huntress Inc., supported the preferred alternative for Amendment 5. (See attachment 5)

David Dowdell, Davrod Corp., stated that the Plan, as currently written, has many problems. He disapproved of the RD being given the discretion of closing the fishery on a seasonal basis. He supported the elimination of the seasonal quotas until more details are forthcoming. He raised questions about how sales receipts for moratorium qualification would be verified by the government. He felt that the qualifying criteria may be rendered meaningless. He supported making the period of eligibility for moratorium permits from Jan 1, 1994 to present and use NMFS logbook data and landing slips that are verifiable. He felt that the current criteria in the preferred alternative may allow too many vessels to enter the fishery. He wants the Council to use data which are verifiable.

Marie Roebuck felt that the Plan would harm small vessels. She stated that the small boats would be put out of business. She was concerned about limited entry.

Michael Love, F/V Luke and Matthew, F/V Northern Traveler, and F/V Northern Voyager, was in favor of the preferred alternative except that the mesh for *Loligo* should be 2 3/8". He was also concerned about the provision for seasonal quotas.

Geir Monsen, Seafreeze Ltd., stated that he helped develop the US fishery for *Loligo*, *Illex* and butterfish. He stated that he has made a large investment and wishes to maintain his business. He can't go scalloping or groundfishing because of moratoria in those fisheries. He felt that Amendment 5 was basically sound and is the right thing to do. He questioned the criteria for *Loligo* stating that it was wide open to fraud. He questioned the mesh requirement, stated it was too small. He opposed the RD having the ability to open and close the fishery on a seasonal basis. He stated that the spring fishery for *Loligo* is based on spawning animals and in every other fishery he is aware of fishing on spawning fish is discouraged, not protected.

Peter Barbera, Town Dock Inc., supported Alternative #9 where the qualifying criteria are the same for *Loligo*, *Illex*, and butterfish. His business employs 100 people and it is getting harder to operate. Would like to have a steady production of *Illex*, which he needs for survival. He stated that Amendment 5 looks like the Mid-Atlantic fishermen are protecting their own interests. Felt the Plan was not promoting attainment of it's objectives, namely development of the US industry while maintaining flexibility.

Jon Kilcommons suggested that the Magnuson Act was not stabilized. (See Attachment 6) He felt the overfishing problem was due to the Magnuson Act. Stated that the Draft Environmental Impact Statement is useless. Stated that the Council does not have rule making authority and until the law is fixed the fisheries and fishermen who depend on them will not be properly managed.

Chris Joy, Seafreeze Ltd., supports the preferred alternative of Amendment No 5. Stated the control date is ok but the 5,000 lb in a week provision for *Loligo* opens the door for fraud. Favors limited entry into these fisheries.

Kyle Goodwin, F/V Persistence, stated that he has fished *Illex* since 1987 and already has seen the fishery become too crowded. Stated that the *Illex* control date should stand.

Bob Smith asked if a fishermen has mackerel on board for bait does this require a permit? He supported a standardized, universal logbook.

Chris Nielson, F/V Nancy and Gary, said he did not catch *Illex* and *Loligo*. He described the Council as a total botch job. Stated that the Councils have totally failed. He generally was opposed to any form of management and was verbally abusive.

Raymond Carelton, F/V Mabel Susan, said his boat was old and tired and that we were killing him with all the red tape and regulations. He said he was a fisherman not an accountant. Stated that the Councils had no right to regulate his fishery and were Nazis for doing so. The Councils are diminishing his flexibility.

Philip Merris, F/V Relentless, supported the preferred alternative as stated.

David Webb, F/V Relentless, supported the preferred alternative as stated.

Paul Gorman, F/V Canyon Explorer, supported the preferred alternative with the exception that he was opposed to the RD being given the authority to invoke seasonal closures.

Timothy Champlin, stated that the groundfish boats were regulated and didn't want them coming down here catching squid. He stated that the Plan was not about conservation, only juggling what we have.

James McCauley, Point Judith Co-op, felt the 5,000 lb in a week provision for *Loligo* would accommodate day boats. He suggested the Council consider that they land that much in three years or perhaps two years out of the five years outlined in the Plan (1988-1993). In addition, the Council should consider an exemption for boats below a certain size since they are not the problem. He felt all the criteria for moratoria permits should be the same. He wants to fish for *Illex* and boats he represents need to get into it. Other mesh sizes should be considered, especially a 5.5" net with a 2 3/8" liner should be allowed. He said the Council should manage the species complex on a TAC basis. He was strictly against a minimum size for *Loligo*. He was also opposed to the seasonal closure provisions. He felt that the public should be given ample opportunity to comment on seasonal closures rather than the RD simply closing the directed fishery without a public hearing process.

Michael Doyle, F/V Seafarer and F/V Charlie's Pride, questioned if a vessel was sold, would the moratorium permit be transferred with the vessel. He stated that he purchased a recirculating seawater system but had not landed *Illex* in significant quantities, would he still qualify for a moratorium? He supported a mesh of 5.5" with a 2 3/8" liner.

Donald Fox, F/V Lightning Bay, supported the preferred alternative except that the qualifying criteria for both squids and butterfish should be the same.

Erling Berg, F/V Jersey Girl, stated that the quotas can be taken by the existing fleet. He stated that the additional entry of groundfish vessels would only further divide up the fishery. He favored the current moratorium criteria, however he was strictly opposed to the seasonal allocation provision of the amendment.
Bob Taber, Trawlworks Inc., suggested that the language to describe the gear and mesh requirements was vague and should be reworded to clarify it's intent since it may be open to different interpretations by different fishermen.

Scott Westcott, F/V Zella and Pt. Judith Co-op, felt the implementation of Amendment 5 was poorly timed. He favored 1 7/8" throughout the net and the language allowing a liner (1 7/8"-2 3/8") inside a 5.5" codend.

Jim O'Malley, East Coast Fishermen's Association, objected to the seasonal provision of the plan being set up as a framework measure. He wanted better safeguards against the RD closing the fishery on a seasonal basis without a chance for public input through the Council process.

Bruce Ladd stated that if you were issued a permit you should be allowed to catch those species for which you were issued a permit.

Greg Huba submitted written statements. (See Attachments 7 and 8)

The hearing was closed at approximately 9:20 p.m.

14 December 1994, Buzzards Bay, MA

There was a pubic hearing held on 14 December 1994 at the Massachusetts Maritime Academy, Buzzards Bay, MA, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Hearing moderator and Council member Tom McVey convened the hearing at 7:30 pm. There were approximately 20 members of the public present.

Mr. Seagraves, Council staff, reviewed the provisions of Amendment 5.

Joseph Avila stated that he was not against anything he had just heard about the Amendment.

David Pierce, Massachusetts Division of Marine Fisheries (MA DMF), read a letter outlining the position of the MA DMF. (See Attachment 9).

Wade Behlman, representing inshore fishermen, agreed with the position taken by the MA DMF. He felt the offshore fishery should be slowed down and that discards in the offshore fishery were a problem.

Robert Kohl, F/V RAMS, was totally opposed to the control dates and the moratorium. He stated that the fishery for *Illex* east and north of Cape Cod was not being prosecuted due to lack of markets. He felt that the boats to the north and east could prosecute a cleaner fishery for *Illex*.

Dave Dutra stated that he owned a 70 year old fishing vessel. He was 100% behind the position taken by the MA DMF. He said the big boats with small mesh fishing offshore were the problem. He stated the Councils and NOAA were not doing their jobs.

Michael De Coninck, F/V MILL POINT, agreed with the moratorium on entry. He felt the proposed mesh size of 1 7/8"was too small. He felt there were problems with lumping the four species together in one FMP. He was concerned with the increase in offshore effort. He endorsed the MA DMF position.

Mark Simonitsch, representing inshore trap fishermen from Maine to Rhode Island, supported the MA DMF position. While he felt the Amendment was a step in the right direction he felt it does not go far enough in addressing problems faced by inshore fishermen in recent years. He wants the inshore fishermen to get their fair share of the fishery. He feels the offshore fishery has hurt the inshore fishery. He outlined the following problems: discards in the offshore fishery, the multi-species nature of the small mesh fisheries, the Management Plan is exclusionary in spirit, butterfish problems not adequately addressed, no representation of fishermen outside of Mid-Atlantic region on advisory panel, mesh being used offshore too small, moratorium will not contract effort, seasonal quota proposal too vague, discards offshore, and that the problems in the inshore fishery are not recognized. He feels that if the market for small squid continued to improve then the landing of small squid offshore will continue to increase. He identified the lack of sea sampling data from the offshore fishery as a serious problem. He feels the overfishing definitions are no good. Stated that the otter trawl fishery is on trial.

Ernest Eldredge, Chatham Fisheries, agreed with the MA DMF position. He feels the single largest problem is the discard problem created by the small mesh fisheries. He felt the OY of 36,000 mt for *Loligo* may be too high. He noted a steady decline in his catch inshore. His business has operated for over 100 years.

Erling Berg, F/V Jersey Girl, stated that the quotas for *Loligo* and *Illex* could be harvested by the existing fleet. He favors the current qualifying criteria for moratoria permits. He was opposed to the proposed seasonal quotas.

Larry Silvia stated that the main problems in these fisheries were the discards of fish at sea. He felt the current estimates of discards are low. He felt the proposed mesh size is too small. He favored a closure of the fishery if discards reached a certain threshold. He noted that squid are a primary food for large pelagic fish. He felt that better data on discards are needed.

Frank Grice, East End Fisheries Corp., was concerned that the primary thrust of Amendment 5 was to limit entry which he stated was primarily economically driven. He was concerned that as vessels are displaced from the New England groundfish fisheries that they will have no other alternatives. He felt the dates picked for the moratorium criteria are arbitrary and capricious. He said it looks like the Plan is designed to protect about 260 vessels. He agreed with the need for cutting down on discards but was opposed to the moratorium on entry. He questioned the reduction in MSY for *Loligo*. He stated that if the offshore fishery is causing problems in the inshore fishery then seasonal quotas may be necessary, but additional things are necessary.

Doug Evans felt the mesh size was too small. He stated that some innovative trawling techniques were being tried in the offshore fishery which may reduce the discard problem.

Dan McKiernan, MA DMF, questioned the accuracy of the landing statistics. He pointed out that the foreign fishery may not have discarded anything. If recent US landings included discards, it is possible that current removals for *Loligo* exceed those by the foreign fishery at it's peak in the early 1970's. He also noted that discards occur at the point of processing on shore and that these are missed by the weighout system.

The hearing was closed at 8:45 p.m.

15 December 1994, Portland, ME

There was a public hearing held on 15 December 1994 at the Holiday Inn West in Portland, ME, on Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Hearing moderator and Council member Tom McVey convened the hearing at 7 pm. There were 6 members of the public present.

Mr. Seagraves, Council staff, reviewed the provisions of Amendment 5.

Edison Love, stated that he wants to get into the fishery. He feels the fishery is being held for a select few. He noted that the fishery has never approached TAC. He felt the freezer trawlers were discarding large volumes of small animals and that observers should be mandatory. He would challenge the Amendment in Federal court.

Roger Woodman, Jr., F/V Fairtry, felt that the squid, mackerel, butterfish complex was still under-utilized and that the orderly entry of new vessels into the fishery should be allowed. He feels that the NMFS and the Councils have boxed in the fishermen and have taken away all of their options. He feels the Plan privatizes an under-exploited resource.

Dennis Frappier, Portland Fish Exchange, stated that the *Illex* and mackerel resources in the Gulf of Maine have not been exploited for the past ten years due to a lack of markets. He feels the resource is theirs even though they have chosen not to exploit them and that permits in the Gulf of Maine for squid, mackerel, and butterfish should not be limited.

The hearing was closed at 7:30 p.m.

ATTACHMENT 1

F/V DARANA R INC.
Capt. James A. Ruhle
P. O. Box 302
Wanchese, N. C. 27981

Being deeply involved in the Squid, Mackerel and Butterfish Fishery, and serving both past and present as an industry advisor for this fishery to the Mid Atlantic Council, I offer the following comments. These comments are based on 14 years practical on grounds experience.

In reference to 9.1.2.4, minimum mesh size for Loligo; unlike most fisheries, the industry asked the council to adopt the measure. A major portion of the fleet voluntarily uses 2" (outside measure) webbing for cod-ends, without any liners. We have proven by experience that this allows a big percentage of borderline marketable size squid to escape. Although some sellable squid also escape, this size webbing proves to be both selective and still workable. The material used in these cod-ends often stretch and then shrink after being used for a period of time. With this in mind, industry advisors asked for a 1 3/4" (inside measure) minimum, to prevent the webbing from being out of compliance due to the shrinkage factor. The council would not build in any tolerance and wanted 2" (inside measure). The proposed 1 7/8" (inside measure) is a compromise on both sides. There was no discussion on chafing gear sizes or construction by the industry advisors other than that the language used in the Groundfish or Summer Flounder Plans would not be suitable in this fishery. Although I purchase 5 1/2" (inside measure) webbing for chaffing gear; due to the different methods of rigging the chaffer to the cod-end, I am opposed to the 5 1/2" minimum size stated in the Plan. If the chaffer is rigged as an outside cod-end, meaning the purse rings, splitting wire, expanding lines and rib lines are all sewn to the chaffer, the webbing is under constant tension. This prevents the chaffer from shrinkage but all escapement is through the meshes.

The method I , as well as many others use to rig the chaffer, is to sew the chaffer on the cod-end only at the top or forward end. This method of rigging allows the webbing to shrink, but allows escapement not only through the meshes but also out of the lower end of the chaffer. The 5 1/2" webbing will draw up to 4 to 4 1/2" before it becomes to worn to continue to use.

The only studies I am aware of on chaffing gear escapement were done in Norway in the deep water shrimp fishery. This report stated that anything over a 2 to 1 ratio was sufficient for shrimp escapement. Therefore, I request the minimum size mesh for chaffers be 4 1/2' (inside measure) for chaffers rigged with one end open.

There also needs to be a provision to allow a small section of 1 7/8" webbing to be sewn inside the last 10 meshes of the cod-end. This webbing is absolutely necessary in order to close the gap left when the purse rings are closed. It is impossible to retain any size squid in the cod-end without this gap being sealed. With no explanation of this in the plan, that webbing could be considered a short liner.

It has taken industry a long time to get any consciences on minimum size for Loligo. It is part of the plan that has not been taken lightly by the whole industry. Although there may not be any scientific studies done by NMFS, much trial and error on the grounds by fishermen have proven to us that the 1 7/8" mesh will help the stock and still be acceptable in the fishery. Regardless of who is chosen to serve on the FMP monitoring committee, the industry will still be the only one with the expertise on mesh sizes. Therefore, I am totally opposed to the mesh size being a framework measure in the FMP.

In reference to 9.2.7.; seasonal allocations of Loligo: It is my opinion that the inshore Loligo Fishery as with the Mackerel Inshore Fishery has been impacted more by environmental and climatic conditions rather than any other factors.

I have a weather Faximile machine aboard my vessel and I have been printing ocean surface temperature charts once or twice a week for the past 18 years. By watching the temperature patterns for weeks ahead of a seasonal run of fish or squid, it is possible to project if the season will be early, late, or non existent. Even if the temperature is near normal at the beginning of a seasonal run, often times prior to the season temperatures could be way off which directly effects the migrations of fish and squid. If the inshore Loligo run was the only inshore fishery to have changed in resent years, I might be inclined to agree with the seasonal allocations. However, there has been a big change in the inshore Mackerel fishery in the same time frame as Loligo. It is totally impossible for me to catch Mackerel in the same areas I caught them a few years ago. 90% of the fish are now caught 10-20 miles farther off-shore than they were before.

This past September, the high volume of landings of Loligo south of Long Island and Nantucket along the 20 fathom edge was very possibly what would have been the inshore run if ocean temperatures had been right for the migration to occur. The average size of the Squid was quite good. I believe that they had already spawned.

By contrast, the water temperature was well above normal for a long time this fall off Virgina and North Carolina. There were a lot more Squid taken in-shore but due to the 5 1/2" mesh size in the Fluke Fishery, landings may not reflect this run. During one week in November, over 6,000 lbs. of very large Loligo were caught in Pamlico Sound, in North Carolina by shrimp and crab trawlers which is a very rare occurrence.

It is stated in Amendment 5 that the FMP monitoring committee will annually review the best available data in order to make "Framework Adjustments". One important part of the data will come from Fishermen's log books. I like most other fishermen have accepted the use of logbooks with the hope of improving the data used by NMFS and the Councils. It has always been industry's position that the best available data was not at all the best. It is our hope that the logbooks will benefit both the Councils and the Industry by improving the data in order to make real time assessment management work.

However, after hearing the Regional Director's comments at the September Mid-Atlantic Council Meeting, I am very concerned that the annual review will not be as up to date as we had hoped. The R.D. stated that the fisheries service will lose 230 positions within two years and that the Councils should lower their expectations of the fisheries service to deliver services.

Bearing this in mind, I fail to see how the data can be up to date in order for the monitoring committee to make any annual "Framework Measure Adjustments".

TO: KEEFER

ATTACHMENT 2

F/V "FLICKA" Capt. Lars Axelsson F/V "DYRSTEN"
705 Hughes Avenue
North Cape May, N.J.
08204

Phone (609) 886-4168

December 12, 1994

Here are some comments and observations on AMENDMENT 5 TO FISHERY MANAGEMENT PLAN FOR THE ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES. I have been a Captain for over 20 years, and have been involved with these fisheries the whole time. I am also currently an advisor for this fishery to the Mid Atlantic Council.

SECTION 9.1.1.3 Page 52 Fifth and sixth paragraph from bottom

The seasonal distribution of Loligo on the geographic side, I believe, is caused more by warm and cold eddies spinning off the gulf stream, together with standard weather patterns.

Also, I believe that the information from the inshore Joint Ventures from 1981 through 1987 is not being reflected here in these statements.

I think if a comparison from the 1960s to date may show that the elements are more responsible for the geographic and seasonal landings. Offshore comparisons with inshore over a longer time frame may be more enlightening to all. We do not need to fuel a USER GROUP inshore offshore war.

Mackerel have shown a change in their availability close to shore in the same time frame as the loligo availability. And the mackerel resource is at a very high level. And yet, there isn't a problem of the offshore fishing affecting the inshore. There is nearly no fishing effort at all. The elements are responsible.

REGIONAL DIRECTOR MAY ESTABLISH SEASONAL QUOTAS:

The seasonal quota, inshore vs offshore is a very hard one to figure. For example. This year we planned to do major work to our vessel in the month of October. We thought that compared to recent years there would be a lull for about a month or two between the illex season and the loligo season. It didn't happen. This year the beginning of Loligo started right in the end of Illex season. We lost out a month of good production.

Earlier this year concerning the inshore run in the spring. There was very good fishing that occured in the twenty fathom range to the east of the Hudson. This is rare, and also exactly right in between the inshore and offshore area.

Why did it occur there? Why not on Long Island like other "traditional" years? Will this production go against the inshore sector or the offshore sector in the future? Tough questions. And from Dick Roe, "The RD in his wisdom with his magic wand and crystal ball will know?"

THE LIMITED ENTRY LANGUAGE: Section 9.1.2.1.1.2 Page 55
(15 lines from bottom of page)

1. Under vessel elilgible for an ILLEX PERMIT

Item # 2 Leaves a big loophole for a lot of new entrants. A date earlier than May 31,1994 can easily be put on documentation for a RSW, or freezer system. And history shows that it takes a year or more before implementation of the final regulations of any Amendment to a FMP.

The rest of the statements ought to be closely looked at.

Items # 3-4 and following paragraphs: These will hinder a vessel to "value add" to the product being caught. In order to add value to the product, more space is needed. Therefore a larger vessel. The vessel will be able to use less product for better profit.

The sheer weight of the freezing system makes for stability and saftey problems. We find that our vessel catches less product now,(freezing at sea) then it did while a "wet fish boat." We should be able to modify our vessels for these reasons.

This should be addressed.

9.1.2.1.1.3. PERMIT APPLICATION: Page 56 (bottom paragraph)

Here we go. Getting set up to fund "government process." It used to come out of normal income taxes.

CONCERNING FEES UNDER THE PERMIT SECTION:

Just by putting the notice in the "Federal Register" the fee has to be paid. This is very autocratic!

FRAME WORK MEASURE ADJUSTMENTS:

This will work well, if all data that is suppose to be on line is. I am afraid of this. The reasons are:

1. The logbook data is not being processed in timely enough manner.
2. The idea of real time is good but, in reality it's not happening.
3. If we write into a plan, something that is supposed to be used, and the bugs are not work out, that will be like putting the cart before the horse.
4. The idea of people being laid off in the Fisheries Service and a bigger job at hand, means the job may not be done in a timely manner.

SECTION 9.1.2.4: MINIMUN MESH SIZE FOR LOLIGO: Page 59 - 60

First, a fisherman ought to be told what he can use, then how he can't use it. I've read this paragraph several times and it is still confusing me to the point that I need an explanation. Maybe other fishermen will be confused also.

Page 60 Amendment Five to the S.M.B. PLAN. Top paragraph second line, "**Net strenthener**"is being cited as prohibited use "on the top of the regulated portion of a trawl net which results in an effective mesh opening of less than 5.5 inch mesh (stretch, inside measure)."

Then the next line says "net strengtheners (covers)...etc" may be used...

Maybe exchanging the last statement with the first will make the whole paragraph easier to understand:

> The owner or operator of a fishing vessel may use a net strenghener (cover), splitting strap, and a bull rope,

(I would like to add, belly bands, split strap chaffer, tripper, trip line, and tripper apron, to the list)

> provided they **do not** constrict the net strengthener to less than effective "5.5 inch" mesh (inside stretch measure) as follows: He shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on top of the allowed net strenghener and gear.

The rest of the statement,"Top of regulated portion of the net"...etc. could be left out.

SOME CONCLUSIONS AND OBSERVATIONS:

1. In my case the net strengtherner goes all the way around the 1 7/8 , actually closer to 1 3/4 (inside measurement), loligo cod end.

2. In the plan's wording, a second net strengthener, that goes around the first net strengthener, is NOT ALLOWED. Is this correct?

   There may be another problem here. Some vessels use a short section of net strengthener in the splitting strap area down to the tripper, to act as chaffing gear for the wire. This piece is usually 10 - 15 meshes long and goes all the way around the cod end. In our case, this past season the splitting strap came tight over 400 times. That is a lot of wear and tear. This could be interpreted by enforcement as a VIOLATION.

   This should be allowed and ought to be stated.

3. While on the subject of net strengthener, we use the double knotted 5.5 inch (inside) twine. The length is about 50 meshes. That is equal to 250 meshes of the loligo twine. Essentially, a bag inside a bag about twenty to thirty feet from the bitter end of the net.

4. Other vessels use similar webbing for a net strengthener. But, they do not attach the bottom of this 5.5 inch webbing to the ring line. (this is where the tripper and trip line go). In time and use this same webbing will actually shrink to approximately 4.5 inches, BECAUSE IT SLIDES UP THE $1\frac{7}{8}$ BAG.
This also, could be viewed as a VIOLATION. This too, should be addressed.

"ALSO SEE 9.1.1.4 FOR LOLIGO SEASONAL QUOTA..." Page 61
(Just above 9.1.2.5.2.)

I looked towards the front of the document to find this and I believe this section refers to ILLEX.

SECTION 9.1.3.1 GENERAL (Page 63)

Some of the items listed may not be received very well by fishermen in general because they are considered private. For instance, I would be against stating my fish prices for all the species I catch "ON A CONTINUING BASIS" trip by trip.

MESH SIZE TO BE ADJUSTED AS PART OF THE ANNUAL QUOTA SETTING PROCESS: Page 68, between 4-7 lines from bottom of page.

I am afraid that the fishermen will get the short end of the stick on this. Extentions and cod ends are very expensive and labor intensive. To vary this year to year can be a real burden to the fisherman.

If the fisherman is sure of GOOD representation in the FMP Monitoring Committee process, then this frame work idea can be good.

or

The Mesh size should remain in the Amendment Process.

ATTACHMENT 3

THOUSAND FATHOM CLUB of SOUTH JERSEY, INC.

P.O. BOX 74 • NORTHFIELD, NJ 08225-0074

SOUTH JERSEY

MId Atlantic Fishery Management council
Cape May Courthouse

December 14, 1994

Squid, mackerel and butterfish are important forage species for most finfish. In the proposed plan I can find no documentation of what percentage of the biomass of these species is consumed by finfish. Recreational fishermen are concerned that excessive quotas for squid and butterfish are having a affect on the stability of the finfish populations.

Recent harvests of squid are about 1/2 of the quotas allowed. We request some calculation of the percentage of squid and butterfish consumed by finfish included in the biomass calculations.

MACKEREL-

This fish has been an important recreational fish and the spring fish for the recreational fleet. Charterboats and headboats had depended on good spring runs of mackerel to start their seasons. In New Jersey the last 3-4 years spring runs have been non-existent. We would appreciate some work on why this might be occurring. We believe there was excessive inshore harvest several years ago when joint venture sold large amounts of mackerel.
The inshore stocks seem to have been affected.
We request consideration of minimum distances from the coast for the landing of mackerel by commercial fishermen. Based on our observations there appears to be excessive commercial harvests inshore and we would appreciate council addressing the issue.
It is important to the boat yards and marinas plus the headboats and
charterboats.

We appreciate a quota assigned but would like to point out that it does recreationals no good if there are no fish existing to be caught. We fish near land at this time of year and would appreciate so consideration of our problem. Would inshore zones that exclude commercial net fishing have any value?

sincerely,

John T. Koegler
President

ATTACHMENT 4

Att. Dave Kiefer

from SAL RUGGIERO

F Intl [illegible] Conf Phila.

CEPHALOPOD AND DEMERSAL FINFISH STOCKS: SOME STATISTICAL TRENDS AND BIOLOGICAL INTERRACTIONS

J.F. Caddy
Fisheries Department
FAO, Rome.

INTRODUCTION

In an earlier review presented at the last Cephalopod Conference, I looked particularly at unexploited resources. In this paper, I want to put the fisheries for cephalopod resources in their current context, as one of the remaining marine renewable resources still experiencing increases in landings, in a world fishery situation marked by overfishing and declines of many finfish resources. In fact, it is my opinion that the effects of overfishing groundfish resources may have had some positive impact on the productivity of cephalopods and other short-lived species. If this hypothesis is correct, we may expect to see continued increases in cephalopod landings particularly in those areas where groundfish landings have increased to levels at and beyond Maximum Sustainable Yield (MSY) in the recent past. For areas already heavily fished for both cephalopods and groundfish, such as the Mediterranean, Northwest Pacific and West Central Atlantic, there seems some evidence from the statistics, that cephalopod landings may have reached a peak, and will now vary largely as a function of fishing effort and environmental variation.

The present paper focusses on the relationship between gross groundfish and cephalopod trends, with particular attention to the FAO data base on world fishery landings, as represented by the most recent data set: that for 1992.

THE GLOBAL SITUATION: A BRIEF OVERVIEW

B\ FINFISH RESOURCES

As we will see later, there is some considerable interest in seeing the world trend in cephalopod resources in the general context of world fisheries; in particular for the groundfish resources of world shelves. Particularly for the groundfish resources, considerable concern has been shown recently with respect to the declines of stocks in different parts of the world, and the general state of overfishing and excessive fleet sizes this appears to be related to (SOFA 1993; FAO 1993).

Largely circumstantial evidence suggests that recent increases in cephalopod landings may have reflected in part an increase in market demand, but also a reaction of the ecosystem to heavy fishing pressure on more conventional finfish fishery of predatory fish

now

resources, which, under conditions corresponding to Maximum Sustainable Yield, would have been reduced in stock size to half or less of their virgin stock size. Since stocks of larger predatory fish are often being exploited at above the level giving the Maximum Sustainable Yield, and in some cases (such as the Northwest Atlantic Cod stock have been decimated), stock sizes and mean ages and sizes have been reduced to a point that their effects on larger prey species such as cephalopods has probably been reduced.

largest

before these stocks were decimated

of whales

Such a trend in reduction of predatory fish has been accompanied by declines of ~~other~~ cephalopod predators such as toothed whales, and other marine mammals whose virgin populations Voss (1973) estimated once consumed some 60-70 millions of tons annually, particularly of oceanic species. These figures seem at first sight improbable, but another simple calculation with more biological basis can be made for the tunas, ~~which are even more important predators on cephalopods. For tunas~~, Olson (1982) found oceanic squid to be the second most important prey item by numbers and roughly 25% by weight. Tuna catches (FAO 1993) have doubled in recent years, and world landings are around some 4.8 million tons.

here

Assuming this increase in tuna harvest has reduced the tuna stock size by some 2 million tons, and noting after Olsen (1982) that tunas consume some 10% of their body weight per day, we can calculate that this 2 million tons, if they had not been caught, would have consumed some 19.9 million t of cephalopods!! These kind of ~~halucinatory~~ figures need to be regarded with great caution, since a sizeable fraction of this 'surplus' was undoubtedly consumed by other predators, and is not available to fishing. ~~Such calculations show in principle,~~ that the removal of top predators may have contributed ~~to oceanic squid potential harvests~~.

However

increases

The predator-prey relationships mentioned in the last two paragraphs are of course ~~very~~ speculative, but it seems clear that there has been a large decline of all cephalopod predators, which will have favoured growing stock sizes of short-lived opportunistic species like most cephalopods.

the growth of

A\CEPHALOPODS

World landings of cephalopods in 1992 continued to be dominated by the fisheries of the Northwest Pacific and Southwest Atlantic; with squid again forming the key component of global catches. Cuttlefish are locally important in tropical seas, and octopus in the East Central Atlantic and Northwest Pacific. Neritic squid species taken in shelf fisheries continue to be dominant in most areas, with oceanic species for which the greatest upward potential was identified in an earlier review (Caddy 1992), forming the key component in leading areas; the Northwest and southwest Pacific, and Southwest Atlantic. Table 1 gives the figures for catches by country.

the

MR. DAVID Kiefer
MID-ATLANTIC FISHERIES
MANAGEMENT COUNCIL

DAVROD CORP.
DBA FV HUNTRESS I
P.O. BOX 3309
NARRAGANSETT, R.I.
02882

WRITTEN COMMENTS ON
AMENDMENT #5 TO THE SQUID,
ATLANTIC MACKEREL, AND BUTTERFISH
FISHERIES

DECEMBER10,1994

I will start with a brief history of myself and my knowledge of the fisheries being discussed. I am the owner of the freezer trawler Huntress I, and recently purchased the fishing vessel Nautilus. I have been involved in the squid, mackerel, and butterfish fisheries since 1979, when the Huntress was built. In 1982 I captained the vessel and was involved in changing the vessel into one of the first successful freezer trawlers on the east coast of the U.S.. In 1986 I became the owner of the Huntress I. I am also part owner and president of Deep Sea Fish of R.I., Inc., a company that markets these species around the world. To sum it up, I have first hand, and expertise knowledge, of the fisheries being discussed, as well as a good deal of experience in the marketing of these species.

I fully understand the councils' concerns that have stimulated this proposed amendment #5, however I feel that many aspects of the proposed plan pose a serious threat to all fishermen. One aspect of the plan that might actually be illegal is the passage of performance criteria after the fact. Think about it, this is on a par to someone building a house based on certain codes that might be in effect at the time of construction, and the government coming back to them three years later and telling them they must tear down their house because they retroactively changed the building code! If the council gets away with this type of management, what is to stop you from changing the performance criteria again in the future such that everybody loses their permits? This aspect of the plan also violates one of the criteria that must be followed, stated in (Section 303(b)(6)) of the MFCMA, and page 5 of the DEIS, that when the council develops a limited entry plan."THE COUNCIL AND THE SECRETARY MUST TAKE INTO ACCOUNT PRESENT PARTICIPATION IN THE FISHERY". I would think that this would mean up to the present time of the promulgation of the rule, not a full year prior.

Another aspect of the proposed plan that is a serious long term threat to all fishermen, is the vagueness of the language. This has been an ongoing problem throughout the country, not only in fisheries management, but in all areas of regulation. Far too much discretion is left in the hands of a few bureaucrats. Specifically, I am talking about the proposal to give the acting Regional Director the authority to develope a seasonal or quarterly quota system for the Loligo resource mentioned as #6 on page 4 of the proposed plan. How can the council expect fishermen, and concerned citizens, to comment on this very important part of the plan, if the criteria and details are not even known? I for one, am not willing to give the acting R.D. such broad discretion, and insist that this part of the plan be deleted until the public is informed of the details! All too often we have bureaucrats writing regulations in some closet some where, without the input of industry, the public, or a sufficient knowledge of the issues. This practice must stop!

I question the need to retroactively establish these rules in the first place. All throughout this proposed plan, language is used that leads me to this conclusion. One of the objectives of the plan, on page 3, is to "Promote the GROWTH of the U.S. commercial fishery". On page 7, paragraph C.4 of DEIS it states " none of these four resources are overfished at this time", on page 5, paragraph C.2.2, it states " The U.S. has demonstrated that it can harvest substantial quantities of these species", not all that is available, on page 6 C.2.8, it states "this amendment is intended to allow the CONTINUED ORDERLY DEVELOPMENT AND CAPITALIZATION of these fisheries". These are just a few of the examples of the conflicting language throughout the proposed plan. Based on these statements one could assume that the council would want to see growth, development, and capitalization of these fisheries.

As a participant in the development of these resources, I now face a real problem due to the proposed plan. There is a chance that my second vessel, purchased to fulfill a contract made with the government back in 1986, may not qualify for her moratorium permits. Back in August of 1992, when the control date was published, the wording used was very similar to the language used in the publication of the Summer Flounder control date. A line was added saying something about the possibility of performance criteria, this also means that there may not be performance criteria. As a businessman, trying to fulfill a CCF fund contract, I was required to interpret this arbitrary language. I felt I made the right decision in looking to the examples that the council had set with the Summer Flounder control date, i.e. having your permit, and having just one pound of landings qualified you for your permit. I used this example that the council and N.M.F.S. had made as my guidelines when purchasing my vessel. Not knowing the full history of the vessel I purchased, and not having access to it's history, I am fearful that my vessel may not qualify based on the retroactive nature of the performance criteria.

I feel that there are two changes to the plan that would address this problem. As stated earlier in these comments, I think that setting up retroactive performance criteria may be illegal, and the plan may be challenged on this basis. The performance criteria was published on June 13, 1994. The time frame that was set up for meeting these criteria should be extended to at least the publication date of the performance criteria. This action would have many good benefits. It would resolve my dilemma as well as others who purchased a vessel between Aug 1992 and June 1994, and who were left to try and interpret very arbitrary language in the control date publication. This action would also satisfy the requirement in section 303(b)(6) of the MFCMA, that PRESENT participation be taken into account when formulating a limited entry plan. This action would also eliminate at least the retroactive nature of the release of the performance criteria information. I do not know, but I would guess that extending this date would not necessarily allow too many more vessels into the fisheries.

A second change that could be made to the moratorium criteria, would be to qualify those of us that can show, through CCF fund contracts, that our vessels, purchased during that twenty-two month time frame (from the publication of the control date, to the publication of the performance criteria), as schedule B vessels, and who were able to get these vessels fishing in the plans fisheries prior to the June 1994 date.

I feel that the idea of retroactively splitting the permits up, and having different performance criteria for each species and a separate permit for each, also presents an opportunity for the plan to be challenged in court. The permits should only be split after the announcement date of this proposal, June 1994. The plan as it stands would have the effect of splitting the permits way back in Aug, 1993, some ten months prior to the announcement of the proposal. I think that this procedure once again makes a rule without allowing the industry and the concerned public to adequately comment prior to implementation.

I also take issue with the part of the plan that makes having a freezer or an rsw system on board, a criteria for the Illex permit. Many land processors actually prefer Illex brought in on ice for cleaning. This item should be dropped as a criteria for getting your Illex permit and the criteria of landing five trips of five thousand pounds or more prior to the implementation of this plan should be honored, even with no freezer or rsw system in place. These fishery plans are supposed to be based on science not how a vessel may handle a product after it is caught.

After meeting with many of my constituents here in Pt. Judith, an aspect of the proposed plan came up that could make the moratorium criteria moot. This issue, is the potential that many boats that were not fishing for and had not fished for squids and butterfish, would just make up takeout slips for landings that will satisfy the criteria in the moratorium. With the time window established for eligibility taking place when mandatory reporting was not required,(1988-1993), N.M.F.S has no way of cross-referencing these slips. Nor does N.M.F.S. have the resources to spend to do this. The potential is there for a real problem. We may end up with more vessels in these fisheries than we ever imagined. I have a proposal that might prevent this from happening, satisfy the standard of using present participation when making a limited entry plan, be more fair, easier to administer, and in the long run, allow fewer vessels to participate in these fisheries.

Let me begin by restating what I believe the purpose of the plan to be, and that is to make sure that those of us already in the squids and butter fish fisheries, not be put out of business by a large influx of effort from fishermen displaced out of other fisheries. I believe that the following approach may fit this intent much better than the proposed plan.

Since the beginning of 1994, anybody involved in the summer flounder, multispecies, and many other fisheries, have had mandatory reporting. This is data that the government has in its possession, that shows what almost everybody is fishing for right now. You would want to find out how much coverage, N.M.F.S. has with its logbooks, but I would bet that it would be fairly broad. This data can be verified and easily cross-referenced with dealer reports. If the council decided to use a fairly narrow time eligibility window, say Jan 1, 1994 to sometime prior to the closing of georges bank,(it would coincide with this mandatory reporting period), and only allow those vessels that had landings to retain their permits, we may end in the long run, with fewer vessels in the fisheries. Exceptions would have to be made, but N.M.F.S. could take a position that the only catches that were eligible, would be ones that had corresponding weighout slips. This approach may have many positive benefits. It could possibly eliminate the potential problem with the fabrication of takeout slips. It most certainly would show present participation. It would eliminate all the issues that arise concerning retro-active criteria setting. It is a position that I feel N.M.F.S. would have a much easier time defending. It would actually reward the honest fisherperson who was following reporting rules. It would virtually eliminate many of the problems that this plan has, as well as many of the aspects of the plan that are targets for litigation.

Why does the plan seek to include people that may have fished for squid back in 1988, and exclude someone who is fishing for squids right now? Adopting some form of the above proposal would not allow too many more vessels into the fisheries, due to the fact that many of the potentially displaced fishermen are just now feeling the crunch, and just now thinking of switching over. I think just a handful of vessels have switched over in the last year.This approach would also eliminate the potential for displaced effort coming our way from the west coast.

I know that this approach may sound funny, but I hope the council will give this some serious thought. We may be a lot better off in the long run and have fewer vessels involved in the fisheries.

As discussed in this document, I feel the plan as written has many flaws. The council, when making decisions should put itself in the shoes of the people that have to live by these decisions. We are business people, we have to make critically important decisions all the time, and therefore the council needs to be very clear in its' intentions, and the language used in its publications and proposals. I feel that the council has failed to do this with the publication of the control date, as well as some of the provisions in the proposed plan.I hope that the council will put some language in the plan that states that the performance criteria will not change again in the future such that we all lose our permits. I urge the council to clarify the proposal for the RD to set up seasonal quotas for Loligo squid, and I hope that the council will consider my proposals, to remedy my own potential dilemma as well as make the plan stronger, more fair, and less susceptible to legal challenges.

Thank You,

David Dowdell
V. President

12/13/94
Dutch Inn, Great Island Road
Galilee, R.I.

Comments on Amendment 5 to the Atlantic Mackeral, Squid and Butterfish Fisheries Management Plan.

Gentlemen,

I am John J. Kilcommons, a citizen of the United States and appear before you exercising my constitutional right to engage in governance.

I am not a fisherman or lawyer. I am an ordinary citizen, a retired Special Agent of the Federal Bureau of Investigation

It is my understanding that a public hearing such as this is an exchange of ideas between citizens and government on a specific issue - in this instance the draft of a plan to amend a FMP. I understand my only right is opportunity to be heard. We are not here to discuss regulations.

Am I correct?

Based on five years of study — self education in Administrative Procedure Law, the Magnuson Fishery Conservation and Management Act of 1976 and a review of "A Legal History of the MFCMA of 1976" prepared by the National Ocean Policy Study and printed October 1976, I advance the following observations to which, I hope, the Council members, citizens and any journalists present will pay close attention It is my belief that if all present will utilize this information, brief as it necessarily is, they will make legal history by identifying a core problem that is destroying this country. That problem is uncontrolled bureaucracy. It is not endemic to the fishing industry. It is a national disaster. It is a ignorance of Administrative Law.

Yesterday I received from Mr. Dave Dowdell a draft Environmental Impact Statement for Amendment 5 dated October 1994 and Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish FMP dated Nov. 1994.

I received both of them last night and have had no opportunity to have my observations typed for which I ask your indulgence.

My first and major conclusion is that the draft Environmental Impact Statement is useless since ~~they~~ it ~~are~~ is almost identical to the plan and if accepted as written will be procedurally incorrect and a basis for future legal challenge.

Secondly, definitions. There is no defining of:

Management Measure
Regulatory Measure
Proposed Action.

If it is determined Management Measures are in fact regulations then the Council is engaged in rulemaking over which it has no authority.

If Proposed Action is in fact policy making then the Council has no policy making authority. Councils have no authority beyond planmaking.

On page 58 of the Draft Environmental Impact Statement there is a discussion of the economic effects of the Amendment. Apparantly the Council has unwittingly confused the requirements of the Regulatory Flexibility Act with the requirements of the National Environmental Policy Act.

The second paragraph on page 58 directs the reader to a detailed discussion of " anticipated impacts of the proposed action" to Section E.2. Section E is located on page 23. Section E is a discussion of "The cultural and social framwork relevant to the fishery". There is no E.2.

I must apologize for not having had sufficient time to more throughly review this amendment, however -

I have had discussion with Ms. Penny Dalton, Senior Executive Staff, National Ocean Policy Study who indicated a willingness to contact and discuss with the Administrative Law scholars of the Administrative Conference of the United States a possible review of the procedures being followed by the agency to determine whether they are in sync with Administrative Procedure Law. The danger, of course, is that a lack of knowledge of Administrative Procedure Law on part of Council members themselves, staff, and the Secretary of Commerce himself could lead to outrageous confusion.

I suggest the council members touch base with Ms. Dalton, the Office of Management and Budget and the Council on Environmental Quality to assure themselves and citizens they are conforming to the law.

I request the Council to enter these comments into the Council Administrative File and the Agency Rule Making file since I suspect there is overlapping.

John J. Fitzsimmons.
5 Simmons Ter.
Middletown, R.I. 02842
401-849-7276

ATTACHMENT 7

V G SEAFROZEN INC.
30 Eagle Nest Terrace
Wakefield, RI 02879-2506
Tel/Fax (401) 783-0215

Mid-Atlantic Council
Room 215, Frear fed. Bldg.
300 South New Street
Dover , DE. 19901-6790

Dear Council Member,

Several months ago, I wrote to the council regarding my thoughts on the proposals for future squid and butterfish allocations. I will spare you additional reading, but would remind that the letter congratulated the council on its proposals to limit fishing to boats with recorded historys. I do not want to see additional boats from New England or Alaska in this fishery.

From Rhode Island to Cape May, we have made this Squid , Butterfish and Mackeral fishery what it is today. I gave up fishing for groundfish back in the early 80's and concentrated on underutilized species. Now there is a problem. Everybody wants to get in the act! Squid have never taken such a pounding and I can prove it with my logbooks. Butterfish pop their heads up one season (93/94 winter) and Japanese processors claim to have enough inventory to last 2 years. No boat that I know had any of those trips to sink a boat with, like in the mid-80's, but everyone was in on it. Gone are the options to keep boats separate. There were the guys who went flounder fishing and those who just fluked, or scupped, etc., now these same vessels squid full time.

Unless the Mid-Atlantic Council adopts measures to protect the Squid and Butterfish resource from an influx of boats, this fishery will collapse as well. I fully support any plan to limit vessels that have no historic catch. Please resist special interest groups and especially, make sure that what we have here in the mid-atlantic is protected from those that have already ruined their fisheries.

Sincerely,
Greg Huba 12/12/94
Greg Huba
Pres/Capt. VG Seafrozen

ATTACHMENT 8

V G SEAFROZEN INC.
30 Eagle Nest Terrace
Wakefield, RI 02879-2506
Tel/Fax (401) 783-0215

July 7, 1994

MID- ATLANTIC COUNCIL
ROOM 2115 FREAR FED BLDG.
300 SOUTH NEW ST.
DOVER, DE. 19901-6790

Dear Council Member,

I am writing to thank you for adopting the measures which will be going out to public hearings very shortly. Recently, I received the Mid-Atlantic Newsletter and have read it over many times, each time feeling that a plan to protect what is most important to the fishermen of the mid-atlantic region is closer at hand.

In 1972, I began my fishing career. The fisheries that we are now addressing, namely squid, butterfish and mackeral, were not yet developed. In Montauk, where I worked out of until 1984, almost all of us began squid fishing in the mid to late 70's. We found markets and formed alliances, namely Eastern Long Island Trawlers, Inc. to facilitate joint venture operations. For those that are unaware, E.L.I.T., Inc. was a coalition formed by virtually the entire fleets of Shinnecock and Montauk with even retired fishermen helping by manning phones and radios. Certain boats agreed to provide Fulton Market while other boats sold to New Jersey distributors and still others were kept aside and often moved at great expense to be nearer foreign "Mother" ships. Along with Point Judith fishermen who started to diversify as well, especially developing the butterfish industry, the traditional species were given relief.

In the winter of 1983/84, my boat, the Green Arrow, which I still own was bringing in butterfish trips that I could not even unload in Montauk, but had to steam to Rhode Island due to a lack of markets. Eventually, I moved to Point Judith, R.I. and continued to fish for under-utilized species, only learned to do it better. Now, Montauk fishermen have pooled resources to purchase pumps and property to specialize in squid and whiting. Cape May has spent lavish amounts of money at great sacrifice to develop both Illex and Loligo squid. It was Cape May companies that first got all of us going on squid and mackeral joint ventures.

My fellow fishermen, from New Jersey, New York, Conneticut and Rhode Island have made the United States squid, mackeral and butterfish industry what it is today. These products are sought after throughout the world. And why? We kept trying to make it better. I've heard New England groundfishermen laugh when they learned of how much ice we would take on a trip. They put their noses up upon hearing that to fish for squid or butterfish meant being on hands and knees without relief and little sleep for days. There is no watch system that works for 1 hour tows!

Myself, I've recently spent as much money on freezing equipment as my boat cost when I bought it 10 years ago. With the smallest freezer boat in the mid-atlantic area (80 feet) I felt that even with less fish that I could still make a living. However, that will be impossible if the influx of new vessels into these fisheries is allowed to continue.

You have my full support for the proposals set forth in the Mid-Atlantic News. I also think that my feelings are shared by others who have persevered in order to help harvest the ocean in a more friendly and diversified manner. Thank you.

Sincerly,

Greg Huba

Greg Huba
Owner/Capt. F/V Green Arrow

ATTACHMENT 9

The Commonwealth of Massachusetts
Division of Marine Fisheries
Leverett Saltonstall State Office Building
100 Cambridge Street
Boston, Massachusetts 02202
727-3193

PHILIP G. COATES
DIRECTOR

December 18, 1994

Mr. David Keifer
Executive Director
Mid-Atlantic Fishery Management Council
Room 2115 Federal Bldg.
Dover, Delaware 19904-6790

Dear David:

We offer the following comments on your Council's Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish FMP. We also refer you to our May 27, 1994 letter highlighting many of the same points with an emphasis on the offshore fishery, discarding of squid and finfish, and the Mid-Atlantic Council's lack of a position on harvest of small squid; i.e., is the Council concerned about increased importance of small squid to the fisheries, especially offshore?

Our emphasis continues to be on Loligo squid. We have just finished a study of the Massachusetts squid fishery which we will submit to you shortly to supplement your Amendment's description of the inshore squid fishery. This study has recommendations that are germane to your Amendment.

We are pleased to see that the Council recognizes the importance of insuring that "sufficient escapement from the winter offshore Loligo fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass." This escapement is of principal concern to DMF and our Marine Fisheries Commission.

Sufficient escapement is of paramount concern to inshore squid fishermen, particularly to those fishing in Area 538 who have seen their share of total U.S. Loligo landings dwindle to 2% in 1992 and 4% in 1993. This contrasts with higher percent shares averaging 29% for the 1980's. Percent share of total catch (including reported joint venture and foreign catch) averaged 10%. Now the share is about 2-4%.

You already have received numerous inquiries and letters from New England weir fishermen who repeatedly emphasis their "deep concern" for Loligo squid, as well as *butterfish and scup stocks that are impacted by offshore fisheries prosecuted with small-mesh nets for many months.* Your Table 22 clearly shows that Loligo are taken in very large amounts from October through April when squid are on overwintering grounds or are moving to and from those grounds. The offshore fishery is large and growing. This lengthy offshore squid season contrasts with inshore fisheries lasting a few months. In Massachusetts the squid fishery is only about one month caused by regulation and our decision to curtail fishing on small squid.

As a preface to our specific comments on your proposed Amendment #5, we must make an important point. At your public hearing in Galilee, one representative of Rhode Island's fleet of freezer/trawlers began his comments by attempting to shift attention away from the offshore to the inshore fishery. He indicated that the Council needed to be more concerned about fishing on spawning squid inshore in the spring. We caution you not to be swayed by these sorts of comments.

First, the offshore fishery catches small and super-small squid in the fall and winter. These are the spawners for the next spring and summer. Isn't it sensible to be concerned about squid not being able to reach their spawning grounds because they're caught as juveniles in the fall on their way to overwintering grounds, caught on offshore wintering grounds, and then caught as adults on their way inshore to spawn? It is sensible and should be of paramount concern to the Council!

Secondly, DMF has regulations that have shortened the inshore squid season to the end of April and May. Furthermore, as described in the DMF NEWS (enclosed), DMF and our Marine Fisheries Commission intend to downsize the mobile gear fisheries in our waters next year. This downsizing will affect the squid fishery as well. We have proposed a drop in our vessel size limit from 90' to 65'. We might propose for February hearings the options of not allowing any April squid fishing by mobile gear or extending our alongshore closure to mobile gear fishing to include at least a portion of April.

Arguments to turn your attention away from the offshore fishery have no substance. Don't be misled or diverted from where the problem rely lies. Now to our points.

The Council recognizes the potential for overfishing Loligo as evidenced by the proposal to decrease the OY to 36,000 metric tons and to establish seasonal quotas. These actions appear consistent with the Council's first problem for resolution; i.e., overcapitalization should be avoided because the "fishery currently has more than sufficient capacity to harvest all the allowable biological catch...additional investment by US fishermen will only dissipate any profits for existing fishermen who have invested heavily to build this fishery." This problem appears inconsistent with the Council's second objective to promote the growth of the US commercial fishery, including the fishery for export. You acknowledge that domestic harvest of Loligo is approaching the MSY level. Is it logical to continue to promote growth in this fishery? It seems more logical to better control the effort of the existing fishing fleet instead of allowing an expansion of effort.

We suggest you tailor your objectives for each species since objectives surely must differ for the squids versus butterfish versus mackerel. Generic objectives suggest the Council really hasn't resolved the question of what it is trying to accomplish for these species. For example, what is your real objective for butterfish especially in light of your third problem for resolution, i.e., as much butterfish by weight is discarded as is landed -- a problem for which you offer no solutions. This third problem is tied to your fifth identified as the mixed species fishery that, as you note, "complicates the identification of appropriate and effective management strategies..." It certainly does as evidenced by the many years of the New England Council groping for a solution to the multispecies nature of the groundfish fishery. Your Council has yet to effectively deal with this thorny problem which will plague you for many years to come unless you can devise some creative approach.

We support your decreasing the Loligo OY, although 36,000 MT may not be low enough. A decrease makes sense in light of recent stock assessment pronouncements. We also encourage you to embrace additional scientific advice that in years of low Loligo biomass, this level of landings likely will result in severe reductions in spawning stock biomass. The stock and fishery could be jeopardized.

This jeopardy could be more real than you think. The Council should not conclude that current fishing removals are well below that of the peak years of foreign fishing (1973-1975) when landings reached 37,000 metric tons. Specifically, current NMFS data collection do not account for discards at sea and often discards at processors as well. According to one NMFS port agent, weighout figures in Rhode Island often represent only squid packed. For example, if 1,500 pounds are landed but 500 pounds are too small for current market and are discarded, then only 1,000 pounds gets reported to port agents by the processor. Were the foreigners packing all sizes with minimal discard? If so, then current removals of squid could easily exceed the levels of the 1970's.

In light of the NMFS assessment advice and that we now know Loligo live for one year, what will be the Council's response to continued high landings of squid and a sudden low biomass? If your answer is the setting of a low quota, you should better define in the amendment who will be impacted by that quota. Will the offshore fishery have to bear the burden by having a seasonal quota reduced? Will the Massachusetts inshore fishery that only lasts one month have to share the burden. If so, be prepared for some serious arguments from us. As noted above, we've restricted our squid fishery to one month, and more restrictions are planned for 1995.

Squid must be available inshore. Seasonal quotas may allocate "paper" squid to the inshore fishery. A seasonal quota affecting the offshore fishery will not benefit the inshore fishery if those quotas are set high.

But how will you know when the quota should be set lower? Your overfishing definition will not help you make this determination. Amend your overfishing definition. It now makes little sense since squid only live one year. The NEFSC recently characterized your overfishing definition as very risky. A different definition to reduce the risk of overfishing is required. Contrary to what you state in the overfishing definition section of the amendment, this definition does not have sufficient scientific merit and is not likely to result in effective action to prevent overfishing.

Overfishing is a real possibility compounded by discarding and high fishing mortality of by-catch species. Note that the New England Council recently decided not to allow any small-mesh fisheries (e.g., whiting in the Gulf of Maine) because catch of regulated species typically is 5% or more by weight of regulated species. Your Council may eventually come to a similar conclusion when the nature of your offshore small-mesh fisheries is better known, e.g., the amount of discarding. The just-completed SARC scup assessment indicates that scup discarding truly can be immense. In 1992 discards by weight almost equalled landings. But, by number discards were about five times as great. Discarding of young fish (age 0 and 1, as well as two) is huge. To what extent does the offshore squid fishery contribute to this problem?

We strongly urge you to get an answer to this crucial question. Considering the effort that now exists in the squid fishery and potential increase in effort, this wastage must be addressed, including wastage of small squid discarded in large amounts. How can the Council justify establishing seasonal quotas impacting the Massachusetts inshore squid fishery and then reducing those quotas if the resource shows signs of trouble -- trouble attributable to heavy discarding offshore. The one-month squid inshore fishery should not be subjected to quotas, especially if anecdotal information is true. Assuming Massachusetts weir fisherman Mark Simonitsch's statement in his November 5 letter to Chairman Lee Anderson is true, i.e, single tow discards have been as high as 65,000 pounds of small squid, the peril of the inshore fisheries is obvious, and fears of inshore fishermen are understandable. In 1993 Loligo landings from Area 538 (the Sounds) was about 1.9 million pounds. It wouldn't take many tows with this sort of discard to begin to rival and then greatly exceed landings of Area 538 squid. Somewhat in support of Mr. Simonitsch's statement, one captain of an offshore vessel freezing squid at-sea revealed in conversation with DMF staff a few years ago that he was discarding up to one-half of his squid catches because they were less than four inches.

The discard problem must be addressed. It's in the best interest of both the offshore and inshore fisheries. We suggest the Council stress the exponential growth rate of squid as the principal factor in determining attainable yields. Growth overfishing results if small squid comprise too much of the catch. The fleet should capitalize on squid's rapid growth rates by removing only the mature animals that have undergone the remarkable 4-fold increase in weight during the final 120 days of their short life span, especially for summer-time hatched squid, documented by Macy and Brodziak.

Unfortunately, your amendment really does not address the squid discard problem or the landing of small squid for which there is a market (3" squid tube). You admit that the impact of a 1 7/8" codend mesh size rule in the squid fishery cannot be evaluated. Furthermore, as you note, use of liners may be widespread. To what extent do you expect your squid codend minimum mesh size to be enforced? With small squid being marketable, incentive for continued use of liners will be high. Our history with groundfish management and the difficulty of securing fishermen's compliance makes us skeptical that you will have fishermen's support for any mesh that cuts their catch of marketable squid.

Furthermore, your mesh management strategy actually may promote small-mesh fishing for other species. You propose that "owners or operators of otter trawl vessels possessing 2,500 pounds or more of Loligo squid may only fish with nets having a minimum mesh size of 1 7/8" diamond..." With the price of squid remaining high, many fishermen probably will find it worth their while to fish for this amount of squid and at the same time target scup, sea bass, butterfish, and/or other so-called "small-mesh" species with the 1 7/8" mesh. Presently, your Council is considering a 4½" minimum mesh size for scup. Since this plan is not too far away from completion (we hope), how do you intend to mesh the strategies for release of small scup (and sea bass, etc.) and retention of small (4-6") and supersmall (< 4") squid? Are these species so separated on the offshore fishing grounds that fishermen can tailor their mesh for each species? We suspect they cannot, or they won't. Perhaps your proposed penalty schedule will be a sufficient deterrent, i.e., six month loss of moratorium permit for first offense, etc. We suspect, however, that only the careless or ignorant-of-the-rules fishermen will be caught. Those who purposefully fish with small mesh will be extremely difficult to apprehend.

But why should we get so caught up in debate about problems caused by fishing with mesh less than 1 7/8" mesh when fishing with 1 7/8" mesh could very well be a problem by itself especially its impact on the success of the inshore squid fishery? Sanctioning small-mesh fishing at this small size is ill-advised. Even representatives of freezer/trawlers testified to this fact. They supported a 2 3/8" cod end, although as a liner inside a 5½ - 6" mesh.

We have no confidence that your mesh size restrictions will be effective. Offshore, small-mesh fishing for squid is prevalent from October through April (71% of all 1992 Loligo landings). Considering poor prospects for adequate enforcement, mesh regulations that are difficult to enforce, the market demand for small squid, and the prolonged period of small-mesh fishing, *we feel the Council has not provided adequate protection for the inshore fishery.*

Perhaps a more viable approach -- one you omitted as an alternative, is seasonal area offshore closures. Revisit the closures that were in effect when foreign fishing was allowed. Closures might have merit especially if small-mesh squid fishing offshore occurs in areas where small scup, butterfish, and other species abound when overwintering and easily targeted. The purpose of those closures was to reduce by-catch, minimize gear conflicts, and minimize fishing conflicts between U.S. and foreign vessels (see attached figure). We're not suggesting these area/closures be adopted. We only suggest the concept be given a thorough evaluation perhaps with an objective of reducing fishing mortality on small squid and juvenile by-catch species during the fall and winter.

You may argue that we don't have enough information to perform the necessary area/closure analyses. Perhaps, but we suspect you have even less information to set "appropriate" quotas. More sea sampling certainly can help with these analyses; consequently, we approve of your efforts to get more sea sampling information. No one can fish for these species if they refuse to take a sea sampler. We are a bit confused, however, as to how persistent NMFS will be with its request. Specifically, if the requested fishing vessel refuses to take an observer, will the vessel be prohibited from fishing until an observer is taken. Furthermore, if the fishing vessel refuses, can it still fish for scup, butterfish, and other species with squid as a bycatch. If so, the vessel can get around the sea sampler requirement .

In conclusion, this plan seems to focus on limiting entry into these fisheries and not on how to better manage the existing fisheries. Important to Massachusetts, your preferred management measures will fall far short of insuring that sufficient escapement from the winter offshore Loligo fishery occurs to allow for traditional inshore fisheries and to provide adequate spawning stock biomass. This is one of your objectives.

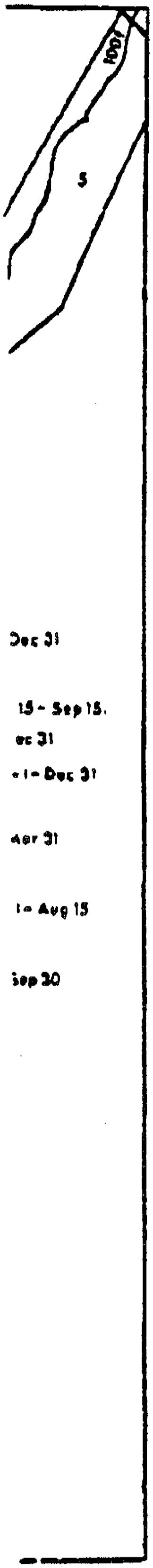
We urge the Council, and the National Marine Fisheries that must review and then approve this amendment to rethink some of these strategies, and consider others such as larger mesh and seasonal offshore closures. The time is right to do this since your Council is developing a plan for black sea bass and scup and these overfished or nearly overfished stocks will need protection not afforded by your proposed Amendment.

Furthermore, the 1994-1995 fall-winter-early spring offshore fishery will be finished before your amendment is in place. Aim for a fall implementation of this amendment better designed to protect small squid which are important recruits to the spring inshore fishery and the spawners that will produce the squid on which the offshore fishery depends.

Sincerely,

Philip G. Coates
Director

cc
Jon Rittgers
Andrew Rosenberg
Allen Peterson, Jr.
Douglas Marshall
Mass. Marine Fisheries Commission
Jack Dunnigan



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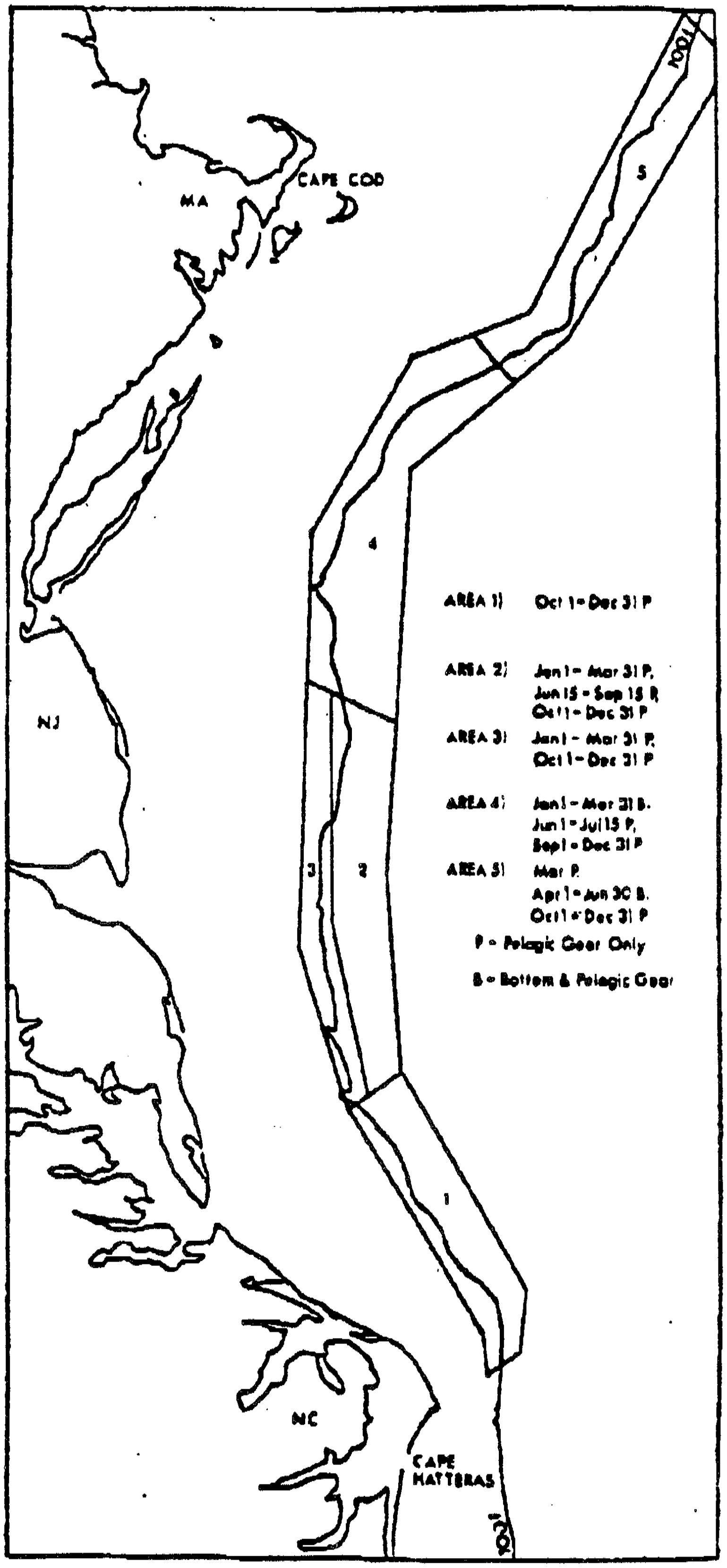

Figure 25) Designated fishing areas
and times for 1978.

APPENDIX 5. SQUID, MACKEREL, AND BUTTERFISH SUPPLEMENT 1 HEARING SUMMARIES

April 18, 1995, VA Beach, VA

The hearing was opened at 7:05 p.m. by hearing officer Tom McVey. Those in attendance were Jerry Schill, Lee Anderson, Jim Gilford, Terry Smith, Kathi Rodrigues, Tony DiLernia, and Joel MacDonald, Charlie Bergmann, Lars Axelsson, Ron Howey, Jim Ruhle, Terry Smith, Bob Pride, Tom Ford, and James Hayden. Staff present were Dave Keifer, Tom Hoff, Joanna Davis and Kathy Collins. Mr. Keifer reviewed the hearing document, then Mr. McVey opened the hearing for questions and comments.

Lars Axelsson, F/V *Flicka* & F/V *Dyrstan*, stated that on page 3, item 3, concerning the mesh, it has been changed several times from what industry wanted. His fear is how is 1-7/8" going to be enforced? This could represent a problem when the vessel is boarded. Nylon twine will shrink or grow at least 10% either way. Twine could be measured before going to sea and it would measure 1 7/8", but when the twine is used and it is wet, it could go to a larger size. How will this actual measurement be used in the field? He knows that there is a tolerance that is used. Enforcement officers would have to check the entire net, this would be over 70 feet of twine on his net that would have to be checked. He suggested it not be throughout the whole body of the net but limit to the cod end portion. This would allow not having to change the whole back end of the net and the cost factor. The inside net would have to be changed. He also mentioned the idea of the safety factor of the vessel. Council should consider the fact that if an RSW had to carry a load in bad weather, there should be some stability. Maybe add some length or width to the boat to make it more stable, this would bring the rear end of the boat up, it would not change the fish hold size. He also realized that capacity needs to be limited. Engines could not be replaced with the same make and model. This is something that should be left open or considered in the future to allow these minor adjustments to be made in a timely fashion so as not to limit to antique vessels with antique engines that will eventually fail. He feels that there should be at least a 2,000 lb. threshold instead of one lb.

Jimmy Ruhle, F/V *Darana R*, asked what the amount of Loligo you have to have on a boat to be required to use the 1 7/8"? There needs to be some sort of a tolerance. May need to look at some number that gives some leeway. One pound worries him. Probably 500 lbs would cover the problem, 1,000 would be safe. He thinks that 200 meshes of 1-7/8" would be sufficient, not 1-7/8" for the entire net, and this needs to be stated in the Plan. On *Illex*, he did not see an end to the moratorium stated. It should be mentioned somewhere that if the DAP falls less than 65-70% of the MSY, that new entrants could be allowed in the fishery. By increasing horsepower, it does not increase your ability to catch more fish. A motor that needs to be replaced may not be able to be replaced with the same horsepower.

Bob Pride, Atlantic Coast Conservation Assoc., VA Beach, stated that the organization is concerned about the availability of forage off the Virginia coast. He said that from the information from SAW 17 regarding *Illex*, he feels the Plan should say something to lower the 30,000 mt under certain conditions. He asked why they would be permitted to have landings above the current landings if the fisheries are already fully exploited and we don't know what the bycatch was?

Charlie Bergmann, representing Cape May Seafood Producers: Axelsson & Johnson, Lund's, Atlantic Capes, and Cold Springs, stated they would like to see the Plan go ahead as rapidly as possible. They understand the need for management and that the rapid expansion may be counterproductive to the sustainable yield of the fishery. He wanted to assure Bob Pride that in the *Illex* fishery, there are no discards, that everything that is harvested is used. He added that in the *Loligo* fishery there is no discard as well. He said there are some matters that need to be addressed as far as the range of the species. We have learned that the species extends further than Cape Hatteras as some of our scientific people had indicated and that this needs to be addressed in the Plans.

The hearing was closed at 7:50 p.m.

25 April 1995, Cape May Courthouse, NJ

The hearing was opened at 7:00 p.m. by hearing officer Tom McVey. Fifteen members of the public were in attendance. Staff present was Dave Keifer. Mr. Keifer reviewed the hearing document, then Mr. McVey opened the hearing for questions and comments.

Jim Harris supports Amendment 5 and urged its adoption as soon as possible.

Harry Axelsson recommended that permit sanctions be assessed against the captain, not the vessel.

Lars Axelsson stated a *Loligo* mesh exemption is needed for the herring and mackerel fisheries. A 1.5" net is used for herring, *Loligo* may be mixed in. The 1 *Loligo* threshold in Supplement 1 is too restrictive, 2,000 lbs would be better.

Dan Axelsson questioned whether a boat would be in violation when returning from east of the 50 fathom line if the net were wet or it made a trawl with small mesh while returning home with *Loligo* on board. Suggested that a boat be allowed to have a certain percentage of the catch as *Loligo*.

Charles Bergmann recommended that the Plan be moved forward before the stock is in trouble. Other issues could be dealt with in two or three years.

Jeffrey Licata agrees with the Plan, but feels it gives a few boats total control of the fishery. Recommends that the Plan allow for processors to permit boats in the future if they cannot get squid from moratorium boats. (See attachment 1)

Joe Brannan recommended that the *Loligo* catch by boats without moratorium permits be 5,000 lbs, not 2,500 lbs. Does not like the measure about a boat or dealer permit being revoked for falsification of moratorium permit information.

Doug Wilson urged that the Plan move forward. Would like the vessel replacement and modification provisions to allow for some vessel expansion.

Mike Genovese agreed with the Plan. Suggested a 2,500 lb *Loligo* bycatch in the mackerel fishery (without using a 1-7/8" net). Recommended more liberal vessel replacement and modification provisions for safety reasons.

Jeff Reichle supports the Amendment, feels the *Illex* provisions especially need to be implemented.

Mr. Hickman felt fishermen should be allowed to upgrade their boats.

The hearing was closed at 7:50 PM.

25 April 1995, Riverhead, NY

The hearing was opened at 7:30 pm by hearing officer Bob Hamilton. Mid-Atlantic Council staff present included Rich Seagraves. Other members of the Mid-Atlantic Council present included Tony DiLernia and John Mason. Approximately 30 members of the public were present.

Mr. Seagraves presented the public hearing document.

Mr. DiLernia had several questions about the changes in the qualifying criteria and the effect they would have on the number of vessels that would qualify. He also had questions about the definition of a freezer for the purpose of qualifying for an *Illex* permit. He also submitted a letter from processors that are concerned about the future availability of *Illex* to the squid processing industry (see Attachment 1).

Daniel Stavola questioned why the qualifying criteria for *Loligo* and butterfish was increased from 5,000 lbs in a week to 20,000 lbs in a month. He recently purchased a vessel that would have qualified for a *Loligo*/butterfish moratorium permit under the 5,000 lb in a week criteria, but will not under the 20,000 in 30 day period option. He feels that changing the qualifying criteria is unfair. He favored staying with the original 5,000 lb/ week proposal or change it to 10,000 lb in a month to qualify for the *Loligo*/butterfish moratorium permit. He had questions about whether or not his freezer would qualify him for an *Illex* permit.

Jim Mangano stated that the new criteria for *Loligo*/butterfish would hurt inshore fishermen. He stated that he qualified under the old criteria but not the new 20,000 lb in a month criteria.
He favors the 5,000 lb in a week criteria for *Loligo*/butterfish moratoria criteria.

Brad Lowoen, representing East Hampton Bayman's Association, was concerned about the *Loligo* resource. He is concerned that the inshore fishermen are not getting their historical share of the *Loligo* resource. He feels that it is very important that the Council reserve some portion of the *Loligo* quota for the inshore fishery. He favored a 40% allocation to the inshore fishery during the period May 1 - November inside 3 miles. He stated that a fishermen should only be allowed to fish on the quota set aside for inside 3 miles or outside 3 miles, but not both.

Michael McCarron was concerned about the change in the qualifying criteria for *Loligo*/butterfish moratorium permits. He may not qualify under the 20,000 lb in a month proposal. He favored staying with the original 5,000 lb in a week criteria from the first round of public hearings.

Mark Phillips stated that the proposed mesh size for *Loligo* is too small. He felt it should be 2 1/8" or 2 1/4". He is opposed to separation of the fishery into inshore and offshore components. He is concerned that many boats are falsifying records to qualify for the moratorium permits.

Rick Lofstad Jr., Long Island Seafood, supports Alternative 9 and feels that the *Loligo*, butterfish, and *Illex* moratorium permits should stay together. He is concerned with the criteria for *Illex*. He feels that fishermen and processors should have the right to further develop markets for *Illex*. He read a list of 27 seafood processors which favor keeping *Illex* and *Loligo* moratorium permits together (see Attachment 2). He feels the *Illex* criteria are far too restrictive. In the past, the price of *Illex* was too low to handle and make a profit. He is concerned that the boats which qualify for *Illex* permits could create a price cartel. He also favored closing the *Illex* fishery in June when the *Illex* squid are small. He offered an alternative proposal for the *Illex* fishery. He recommended that a portion (15,000 mt) of the *Illex* quota be reserved for the vessels that qualify for moratorium permits and that the other portion be allocated to an open access fishery placed on trip limits (possibly 50,000 lbs per trip). He also recommended closed seasons for the *Illex* fishery.

Kevin Maguire, Pontos Fisheries, was concerned about the *Illex* criteria. He runs a dock where many of the boats will not qualify for *Illex*. He stated that the reason these boats did not fish *Illex* in the past was due to the low price. He had questions about the definition of an onboard plate freezer. Would an ice machine qualify a vessel for *Illex*? He feels the *Illex* qualifying criteria are too restrictive. He is concerned that other boats at Inlet Seafood will not qualify. He feels the larger boats get the big advantage in the *Illex* fishery.

George Miller had a question about the qualifying criteria for butterfish moratorium permits.

The hearing was closed at 9:39 pm.

24 April 1995, Galilee, Rhode Island

The hearing was opened at 7:07 pm by hearing officer John Karlsson of the Rhode Island Division of Fish and Wildlife. Mid-Atlantic Council staff present included Rich Seagraves. Representatives of the New England Council present included James McCauley. Approximately 20 members of the public were present.

Mr. Seagraves presented the public hearing document.

Geir Munson supported Supplement 1 to Amendment 5 as written.

David Dowdell had a problem with the moratorium permit window of eligibility. He stated that it was unfair to extend the eligibility window back to 1981 and not to extend it up to the present time, or at least to the date that the proposed management regulations were first published. He stated that the Magnuson Act expressly states that limited entry programs must take into account present participation. He feels that it is only fair to extend the window to August 1994 when the proposed Amendment was first made public. He was also opposed to the breaking up of the *Loligo* and *Illex* permits. He thought that if he qualified for butterfish he would qualify for *Illex* as well.

James McCauley, Pt. Judith Fish Coop, had concerns about the way the mesh restrictions are currently worded. He suggested adding language which describes the allowable ratios for hanging the net. He stated that there are many ways to circumvent the mesh rule the way it is currently written. He supported the 20,000 lb criteria for *Loligo*/butterfish but had reservations about extending the window of eligibility back to 1981. He supports the notion that if you qualify for *Loligo*/butterfish then you should qualify for *Illex* too. Short of that, he would like to see some *Illex* quota set aside for non-moratorium vessels. He had questions about requirements of vessel ownership in the case of the *Illex* moratorium.

Dan Cohen, Atlantic Cape Fisheries, generally supported the Supplement as written. He feels that we need to move the Plan ahead. He feels that the MAFMC should consult with industry and come up with a drawing which depicts a legal squid net as is being done in the Scallop FMP. He supports the moratorium qualifying criteria as currently written. He stated that the Council has allowed fishermen an extra fishing season to qualify for the *Illex* moratorium permit.

Chris Joy, Seafreeze, supports Supplement as written.

James O'Malley, East Coast Fisheries, had a problem understanding the logic of the *Illex* qualifying criteria. He was concerned that if you landed five trips of 5,000 pounds of *Illex* between Aug 1993 and May 1 1994 then you would not qualify. He stated that the Amendment will not fly.

Fred Mattera , FV Travis and Natalie, has a problem with the mesh size. He stated that a straight 2" codend for *Loligo* is the way to go. He favors a 2" codend for *Illex* as well. He was concerned that the qualifying criteria for *Loligo* and *Illex* are different. He stated that the criteria were written this way to exclude certain sectors of the fishing industry. He was concerned that we are letting 390 boats into the *Loligo* fishery and only 80 into the *Illex* fishery. He favored the same qualifying criteria for *Illex, Loligo*, and butterfish.

Augie Noons, representing sport fishermen, was concerned that the species regulated in this Plan may be overfished and that they are an important component of the diet of large pelagic game fish. He is concerned about shifts in effort to these fisheries from the New England groundfish fleet and supports Draconian measures to protect these resources.

Attachment 1

TopCatch
Seafood Processing
87 Sackett Street • Brooklyn, N.Y. 11231
Tel: (718) 624-9300
(718) 624-9306
Fax: (718) 624-9307

DAVID R.KEIFER,EXECTIVE DIRECTOR.
MID-ATLANTIC FISHERY MANAGEMENTCOUNCIL.
ROOM 2115 FEDERAL BUILDING.
DOVER,DELAWARE 19904-6790.

GENTLEMEN:

I AM WRITING TO YOU TO RECORD MY CONCERNS AND COMMENTS REGARDING AMENDMENT 5 TO THE ATLANTIC MACKERAL,SQUID AND BUTTERFISH PLAN,SPECIFICALLY THE PROPOSED MORATORIUM ON ENTRY INTO THE LOLIGO AND ILLEX FISHERY.IMPLEMENTATION OF SUCH A PLAN WOULD PLACE LAND PROCESSORS IN AN EXTREMELY VULNERABLE POSITION WITH THIER SUPPLIERS.

IN ESSENCE,BOAT OWNERS WOULD HAVE COMPLETE CONTROL OVER THE SUPPLY OF PRODUCT.IF THE BOAT OWNERS DECIDED TO OPEN PROCESSING PLANTS OF THIER OWN,THEY WOULD BE ABLE TO DEPRIVE ANY COMPETITOR OF PRODUCT AND FORCE THEM OUT OF BUSINESS.THE PLAN AS IT IS WRITTEN NOW,EFFECTIVELY HANDS BOAT OWNERS THE OPPORTUNITY TO CREATE A COMPLETE MONOPOLY.

PROCESSORS THAT HAVE BEEN IN THE BUSINESS SINCE 1990 AND EARLIER,HAVE ESSENTIALLY CREATED THIS PRODUCT TO BE SOLD TO RETAIL STORES AND THE FOOD SERVICES INDUSTRY.THEY HAVE TAKEN A RESOURCE THAT WAS NOT BEING UTILIZED AND TRANSFORMED IT INTO A USABLE DOMESTIC PRODUCT.THE EMERGENCE OF THE CURRENT MARKET FOR THE PRODUCT IS THE RESULT OF THE HAND WORK AND DEDICATION OF THE PROCESSORS,WHICH CANNOT SIMPLY BE OVERLOOKED.

IF THIS SPECIES NEEDS TO BE CONTROLLED BY LIMITED ACCESS,THEN SO BE IT.HOWEVER PROCESSORS MUST BE AFFORDED THE SAME RIGHTS AND PROTECTION AS BOAT OWNERS.WE SUGGEST A PROVISION BE INCLUDED IN THE ADMENDMENT TO PROVIDE EMERGENCY ACTION FOR THE PROCESSORS,IN THE EVENT THEY ARE UNABLE TO OBTAIN PRODUCT FROM PERMIT HOLDING SQUID FISHERMAN,THEY SHOULD BE AFFORDED THE EMERGENCY MEASURE OF CONTRACTING A BOAT FROM OUTSIDE THE FISHERY TO ENTER THE FISHERY UNDER A SPECIAL PERMIT,IN ORDER TO SUPPLY THE PROCESSOR WITH PRODUCT.A SECOND ALTERNATIVE WOULD BE TO ISSUE TO PROCESSORS LICENSES FOR FUTURE BOATS THAT

WOULD BE OWNED BY SAID PROCESSORS AND THE SAID LICENSES WOULD BE HELD UNTIL NECESSITY WARRENTED THIER USE.

SCIENTIFIC DATA HAS STATED THAT THIRTY-THREE THOUSAND (33,000) METRIC TONS OF LOLIGO CAN BE SAFETLY HARVESTED FROM THE FISHERY WITHOUT HARMING THE SPECIES,AND THE INDUSTRY IS CURRENTLY HARVESTING ONLY TWENTY-TWO THOUSAND (22,000)METRIC TONS A YEAR,BY THE THREE HUNDRED (300) OR MORE BOATS PRESENTLY LICENSED FOR SQUID.THE SMALL NUMBER OF PERMITS WHICH CAN BE ISSUSED TO THE PROCESSOR WOULD IN NO WAY BE DETRIMENTAL TO THE STOCK.

THE ADMENDMENT AS IT IS WRITTEN NOW PROVIDES NO PROTECTION AT ALL FOR THE RIGHTS OF THE PROCESSORS AND LEAVES MUCH ROOM FOR ABUSE.THE OPPORTUNITY THE AMENDMENT PRESENTS FOR UNFAIR AND MONOPOLISTIC PRACTICES IS TOO GREAT AND CANNOT BE IGNORED. THE COUNCIL MUST RE-EXAMINE AND RE-DRAFT AN AMENDMENT THAT CAN PROTECT THE FISHERY,THE BOAT OWNERS,THE PROCESSORS AND OUR FREE MARKET SYSTEM.

VERY TRULY YOURS

JEFFREY LICATA

ARTHUR GENTILE.

A LONG ISLAND SEAFOOD EXPORT

① MONTAUK FISH DOCK

② INLET SEAFOOD

③

④ COOPER'S SEAFOOD

⑤ SHINNECOCK FISH DOCK

⑥ SHINNECOCK FISHERMAN'S CO-OP

⑦ PELL'S MARINA

⑧ JONES INLET PACKING

⑨ TOP-CATCH SEAFOOD

⑩ JOS. H. CARTER INC

⑪ FULTON FISH MONGERS ASSN

⑫ RUGGERIO SEAFOODS

⑬ STONINGTON FILLET

⑭ FINEST KIND SEAFOOD

⑮ NEW LONDON SEAFOODS DIST

⑯ PARISI CANDOLA BROTHERS

⑰ SEA FRESH, INC.

⑱ TOWN DOCK, INC

⑲ SWEETWATER SFD.

⑳ MILLIGAN SEAFOOD

㉑ COR-J SEAFOOD

㉒ MARICULTURE TECHNIQUES

㉓ FROMETTA CONSIGNMENT

㉔ FISH EXPRESS SEAFOOD

㉕ GAMBARDELLA SEAFOOD

㉖ MIKA OVERSEA'S CORP

㉗ FOX SEAFOOD

ATTACHMENT 2

From Rich Lofstead

APPENDIX 6 RESPONSE TO COMMENTS ON AMENDMENT 5 TO THE ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FMP

Appendices 4 and 5 summarize the comments received on the hearing draft of Amendment 5 and Supplement 1 to the Atlantic Mackerel, Squid and Butterfish FMP. In addition there were numerous written comments received . Comments can be classified into several categories as they regard the Amendment and proposed management measures. Public comments/questions are summarized in bold followed by the response by Council staff.

Mackerel

NMFS suggests that prudent management is in order

This is why Amendment 5 would raise the spawning stock biomass floor and lower the maximum allowable catch. needed.

NMFS also questioned whether the respecification of the mackerel catch parameters would limit the ability of mackerel to assist the groundfish fisheries

The catch parameters were respecified in order to foster prudent management. The mackerel control date was withdrawn and mackerel was removed from the limited entry program in order to provide some relief for the groundfish fishermen. The automatic trigger to restore the control date is included to assure that "some relief" does not lead to overcapitalization.

NMFS also suggested that the mackerel control date trigger may be inappropriate

Amendment 5 includes a trigger for publishing a control date for Atlantic mackerel in order to give the Council an opportunity to determine if a limited entry program is needed at that time to prevent overcapitalization of the fishery. The Amendment must be revised to clearly indicate that the Council adopted a control date for the entire FMP, that is, the squids, butterfish, and mackerel, and withdrew the mackerel portion of the control date to provide some relief for vessels impacted by the overfished status of the groundfish resources. There continues to be a concern that the mackerel fishery not become overcapitalized and overfished. The formula in Amendment 5 for triggering the control date automatically assures that there will be an opportunity to evaluate whether an entry limitation program is appropriate whenever the trigger level is reached and allow time for the development of such a measure if it is deemed appropriate at that time.

NMFS questioned the notation used in the mackerel overfishing definition

The hearing draft of Amendment 5 used "Total Allowable Catch" (TAC) to refer to the allowable catch in US waters and the projected catch in Canadian waters in the upcoming fishing year in both 9.1.1.2 (the overfishing definition) and in 9.1.1.5 (the specifications of ABC, OY, etc.). "Allowable Biological Catch" (ABC) was used to denote the specified catch in US waters in the upcoming fishing year. In effect, TAC was substituted for T in earlier versions of the FMP.

It is recommended that in the final version of Amendment 5, the overfishing definition currently approved be used: "Overfishing is defined as the catch of Atlantic mackerel exceeding the annual quota for the species. The provision of the FMP concerning setting annual quotas prevents overfishing."

Additionally, the specifications on page 53 were revised as follows:

> "The specification of mackerel OY, DAH, DAP, and TALFF (in metric tons) is:

ABC = allowable biological catch (mt) in US waters for the upcoming fishing year.

C = estimated mackerel catch (mt) in Canadian waters for the upcoming fishing year.

S = mackerel spawning stock biomass (mt) in the year prior to the upcoming fishing year.

LTPC = long term potential catch as specified by the NEFSC (currently estimated at 134,000 mt).

$ABC \leq LTPC - C$.

$ABC \leq S - C - 900{,}000$ mt.

$OY \leq ABC$.

$DAH \leq OY$.

$DAP \leq OY$.

$TALFF \leq OY - DAH$."

The narrative on page 52 was changed to reflect these equations.

Separation of Recreational and Commercial Fisheries

One commentor suggested creating an inshore area where commercial net fishing would be prohibited. The concept is that, if the trawlers were prohibited from fishing inshore, most mackerel would be available to the recreational fishery. This concept has been advanced several times before.

The best available data to analyze the issue came from a small Internal Waters Processing (IWP) project near Cape May, NJ. US boats from Cape May fished in the EEZ close to shore and transferred their catch to a Soviet processing vessel in Delaware Bay near Cape May. The State of New Jersey required the US vessels to keep tow by tow logs, copies of which were made available to the Council. Staff plotted the beginning and end points and direction of each tow. The IWP project lasted about two weeks.

The staff analysis was presented to the Council's Scientific and Statistical Committee, which concluded that the available information was not adequate to reach any conclusions.

Even if justification for this proposal could be developed and the Council agreed to include it, since it was brought up at only one hearing and would likely have major consequences for a number of fisheries, the Council should take it back to hearings or consider it for another amendment.

Loligo

Loligo minimum net mesh

Amendment 5 includes a 1⅞" (1.87", 48 mm) minimum mesh net for *Loligo* with a 4.5" (141 mm) net strengthener. NMFS suggested a 2.34" (60 mm) or 3.5" (90 mm) net. Industry commentors suggested nets ranging up to 2⅜", essentially the same as the smaller NMFS recommendation. Several persons recommended that a liner be allowed extending ten meshes from the rear most portion of the net. One person recommended that the net strengthener be 4.5". There was also confusion over the process to adjust the net size over time.

Language was added to clarify that the adjustment provision starts with the Monitoring Committee, goes to the Council's Squid, Mackerel, and Butterfish Committee, then to the Council, then to the Regional Director for publication as a proposed rule, then as a final rule. The Amendment also provides that an adjustment to the net size not take effect until a year after the final rule on the adjustment is published in order to give fishermen time to adjust to the change without wasting nets.

While the arguments in favor of the larger net are impressive, the net size should stay at 1⅞" (1.87", 48 mm) minimum with a 4.5" (141 mm) net strengthener and a liner be allowed extending ten meshes from the rear most portion of the net. The observer provisions of the Amendment should provide data to support a mesh size increase. The NMFS comments in support of larger mesh for Loligo are based upon a yield per recruit analysis by Lange (1980). While Lange's analysis indicated significant increases in yield per recruit for Loligo with increasing mesh sizes, the gains in YPR were found to be sensitive to the values of natural mortality chosen. Lange's analysis would appear to be inappropriate given that Loligo are now known to be an annual species (her analysis was based on a life span greater than one year). Recently published work concerning the age and growth of Loligo should be used in future assessments to re-estimate gains in yield through increasing mesh size. Since this is a framework measure, the mesh size could be changed in the future pending the outcome of these analyses.

Loligo MSY and Maximum OY

Some commentors suggested that the proposed 36,000 metric ton (mt) MSY and maximum OY for *Loligo* might be too high. These concerns focused both on the *Loligo* resource and on *Loligo, Illex,* and butterfish as prey species.

The MSY for *Loligo* has been 44,000 mt since before the first Squid FMP was written. The most recent stock assessment recommended that MSY be reduced to 36,000 mt, which is part of Amendment 5. Amendment 5 continues the current quota setting process where the annual Optimum Yield (OY) may be set between 0 and the MSY, depending on stock conditions and other factors. The MSY, therefore, becomes maximum OY. This builds in a conservative bias since MSY is defined as the largest *average* catch or yield that can continuously be taken from a stock under existing environmental conditions, while maintaining the stock size.

The process in Amendment 5 also allows for real-time management of *Loligo* if an effective system can be developed.

It is recognized that the squids are prey for many species. The estimation of MSY assumed a natural mortality rate of 4.1 to account for this (most finfish are assumed to have a natural mortality rate of 0.2-0.8).

Loligo seasonal quotas

Public response to the provision for seasonal quotas for *Loligo* was mixed. In general, those involved in the inshore fisheries favored seasonal quotas while those involved in the offshore fisheries were generally opposed. The opposition was also concerned about giving the Regional Director the authority to close the *Loligo* fishery without adequate opportunity for public comment.

The Amendment currently directs the Atlantic Mackerel, Squid and Butterfish Monitoring Committee to establish an annual quota for *Loligo*. The annual quota could then be allocated into seasonal quotas based on the 10 year historical average seasonal distribution of *Loligo* landings. The Committee would recommend which time frame for *Loligo* seasons is appropriate (monthly, bi-monthly, quarterly, or semi-annually). The Regional Director could close the *Loligo* fishery on a seasonal basis when 80% of the seasonal quota was reached. Trip limits of up to 2,500 lbs would be imposed for the remainder of the season to allow the landing of *Loligo* taken in non-directed trips. The quota and seasonal specifications of the Monitoring Committee would go to the Mackerel, Squid, and Butterfish Committee, then to the Council, then to the Regional Director, then be published in the *Federal Register* . The public would be given time to comment at each step. These provisions are defined explicitly in Amendment 5.

A seasonal quota system could be designed to take into account the growth pattern of the *Loligo*, thus addressing the concern of some commentors that very small *Loligo* were being taken during certain seasons. If these were allowed to grow, the yield from the fishery could be increased.

MA Division of Marine Fisheries suggestion to implement seasonal/area closures of the *Loligo* fishery to prevent the capture of very small squid

Since scup and butterfish are also taken coincidentally with *Loligo* in the small mesh fishery, some reductions in the catch and discard of small specimens of these species would also be realized. The catch and discard of small squid during certain parts of the season is only supported by anecdotal reports at the present time. The Council should consider the seasonal/area closure option in the future when the appropriate data and analyses become available. .

***Loligo*, *Illex*, and Butterfish ABC, OY, DAH, DAP, JVP, and TALFF**

NMFS questioned the biological basis for the ABCs and OYs and the finding that DAH and DAP equal OY. These matters are discussed in 9.2.3.

General Comments

NMFS comments on vessel replacement

NMFS pointed out the vessel replacement differences between the MAFMC moratoria and the NEFMC moratoria. They also said we needed to state the replacement vessel tolerances. The MAFMC and NEFMC use different vessel replacement rules in their vessel moratoria. The MAFMC philosophy allows vessel replacement only for casualty loss of the boat becoming unseaworthy through no fault of the owners; replacement vessels must have substantially similar harvesting capacity as the vessel being replaced and both the entering and replaced vessels are owned by the same person ("Substantially similar harvesting capacity" means the same Gross Registered Tonnage (GRT) and vessel registered length). The permit stays with the vessel.

In the NEFMC system the owner may sell the boat without the permit and use the permit on a replacement boat. The replacement boat may have horsepower up to 20% greater than the boat being replaced and the replacement boat may have its length, GRT, and net tonnage up to 10% greater than the vessel being replaced. An existing permitted vessel may be upgraded within these same parameters.

The Council recommended staying with the rules we have.

NMFS: How will freezer boats prove landings since many do not sell to dealers? What will the Council want NMFS to accept as Proof of Landings?

The NMFS has a paper trail on exports and the catch of these vessels is covered by the weighout system. NMFS has formulas for converting frozen weight to live weight for purposes of entering the freezer boat catch into the weighout file.

NMFS: A cushion of time should be provided between submission of the documents to meet requirements of the moratorium and the issuance of the moratorium permit

This is best handled administratively by the Regional Director.

NMFS: Coast Guard and NMFS enforcement may have a problem determining 2,500 lbs of *Loligo*

The Coast Guard did not raise this as an issue.

NMFS: Operator permit not properly analyzed and justified

It should be noted that the operator permit requirement is not new to this Amendment, but is already in effect for the Summer Flounder, Northeast Multispecies, and Sea Scallop FMPs. Inclusion in Amendment 5 is merely a continuation of the region wide program to require operator permits in all FMPs.

EPA recommended the use of ITQs rather than entry limitation

ITQs were presented as Alternative 5 in Appendix 1 to Amendment 5 and in section E.3.5 of the FEIS. The conclusion of the evaluation was that it might be preferable to continue management of these resources without ITQs to protect the resource and introduce an ITQ system subsequently.

Moratorium on entry to the squid and butterfish fisheries

One concern expressed in public comment was that the eligibility criteria for the *Illex* and *Loligo*/butterfish moratoria were too exclusionary. Others felt that the criteria were too lenient and that the requirements should be strengthened. Still others supported the position that the criteria for both moratoria should be the same.

The Mid-Atlantic Council seeks to limit entry to the squid and butterfish fisheries. The Council reached a consensus on the qualifying criteria to obtain a moratorium permit which the Council determined to be fair and equitable. Many fishermen commented that even though they did not participate in the Illex fishery in the past, they would like the opportunity to do so in the future. The goal of the moratorium program is to limit access to these fisheries to prevent over-capitalization. If the qualifying criteria did not exclude those who had not participated in the past, the fishery would essentially remain an open access fishery. This would under mine the intent of the limited entry provisions of this Amendment.

Additional DEIS Comments

The United States Environmental Protection Agency commented in a letter of 20 January 1995 and rated this DEIS as an "LO" (Lack of Objections). They also concluded that NMFS was doing a commendable job in involving the community by working through the Regional Fishery Management Councils to achieve management objectives for these fishery resources. They had a few specific comments dealing with effective enforcement, ITQ's, State habitat identification, etc. All the EPA comments were addressed in the finalization of the FMP and FEIS.

Two other individuals specifically mentioned the DEIS in their comment letters. The specific comments on the DEIS by David Dowdell seem to be because some information was taken out of context in the citations but attempts were made to clarify the FMP and address Council policy concerning limited entry.
Responses to the comments of John Kilcommons are as follows:
Question #1. He states that his only right at the hearing is the opportunity to be heard and not discuss regulations.
Reply #1. The NEPA process involves public hearings in which concerned citizens can provide the Council with information and their opinions on the proposed Federal action. Written comments submitted on the NEPA document are generally responded to in writing by the Council. Through the public hearing process the Council hopes to both inform the public and receive information that is needed to improve fisheries management.
Question #2. He states that the DEIS is almost identical to the FMP and as such is useless?
Reply #2. The NEPA process encourages Federal agencies to consolidate management plans and NEPA documents when appropriate to avoid duplication and paperwork. The intent of NEPA is to examine impacts to the human environment from the proposed Federal action and to discuss alternatives to that action. The FMP process and associated document does provide most of the information and document components required by CEQ guidelines. To avoid duplication the Council has combined the FEIS/FMP and the combined documents meet all CEQ requirements in regards to the NEPA process.
Question #3. The Council discusses the economic impacts in the DEIS and has confused the requirements of the RFA with NEPA requirements?
Response #3. The intent of NEPA is to examine impacts of Federal actions on the human environment including social and economic impacts. In cases where the physical and biological impacts of Federal actions are linked to economic and social impacts, the EIS process calls for a discussion of those impacts. These requirements may be similar to requirements in other Federal statutes including the RFA and may be

discussed in a joint statement when appropriate. Many economic impacts lead to social impacts especially in the fishing community and these impacts must be discussed in the NEPA document to meet CEQ guidelines.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930

JAN 27 1995

Mr. David R. Keifer
Executive Director
Mid-Atlantic Fishery Management Council
300 South New Street
Dover, DE 19904-6790

Dear Dave,

Attached please find our comments on the public hearing draft for Amendment 5 to the FMP for Atlantic mackerel, squid, and butterfish. If you have any questions, please contact Myles Raizin, (508) 281-9104.

Sincerely,

Jon C. Rittgers
Regional Director

Mackerel

Mackerel was last assessed at the 12th Stock Assessment Workshop (1991). Currently, overfishing of Atlantic mackerel is defined as when catch exceeds TAC (less than or equal to long-term potential yield of 134,000 mt). This long-term potential yield was based on $F_{0.1}$ applied to the geometric mean year-class size (1961-84 year classes). While this information is currently the best available, it is very dated and may not reflect current circumstances. Thus, prudent management is in order.

Loligo

The basis for a 1 7/8" (48 mm) minimum mesh size requirement for *Loligo* appears to be that this size is in general use in the fishery and allows very small *Loligo* to escape. Lange indicated, however, that significant increases in yield per recruit would be achieved using 60 or 90 mm mesh instead of 45 mm. More generally, the survival of small squid that pass through fishing nets may be low if there is substantial contact between the net and the squid's fins as the squid's skin can be easily torn by contact with a net.
Additionally, Brodziak and Macy (1994) found that growth in weight of adult Loligo follows an exponential curve, thus overall resource yield may be substantially reduced if juvenile squid are harvested before their growth accelerates.

Given these facts, the Council should consider a larger minimum mesh size requirement.

Illex

On page 11 (also p. 19), it is stated that there is strong evidence that *Illex* squid off the US and Canadian coasts (Nova Scotia and Newfoundland) may represent two components of a single stock. We do not support this statement given a review of the paper cited (Hatanaka ***et al.***, 1984). In fact, Hatanaka ***et al.*** state (p. 96) that

> *spawning may occur in the summer as well in the winter, and Roper and Lu (1979) found larvae during most of the year in that area (northeastern United States). However, the major component of the stock,..., is believed to spawn in southern offshore waters during the winter.*

The key point is that *Illex* squid have a protracted spawning season that begins in winter and may extend into summer in some years. The distribution of larvae from Roper and Lu (1979) indicates that the stock has the capacity to reproduce throughout the year off the northeastern United States. It is probably premature to state that there are two components of the stock, presumably representing winter and summer spawning events. The actual dynamics may be much more complicated, and in the absence of published findings on *Illex* stock structure, there is no reason to reject the hypothesis that population constitutes a unit stock.

Technical Comments

(p. 14, par. 4) There should be a reference for the embryonic development times for different temperature regimes. We suggest
McMahon, J.J. and W.C. Summers. 1971. Temperature effects on the developmental rate of squid (*Loligo pealei*) embryos. Biol. Bull. 141:561-567.

(p. 14, par. 6) Cetacean and seabird predation upon squid is substantial. Kenney *et al.* estimated that between 154,000 mt and 224,000 mt of squid were consumed off the northeast U.S. annually by whales and dolphins. See:
Kenney, R.D., M.A.M. Hyman, and H.E. Winn. 1985. Calculation of standing stocks and energetic requirements of the cetaceans of the northeast United States outer continental shelf. NOAA Tech. Mem. NMFS-F/NEC-41.

(p. 102) The entry for 1993 U.S. landings of *Loligo* (22,269 mt) does not agree with the figure for the 1993 total landings (22,900 mt). Since there are no foreign landings for 1993, these two figures should match.

§ 655.2 - Add the following definitions: liners, plate freezer, recirculating sea water equipment.

- The definition of vessel length should be the length specified by Coast Guard Documentation, builder certificate, or vessel survey.

§ 655.3 - should be amended to read:

(a) The relation of this part to other laws is set forth in § 620.3 of this chapter and paragraphs (b) through (e) of this section.

(b) Additional regulations governing domestic fishing for New England Multispecies, which impacts this part, are found at 50 CFR part 651.

(c) Additional regulations governing domestic fishing for summer flounder, which impacts this part, are found at 50 CFR part 625.

(d) Nothing in these regulations supercedes more restrictive state management measures.

(e) These regulations are not superceded by less restrictive state management measures for SMB for vessels that hold SMB Permits.

§ 655.4 - Vessel permits

(b)(1)(i) Remove the phrase "The owner or operator of"

(j)(2) and (4) Black sea bass should be replaced with SMB for their respective permits.

§ 655.25 allows vessels to harvest 2500lbs with mesh less than 1 7/8. Is it the Council's intent to exempt these vessels from the minimum mesh restriction.

§ 655.6 Operator Permits

(a) Do recreational vessel operators need an operator permit to fish for or possess smb.?

§ 655.7 Reporting Requirements

(a)(6) replace the word Black Seabass with SMB

§ 655.9 General Prohibitions

Prohibitions need to be added for mesh restrictions.

If owners are required to submit info on landings then there should be a prohibition on submitting false information.

Charter and party vessels should be prohibited from selling SMB without a commerical permit.

§ 655.25 Minimum Mesh

(d) 5.5" should be replaced with 1 7/8"

Only diamond mesh is mentioned, what about square mesh?

Additional Comments

With replacements, upgrades, splitting and permit history being allowed in other FMP's. The Council needs to be aware of how this amendment differs from the New England amendments and the ramifications it may cause. In addition, the Council needs to define the tolerance allowed for replacement vessels in terms of horsepower, length, tonnage, etc. To simply say that the vessel should have the same or similar parameters is too confusing.

How will freezer boats prove landings since many do not sell to dealers? Many sell direct to foreign buyers eliminating any third party verification. Which brings up the question of what will the Council want NMFS to accept as Proof of Landings? It may be better to define requirements "up front".

A cushion of time should be provided between submission of the documents to meet requirements of the moratorium and the isssuance of the moratorium permit.

It may be inappropriate to use a trigger for the mackerel control date. General Counsel has expressed concern regarding the defensibility of this action.

Coast Guard and NMFS enforcement may have a problem determining 2500 lbs. of loligo.

Section 9.1.1. Specification of ABC, OY, DAH, DAP, JVP and TALFF.

The section consists of many statements that do not appear to be substantiated with scientific data or convincing arguments. An example is:

"OY is all Illex harvested pursuant to this FMP. The maximum OY for Illex is 30,000mt. The Council has concluded that US vessels have the capacity to, and will, harvest the OY on an annual basis, so DAH equals OY. The Council has also concluded that US fish processors, on an annual basis, will process that portion of the OY will be harvested by US commercial fishing vessels, so DAP equals DAH and JVP equals zero. Since US fishing vessels have the capacity and intent to harvest the entire OY, there is no portion of the OY that can be made available for foreign fishing, so TALFF also equals zero." (Section 9.1.1.4, p.52)

Any analyses done for the above justifications should be summarized here and referred to, for the benefit of NMFS and public comments. Otherwise, the justifications come across as a series of assertions. For example, on what basis is the Illex OY of 30kmt generated and where are sources of hard data to back up the analyses beginning with 30kmt for OY and ending with zero JVP and TALFF?

Similar comments can be said for every species under this amendment. It should be noted also that Illex, butterfish and Atlantic mackerel are classified as under-exploited species and statistics shows actual performance has been below the OYs in recent years.

Limited entry programs

Being classified as under-exploited fisheries, the butterfish, Illex, and mackerel fisheries are not overcapitalized if the New England groundfish fleet are excluded in the calculations. While being under-exploited, these species are specified as alternative species for the financial survival of the economically depressed groundfish fleet. The proposed limited entry programs may prevent groundfish fleet from participating in these under-exploited fisheries. Therefore, the proposed limited entry program may be counterproductive from the NMFS perspective, in particular the federal government has just spent $30 million to assist the groundfish fisheries. Further, the proposed limited entry program for these under-exploited resources is not quite consistence with one of the FMP objectives, i.e., promote the growth of the US commercial fishery, including the fishery for export.

One way to reconcile the policy inconsistency between the Council and the federal government is to set fisheries quotas for these species and designate a specific quota for the groundfish fleet which uses the same otter trawl gears fishing from the same geographical region. This would be explicitly regarded not only as a groundfish assistance measure but also as a measure to promote the growth of these fisheries.

The proposed limited entry program has the potential to repeat what NMFS went through with the management of the surf clam fishery. If the limited entry program would ultimately lead to an ITQ system, it would be more desirable to begin with an ITQ system for a portion of the species OY for the active fleet of the species and designating the rest of the OY for groundfish assistance. The ITQ system can be suitable for these fisheries because they are relatively clean fisheries with minimum by-catches of other species.

Eligibility criteria for a limited entry fishing permit are not self-explanatory nor consistent between the Loligo and Illex fisheries. This inconsistency may unnecessarily constrain Illex fishery development. Reasons are not spelled out for setting the Loligo eligibility criterion of 5,000lbs sold in a week during the period from 13 August 1988 to 13 August 1993. Nor are reasons provided for understanding the purposes of the Illex eligible criterion of five landings of 5000lbs during the same period. It is our observation that the above discrepancy may result in constraining the development of the Illex fisheries at a greater degree than the Loligo fisheries. This may also contradict the biological advice on the degree of resource exploitation: Illex is classified as under-exploited while Loligo is fully exploited.

The percentage utilization for the mackerel control date has implications on the size of the OY and its ability to assist groundfish fisheries and/or the degree of growth of the fisheries to be promoted. Since, along with the percentage, the OY is determined by ABC which in turn is a function of SSB. Arguments for re-specification of the mackerel SSB from 600kmt to 900kmt can impact on a lot of policy decisions. The re-specification should not be casually treated and should be justified and reconciled with various estimates.

The requirement for the operator/captain permit has not been properly analyzed and justified. The argument for the permit was once made as follows: Very often, a vessel owner is not the captain of the vessel and the owner has a hard time controlling the captain's action while fishing. As a result, violations tend to increase. Therefore it has been argued that fishing violations can be reduced by permitting captains and forcing them to bear part of the responsibility for the violations. Some issues are involved: (1) A captain is hired by a vessel owner and shares fishing profits with the vessel owner. Hiring and firing decisions of a captain should be the vessel owner's responsibility that should not be intruded or assisted by the government. Further, the government does not have roles to assist a private business owner (a vessel owner) to make sure that its manager (a vessel captain) follow the regulations. The captain's fishing decisions and consequences are clearly the responsibility of the vessel owner and this includes fishing success/failure and trip violations. (2) Do we have evidence that a vessel owner takes regulations seriously enough to fire his captain because of serious violations? (3) Are we sure that the argument for permitting captains is not an expediency for passing the compliance burden back to the government? (4) Even if we are serious about forcing captains to comply with regulations, we can accomplish this without permitting every captain of the fleet. All we need is to revise the regulations and penalty schedules to include captains and also start to document those captains who violate regulations for severe penalties in cases of repeated violations. This would greatly reduce the NMFS burden and cost, and the unnecessary burden to law-abiding captains. (5) If the Council is so concerned with quality of captains for the purposes of complying with fishery regulations, the Council should specify professional qualifications for captains including criteria such as navigation and fishing skills as well as knowledge of fishing regulations, and train captains.

There seems an inconsistency in the minimum mesh size within each of three sections: 9.1.2.4 (pg. 59); 1.5.1.2.4 (pg. RIR-11); Sect. 655.25 (DPR-18). In each section, an initial statement requires: "nets having a minimum mesh size of 1 7/8 inch (mesh)..." However, all three sections include a reference to 5.5 inch mesh in the third from the last paragraph. We would assume that the 5.5 inch reference is incorrect and should be 1 7/8 inch.

At section 9.1.1.2 (Overfishing definitions) Allowable Biological Catch (ABC) should be used instead of TAC to be consistent with implementing regulations and annual specifications. The overfishing definition for squids should be revisited in a future amendment to reflect the determination that these are annual species.

At the last paragraph of section 9.1.2.4. (Minimum mesh requirements for Loligo), Council staff should not regard a bycatch as something to be achieved but allowed.

At section 9.1.2.5.1., staff makes an incorrect reference to 9.1.1.4. regarding a Loligo seasonal quota framework provision. This provision, while alluded to in the real-time management discussion as an option, is not sufficiently described nor discussed in enough detail to implement.

Arguments against the 1 7/8" (47.6 mm) minimum are not discussed and should be present in the Council-approved version. The biology has shown that a 60 mm mesh will produce a higher yield-per-recruit. Why was 1 7/8" chosen when it is clear that this will be a much less conservative mesh size?

The above comments were provided by the NMFS, Northeast Fishery Science Center, and the management and fisheries analysis divisions of the NMFS, Northeast Regional Office.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 20 1995

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Rolland A. Schmitten
Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910

Dear Mr. Schmitten;

The Environmental Protection Agency (EPA), in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, has reviewed the Draft Environmental Impact Statement for Amendment 5 to the Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries.

It appears that NMFS is doing a commendable job in involving the community by working through regional Fishery Management Councils to achieve management objectives for these fishery resources. Fishery management plans by necessity have to focus less on the biological aspects of the resource and more on how to manage the practioners, in this instance, the fishermen. The DEIS adequately considers both of these aspects.

EPA's rating for this DEIS is "LO," (Lack of Objections - a summary of the EPA rating system is enclosed). While EPA has not identified any potential environmental impacts requiring substantive changes to the proposal, EPA offers a number of comments (see enclosure) on various aspects which we believe will improve the DEIS. In particular, we recommend that more analysis be included in the EIS on possible use of economic forces in limiting catch size (comment 2) and enforcement measures (comments 3 and 8).

Thank you for the opportunity to review the DEIS for the Fishery Management Plan. If you have any questions regarding our comments, please feel free to contact me at 202-260-5053 or contact Joe Montgomery of OFA at 202- 260-8793.

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

Enclosures

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommend for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

EPA COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR AMENDMENT 5 TO THE FISHERY MANAGEMENT PLAN FOR THE ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

(1) The success of any management program depends upon maximum participation and ownership of the plan by the regulated community. It appears that NMFS is doing a commendable job in involving the community by working through regional Fishery Management Councils to achieve management objectives for these fishery resources. Fishery management plans by necessity have to focus less on the biological aspects of the resource and more on how to manage the practioners, in this instance, the fishermen. The DEIS appears to have adequately considered both of these aspects.

(2) The basic elements of fishery management plans include regulating allowable catch per year and some limitations on allowable catch size. It would seem far simpler to limit the allowable annual catch and let economic forces sort out who enters the fishery rather than establish a system for limiting access to a managed fishery (DEIS pg 21, Section E.2.1. Entry Limitations to the Squid and Butterfish Fisheries). For this reason we would encourage NMFS to examine in the EIS the alternative resource management strategy known as "Individual Transferable Quota" (ITQ) program where a total annual fishing quota is divided into smaller parts and allocated among individual participants. Individual quotas or shares could be bought or sold or leased so that harvesters have flexibility in planning their fishing activities. Canada has been successfully using ITQ in selected fisheries. The Canadian Department of Fisheries and Oceans (DFO), in concert with fishermen representatives, have managed the black cod and halibut fisheries in British Columbia since 1990 and 1991 using ITQ, and the program has been considered successful by most participants. The costs incurred in administrating an ITQ program may be authorized by section 303(b)(1) of the Magnuson Act which allows charging permit holders the costs of permit administration.

(3) The final EIS should include a discussion of the steps that will be taken to ensure effective enforcement of the amendments covered in the DEIS.

(4) One of the proposed management measures is the requirement that the fishing industry use only "small" mesh size to capture the four target species. The DEIS states that the justification for this requirement is that a "small" mesh size is currently in use and that requiring this will prevent the use of larger mesh sizes in the future. The EIS should more thoroughly evaluate the relationship between mesh size and the achievement of the recruitment goals among the target species. This discussion should be clear as to why one mesh size is more appropriate than another for achieving the desired results for the fishery. In addition the EIS should evaluate the relationship between

different mesh sizes and the occurrence of incidental catch.

(5) With regard to incidental catch, we note that the incidence of this for target species is high, with the catch of non-target species sometimes greater than 50% of the total biomass. We believe the EIS should examine alternative management measures to more effectively deal with the incidental catch problem.

(6) The DEIS states that the proposed management measures will benefit biodiversity among the fisheries because they will prevent overfishing of the target species (DEIS, p. 50). We recommend that the EIS explain more clearly the standard that NMFS is trying to meet in terms of biodiversity and how a reduced fishing effort will accomplish these objectives. Related to this point, the EIS should more thoroughly evaluate the relationship between the physical impacts of trawling and biodiversity of the benthic community. The EIS should also more thoroughly evaluate what the physical impacts of trawling are on the benthic habitat. While the DEIS indicates that there is a dearth of information on the subject, we believe that studies exist that have begun to explore this issue and that this information should be reflected in the analysis.

(7) According to the DEIS, because several states failed to respond to requests for information on critical habitat, the FMP does not identify these areas for those states. We are concerned that this lack of information will prohibit the effective implementation of critical habitat protection, since the areas that need to be targeted will not be known. We recommend that NMFS consider other sources of information, such as scientific publications, etc. If no other sources are available, this should be so indicated in the EIS. Further, the EIS should evaluate the relevance of incomplete or unavailable information to evaluating the effectiveness of the proposed management measures and environmental impacts.

(8) In Sec. F.6.1-4.c. of the DEIS (p. 45), it is recommended that the following language be added before the final sentence of the paragraph: "Photographs taken by witnesses and a willingness to personally testify against alleged violators are also desirable." In addition, the last sentence of this paragraph should read: "This would enable EPA <u>or the Coast Guard</u> to take appropriate action against illegal dumping."

D/C

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FISHERIES DIVISION
MARINE FISHERIES OFFICE
P.O. BOX 719
OLD LYME, CT 06371

January 26, 1995

Mr. David R. Keifer, Executive Director
Mid Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, DE 19901-6790

Dear Mr. Keifer:

I am writing with a late comment on Amendment 5 of the Squid, Mackerel, & Butterfish Plan. I hope that my comment can be accommodated. It is generally consistent with others you have received (e. g. Massachusetts DMF).

Since the late 1980's, Connecticut vessels have begun to direct their efforts towards the so-called "underutilized species complex" of southern New England and the Mid-Atlantic. This has occurred because of the declining groundfish resource base and, inevitably, because the combination of our proximity to squid, mackerel, and butterfish resources and the gradually increasing demand for such species has made them more attractive as target fisheries. Connecticut's fishery is a small one in comparison to some of the other states in southern New England and the Mid-Atlantic region but the species in question are important to our fishermen. In particular, the Loligo squid fishery has the potential to sustain some vessels in the nearshore waters spring fishery which might otherwise have few alternative opportunities.

For that reason, I request that additional consideration be given to measures in the Plan intended to ensure fair and equitable access to the squid fishery in the springtime by the small vessel southern New England fishing fleet. While the plan summary alludes to seasonal quotas to be established by the Regional Director, this may not be the only (or even the most desirable) solution. I hope that the Council will explore this issue fully.

I appreciate your consideration of these views. Thank you.

RECEIVED
JAN 31 1995
MID-ATLANTIC FISHERY COUNCIL

Sincerely,

Eric M. Smith
Assistant Director

cc: E. Beckwith

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U.S. ADVISORY COMMITTEE
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March 10, 1995

Dr. Lee Anderson
Chairman
Mid-Atlantic Fishery Management Council
Federal Building, Room 2115
300 South New Street
Dover, DE 19901-6790

Dear Dr. ~~Anderson~~ Lee:

The Advisory Committee to the United States National Section of the International Commission for the Conservation of Atlantic Tunas would like to submit the following comment to the Mid-Atlantic Fishery Management Council for consideration during the finalizing of Amendment Five of the squid, mackerel, and butterfish plan. Commercially and recreationally important large pelagic species (tunas, billfish and sharks) migrate to the continental shelf to forage on concentrations of schooling prey such as Atlantic herring, mackerel, butterfish, squid and sand lance. We are concerned that increases and shifts in commercial fishing effort on these forage species may have a negative impact on the distribution and health of stocks of large pelagic species.

Management efforts to redirect effort from the troubled groundfish fishery to under-utilized fisheries could inadvertently result in large increases in mortality on important forage species. We are concerned that existing domestic allocations do not appear to adequately consider the importance of forage species in trophic relationships with large pelagic species and other commercially and recreationally important species. We urge you to consider the feeding requirements of large pelagic fish species for squid, mackerel and butterfish when finalizing Amendment Five. We suggest that you begin the process of quantitatively including forage requirement of highly migratory species into the assessments of maximum sustainable yields for the species considered in Amendment Five. A failure to do so could have severe economic impact in the future recreational and commercial fisheries that utilize the squid, mackerel and butterfish and highly migratory species.

Thank you for considering these comments.

Sincerely,

John Mark Dean
Chairman

RECEIVED
MAR 12 1995
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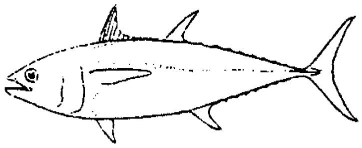
COUNCIL

cc: Commissioners
A. Weiss



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930

FEB 16 1995

MEMORANDUM FOR: The Record

FROM: F/NE - Jon C. Rittgers

SUBJECT: Section 7 consultation for the Public Hearing Draft for Amendment 5 to the Fishery Management Plan for Atlantic mackerel, squid, and butterfish (FMP).

The Draft Public Hearing Document for Amendment 5 to the FMP for atlantic mackerel, squid and butterfish fisheries has been reviewed pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA). The Environmental Impact Statement (EIS) for the FMP states that management activities in Amendment 5 will tend to reduce contacts with endangered and threatened turtle species and marine mammals based on control of unrestricted growth of fishing activity. In addition, since a "not likely to adversely affect" determination was made on Amendment 4 of this FMP, no new information on takes of marine mammals or sea turtles has been attributed to these fisheries. The only new information for consideration since implementation of Amendment 4 is the designation of right whale critical habitat for Cape Cod Bay, the Great South Channel, and waters adjacent to the Georgia and Florida coasts, in June 1994. This was not considered in the EIS. After reviewing the information on Amendment 5 and right whale critical habitat, we conclude that implementation of Amendment 5 will not be likely to affect right whale critical habitat. Therefore, we concur with the determination that the Amendment 5 and associated fisheries activities carried out under this FMP, are not likely to adversely affect (NLA) threatened and endangered species under NMFS' jurisdiction. Therefore, unless NMFS, Fisheries Management Division informs us that the approved version of Amendment 5 differs substantially from the Draft Public Hearing Document, no further consultation is necessary. Should the FMP be amended or new information become available that changes the basis for this determination, then consultation must be reinitiated.

Following is a list of corrections to information on endangered species provided in the EIS:

Page 52, 2nd paragraph, states that "at this time, there is only a recovery plan for the loggerhead turtle". Currently, there are 5 sea turtle recovery plans in place, these include plans for the loggerhead as mentioned, the green sea turtle (10/91), the leatherback sea turtle (4/92), the Kemp's ridley sea turtle (8/92), and the hawksbill sea turtle (12/93). Recovery plans are also in place for the humpback whale and the right whale. In addition, the shortnose sturgeon Recovery Team has drafted its recovery plan, but it has not been finalized.

Page 27, 2nd paragraph, states that critical habitat has been proposed for summer feeding grounds in New England and winter calving grounds off the Georgia and Florida coasts. This was published as a final rule in June 1994, and needs consideration in this and any future section 7 consultations.

cc: F/PR - Ziobro
GCNE - Martin
F/NER - Rodrigues, Raizin, Goodale
MAFMC
File 1514-05 MAFMC Squid, Mackerel, Butterfish

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 Westgate Center Drive
Hadley, MA 01035-9589

In Reply Refer To:
FWS/Region 5/ES-TE

JUN 20 1995

JUN 23 1995

Mr. Myles Raizin
National Marine Fisheries Service
One Blackburn Drive
Gloucester, Massachusetts 01930

Dear Mr. Raizin:

I have reviewed Amendment #5 of the Atlantic Mackerel, Squid, and Butterfish Management Plans as requested in your June 14, note. Currently four species of birds listed by the U.S. Fish and Wildlife Service might be encountered, including: bald eagle, peregrine falcon, piping plover, and roseate tern. However, the management plan proposed would not affect them. No further consultation is necessary.

Sincerely,

Paul R. Nickerson
Endangered Species Coordinator

APPENDIX 7. ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FMP REGULATIONS

AUTHORITY: 16 U.S.C. 1801 *et seq.*

Subpart A - General Provisions

§655.1 Purpose and scope.

(a) The regulations in this part govern fishing for Atlantic mackerel, *Illex*, *Loligo*, and butterfish by fishing vessels of the United States in the EEZ off the coasts of the Atlantic States.

(b) The regulations governing fishing for Atlantic mackerel, *Illex*, *Loligo*, and butterfish by vessels other than vessels of the United States are contained in 50 CFR Part 611.

(c) This part implements the Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries of the Northwest Atlantic Ocean.

§655.2 Definitions.

In addition to the definitions in the Magnuson Act and in §620.2 of this chapter, the terms used in this part have the following meanings:

Atlantic butterfish or *butterfish* means the species *Peprilus triacanthus*.

Atlantic mackerel, Squid, and Butterfish Monitoring Committee or *Monitoring Committee* means a committee made up of staff representatives of the Mid-Atlantic and New England Fishery Management Councils, the Northeast Regional Office of NMFS, and the Northeast Fisheries Science Center. The Council Executive Director or his designee chairs the Committee.

Atlantic mackerel or *mackerel* means the species *Scomber scombrus*.

Blast freezer means a freezing system in which fish are frozen by being exposed to cold air being blown over them. Equipment needed is a condensing unit including a compressor, compressor drive, seawater-cooled condenser, water pump and controls. The fish hold is pre-cooled to -20 F o before fish are brought onboard, The fish, after cleaning, are placed directly in the blast air stream to freeze them as quickly as possible. After they are frozen, the fish may be dipped in water (glazed) to prevent dehydration during frozen storage. The equipment is run to maintain the low temperature until time of offloading.

Charter or party boat means any vessel which carries passengers for hire to engage in fishing.

Dealer means any person who receives squid, mackerel, or butterfish for a commercial purpose from the owner or operator of a vessel issued a permit under § 655.4 other than solely for transport on land.

Fishery management plan (*FMP*) means the Fishery Management Plans for the Atlantic Mackerel, Squid, and Butterfish Fisheries of the Northwest Atlantic Ocean, as consolidated by amendment 3 and revised by subsequent amendments.

Fishing for commercial purposes means any fishing or fishing activity which results in the harvest of Atlantic mackerel, squid, or butterfish, one or more of which (or parts thereof) is sold, traded, or bartered.

Fishing trip or *trip* means a period of time during which fishing is conducted, beginning when the vessel leaves port and ending when the vessel returns to port.

Illex means the species *Illex illecebrosus* (short-finned or summer squid).

Joint venture harvest means U.S. harvested Atlantic mackerel, squid, or butterfish transferred to foreign vessels in the EEZ or in the internal waters of a State. Transfers to foreign vessels in the internal waters of a State are governed under section 306(c) of the Magnuson Act.

Liner means a piece of mesh rigged inside the main or outer net. In the case of the *Loligo* net regulated in this FMP, the main or outer net has a minimum mesh of 1-⅞" (4.7625 cm) (stretch, inside measure), a net strengthener (cover) not having a mesh less than 4.5" (11.43 cm) (inside stretch measure), and a liner used to close the opening created by the rings in the rear most portion of the net, provided the liner extends no more than 10 meshes forward of the rear most portion of the net.

Loligo means the species *Loligo pealei* (long-finned or bone squid).

Metric ton (*mt*) means 1,000 kilograms or 2,204.6 pounds.

Personal use means not for sale, barter, or trade.

Plate freezer means a freezing system in which fish are frozen by contact with refrigerated plates. The fish, after cleaning, are loaded into the plate freezer and the unit is operated until the entire mass of fish between the plates is frozen. Water may be added to the fish before freezing to eliminate air spaces between the fish. The frozen fish blocks are then removed from the plate freezer and stored in a hold maintained at -20 degrees F by blast freezing equipment.

Recirculating sea water equipment means a refrigerated sea-water system in which the seawater cooled by mechanical refrigeration is circulated through bulk tanks which contain fish. Heat is transferred from the fish to the seawater in the tank to the mechanical refrigeration system, thereby cooling the fish.

Regional Director means the Regional Director, Northeast Region, National Marine Fisheries Service, 1 Blackburn Drive, Gloucester, MA 01930, telephone 508-281-9250, or a designee.

Reporting week means a period of time beginning at 0001 hours local time on Sunday and ending at 2400 hours local time the following Saturday.

Squid means *Loligo pealei* and *Illex illecebrosus*.

Substantially similar harvesting capacity means the same or less GRT and vessel registered length for commercial vessels.

Vessel length means the length specified by Coast Guard Documentation, builder certificate, or vessel survey.

§655.3 Relation to other laws.

(a) The relation of this part to other laws is set forth in §620.3 of this chapter and paragraph (b) through (e) of this section.

(b) Additional regulations governing domestic fishing for New England Multispecies, which impacts this part, are found at 50 CFR part 651.

(c) Additional regulations governing domestic fishing for summer flounder, which impacts this part, are found at 50 CFR part 625.

(d) Nothing in these regulations supersedes more restrictive state management measures.

(e) These regulations are not superseded by less restrictive state management measures for mackerel, squid, and butterfish vessels that hold mackerel, squid, and butterfish permits.

§655.4 Vessel permits.

(a) *General.*

(1) *Requirement.* Subject to the eligibility requirements specified in paragraph (b) of this section, the owner of a vessel of the United States, including a party or charter vessel, must obtain a permit issued under this part to fish for or retain Atlantic mackerel, *Loligo, Illex,* or butterfish in or from the EEZ except vessels used by recreational fishermen taking Atlantic mackerel, *Illex* and *Loligo* squid, or butterfish for the personal use of such recreational fishermen.

(2) *Condition.* Vessel owners who apply for a fishing vessel permit under this section must agree as a condition of the permit that the vessel's fishing, catch and pertinent gear (without regard to whether such fishing occurs in or from the EEZ or landward of the EEZ, and without regard to where such fish or gear are possessed, taken or landed) will be subject to all requirements of this part. All such fishing, catch and gear will remain subject to all applicable state requirements. If a requirement of this part and a management measure required by state law differ, any vessel owner permitted to fish in the EEZ must comply with the more restrictive

requirement.

(b) *Moratorium permits.*

(1) *Loligo and butterfish.* A vessel is eligible for a moratorium permit the in *Loligo* and butterfish fishery if it meets any of the following criteria:

(i) The vessel landed and sold 20,000 pounds (9.07 mt) in any 30 consecutive day period of *Loligo* or butterfish between 13 August 1981 and 13 August 1993.

(ii) The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person.

(iii) Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same or less GRT and vessel registered length for commercial vessels.

(2) *Illex*. A vessel is eligible for a moratorium permit in the *Illex* fishery if it meets any of the following criteria:

(i) have had five landings of 5,000 pounds (that is, landed 5 trips of at least 5,000 pounds each) (2.268 mt) between 13 August 1981 and 13 August 1993, or

(ii) have purchased recirculating sea water equipment or an on board commercial plate or blast freezer by 31 May 1994 (the freezer must be one designed for use on a fishing vessel, not be a residential or similar freezer installed on the boat to meet the eligibility criteria) and have installed the equipment and landed five trips of at least 5,000 pounds (2.268 mt) prior to the effective date of these regulations.

(iii) The vessel is replacing a vessel of substantially similar harvesting capacity which involuntarily left the squid or butterfish fishery during the moratorium, and both the entering and replaced vessels are owned by the same person.

(iv) Vessels that are judged unseaworthy by the Coast Guard for reasons other than lack of maintenance may be replaced by a vessel with the same or less GRT and vessel registered length for commercial vessels.

(3) *Restriction*. No one may apply for the permit specified in paragraphs(b)(1) and (2) of this section more than 12 months after the effective date of these regulations, or the events specified under paragraphs (j)(1) and (2) of this section. This section does not affect annual permit renewals.

(c) *Atlantic mackerel permit.* Any vessel of the United States is eligible for a permit to harvest Atlantic mackerel for commercial purposes.

(d) *Incidental catch permit.* Any vessel of the United States is eligible for a permit to harvest *Loligo*, *Illex*, or butterfish for commercial purposes as an incidental catch in other fisheries. These vessels must fish with a net legal in the directed fishery, may land no more that 2,500 pounds (1.134 mt) of each species (*Loligo*, *Illex*, and/or butterfish) per trip, and the operator of the vessel must file the appropriate trip reports. The bycatch allowance may be adjusted by the Regional Director based on the recommendation of the Council.

(e) *Party and charter boat permit.* Any party or charter boat is eligible for a permit to fish, other than a moratorium permit, if it is carrying passengers for hire, and is then subject to any applicable possession limits.

(f) *Permit application.*

(1) An application for a permit under this section must be submitted and signed by the owner of the vessel on an appropriate form obtained from the Regional Director at least 30 days prior to the date on which the applicant desires to have the permit made effective. The Regional Director will notify the applicant of any deficiency in the application pursuant to paragraphs (d)(2), (e) and (f)(2) of this section. Applicants for moratorium permits shall provide information with the application sufficient for the Regional Director to determine if the vessel meets the eligibility requirements. Dealer weighout forms and notarized statements from marine architects or surveyors or shipyard officials will be considered acceptable forms of proof.

(2) *Information requirements*. In addition to applicable information required to be provided by paragraph (d)(1) of this section, an application for either a moratorium permit or a party and charter boat permit must contain at least the following information, and any other information required by the Regional Director: vessel name; owner name, mailing address, and telephone number; U.S. Coast Guard documentation number and a copy of the vessel's U.S. Coast Guard documentation or, if undocumented, the vessel's state registration number and a copy of the state registration; home port and principal port of landing; length; gross tonnage; net tonnage; engine horsepower; year the vessel was built; type of construction and type of propulsion; approximate fish hold capacity; type of fishing gear used by the vessel; number of crew; permit category;if owner is a corporation, a copy of the Certificate of Incorporation, and the names and addresses of all shareholders owning 25 percent or more of the corporation's shares; if the owner is a partnership, a copy of the Partnership Agreement and the names and addresses of all partners; if there is more than one owner, names of all owners having owned more than a 25-percent interest; the name and signature of the owner or the owner's authorized representative; permit number of any current or, if expired, previous Federal fishery permit issued to the vessel; and a copy of charter/party boat license and number of passengers the vessel is licensed to carry (charter and party boats).

(3) *Change in permit information*. Any change in the information specified in paragraph (d)(2) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(g) *Fees*. The Regional Director may charge a fee to recover administrative expenses of issuing a permit required under paragraphs (b) and (c) of this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining administrative costs of each special product or service. The fee may not exceed such costs and is specified with each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (f) of this section.

(h) *Issuance*.

(1) The Regional director will issue a permit under this section at any time during the fishing year to an applicant if:

(i) The application is complete as described in paragraph (d)(2) of this section; and

(ii) The applicant has complied with all applicable reporting requirements of section 655.6 during the 12 months immediately preceding the application.

(2) Upon receipt of an incomplete application, or an application from a person who has not complied with all applicable reporting requirements of §655.6 during the 12 months immediately preceding the application, the Regional Director will notify the applicant of the deficiency. If the applicant fails to correct the deficiency within 30 days of the Regional Director's notification, the application will be considered abandoned.

(i) *Appeal of denial of permit.*

(1) Any applicant denied a moratorium permit may appeal to the Regional Director within 30 days of the notice of denial. Any such appeal shall be in writing. The only ground for appeal is that the Regional Director erred in concluding that the vessel did not meet the criteria in paragraph (b)(1) of this section. The appeal shall set forth the basis for the applicant's belief that the Regional Director's decision was made in error.

(2) The appeal may be presented, at the option of the applicant, at a hearing before an officer appointed by the Regional Director.

(3) The hearing officer shall make a recommendation to Regional Director.

(4) The decision on the appeal by the Regional Director is the final decision of the Department of Commerce.

(j) *Expiration*. Except as provided in paragraph (b)(1)(iii) of this section, a permit expires:

(1) When the owner retires the vessel from the fishery;

(2) Upon the renewal date specified on the permit; or

(3) When the ownership of the vessel changes; however, the Regional Director may authorize the continuation of a vessel permit for the mackerel, squid, and butterfish fishery if the new owner requests. Applications for continuation of a permit must be addressed to the Regional Director.

(k) *Duration*. A permit is valid until it is revoked, suspended, or modified under 15 CFR Part 904, or until it otherwise expires or ownership changes or the applicant has failed to report any change in the information on the permit application to the Regional Director as specified in paragraph (d)(3) of this section.

(l) *Alteration*. Any permit which has been altered, erased, mutilated is invalid.

(m) *Replacement*. Replacement permits for an otherwise valid permit may be issued by the Regional Director when requested in writing by the owner, stating the need for replacement, the name of the vessel, and the fishing permit number assigned. An application for a replacement permit will not be considered a new application. An appropriate fee may be charged for issuance of the replacement permit.

(n) *Transfer.* Permits issued under this part are not transferable or assignable. A permit will be valid only for the fishing vessel and owner for which it is issued.

(o) *Display.* The permit must be displayed for inspection upon request by any authorized official or any employee of NMFS designated by the Regional Director.

(p) *Suspension and revocation.* The Administrator may suspend, revoke, or modify any permit issued or sought under this section. Subpart D of 15 CFR Part 904 (Civil Procedures) governs the imposition of enforcement-related sanctions against a permit issued under this part.

(q) When the landings of Atlantic mackerel by U.S. vessels with commercial permits first reach 50% of ABC, the Secretary of Commerce will immediately announce in the FEDERAL REGISTER a control date for possible entry limitation into the Atlantic mackerel fishery.

§655.5 Dealer permit.

(a) *General.* Any dealer must have a valid permit issued under this section in their possession.

(b) *Permit application.*

(1) An applicant must apply for a dealer permit on a form provided by the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days before the date upon which the applicant desires to have the permit made effective. Applications must contain the name, principal place of business, mailing address and telephone number of the applicant. The Regional Director will notify the applicant of any deficiency in the application pursuant to paragraph (b)(3)(ii) of this section.

(2) *Change in permit information.* Any change in the information specified in paragraph (b)(1) of this section must be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(3) *Issuance.*

(i) The Regional Director will issue a permit at any time during the fishing year to an applicant if:

(A) The application is complete; and

(B) The applicant has complied with all applicable reporting requirements of this section and §648.6(a) during the 12 months immediately preceding the application.

(ii) Upon receipt of an incomplete application, or an application from a person who has not complied with all applicable reporting requirements of paragraph (b)(1) this section and §648.6(a) during the 12 months immediately preceding the application, the Regional Director will notify the applicant of the deficiency. If the applicant fails to correct the deficiency within 30 days of the Regional Director's notification, the application will be deemed abandoned.

(4) *Expiration.* The permit must be renewed annually and unless renewed annually will expire upon the renewal date specified in the permit.

(5) *Duration.* Any permit issued under this section remains valid until it is revoked, suspended or modified under 15 CFR part 904, or otherwise expires, or ownership changes, or the applicant has failed to report any change in the information on the permit application to the Regional Director.

(6) *Alteration*. Any permit which is altered, erased, or mutilated is invalid.

(7) *Replacement*. The Regional Director may issue replacement permits for lost permits. Any application for a replacement permit shall not be considered a new permit.

(8) *Transfer*. A permit is not transferable or assignable. It is valid only for the dealer to whom it is issued.

(9) *Display*. The permit must be displayed for inspection upon request by an authorized officer or any employee of NMFS designated by the Regional Director.

(10) *Suspension and revocation.* The Administrator may suspend, revoke, or modify, any permit issued or sought under this section. Procedures governing permit enforcement-related sanctions or denials are found at Subpart D of 15 CFR Part 904.

(11) *Fees*. The Regional Director may charge a fee to recover administrative expenses of issuing a permit required under paragraph (b) of this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining administrative costs of each special product or service. The fee may not exceed such costs and is specified with each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (b)(3) of this section.

§655.6 Operator permit.

(a) *General*. Any operator of a vessel holding a valid Federal Atlantic mackerel, *Loligo*, *Illex*, or butterfish permit under this part, or any operator of a vessel fishing for Atlantic mackerel, *Loligo*, *Illex*, or butterfish in the EEZ or in possession of Atlantic mackerel, *Loligo*, *Illex*, or butterfish in or harvested from the EEZ, must carry on board a valid operator's permit issued under this part or other applicable plans.

(b) *Operator application.* Applicants for a permit under this section must submit a completed permit application on an appropriate form obtained from the Regional Director. The application must be signed by the applicant and submitted to the Regional Director at least 30 days prior to the date on which the applicant desires to have the permit made effective. The Regional Director will notify the applicant of any deficiency in the application pursuant to this section.

(c) *Condition*. Vessel operators who apply for an operator's permit under this section must agree as a condition of this permit that the operator and vessel's fishing, catch, and pertinent gear (without regard to whether such fishing occurs in the EEZ or landward of the EEZ, and without regard to where such fish or gear are possessed, taken, or landed), are subject to all requirements of this part while fishing in the EEZ or on board a vessel permitted under section 651.4. The vessel and all such fishing, catch, and gear will remain subject to all applicable state or local requirements. Further, such operators must agree as a condition of this permit that if the permit is suspended or revoked pursuant to 15 CFR part 904, the operator cannot be on board any fishing vessel issued a Federal Fisheries Permit or any vessel subject to Federal fishing regulations while the vessel is at sea or engaged in offloading. If a requirement of this part and a management measure required by state or local law differ, any operator issued a permit under this part must comply with the more restrictive requirement.

(d) *Information requirements.* An applicant must provided at least all the following information and any other information required by the Regional Director: Name, mailing address, and telephone number; date of birth; hair color; eye color; height; weight; social security number (optional) and signature of the applicant. The applicant must also provide two color passport-size photographs.

(e) *Fees*. The Regional Director may charge a fee to recover the administrative expense of issuing a permit required under this section. The amount of the fee is calculated in accordance with the procedures of the NOAA Finance Handbook for determining the administrative costs of each special product or service. The fee may not exceed such costs and is specified on each application form. The appropriate fee must accompany each application; if it does not, the application will be considered incomplete for purposes of paragraph (f) of the section.

(f) *Issuance*. Except as provided in subpart D of 15 CFR part 904, the Regional Director shall issue an operator's permit within 30 days of receipt of a completed application if the criteria specified herein are met. Upon receipt of an incomplete or improperly executed application, the Regional Director will notify the applicant of the deficiency in the application. If the applicant fails to correct the deficiency within 30 days following the date of notification, the application will be deemed abandoned.

(g) *Expiration*. Federal operator permits must be renewed annually, and unless renewed will expire upon the renewal date specified in the permit.

(h) *Duration*. A permit is valid until it is revoked, suspended or modified under 15 CFR part 904, or otherwise expires, or the applicant has failed to report a change in the information on the permit application to the Regional Director as specified in paragraph (k) of this section.

(i) *Replacement*. Replacement permits, for otherwise valid permits, may be issued by the Regional Director when requested in writing by the applicant, stating the need for replacement and the Federal operator permit number assigned. An applicant for a replacement permit must also provide two color passport-size photos of the applicant. An application for a replacement permit will not be considered a new application. An appropriate fee may be charged.

(j) *Transfer*. Permits issued under this part are not transferable or assignable. A permit is valid only for the person to whom it is issued.

(k) *Change in application information*. Notice of a change in the permit holder's name, address, or telephone number must be submitted in writing to, and received by, the Regional Director within 15 days of the change in information. If written notice of the change in information is not received by the Regional Director within 15 days, the permit is void.

(l) *Alteration*. Any permit that has been altered, erased, or mutilated is invalid.

(m) *Display*. Any permit issued under this part must be maintained in legible condition and displayed for inspection upon request by any authorized officer.

(n) *Sanctions*. Vessel operators with suspended or revoked permits may not be on board a Federally permitted fishing vessel in any capacity while the vessel is at sea or engaged in offloading. Procedures governing enforcement related permit sanctions and denials are found at subpart D of 15 CFR part 904.

(o) *Vessel owner responsibility.* Vessel owners are responsible for ensuring that their vessels are operated by an individual with a valid operator's permit issued under this section.

§655.7 Recordkeeping and reporting requirements.

(a) *Dealers.*

(1) *Weekly report.* Dealers must send by mail to the Regional Director, or official designee, on a weekly basis on forms supplied by or approved by the Regional Director, a report on fish purchases. If authorized in writing by the Regional Director, dealers may submit reports electronically or through other media. The following information and any other information required by the Regional Director, must be provided in the report: name and mailing address of dealer; dealer number; name and permit number of the vessels from which fish are landed or received; dates of purchases; pounds by species; price by species; and port landed. If no fish are purchased during the week, a report so stating must be submitted.

(2) *Annual report.* All persons required to submit reports under paragraph (a)(1) of this section are required to complete the "Employment Data" section of the Annual Processed Products Reports; completion the other sections on that form is voluntary. Required data are the number of employees handling fishery products by month. Reports for a given calendar year must be submitted to: NMFS Statistics, 166 Water Street, Woods Hole, MA 02543, and must be postmarked by February 10 of the following year.

(3) *Inspection.* Upon the request of an authorized officer, or by an employee of NMFS designated by the Regional Director to make such inspections, the dealer must make immediately available for inspection copies of the required reports that have been submitted, or should have been submitted, and the records upon which the reports were based.

(4) *Record retention.* Copies of reports, and records upon which the reports were based, must be retained and be available for review for 1 year after the date of the last entry on the report. The dealer must retain such reports and records at its principal place of business.

(5) *Submitting reports.* Reports must be received or postmarked, if mailed, within 3 days after the end of each reporting week. Each dealer will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a dealer permit. If no fish were purchased during a week, a report so stating must be submitted.

(6) *At-sea activities.* All persons purchasing, receiving, or processing any mackerel, squid, or butterfish at sea for landing at any port of the United States must submit information identical to that required by paragraphs (a)(1) and (2) of this section and provide those reports to the Regional Director or designee on the same frequency basis.

(b) *Vessel owners issued a moratorium permit, incidental catch permit or mackerel permit.*

(1) *Fishing log reports.* The owner of any vessel issued a moratorium permit under §655.4 must maintain on board the vessel, and submit, an accurate daily fishing log report for all fishing trips regardless of species fished for or taken, on forms supplied by or approved by the Regional Director. If authorized in writing by the Regional Director, vessel owners may submit reports electronically, for example by using a vessel tracking system or other media. At least the following information, and any other information required by the Regional Director, must be provided: Vessel name, U.S. Coast Guard (USCG) documentation number (or state registration number if undocumented); permit number; date/time sailed; date/time landed; trip type; number of crew; gear fished; quantity and size of gear; mesh/ring size; chart area fished; average depth; latitude/longitude (or loran station and bearings); total hauls per area fished; average tow time

duration; pounds by species of all species landed or discarded; dealer permit number; dealer name; date sold; port and state landed; and vessel operator's name, signature, and operator permit number (if applicable).

(2) *When to fill in the log*. Such log reports must be filled in, except for information required but not yet ascertainable, before offloading has begun. All information in paragraph (b)(1) of this section must be filled in for each fishing trip before starting the next fishing trip.

(3) *Inspection*. Upon the request of an authorized officer, or an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip, owners and operators must make immediately available for inspection, the fishing log reports currently in use, or to be submitted.

(4) *Record retention*. Copies of the fishing log reports must be retained and available for review for 1 year after the date of the last entry on the log.

(5) *Submitting reports*. Fishing log reports must be received or postmarked, if mailed, within 15 days after the end of the reporting month. Each owner will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a Federal Fisheries Permit. If no fishing trip is made during a month, a report so stating must be submitted.

(c) *Owners of party and charter boats*.

(1) *Fishing log reports*. The owner of any party or charter boat issued a permit under §655.4 and carrying passengers for hire shall maintain on board the vessel, and submit, an accurate daily fishing log report for each charter or party fishing trip, even if no Atlantic mackerel, squid, or butterfish is retained, on forms supplied by or approved by the Regional Director. The owner of any party or charter boat issued a Atlantic mackerel, squid, or butterfish permit other than a moratorium permit and carrying passengers for hire shall maintain on board the vessel, and submit, an accurate daily fishing log report for each charter or party fishing trip which lands Atlantic mackerel, squid, or butterfish. If authorized in writing by the Regional Director, vessel owners may submit reports electronically, for example, by using a vessel tracking system or other media. At least the following information, and any other information required by the Regional Director, must be provided: Vessel name, U.S. Coast Guard (USCG) documentation number (or state registration number if undocumented); permit number; date/time sailed; date/time landed; trip type; number of crew; number of anglers, quantity and size of gear; chart area fished; average depth; latitude/longitude (or loran station and bearings); average tow time duration; count by species of all species landed or discarded; port and state landed; and vessel operator's name, signature, and operator permit number (if applicable).

(2) *When to fill in the log.* Such log reports must be filled in upon reaching the dock before offloading has begun. All information required in paragraph (c)(1) of this section must be filled in for each fishing trip by the end of each fishing trip.

(3) *Inspection.* Upon the request of an authorized officer, or an employee of NMFS designated by the Regional Director to make such inspections, at any time during or after a trip, owners and operators must make immediately available for inspection the fishing log reports currently in use, or to be submitted.

(4) *Record retention.* Copies of the fishing log reports must be retained and available for review for 1 year after the date of the last entry on the log.

(5) *Submitting reports.* Fishing log reports must be received or postmarked, if mailed, within 15 days after the end of the reporting month. Each owner will be sent forms and instructions, including the address to which to submit reports, shortly after receipt of a Federal Fisheries Permit. If no Atlantic mackerel, squid, or butterfish is landed or no fishing trip is made during a month, a report so stating must be submitted.

§655.8 Vessel identification.

(a) *Vessel name.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length must affix permanently its name on the port and starboard sides of the bow and, as possible, on its stern.

(b) *Official number.* Each fishing vessel subject to this Part and over 25 feet (7.6 m) in registered length shall display its official number on the port and starboard sides of the deckhouse or hull, and on an appropriate weather deck so as to be clearly visible from enforcement vessels and aircraft.

(c) *Numerals.* Except as provided in paragraph (e) of this section, the official number must be displayed in block arabic numerals in contrasting color at least 18 inches (45.7 cm) in height for fishing vessels over 65 feet (19.8 m) in registered length, and at least 10 inches (25.4 cm) in height for all other vessels over 25 feet (7.6 m) in registered length. The registered length of a vessel, for purposes of this section, is that registered length set forth in US Coast Guard or State records.

(d) *Duties of owner.* The vessel owner shall insure that each vessel subject to this part will:

(1) Keep the vessel's name and official number clearly legible and in good repair, and

(2) Ensure that no part of the vessel, its rigging, its fishing gear, or any other object obstructs the view of the official number from any enforcement vessel or aircraft.

(e) *Nonpermanent marking.* Vessels carrying recreational fishing parties on a per capita basis or by charter must use markings that meet the above requirements, except for the requirement that they be affixed permanently to the vessel. The nonpermanent markings must be displayed in conformity with the above requirements when the vessel is fishing for Atlantic mackerel, *Loligo*, *Illex*, or butterfish.

§655.9 General prohibitions.

In addition to the general prohibitions specified in §620.7 of this chapter, it is unlawful for any person to do any of the following:

(a) To fish for commercial for Atlantic mackerel, squid, and butterfish without a permit issued pursuant to §655.4.

(b) To use any vessel for taking, catching, harvesting, or landing of any Atlantic mackerel, squid, or butterfish (except as provided in §655.4(a)) unless the vessel has on board a valid permit issued under §655.4.

(c) To fail to report to the Regional Director within 15 days any change in the information contained in the permit application for a vessel, as specified in §655.4(b).

(d) To falsify or fail to affix and maintain vessel markings as required by §655.8.

(e) To take and retain, or land more Atlantic mackerel, squid, or butterfish than specified under a notice issued under §655.24.

(f) To falsify the records and reports prescribed by these regulations.

(g) Violate any other provision of this part, the Magnuson Act, any notice issued under Subpart B of this part, or any other regulation or permit promulgated under the Magnuson Act.

(h) To make any false statement, written or oral, to an authorized officer, concerning the taking, catching, landing, purchase, sale, or transfer of any mackerel, squid, or butterfish.

(i) To interfere with, obstruct, delay, or prevent by any means the lawful investigation or search conducted in the process of enforcing this part.

(j) To fish for *Loligo* squid with a net smaller that 1 7/8" (48 mm) if the vessel possesses *Loligo* on board except that:

(1) During the months of June, July, August, and September otter trawl vessels fishing for *Illex* seaward of the 50 fathom curve shall be exempt from the *Loligo* mesh requirement .

(2) Vessels participating in the directed fishery for sea herring shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

(k) To sell mackerel, squid, or butterfish is issued a charter or party boat permit under §655.4(e) but not issued a commercial permit under §655.4(b), (c), or (d).

(l) To falsify information in order to qualify a vessel for a moratorium permit pursuant to §655.4(b).

(m) Transfer *Loligo, Illex,* or butterfish at sea to another vessel without the appropriate moratorium permit issued pursuant to §655.4(b).

(n) Possess more than 2,500 lbs. of *Loligo*, *Illex*, or butterfish at sea to another vessel without the appropriate moratorium permit issued pursuant to §655.4(b).

§655.10 Facilitation of Enforcement. See §620.8 of this chapter.

§655.11 Penalties. Any person or fishing vessel committing or used in the commission of a violation of this part is subject to the civil and criminal penalty provisions and civil forfeiture provisions of the Act and to 15 CFR Part 904 (Civil Procedures), and any other applicable laws.

Subpart B - Management Measures

§655.20 Fishing year. The fishing year is the 12-month period beginning on January 1 and ending on December 31.

§655.21 Allowable levels of harvest.

(a) *Maximum optimum yields*. The optimum yields (OYs) during a fishing year may not exceed the following amounts:

Atlantic mackerel	that quantity of mackerel that is less than or equal to long term potential catch, in U.S. and Canadian waters, as specified by the Northeast Fisheries Science Center, that will still maintain a spawning stock size in the year following the year for which catch estimates and quotas are being prepared equal to or greater than 900,000 mt (1,984,050,000 pounds).
Loligo	36,000 mt (79,362,000 pounds)
Illex	30,000 mt (66,135,000 pounds)
Butterfish	16,000 mt (35,272,000 pounds)

(b) *Annual specifications*. Total allowable biological catch (ABC), initial optimum yield (IOY), and amounts for domestic annual harvest (DAH), and domestic annual processing (DAP) for the squids and butterfish and ABC, IOY, DAH, DAP, JVP, TALFF for Atlantic mackerel will be determined annually by the Regional Director, in consultation with the Mid-Atlantic Fishery Management Council (Council), under the procedures specified in §655.22, consistent with the following:

(1) *Squid*.

(i) Total allowable biological catch (ABC) for any fishing year is either the maximum OY specified in paragraph (a) of this section, or a lower amount determined by the Regional Director, in consultation with the Council, if stock assessments or other ecological data indicate that the potential yield is less than the maximum OY level.

(ii) The DAH and DAP must be based on data from sources specified in §655.22(G) and other relevant data including past domestic landings, the capacity and intent of U.S. processors to process U.S.-harvested squid.

(2) *Atlantic mackerel*. For Atlantic mackerel the maximum OY may not exceed ABC. Mackerel amounts are derived using the following terms:

ABC = Allowable biological catch in U.S. waters for the upcoming fishing year.

C = Estimated mackerel catch in Canadian waters for the upcoming fishing year.

S = Mackerel spawning-stock size at the beginning of the upcoming fishing year.

LTPC = long term potential catch as specified by the NEFSC.

(i) ABC for the upcoming fishing year is that quantity of mackerel that is less than or equal to Long Term Potential Catch (LTPC) minus the estimated catch in Canadian waters (C) and is also less than or equal to the spawning stock size at the beginning of the upcoming fishing year (S) minus C minus 900,000 mt (1,984,050,000 pounds).

(A) IOY is less than or equal to ABC and represents a modification of ABC, based on biological and economic factors, intended to provide the greatest overall benefit to the nation by incorporating all relevant factors. Examples of biological adjustments include, but are not limited to, reductions from ABC to account for availability of mackerel to the US fishery and to minimize fluctuations from year to year that could result from the biomass of a pelagic schooling species such as mackerel. Examples of economic factors include, but are not limited to, the nine criteria set forth below in (ii)(A) through (I).

(ii) The IOY is composed of an initial DAH and initial TALFF. The Regional Director projects the DAH by reviewing data concerning past domestic landings, projected amounts of mackerel necessary for domestic processing and for joint ventures during the fishing year, and other data pertinent for such a projection. The recreational fishery component of DAH is estimated by the Council based on the recommendation of the Atlantic Mackerel, Squid, and Butterfish Monitoring Committee. The JVP component of DAH is the portion of DAH which domestic processors either cannot or will not use. In addition, this specification of IOY is based on such criteria as contained in the Magnuson Act, specifically section 201(e), and the application of the following factors --

(A) Total world export potential by mackerel producing countries;

(B) Total world import demand by mackerel consuming countries;

(C) U.S. export potential based on expected U.S. harvests, expected U.S. consumption, relative prices, exchange rates, and foreign trade barriers;

(D) Increased/decreased revenues to the U.S. from foreign fees;

(E) Increased/decreased revenues to U.S. harvesters (with/without joint ventures);

(F) Increased/decreased revenues to U.S. processors and exporters;

(G) Increases/decreases in U.S. harvesting productivity due to decreases/increases in foreign harvest;

(H) Increases/decreases in U.S. processing productivity; and

(I) Potential impact of increased/decreased TALFF on foreign purchases of U.S. products and services and U.S. caught fish, changes in trade barriers, technology transfer, and other considerations.

(iii) The DAH, DAP, and JVP must be based on data from sources specified in §655.22(G) and other relevant data including past domestic landings, the capacity and intent of U.S. processors to process U.S. harvested mackerel and projected amounts of mackerel necessary for joint ventures during the fishing year.

(iv) IOY must be set at a level that will produce the greatest overall net benefit to the United States.

(v) The IOY may be adjusted by the Regional Director, in consultation with the Council, at any time during the fishing year, under §655.22(f). The basis for any adjustment may be that new information or changed circumstances indicate that U.S. fishermen will exceed the initial DAH, or that the IOY should be increased to produce maximum net benefits to the United States based upon an application of the factors above. The IOY may be increased by the amount that DAH or TALFF, or both, are increased, but IOY may not exceed ABC. An adjustment to IOY may not result in TALFF being reduced to a quantity less than that allocated to and accepted by foreign nations.

(3) Butterfish.

(i) The Regional Director will review yearly the most recent biological data, including data on discards, pertaining to the stock. If the Regional Director determines that the stock cannot support a level of harvest equal to the maximum OY, he will establish a lower ABC for the fishing year. This level represents essentially the modification of MSY to reflect changed biological circumstances. If the stock is able to support a harvest level equivalent to the maximum OY, the ABC is set at that level.

(ii) From the ABC, the Regional Director, in consultation with the Council, will determine the IOY for the fishing year. The IOY represents a modification of ABC. The IOY is composed of an initial DAH and initial bycatch TALFF. The Regional Director will project the DAH by reviewing the data concerning past domestic landings, projected amounts of butterfish necessary for domestic processing and for joint ventures during the fishing year, and other data pertinent for such a projection.

(iii) In assessing the level of IOY, the Regional Director will provide for a bycatch TALFF equal to 0.08 percent of the allocated portion of the Atlantic mackerel TALFF.

(iv) The IOY may be adjusted by the Regional Director, in consultation with the Council, upward to the ABC at any time during the fishing year. An adjustment may be made to IOY to accommodate DAH needs. However, TALFF may not be adjusted to a quantity less than that needed for bycatch. Any adjustments to the IOY will be published in the FEDERAL REGISTER and may provide for a public comment period.

(c) *Allowable domestic harvest*. Fish taken within State jurisdiction will be counted against the domestic harvests specified under this section. The allowable domestic harvest for each species is the OY (including OY as increased under paragraph (b)(1)(v) of this section) minus TALFF.

§655.22 Procedures for determining initial annual amounts and adjustments.

(a) *Annual review*. The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee will review the following data on or before August 15th of each year to determine the allowable levels of fishing and other restrictions necessary to result in appropriate exploitation as set forth in §655.21 (a) :

(1) Commercial and recreational catch data;

(2) Current estimates of fishing mortality;

(3) Stock status;

(4) Recent estimates of recruitment;

(5) Virtual population analysis results;

(6) Levels of noncompliance by fishermen or individual States;

(7) Impact of size/mesh regulations;

(8) Sea sampling and trawl survey data, or, if sea sampling data are unavailable, length frequency information from the trawl survey and mesh selectivity analyses;

(9) Impact of gear other than otter trawls on the mortality of Atlantic mackerel, squid, and butterfish; and

(10) Any other relevant information.

(b) *Recommended measures*. Based on this review, the Monitoring Committee will recommend to the Mackerel, Squid, and Butterfish Committee of the Council the following measures to assure that the fishing levels specified in §655.21(a) are not exceeded:

(1) Commercial quotas for *Loligo*, *Illex*, Atlantic mackerel, and butterfish will be set from a range of 0 to the maximum allowed as specified in §655.21(a).

(2) Commercial minimum fish size for mackerel;

(3) Commercial trip limits for mackerel;

(4) Commercial seasonal quotas for mackerel;

(5) Recreational minimum fish size for mackerel;

(6) Recreational possession limit for mackerel; and

(7) Recreational season for mackerel

(8) Commercial seasonal quotas for *Loligo*;

(9) Minimum mesh size for *Loligo*;

(c) *Annual fishing measures*. The Mackerel, Squid, and Butterfish Committee shall review the recommendations of the Monitoring Committee. Based on these recommendations and any public comment, the Mackerel, Squid, and Butterfish Committee shall make its recommendations to the Council with respect to the measures necessary to assure that the applicable harvest levels specified in paragraph (a) of this section are not exceeded. The Council shall review these recommendations. Based on these recommendations, and any public comment, the Council shall make recommendations to the Regional Director with respect to the measures necessary to assure that the harvest levels specified in paragraph (a) of this section are not exceeded. Included in the recommendation will be supporting documents as appropriate, concerning the environmental and economic impacts of the proposed action. The Council may also recommend, for Atlantic mackerel, that certain ratios of TALFF to purchases of domestic harvested fish and/or domestic processed fish be established in relation to the initial annual amounts.The Regional Director will review these recommendations. On or about November 1 of each year, the Secretary will publish a notice in the FEDERAL REGISTER that specifies, for Atlantic mackerel , preliminary initial amounts of OY, DAH, DAP, JVP (if any), and TALFF (if any) and for the squids and butterfish, total allowable biological catch (ABC), initial optimum yield (IOY), and amounts for domestic annual harvest (DAH), and domestic annual processing (DAP). The amounts will be based on information submitted by the Council and from the sources specified in paragraph (e) of this section; in the absence of a Council report, the amounts will be based on information gathered from sources specified in paragraph (e) of this section and other information considered appropriate by the Regional Director. If the preliminary initial amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 criteria set forth above for the species affected. The FEDERAL REGISTER notice will provide for a 30-day comment period.

(d) The Council's recommendation and the information listed in paragraph (e) of this section will be available in aggregate form for inspection at the office of the Regional Director during the public comment period. The Council's report on specifications established under paragraph (g) of this section will also be available for inspection at the office of the Regional Director upon receipt from the Council.

(e) On or about December 15 of each year, unless annual specifications have been established under paragraph (g) of this section, the Secretary will make a final determination of the initial amounts for each species, considering all relevant data and any public comments, and will publish a notice of the final determination and response to public comments in the FEDERAL REGISTER. If the final amounts differ from those recommended by the Council, the notice must clearly state the reason(s) for the difference(s) and specify how the revised specifications satisfy the 9 criteria set forth above for the species affected.

(f) Sources used to establish initial annual specifications for Atlantic mackerel include:

(1) Results of a survey of domestic processors and joint venture operators of estimated processing capacity and intent to use that capacity (approved by the Office of Management and Budget under OMB control number 0648-0114);

(2) Results of a survey of fishermen's trade associations of estimated fish harvesting capacity and intent to use that capacity (approved by the Office of Management and Budget under OMB control number 0648-0114);

(3) Landings and catch statistics;

(4) Stock assessments; and

(5) Relevant scientific information.

(g) Any adjustments to the OY must be published in the FEDERAL REGISTER with the reasons for such adjustment. Any notice of adjustment may provide for a public comment period.

§655.23 Closure of the fishery.

(a) *General.* The Secretary shall close any domestic fishery in the EEZ for any species when U.S. fishermen have harvested 80 percent of the allowable domestic harvest (see §655.21(c)), if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure will be in effect for the remainder of the fishing year.

(b) *Notice.* If the Secretary determines that a closure is necessary, he will:

(1) Notify in advance the Executive Directors of the Mid- Atlantic, New England, and South Atlantic Councils;

(2) Mail notifications of the closure to all holders of permits issued under §655.5 at least 72 hours before the effective date of the closure;

(3) Provide for adequate notice of the closure to recreational fishermen in the fishery; and

(4) Publish a notice of closure in the FEDERAL REGISTER.

(c) *Incidental catches.* During a period of closure, the trip limit for the species for which the fishery is closed is 10 percent by weight of the total amount of fish on board for vessels with *Loligo*/butterfish moratorium permits, *Illex* moratorium permits or mackerel commercial permits.

§655.24 Time and area restrictions.

(a)(1) *Directed foreign fishing restriction.* Foreign fishing, other than joint venture support by foreign vessels, shall be conducted beyond twenty miles from the baseline from which the territorial sea is measured.

(2) The Secretary shall modify the twenty mile restriction or impose northern or southern boundaries or other time or area restrictions on foreign fishing if necessary to address national security concerns.

(3) The Secretary may modify the twenty mile restriction or impose northern or southern boundaries or other time or area restrictions on foreign fishing if he determines that:

(i) the restriction will enhance the availability of fish to domestic fishermen;

(ii) the restriction will reduce the amount of the bycatch of certain nontarget species;

(iii) the restriction will reduce gear conflicts between domestic and foreign fishermen; or

(iv) the restriction will enhance the conservation and management of the fishery.

(b) *Procedure*.

(1) The Secretary shall consult with the Council prior to giving notice of any area or time restriction. The Secretary shall also consult with the Coast Guard if the restriction is proposed to reduce gear conflicts. If the Secretary determines after such consultation that the restriction is appropriate, he shall publish a notice of the restriction in the FEDERAL REGISTER together with a summary of the information on which the restriction is based.

(2) The Secretary may rescind any restriction if he determines that the information on which the restriction is based is no longer relevant.

(c) *Effect.* Any notice of restriction shall operate as a condition imposed on the permit issued to the foreign vessels involved in the fishery.

§655.25 Minimum net mesh.

(a) Owners or operators of otter trawl vessels possessing *Loligo* squid may only fish with nets having a minimum mesh size of 1-⅞" (4.7625 cm) diamond, inside stretch measure, applied throughout the entire net including the body and codend. If the squid are landed in a State that has a more stringent mesh regulation, the State regulation would prevail. There are two exemptions to this requirement:

(1) During the months of June, July, August, and September otter trawl vessels fishing for *Illex* seaward of the 50 fathom curve shall be exempt from the *Loligo* mesh requirement .

(2) Vessels participating in the directed fishery for sea herring shall be exempt from the *Loligo* mesh requirement provided their catch is comprised of 75% or more by weight of sea herring.

(b) Owners or operators of otter trawl vessels possessing *Loligo* squid which do not qualify under the exemptions in §655.25(a)(1) or (2) may not have available for immediate use any net, any piece of net not meeting the minimum mesh requirements, or mesh that is rigged in a manner that is inconsistent with the minimum mesh size requirement. A net that conforms to one of the following specifications and that can be shown not to have been in recent use is considered to be not "available for immediate use":

(1) A net stowed below deck, provided:

(i) it is located below the main working deck from which the net is deployed and retrieved;

(ii) the towing wires, including the "leg" wires, are detached from the net; and

(iii) it is fan-folded (flaked) and bound around its circumference.

(2) A net stowed and lashed down on deck, provided:

(i) it is fan-folded (flaked) and bound around its circumference;

(ii) it is securely fastened to the deck or rail of the vessel; and

(iii) the towing wires, including the leg wires, are detached from the net.

(3) A net that is on a reel and is covered and secured, provided:

(i) the entire surface of the net is covered with canvas or other similar material that is securely bound;

(ii) the towing wires, including the leg wires, are detached from the net; and

(iii) the codend is removed from the net and stored below deck.

(4) Nets that are secured in a manner approved by the Regional Director, provided that the Regional Director has reviewed the alternative manner of securing nets and has published that alternative in the FEDERAL REGISTER.

(c) Any combination of mesh or liners that effectively decreases the mesh below the minimum size is prohibited, except that a liner may be used to close the opening created by the rings in the rear most portion of the net, provided the liner extends no more than 10 meshes forward of the rear most portion of the net.

(d) The owner or operator of a fishing vessel shall not use any device, gear, or material, including, but not limited to, nets, net strengtheners, ropes, lines, or chaffing gear, on the top of the regulated portion of a trawl net which results in an effective mesh opening of less than 1-⅞" (4.7625 cm) mesh (stretch, inside measure); net strengtheners (covers), splitting straps and/or bull ropes or wire may be used provided they do not constrict the top of the regulated portion of the net to less than effective 1-⅞" (4.7625 cm) mesh (inside stretch measure). "Top of the regulated portion of the net" means the 50% of the entire regulated portion of the net which (in a hypothetical situation) would not be in contact with the ocean bottom during a tow if the regulated portion of the net were laid flat on the ocean floor. For the purpose of this paragraph, head ropes shall not be considered part of the top of the regulated portion of a trawl net. Net strengtheners (covers) may not have a mesh less than effective 4.5 inch (11.43 cm) mesh (inside stretch measure).

(e) The minimum net mesh size may be changed annually, if appropriate, following the Atlantic Mackerel, Squid and Butterfish FMP Monitoring Committee process. Based on the recommendations of the Monitoring Committee and Council, the Regional Director, by regulatory amendment, shall implement regulations on gear other than otter trawls to achieve discards of *Loligo* squid equivalent to the discards with otter trawls given the minimum net mesh requirements. This provision is intended to address the problem that could develop if gear currently not in significant use in the squid fishery are developed as a way of avoiding the minimum otter trawl mesh rule.

§655.26 Sea sampler program.

(a) *Request to take sea sampler.* The Regional Director may request a fishing vessel issued a permit under §635.4 to take on board an observer or sea sampler to accompany the vessel on all fishing trips conducted during the period specified in the request. If requested by the Regional Director to take an observer or sea sampler, a vessel may not engage in any fishing operations for Atlantic mackerel, squid, or butterfish unless an observer or sea sampler is on board or unless the requirement is waived.

(b) *Responsibility for sea sampler placement.* If requested by the Regional Director to take a sea sampler, it is the responsibility of the vessel owner to arrange for and facilitate sea sampler placement. Upon notice, the Regional Director will provide information concerning sea sampler availability and placement.

(c) *Waiver.* The Regional Director may waive the sea sampler requirement based on a finding that the facilities for housing the sea sampler or for carrying out sea sampler functions are so inadequate or unsafe that the health or safety of the sea sampler or the safe operation of the vessel would be jeopardized.

(d) *Sea sampler functions.* If requested by the Regional Director to take a sea sampler, the vessel owner, vessel operator, and crew must cooperate with the sea sampler in the performance of the sea sampler's duties, including:

(1) Notifying the sea sampler in a timely fashion of when fishing operations are to begin and end;

(2) Allowing for the embarking and debarking of the sea sampler, as specified by the Regional Director, ensuring that transfers of sea samplers at sea are accomplished in a safe manner, via small boat or raft, during daylight hours as weather and sea conditions allow, and with the agreement of the sea sampler involved;

(3) Providing adequate accommodations and food;

(4) Allowing the sea sampler access to all areas of the vessel necessary to conduct sea sampler duties;

(5) Allowing the sea sampler access to communications and navigation equipment and personnel as necessary to perform sea sampler duties;

(6) Providing true vessel locations, by latitude and longitude or loran coordinates, as requested by the sea sampler;

(7) Notifying the sea sampler of any sea turtles, marine mammals, Atlantic mackerel, squid, or butterfish, or other specimens taken by the vessel, as requested by the sea sampler;

(8) Providing the sea sampler with sea turtles, marine mammals, Atlantic mackerel, squid, or butterfish, or other specimens taken by the vessel, as requested by the sea sampler; and

(9) Providing storage for biological specimens, including cold storage if available, as requested by the sea sampler. These specimens must be retained on board the vessel, as instructed by the sea sampler or until retrieved by authorized personnel of the National Marine Fisheries Service.

§655.27 Experimental fishery.

(a) The Regional Director, in consultation with the Executive Director of the Council, may exempt any person or vessel from the requirements of this part for the conduct of experimental fishing beneficial to the management of the Atlantic mackerel, squid, or butterfish resource or fishery.

(b) The Regional Director may not grant such exemption unless he/she determines that the purpose, design, and administration of the exemption is consistent with the objectives of the FMP, the provisions of the Magnuson Act, and other applicable law, and that granting the exemption will not:

(1) Have a detrimental effect on the Atlantic mackerel, squid, or butterfish resource and fishery; or

(2) Cause any quota to be exceeded; or

(3) Create significant enforcement problems.

(c) Each vessel participating in any exempted experimental fishing activity is subject to all provisions of this FMP except those necessarily relating to the purpose and nature of the exemption. The exemption will be specified in a letter issued by the Regional Director to each vessel participating in the exempted activity. This letter must be carried aboard the vessel seeking the benefit of such exemption.

APPENDIX 8. ABBREVIATIONS AND DEFINITION OF TERMS

Act (MFCMA) - the Magnuson Fishery Conservation and Management Act of 1976, as amended, 16 USC 1801 et seq.

allocated portion - that portion of the TALFF actually distributed to foreign nations.

Allowable Biological Catch (ABC) - the maximum allowable catch for a particular fishing year developed by reducing the maximum OY as necessary based on stock assessments.

Amendment - Amendment 5 to the Atlantic Mackerel, Squid, and Butterfish FMP (FMP).

Atlantic mackerel (mackerel) - the species *Scomber scombrus*.

Blast freezer - a freezing system in which fish are frozen by being exposed to cold air being blown over them. Equipment needed is a condensing unit including a compressor, compressor drive, seawater-cooled condenser, water pump and controls. The fish hold is pre-cooled to -20 F o before fish are brought onboard, The fish, after cleaning, are placed directly in the blast air stream to freeze them as quickly as possible. After they are frozen, the fish may be dipped in water (glazed) to prevent dehydration during frozen storage. The equipment is run to maintain the low temperature until time of offloading.

butterfish - the species *Peprilus triacanthus*.

CFR - Code of Federal Regulations.

Council (MAFMC) - the Mid-Atlantic Fishery Management Council.

CPUE - catch per unit of effort.

Domestic Annual Harvest (DAH) - the capacity of US fishermen, both commercial and recreational, to harvest and their intent to use that capacity.

Domestic Annual Processing (DAP) - the capacity of US processors to process, including freezing, and their intent to use that capacity.

F - instantaneous rate of fishing mortality (The proportion of the population caught in a small period of time.). This mortality occurs in the presence of mortality from other causes and is usually given as averages for a year.

$F_{0.1}$ - the rate of fishing mortality for a given method of fishing at which the increase in yield per recruit for a small increase in fishing mortality results in only 10% increase in yield per recruit for the same increase in fishing mortality from a virgin fishery.

FMP - fishery management plan.

Exclusive Economic Zone (EEZ) - the zone contiguous to the territorial sea of the US, the inner boundary of which is a line coterminous with the seaward boundary of each of the coastal States and the outer boundary of which is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured.

GIFA - Governing International Fishery Agreement.

GRT - gross registered ton.

ICNAF - International Commission for the Northwest Atlantic Fisheries (replaced by NAFO).

internal waters - marine waters landward of the territorial sea.

joint venture - an arrangement through which US fishermen transfer their catch at sea to foreign vessels.

metric tons (mt) - 2204.6 pounds.

MSY - maximum sustainable yield. The largest average catch of yield that can continuously be taken from a stock under existing environmental conditions, while maintaining the stock size.

NAFO - Northwest Atlantic Fisheries Organization.

natural mortality - deaths from all causes except fishing, including predation, senility, epidemics, pollution, etc.

NEFC - the Northeast Fisheries Center of the NMFS.

NMFS - the National Marine Fisheries Service of NOAA.

NOAA - the National Oceanic and Atmospheric Administration of the US Dept. of Commerce.

Optimum Yield (OY) - the initial annual specification amounts as determined by the Northeast Regional Director, in consultation with the Council, modifying the ABC on the basis of biological or economic considerations.

Plate freezer - a freezing system in which fish are frozen by contact with refrigerated plates. The fish, after cleaning, are loaded into the plate freezer and the unit is operated until the entire mass of fish between the plates is frozen. Water may be added to the fish before freezing to eliminate air spaces between the fish. The frozen fish blocks are then removed from the plate freezer and stored in a hold maintained at -20 degrees F by blast freezing equipment.

Recirculating sea water equipment - a refrigerated sea-water system in which the seawater cooled by mechanical refrigeration is circulated through bulk tanks which contain fish. Heat is transferred from the fish to the seawater in the tank to the mechanical refrigeration system, thereby cooling the fish.

Regional Director (RD) - the Regional Director, Northeast Region, NMFS.

SA - Subarea or Statistical Area.

SSC - the Scientific and Statistical Committee of the Council.

Secretary - the Secretary of Commerce, or his designee.

squid - the species *Loligo pealei* (*Loligo* or *L. pealei*) and *Illex illecebrosus* (*Illex* or *I. illecebrosus*).

state waters - internal waters and the Territorial Sea.

stock assessment - the NMFS yearly biological assessment of the status of the resources. This analysis provides the official estimates of stock size, spawning stock size, fishing mortalities, recruitment, and other parameters used in this Plan. The data from these assessments shall constitute the "best scientific information currently available" as required by the Act.

Territorial Sea - marine waters from the shoreline to 3 miles seaward.

Total Allowable Level of Foreign Fishing (TALFF) - that portion of the Optimum Yield made available for foreign fishing.

USDC - US Department of Commerce.

year-class - the fish spawned or hatched in a given year.

yield per recruit (YPR) - the expected yield in weight from a single recruit.