AMENDMENT 6 TO THE

FISHERY MANAGEMENT PLAN

AND ENVIRONMENTAL ASSESSMENT

FOR THE

ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

August 1996

Mid-Atlantic Fishery Management Council

in cooperation with

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

Draft adopted by MAFMC: 26 June 1996
Final adopted by MAFMC: 7 August 1996
Final approved by NOAA: 13 February 1997

11 September 1996

AMENDMENT 6 TO THE

FISHERY MANAGEMENT PLAN

AND ENVIRONMENTAL ASSESSMENT

FOR THE

ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

August 1996

Mid-Atlantic Fishery Management Council

in cooperation with

the National Marine Fisheries Service,

the New England Fishery Management Council,

and

the South Atlantic Fishery Management Council

Draft adopted by MAFMC: 26 June 1996
Final adopted by MAFMC: 7 August 1996
Final approved by NOAA:

A publication of the Mid-Atlantic Fishery Management Council pursuant to NOAA Award No. #NA57FC0002.

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.

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 for this Amendment are:

1. Overfishing Definitions

1.1. ***Illex illecebrosus***

Overfishing for *Illex* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{20} is exceeded. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50}. Maximum OY will be specified as the catch associated with a fishing mortality rate of F_{20}. Quotas will be set annually by the Regional Director according to the current FMP.

1.2. ***Loligo pealei***

Overfishing for *Loligo* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{max} is exceeded. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50}. Maximum OY will be specified as the catch associated with a fishing mortality rate of F_{max}. Quotas will be set annually by the Regional Director according to the FMP

1.3. Atlantic Butterfish

Overfishing for Atlantic butterfish will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{msy} is exceeded or 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). Maximum OY will be specified as the catch associated with a fishing mortality rate of F_{msy}. Quotas will be set annually by the Regional Director according to the FMP.

2. General Catch Limitations

NMFS shall close the US fishery for *Loligo*,*Illex*, or butterfish when US fishermen have harvested 95% of the domestic allowable harvest if such closure is necessary to prevent DAH 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 as follows: *Loligo*-2,500 lbs, *Illex*-5,000 lbs and butterfish-2,500 lbs. The trip limits shall remain in effect until the end of the fishing year.

3. Seasonal Closures in the *Illex* Fishery

The Regional Director, based upon the recommendation of the Council, may impose seasons in the *Illex* fishery to improve yield per recruit from the fishery. These closures may include delaying the opening of the directed *Illex* fishery if substantial increases in yield will result from such closures.

3. TABLE OF CONTENTS

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.

Amendment 5 was approved by NMFS 9 February 1996. It lowered the *Loligo* MSY, eliminated the possibility of directed foreign fisheries for *Loligo*, *Illex*, and butterfish; instituted a dealer and vessel reporting system; instituted an operator permitting system; and expanded the management unit to include all Atlantic mackerel, *Loligo*, *Illex*, and butterfish under US jurisdiction.

4.2. PROBLEMS FOR RESOLUTION

4.2.1. Definitions of Overfishing for the Annual Squid Species and Butterfish are Inadequate

The current overfishing definitions for *Loligo*, *Illex* and Atlantic butterfish are as follows: "For the purposes of meeting the 602 guidelines, overfishing is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Center autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present)." When these definitions were developed, the squid species were believed to live up to 2-3 years. Recent advances in the aging of squid using statoliths indicate that both species of squid live only one year. As a result, this definition has been characterized as "risky" by a review panel which evaluated overfishing definitions used in US management Plans (Rosenberg *et al.* 1994). Atlantic butterfish are also short-lived, with few individuals observed beyond age 3. In light of their short lifespan, Rosenberg *et al.* (1994) also considered the current overfishing definition for Atlantic butterfish to be risky. The purpose of this amendment is to establish new overfishing definitions for *Loligo*, *Illex*, and Atlantic butterfish which provide adequate protection from recruitment overfishing for each of these short lived species.

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

No need to change this section at this time.

5.2. ABUNDANCE AND PRESENT CONDITION

No need to change this section at this time.

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 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 1996), as now appears typical of pelagic squid species studied throughout the world (Jereb *et al*. 1991). Because only a single cohort is available at any time, the stock is very vulnerable to recruitment overfishing.

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 a life span of one year (Dawe *et al.* 1985). *Illex* grow rapidly, achieving mantle lengths of 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. Because only a single cohort is available at any time, the stock is very vulnerable to recruitment overfishing.

5.3.3. 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 years. 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).

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. Initial yield per recruit calculations based on an annual life cycle for *Loligo* indicated that for an estimated cohort of average size (2.2 billion squid), a maximum yield of 36,000 mt could be realized (NMFS 1994). More recently, NMFS (1996) estimated the long-term potential yield (LTPY) for *Loligo* to be 21,000 mt. The maximum optimal yield for the stock was estimated to be 26,000 mt (NMFS 1996).

5.4.2. *Illex*

Lange (1984) estimated MSY for *Illex* to be 40,000 mt. In the most recent assessment, NMFS (1996) estimated LTPY for *Illex* to be about 14,600 mt. The biomass dynamics model used also provided an estimate of Max OY of 21,000 mt for *Illex*.

5.4.3. 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 (1984).

6. DESCRIPTION OF HABITAT

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

No need to change this section at this time.

6.2. HABITAT CONDITION

No need to change this section at this time.

6.3. GENERAL CAUSES OF POLLUTION AND HABITAT DEGRADATION

No need to change this section at this time.

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

No need to change this section at this time.

6.5. MID-ATLANTIC FISHERY MANAGEMENT COUNCIL HABITAT POLICY

No need to change this section at this time.

6.6. HABITAT PRESERVATION, PROTECTION AND RESTORATION RECOMMENDATIONS

No need to change this section at this time.

6.7. HABITAT RESEARCH NEEDS

No need to change this section at this time.

7. DESCRIPTION OF FISHING ACTIVITIES

No need to change this section at this time.

8. DESCRIPTION OF ECONOMIC CHARACTERISTICS OF THE FISHERY

8.1. DOMESTIC HARVESTING SECTOR

No need to change this section at this time.

8.2. DOMESTIC PROCESSING SECTOR

No need to change this section at this time.

8.3. INTERNATIONAL TRADE

No need to change this section at this time.

9. FISHERY MANAGEMENT PROGRAM

9.1. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

9.1.1.2. Overfishing Definitions

9.1.1.2.1. *Illex illecebrosus*

Overfishing for *Illex* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{20} is exceeded. F_{20} is defined as the fishing mortality rate which results in 20% of the maximum spawning potential of the stock. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50}. F_{50} is defined as the fishing mortality rate which results in 50% of the maximum spawning potential of the stock. Maximum OY will be specified as the catch associated with a fishing mortality rate of F_{20}. Quotas will be set annually by the Regional Director according to the current FMP.

9.1.1.2.2. *Loligo pealei*

Overfishing for *Loligo* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{max} is exceeded. F_{max} is defined as the fishing mortality rate which results in the maximum yield per recruit. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50}. F_{50} is defined as the fishing mortality rate which results in 50% of the maximum spawning potential of the stock. Maximum OY will be specified to be the catch associated with a fishing mortality rate of F_{max}. Quotas will be set annually by the Regional Director according to the FMP.

9.1.1.2.3. Atlantic Butterfish

Overfishing for Atlantic butterfish will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{msy} is exceeded or 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). Maximum OY will be specified to be the catch associated with a fishing mortality rate of F_{msy}. F_{msy} is defined as the fishing mortality rate which results in the maximum sustainable yield. Quotas will be set annually by the Regional Director according to the FMP.

9.1.1.2.4. Catch Limitations

9.1.1.2.4.1. General

9.1.1.2.4.1.1. Close Directed Fisheries for Squids or Butterfish When 95% of DAH is Taken

NMFS shall close the US fishery for *Loligo*, *Illex*, or butterfish when US fishermen have harvested 95% of the allowable domestic harvest if such closure is necessary to prevent DAH 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 as follows: *Loligo*-2,500 lbs, *Illex*-5,000 lbs and butterfish-2,500 lbs. The trip limits shall remain in effect until the end of the fishing year.

9.1.1.2.5. Seasonal Closures in the *Illex* Fishery

The Regional Director, based upon the recommendation of the Council, may impose seasons in the *Illex* fishery to improve yield per recruit from the fishery. These closures may include delaying the opening of the directed *Illex* fishery if substantial increases in yield will result from such closures.

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 Councils are required to establish a specific, measurable definition of overfishing for each stock or stock complex managed by an FMP. The 602 guidelines define overfishing as a level or rate of fishing mortality that jeopardizes the long-term capacity of a stock or stock complex to produce MSY on a continuing basis. Rosenberg *et al.* 1994 recommended that overfishing definitions should set a limiting threshold for management of a stock which is separate from a fishing target. The term threshold can refer to either a minimum biomass level or a maximum fishing mortality rate. Overfishing thresholds are designed to place conservation constraints on management actions such that recruitment fishing does not occur. In other words, the management strategy should be designed to avoid ever crossing the threshold. Management goals should be cast into a management strategy such that, on average, the target harvest level is achieved. As a result, fishing mortality on the stock should always be maintained well below the threshold level.

The threshold fishing mortality rates proposed in this Amendment are designed to protect each stock from recruitment overfishing. The target fishing mortality rates proposed should allow the stocks to produce sustained yields on a continuing basis. This should provide major benefits to both the industry and the Nation since overfishing will be prevented allowing the fishery to operate in a consistent and sustainable manner over the long term.

9.2.1.1.1. *Illex illecebrosus*

The appropriateness of various targets and thresholds for overfishing were discussed at length in the most recent stock assessment for *Illex* (NMFS 1996). It was the consensus of the SARC that the current definition is inadequate because the fall survey does not track pre-recruits well enough to be useful. NMFS (1996) suggested that either a rate-based or biomass-based definition might offer better protection for the stock. Due to the flat topped nature of the YPR curve for *Illex*, it was recommended that F_{max} not be used as a biological reference point for this species. As a result, the overfishing threshold recommended by the SARC was F_{20}. F_{20} is the fishing morality rate that will result in 20% of the maximum spawning potential for the Illex stock. In other words, it is the level of fishing mortality that will reduce the spawning stock, on average, to 20% of the level that would exist if the stock was not fished. In addition, F_{60} (F which

results in 50% of maximum spawning potential) was chosen as a precautionary target harvest level for *Illex*. The F_{50} target level is similar to the harvest control strategy used for the Falkland Islands *Illex* squid fishery (where a target of 40% proportional escapement is the goal of management). It is considered a precautionary level of harvest which should be sustainable over a variety of recruitment and biomass levels and protect the stock from recruitment failure due to overfishing. This should be greatly beneficial to both the industry and the nation since stable, sustainable harvests at this level can be maintained in the long term.

SAW-21 recalculated biological reference points for *Illex* based upon the assumption of an annual life span. Based on these analyses, *Illex* are now considered to be fully-exploited and the stock is at a medium level of abundance. Recent domestic landings are at an all time high and have increased to over 18,000 mt in 1993 and 1994. The domestic fishery is now approaching the levels sustained by foreign fleets from 1973 through 1982. The quota associated with the F_{50} target recommended by SAW-21 is 19,000 mt based on the most recent estimates of stock size (1982-1993). This level of harvest is believed to be sustainable over a wide range of stock sizes. This conclusion is supported by the performance of the *Illex* fishery in the US EEZ during the period 1973-1982 when reported foreign landings were at their peak. Total landings in the US EEZ during this time period averaged 19,400 mt. The NMFS all sizes mean number per tow of *Illex* from the autumn bottom trawl survey during this same time period was 19.3, about 40% higher than the mean for the entire time series from 1967-1991. These data support the conclusion that 19,000 mt is a sustainable level of harvest in the *Illex* fishery over broad range of stock sizes.

9.2.1.1.2. *Loligo pealei*

The current definition of overfishing for *Loligo* is based upon examination of the 3-yr moving average of the NEFSC fall survey pre-recruit number tow values. This definition was characterized as risky by Rosenberg *et al.* 1994 in their scientific review of overfishing definitions in US Fishery Management Plans. The most recent stock assessment recommended that fishing mortality levels that produce 50% of the maximum spawning potential per recruit can be considered a target harvest rate that is likely to produce sustainable yields in the fishery. Overall, it appears that the long term potential yield (LTPY) of 21,000 mt can be realized from the fishery without jeopardizing the reproductive potential of the stock. Applying the maximum yield per recruit attainable with current fishing patterns applied to an average cohort of *Loligo* resulted in an estimate of Maximum OY of about 26,000 mt (NMFS 1996). This calculation is supported by the observation that when historical landings exceeded 30,000 mt during the 1972-1976 fisheries there was a marked decline in stock biomass. NMFS (1996) cautioned that maximum OY should be viewed as an upper bound on the allowable annual quota and should not be construed as a target which can be achieved every year. Hence, a constant annual catch of maximum OY is probably not sustainable and moreover, landings consistently in excess of the management target (LTPY = 21,000 mt) may have negative consequences for *Loligo* predators and the marine food web of which they are an integral part (NMFS 1996).

9.2.1.1.3. Atlantic Butterfish

In light of the fact that few butterfish are observed beyond age 3 in recent years, Rosenberg *et al.* 1994 considered the current definition of overfishing for butterfish to be risky. They recommended that additional measures be added to the definition of overfishing for this species. This Amendment proposes that an additional threshold mortality rate of F_{msy} be added to the definition of overfishing for butterfish. This biological reference point has been used in other fishery management plans (bluefish for example). In the absence of an acceptable estimate of current fishing mortality for butterfish, the 3 yr moving average of the survey index would be used. In the case where both are available, either part could indicate an overfished condition in the stock (i.e., if either the 3-yr moving average of the fall survey falls within the lowest quartile of the time series or if F exceeds F_{msy}).

9.2.1.1.4. General Catch Limitations

The current FMP specifies that the directed fishery will be closed when 80% of the DAH is taken if such closure is necessary to prevent the domestic allowable harvest from being exceeded. This clause was

placed in the FMP at a time when the catch data available to monitor the fisheries were not available on a timely basis and coastwide coverage of the fisheries was generally poor. Since then logbook and dealer reporting have been made mandatory as a part of Amendment 5. As a result, the need for a mechanism to close the fisheries prematurely to prevent overfishing is greatly reduced. Hence under the preferred alternative the directed fishery would be closed when 95% of DAH was projected to be taken. Moreover, the new definitions of overfishing are much more conservative than those specified in Amendment 5 and earlier Amendments. The retention of the 80% closure clause would likely lead to the unnecessary premature closure of the squid fisheries in years of very high abundance since the proposed definition already specifies the quota in a conservative manner. The inshore/small boat fishery should benefit since the fishery will remain open as a bycatch fishery for the remainder of the fishing year. This will allow small vessels to retain up to 2,500 lbs of *Loligo* or butterfish and up to 5,000 lb of *Illex*. The levels for *Loligo* and butterfish correspond to the initial bycatch specifications for non-moratorium vessels approved in Amendment 5. The specification of 5,000 lbs for *Illex* is proposed in the resubmission of Amendment 5. These levels will allow the fishery to be prosecuted as a bycatch fishery only after 95% of DAH is taken. These specifications should satisfy the enforcement concerns brought before the Council by both the Regional Director and the Coast Guard since they are relatively easy to enforce.

9.2.1.1.5. Seasonal Closures in the *Illex* Fishery

The current FMP provides that seasonal quotas can be specified as a framework provision for *Loligo* only. A seasonal closure provision has been included in Amendment 6 for the *Illex* fishery. The rationale is that the new definition of overfishing will result in a lower annual quota given the current fishing pattern. It is likely that yield in the *Illex* fishery could be substantially increased by delaying entry into the fishery. This could be accomplished by delaying the opening of the *Illex* season, but the current plan does not provide for this mechanism. By delaying the opening of the *Illex* season, substantial increases in yield will result since the cohort will be given more time to grow before they are harvested. Preliminary analyses conducted by the NEFSC indicate that yield could be increased by roughly 30% by delaying the beginning of the *Illex* season until July 1 (P. Rago, pers. comm.). Because of their rapid growth rate, substantial benefits due to increases in yield in the *Illex* fishery could be realized due to seasonal delays in harvest because the fishery would be harvesting larger, more valuable squid.

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

The establishment of new definitions of overfishing for *Loligo*, *Illex* and butterfish are based upon recommendations from the most recent stock assessments for each species and the recommendations concerning the development of overfishing definitions by Rosenberg *et. al.* 1994. These assessments represent the best and most current scientific information available to formulate rational harvest strategies for these short-lived species.

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

No need to change this section at this time.

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

No need to change this section at this time.

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

No need to change this section at this time.

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

No need to change this section at this time.

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

No need to change this section at this time.

9.2.1.8. Fishery Impact Statement

No need to change this section at this time.

9.3. RELATION OF RECOMMENDED MEASURES TO APPLICABLE LAWS AND POLICIES

9.3.1. FMPs

No need to change this section at this time.

9.3.2. Treaties or International Agreements

No need to change this section at this time.

9.3.3. Federal Law and Policies

No need to change this section at this time.

9.3.3.1. Marine Mammals and Endangered Species

No need to change this section at this time.

9.3.3.2. Marine Sanctuaries

No need to change this section at this time.

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

No need to change this section at this time.

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.

At the time of submission of this Amendment for Secretarial approval, the States of Rhode Island, New Hampshire, Pennsylvania and Connecticut have determined that Amendment 6 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan is consistent with the goals and objectives of their respective Coastal Zone Management Programs. The provisions of this Amendment relative to CZM programs of Maine, Massachusetts, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina are currently under review by those States.

9.4. COUNCIL REVIEW AND MONITORING OF THE FMP

9.4.1. Monitoring

No need to change this section at this time.

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

No need to change this section at this time.

10. REFERENCES

Brodziak, J.K.T. and W.K. Macy. 1994. Revised estimates of growth of long-finned squid, *Loligo pealei*, in the Northwest Atlantic based on statolith ageing: implications for stock assessment and fishery management. ICES C.M. 1994/K:13. 46 p.

Dawe, E.G., R.K. O'Dor, P.H. Odense, and G.V. Hurley. 1985. Validation and application of an ageing technique for short-finned squid (*Illex illecebrosus*). J. Northw. Atl. Fish. Sci. 6:107-116.

Grosslein, M.D. and T.R. Azarovitz. 1982. Fish distribution. MESA New York Bight Atlas Monograph 15. 182 p.

Jackson G.D. and J.H. Choat. 1992. Growth in tropical cephalopods: an analysis based on statolith microstructure. Can. J. Fish. Aquat. Sci. 49:218-228.

Jereb, P., S. Ragonese, S. von Boletzky [*Eds.*]. 1991. Squid age determination using statoliths. Proceedings of the International Workshop held at the Institutio di Technilogica della Pesce e del Pescato (ITPP-CNR), Mazara del Vallo, Italy, 9-14 October 1989. N.T.R.-I.T.P.P. Special Publication,, Vol. 1, 127 p.

Lange, A.M.T., and M.P. Sissenwine. 1980. Biological considerations relevant to the management of squid (*Loligo pealei* and *Illex illecebrosus*) of the northwest Atlantic. Mar. Fish. Rev. 42 (7-8): 23-38.

Lange, A.M.T. 1984. An assessment of the long-finned squid resource off the northeastern United States Autumn 1984. NMFS, NEFC, Woods Hole Lab. Ref. No. 84-37. 23 p.

Macy, W.K. III. 1992. Preliminary age determination of the squid, *Loligo pealei*, using digital imaging. ICES CM 1992/K:, 9 p.

Mesnil, B. 1977. Growth and life cycle of squid, *Loligo pealei* and *Illex illecebrosus*, from the northwest Atlantic. ICNAF Selected Papers 2: 55-69.

Murawski, S.A., and G.T. Waring. 1979. Biological and fisheries data on butterfish, *Peprilus triacanthus*,

in the northwestern Atlantic Ocean. Trans. Am. Fish. Soc. 108(5): 427- 439.

National Marine Fisheries Service (NMFS). 1994. Report of the 17th Northeast Regional Stock Assessment Workshop (17th SAW). Stock Assessment Review Committee (SARC), Consensus Summary of Assessments. Northeast Fisheries Science Center, Woods Hole Laboratory Reference Document 94-06. 124 p.

National Marine Fisheries Service (NMFS). 1994a. Appendix 2.d.: Guidelines on regulatory analysis of fishery management actions. Revised version. In: Operational Guidelines for Fishery Management Plan Process. NMFS, Silver Spring, MD.

National Marine Fisheries Service (NMFS) 1996. Report of the 21st Northeast Regional Stock Assessment Workshop (21st SAW). Stock Assessment Review Committee Consensus Summary of Assessments. NOAA, Northeast Fisheries Science Center.

Rosenberg, A., P. Mace, G. Thompson, G. Darcy, W. Clark, J. Collie, W. Gabriel, A. MacCall, R. Methot, J. Powers, V. Restrepo, T. Wainwright, L. Botsford, and K. Stokes. 1994. Scientific Review of Definitions of Overfishing in US Fishery Management Plans. NOAA Tech. Mem. NMFS-F/SPO-17.

Sissenwine, M.P., and A.M. Tibbetts. 1977. Simulating the effect of fishing on squid (*Loligo* and *Illex*) populations off the northeastern United States. ICNAF Sel. Pap. 2: 71-84.

USDC. 1984. Status of the fishery resources off the northeastern United States for 1983. NOAA, NMFS-F/NEC-29. 132 p.

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

The current overfishing definitions for *Loligo*, *Illex* and Atlantic butterfish are as follows: "For the purposes of meeting the 602 guidelines, overfishing is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Center autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present)." When these definitions were developed, the squid species were believed to live up to 2-3 years. Recent advances in the aging of squid using statoliths indicate that both species of squid live only one year. As a result, this definition has been characterized as "risky" by a review panel which evaluated overfishing definitions used in US management Plans (Rosenberg *et al.* 1994). Atlantic butterfish are also short-lived, with few individuals observed beyond age 3. In light of their short lifespan, Rosenberg *et al.* (1994) also considered the current overfishing definition for Atlantic butterfish to be risky. The purpose of this amendment is to establish new overfishing definitions for *Loligo*, *Illex*, and Atlantic butterfish which provide adequate protection from recruitment overfishing for each of these short lived species. If new definitions of overfishing are not developed for these species, it could lead to recruitment failure which would jeopardize both the stocks and the fisheries.

2. Close Directed Fisheries for the Squids or Butterfish When 100% of DAH is Taken

2.1. Description

NMFS shall close the US fishery for *Loligo*,*Illex*, or butterfish when US fishermen have harvested 100% of the allowable domestic harvest. 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.

2.2. Beneficial and Adverse Impacts

This is a modification of the language in the current FMP. This provision (the 80% closure rule) was made part of the FMP when fishery landings data were inadequate in both scope and availability to adequately monitor the fisheries. The most recent Amendment added a provision which requires mandatory reporting of catch by both dealers and vessels. This should result in improved monitoring of the fishery within the fishing season. Premature closure of the fishery could have unequal effects by time and area. The current catch reporting system should allow for adequate monitoring of the fishery. It is conceivable under this provision that the entire annual quota could have been taken by the large boat offshore fishery. If this measure had been adopted, it could have negatively impacted smaller scale vessels which fish for the squids and butterfish in the late part of the fishing season.

APPENDIX 2. PUBLIC HEARING SUMMARIES FOR AMENDMENT 6 TO THE ATLANTIC MACKEREL, SQUID AND BUTTERFISH FISHERY MANAGEMENT PLAN

29 July 1996, Warwick, RI

Mr. McCauley opened the hearing at 7:06 pm. Members of the New England Fishery Management Council present included hearing officer Jim McCauley and Jim O'Malley. Mid-Atlantic Council staff present was Rich Seagraves. Five members of the public were present.

Mr. Seagraves presented the draft Amendment.

Geir Monsen, representing Seafreeze of N. Kingston, RI stated that he supported closing the fishery when 100% of the DAH is taken. He stated that he has serious questions about the science going into the *Loligo* and *Illex* stock assessments. The assessments are based on computer models which he questioned. The assessment needs real data in it. The assessment science is also based on an antiquated NMFS survey vessel which is small and uses a small net. He feels that the results of these surveys are highly questionable. Other governments hire commercial vessels to do these surveys and to do exploratory fishing. He feels that the US government should consider doing the same thing. They should use fishermen to do the surveys. He feels the assessment and the Amendment are mostly academic science as opposed to real world information about what is actually out in the ocean.

Peter Barbera, Town Dock inc., supports closing the fishery when 100% of DAH is taken (as opposed to the 95% proposal in the preferred alternative). He supports the seasonal closure option for the *Illex* fishery. It is good for the resource and the economics of the fishery. When the *Illex* are landed early they are small and lower in value. If they are harvested later in the season they increase in weight and value.

Bill Carroll, a seafood processor, supports closing the fishery when 100% of DAH is taken. It doesn't make sense to close it when 95% of the DAH is taken. He has serious doubts about the models and the science. He suggested that input from fishermen would improve the assessments. He agrees with delaying the opening of the Illex season to allow the squid to grow.

Jim OMalley, East Coast Fisheries, submitted a written statement in support of seasonal management of the *Illex* fishery (Attachment 1). He also suggested that the definitions section of the FMP be updated to define the new terminology used in Amendment 6 (for example, F_{60}, F_{20}, etc.).

The hearing was closed at 7:47 pm.

29 July 1996, Virginia Beach, VA

The hearing was called to order by Hearing Officer Jack Travelstead at 7:05 p.m.

Mr. Travelstead made opening comments and turned hearing over to David Keifer who presented comments on the draft amendment. Clerical support was provided by Joanna Davis.

Attendees: Charles Amory of L. D. Amory & Co, Inc., Hampton, VA; James Ruhle of Wanchese, NC; Billy Carl Tillett of Moon Tillett Fish Co., Wanchese, NC; and James Fletcher of United National Fishermen's Assoc., Manns Harbor, NC.

The first comment was from Mr. Ruhle. He did not understand what ADH means (annual domestic harvest?). It is the same as DAH, per Travelstead and Keifer.

Mr. Tillett asked if the overfishing definition is created by squid being one year old? Mr. Keifer answered that it was based on the squid living for three years, but now they know they live for one year. Mr. Tillett further asked why we're dropping from 19.000 mt to 14,000 mt, and to please explain. Mr. Keifer answered that the long term potential yield was 19,000 mt. Same as MSY. The Center has issued a paper saying the take should only be 14,000 mt for next year, because the assessment says it should not be more than that. They use results of the trawl survey, starting in October, then March and April. They are catching on random sampling, then comparing them by size and numbers.

Mr. Fletcher said that a scientific review takes almost one year. How are we going to run management, always a year behind? How are we going to manage species that live only one year? Mr. Keifer answered that we attempt to handle that in Amendment 5. For the first year the Regional Director will gather information on real time management of *Illex,* then take it to the Council and see if it would work. You may want to delay the season.

Mr. Tillett questioned the 19,000 v. 14,000 mt. He does not understand the concept. Keifer referred him to the information that will come out of the Monitoring and Council meetings. The overfishing definition is based on 19,000 mt.

Official comments regarding amendment:

Mr. Fletcher: F_{20} as overfishing definition is an incorrect assumption. It's not a logical and achievable definition. By the definition of F, it should not be used as a definition of overfishing, especially for a one year species. It did not work in the Summer Flounder Plan. He questioned why we keep switching from F as a definition of overfishing, MSY, and then to OY? He thinks Council and NMFS has a credibility problem with the definitions of overfishing. It should be the same for all species and work off the same value scheme, but by changing the schemes and definitions of overfishing for the different species, "not only are you confusing fishermen but the management process." He objects to the Regional Director being able to open and close seasons. Further, he's not happy with the way we've come up with who and what vessels are allowed to participate in the fishery. This needs to be addressed.

Mr.Tillett: Opposes all three preferred measures. He questions the stock assessment and the rapid decline in the figures that we're getting ready to base this management plan on. Does not like Regional Director being able to open and close seasons, and basing it on size is not right. In their area, Hudson Canyon to Cape Hatteras, it starts at different times and there are different size squids in different areas. They are trying to base it on size, and size has no baring on it. He is losing confidence in the whole process. He has had reservations on this Plan from the start. A Plan needs to be developed so that the ones in this fishery can live; the season is only three months now! Nobody knows the status of the stock, and you cannot determine a stock from a survey. NMFS credibility should be challenged.

Mr. Ruhle: Regarding number one, revised definitions, he totally disagrees with the numbers (although not in theory). He does not disagree with the mathematics, but this is based on a spring and fall survey, with inadequate boats, with inadequate gear, in inadequate places. The Regional Director gave him an answer that, "they were wrong, but they were consistently wrong." That worked for a while but they now have to deal with numbers that will cut off their season of catching something that they know are out there in big numbers. He agrees with the Falkland Islands management. He agrees, but the big difference between the Falkland's management and what the Center is doing is, is that

they'd better go and get acoustical surveys and use document landed boats; trawlers, jiggers, whatever it takes, not just along the 100 fathom edge for two or three months, but during the peak season. In other words, they should originate a whole new set of scales or graphs to determine this. They are fighting for a moratorium, because there is enough pressure on what they think is there, in the 30,000 range, but until the Center changes their procedure (starting point for assessment), the numbers are going to be wrong (re *Illex*). If the starting number is wrong, they are all going to be wrong. And there are many more *Illex* than *Loligo*. You see them everywhere. The Council has done a great job, but the numbers they have to work with are wrong.

Regarding number two, he likes 95% better than 85% ... but of what? He doesn't know what DAH is at this point and neither do we. He would agree with the 95% before he would 100%. This thing has been dragged out too long. It's really frustrating. **On the last item, he's totally opposed.** He understands the principles, but it will never work. If all the squid were the same size there would be no problem, but they are not. It takes them the four month season to get the landings they have achieved over the years. "I'm going to blame everything on the Regional Director, because I don't like him. I don't think he could, in a timely manner, stop and start any season." It's a phase of management that will not work and is not necessary.

Mr. Amory: Agrees with other speakers. If we continue losing credibility, we're really going to be in trouble. He **suggests we look more at the correlation between catch record and weather patterns.** This is certainly one of the most important areas to look at when trying to determine young of the year, successful spawning rates, and things of that nature. There has got to be a way, with NOAA having both sets of records, that they could correlate the two. That would have a tremendous impact on the ability of the scientists to explain some of the phenomena we are seeing. For example, the Atlantic croaker has the most abundance it's ever known, with no management program ... why did that happen?

Mr. Fletcher: Read a portion of attached document regarding climate changes in the North Pacific (Attachment 2). The Council and NMFS had this concept pointed out to them before and it was thrown in the trash can. Suggests they reconsider it. Not NMFS scientists, but world respected scientists, are beginning to see this. If you write the Squid Plan based entirely on performance and not on climate, we're going to have more problems that industry does not need.

Mr. Tillett: In the beginning this Plan was initiated, in part, by the industry. The numbers are upsetting to him. Lower numbers mean more incentive for closed seasons. In that three or four month period, they might make the season in two of those months. People need to realize that if you keep on developing plans that get "whittled down", the ones most affected by the Plans have to jump into something else. The ripple effect that is coming from all this isn't working. The Plans are not working, plain and simple. Nobody is winning.

Mr. Ruhle: Wanted to make a comment for the record (although not related to this amendment), that industry has come up with a higher figure on landings of *Illex* than NMFS. The best NMFS could come up with is 18,000 mt. Industry has come up with 21,000 mt. We're talking about harvest. We don't know why it's not showing up. This has been brought to the attention of the Council; at least the Committee. They've done a lot of checking on this. Perhaps when logbooks get up to date it may show up. Logbooks have only existed about two years tops. There is still concern that when numbers are working against you, and their numbers are higher than NMFS, it's a concern.

Mr. Tillett: Mentioned that North Carolina has just witnessed the same situation in summer flounder.

Mr. Travelstead reminded them that comments must be submitted to the Council office by August 1. He adjourned the hearing at 7:55 p.m.

30 July 1996, Riverhead, NY

Hearing officer Bob Hamilton opened the hearing at 7:35 pm. Mr. Seagraves presented the draft Amendment. Mid-Atlantic Council staff present was Rich Seagraves. Five members of the public were present.

Dennis Hand, F/V Melissa Lu, stated that his livelihood depends entirely on squid. He supports raising the mesh size to 2.25 inches for squid.

Bob Harter stated that to set the mesh size correctly we need to talk to some old-time fishermen to see what the proper bagsize should be. He is hesitant to suggest a mesh size. He has lost all confidence in the fishery management system. He stated that when fish populations go down the immediate cause is said to be overfishing. The fluke fishing is good but we are not allowed to catch them. He loses confidence in the system when the ocean is full of striped bass and he is not allowed to fish for them. If he can't continue to catch the amount of squid he has been catching in the past then he is out of business. There is nothing else to catch. Why is it that whenever catches decline that overfishing is automatically the blame? The scientists do not take into account all the other factors that affect fish stocks. There could be natural factors such as seal predation which are causing the decline. Seals and other marine mammals are on the increase and consume a lot of fish. He cited Canadian data on marine mammals which shows that they eat a lot of fish. Recreational fishermen also catch a lot of fish.

John Mason, commercial fishermen from Shinnecock, questioned what the recent catches of the squids were . Why was New York not included in those figures? Council staff last presented data which said that MSY was 36,000 mt. Why has this changed. NMFS doesn't do anything for the fishermen. There was not adequate notice for this meeting. NMFS does not stop recreational fishermen from selling fish. There should be a license system for selling fish which is enforced. He would like to see an exemption from the quota in State waters, even for Federal permit holders. He is very unhappy about the quota. He would also like to see a small boat exemption. He was concerned about the quota numbers changing from what was previously presented.

Christian Harter stated that the surveys conducted by NMFS are no good. To base the management of all these species on the surveys is a mistake. NMFS should go by what is caught by the fishermen. The ocean is so large that to make a wild guess about what can be caught is ludicrous.

The hearing was closed at 9:40 pm.

31 July 1996, Cape May Court House, NJ

Hearing officer Charlie Bergman opened the hearing at 7:05 pm. Mid-Atlantic Council staff present was Rich Seagraves. Nine members of the public were present.

Mr. Seagraves presented the draft Amendment.

Jeff Reichle, Lunds Fisheries, wanted to address the proposed specification of DAH and Max OY. He feels that there was not enough time spent on the model. Water temperatures during 1994 and 1995 resulted in poor fishing during those years. There was high effort and poor fishing in 1995. Water temperature must be factored in. How staff arrived at the conclusions concerning DAH needs to be better explained before we comment intelligently on this Amendment A more complete explanation of the how the models work and how the commercial LPUE data was used needs to be presented.

Eric Axellson, Axellson and Johnson, commented that he agreed with just about every thing that Jeff just said. He has a total lack of confidence in the science that went into the quota calculations. Another thing is that if you had delayed the opening of the *Illex* season by three weeks this year then the fishermen would not have caught anything.

Michael Loper, representing the F/V Night Watch Inc., stated that he has fished for *Illex* for the past 15 seasons. So far what we have learned about *Illex* in previous seasons is that there appears to be an influx of small squid. Recently, all of a sudden they have disappeared. We can't find them. We don't know as much about this animal as we thought we did. I feel that none of us can come to a conclusion about what the correct specification of DAH or Max OY should be. We need to know how this animal lives, eats and breathes. He feels that he can't comment about the changes in the quota specifications until a better explanation of the science is given. Please make any new information available to the fishermen. He stated that he would be happy to provide catch records to the people doing the stock assessment. He suggested that what is needed is scientific and industry cooperation to determine what the proper quota specifications should be.

Lars Axellson, F/V Flicka and Drysten, stated that after a review of the definitions he would rather stay with the current plan until we are better educated. He stated that if we specify the quotas for 1997 according to Amendment 6 then it is going to be a very short season. He questioned how the foreign catch has been evaluated. The *Illex* stock has been fished a lot longer than what is included in the current analysis. The squid catch was much higher in the 1970's than it is now, yet the squid are still here. How has the historical US catch been factored into the models for setting quotas? Was the JV data included in that? The document alludes to the squids being annual species. This was mentioned by Lange in 1973. The quota continues to drop and drop. The reason given is to be risk averse. It appears that the quotas always appear to be halved. They are finally lowered to a level that fishermen can not survive at. You are taking away about 20-40% of the income for those who are left to participate in the fishery. Why are the definitions different between *Loligo* and *Illex*? The Council needs to do a better job educating those being regulated to be credible. He supports closing the fishery when 100% of DAH is taken since the quota is already set in a risk averse manner. He questions the provisions for seasonal quotas. The timing of the *Illex* season can vary a lot. Weather patterns can sometimes shut off the fishery completely. He feels that bottom water temperature may much more important than was originally thought. The Gulf stream is much closer in the south in some years and the further north you go the further off it is. Temperature and availability are very important. On the question of increasing yield per recruit, he favors that but how will you determine that? He has been fishing for *Illex* for 16 years and he has seen a lot of variability in the appearance of small squid. Sometimes there are waves of squid that move in of various sizes. There are times that they are plagued with very small *Illex* after larger squid were available. Real-time management will take a considerable effort, you will need someone out on the vessels. Who is going to do this work? How are they going to determine when the time is right to open and close the season? If they wait until August it may be too late. The industry has been fishing around 20,000 mt in recent years, and we felt that this was sustainable. You stated that DAH can float from the initial specification up to Max OY. How will it be determined that it is allowed to rise within the season? The plan contains measures which are frameworked which seems to be the new buzzword. This scares him when a monitoring committee made up of biologists who from their desks are making these decisions. Are there any fishermen voting on this committee? He recently spoke with a fishermen who spends about 300 days a year at sea fishing and not once has anyone ever bother to ask him what he thinks about managing the fishery. The Council needs better communication with the fishermen rather than policy being dictated to the fishermen by biologists and bureaucrats.

Jim Harris, trawler Abracadabra, stated that we need a lot more information. From 1973-1982 the foreign landings averaged 18,000 mt. The US fishery has operated at 15,000-20,000 mt. for the last 20 years we have been around this level. He is opposed to lowering the quota . He is opposed to seasons in the *Illex* fishery. Who will determine this? He has seen good fishing in May and June followed by no fish in July.

John Koegler, TFCSJ, stated that he took the time to read SAW 17 and 21. He supports Lars idea that in general fishermen are scared to death when biologists, staff, and NMFS get together to come up with these regulations. He then read a prepared statement (attachment 3). He expressed concerns about the squid fishery overfishing the resource since his recreational tuna fishery is directly dependent upon the availability of squid. He stated that he can no longer bring squid to his boat with lights like he used to. If the squid resource is overfished then his fishery is dead because the tuna and other recreational species depend on squid for food. We access the same resource as the commercial squid fishery only we do it indirectly.

APPENDIX 3. REGULATORY IMPACT REVIEW

1. INTRODUCTION

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 Executive Order (E.O.) 12866. The RIR also serves as the basis for determining whether any proposed regulation is a "significant regulatory action" under certain criteria provided in E.O. 12866.

1.1. Description of User Groups

There is no need to change this section at this time.

1.2. Problem Addressed by the Amendment

The problems to be addressed are discussed in Section 4.2 of this Amendment.

1.3. Management Objectives

The objectives of the Amendment are described in Section 4.3 of this Amendment.

2. METHODOLOGY AND FRAMEWORK FOR ANALYSIS

The basic approach adopted in this RIR is an assessment of management measures from the standpoint of determining the resulting changes in costs and benefits to society. The net effects should be stated in terms of producer and consumer surpluses for *Illex*, *Loligo* and Atlantic butterfish commercial fisheries. In an ideal situation, the expected present values of net yield streams over time associated with the different alternatives should be compared in evaluating impacts. The analysis employed in the document is for the most part qualitative in nature, however, it is intended to analyze the directional effect of the course of actions and the effects on the fishing industry.

3. IMPACTS OF PROPOSED ALTERNATIVES

3.1. Overfishing Definitions

See Sections 9.1.1.2 and 9.2 of this Amendment for a description of the proposed definitions.

The new overfishing definitions for *Illex*, *Loligo* and Atlantic butterfish were established in order to provide adequate protection from recruitment overfishing for each of these short lived species. The NMFS has concluded that the sustainable level of harvest in the *Illex*, *Loligo* and Atlantic butterfish fisheries to be 19,000, 21,000, and 7,200 metric tons (mt), respectively.

Based on unpublished NMFS Weighout data (Maine through Virginia) the 1994 total commercial landings for *Illex* was estimated at 18,344 mt (Table 1). The proposed *Illex* overfishing definition will not affect current fishing patterns for this species. Therefore, it is not expected that significant changes in revenues or production costs for the vessels participating in *Illex* fishery to occur from the implementation of the new overfishing definition. In 1994, Atlantic butterfish landings totaled 3,631 mt (Table 1). The proposed Atlantic butterfish overfishing definition will not affect current fishing patterns for this species. Therefore, it is not expected that significant changes in revenues or production costs for the vessels participating in the Atlantic butterfish fishery to occur from the implementation of the new overfishing definition.

Based on the same weighout data the 1994 total commercial landings for *Loligo* were estimated at 22,577 mt (Table 1). Given the 1989-1994 historical landings for *Loligo* , the new annual quota of 21,000 mt would be lower than the commercial landings for three of the years in the time series (1989, 1993, and 1994), and higher than the commercial landings for the remaining years (1990,1991, and 1992). *Loligo* is an annual species subject to variability and abundance. Therefore, for comparison purposes the new annual quota is compared to the 1994 landings and to the average landings for the 1989-1994 fishing period in order to obtain the potential effects of the new quota versus the 1994 landings and versus landings from a historical pattern.

Average landings for the 1989-1994 period were estimated at 20,172 mt. The new *Loligo* overfishing definition will result in a lower annual quota given the 1994 fishing pattern, and in a higher annual quota given the average 1989-1994 fishing pattern. Revenue changes as a consequence of the new quota derived from the new overfishing definition for *Loligo* can be generated to assess the economic effect of the proposed alternative.

Since no study has estimated the ex-vessel demand function for *Loligo*, changes in revenues will be estimated assuming the 1994 ex-vessel value for *Loligo*. Based on unpublished NMFS weighout data (Maine through Virginia) the 1994 ex-vessel value for *Loligo* was estimated at $1,415/mt. An annual quota of 21,000 mt would result in a decrease in landings from the 1994 level of 1,577 mt. In this case the revenue reduction from the implementation of this alternative would be $2,231,455 (1,577 mt x $1,415/mt). On the other hand, an annual quota of 21,000 mt would result in an increase in landings from the 1989-1994 average of 828 mt. In this case the revenue increase from the implementation of this alternative would be $1,171,620 (828 mt x $1,415/mt).

Table 1. *Illex*, *Loligo* and Atlantic butterfish commercial landings (mt) from Maine to Virginia.

Year	*Illex*	*Loligo*	Atlantic butterfish
1989	6,802	23,650	3,203
1990	11,316	14,954	2,298
1991	11,908	19,409	2,189
1992	17,827	18,172	2,754
1993	18,012	22,269	4,430
1994	18,344	22,577	3,631
Average	**14,035**	**20,172**	**3,084**

3.2. General Catch Limitations

The current FMP specifies that the directed fishery will be closed when 80% of the DAH is taken if such closure is necessary to prevent the domestic allowable harvest from being exceeded. This clause was placed in the FMP at a time when the catch data available to monitor the fisheries were not available on a timely basis and coastwide coverage of the fisheries was generally poor. Since then logbook and dealer reporting have been made mandatory as a part of Amendment 5. As a result, the need for a mechanism to close the fisheries prematurely to prevent overfishing is greatly reduced. Hence under the preferred alternative the directed fishery would be closed when 95% of DAH was projected to be taken. Moreover, the new definitions of overfishing are much more conservative than those specified in Amendment 5 and earlier Amendments. The retention of the 80% closure clause would likely lead to the unnecessary premature closure of the squid fisheries in years of very high abundance since the proposed definition already specifies the quota in a conservative manner. The inshore/small boat fishery should benefit since the fishery will remain open as a bycatch fishery for the remainder of the fishing year. This will allow small vessels to retain up to 2,500 lbs of *Loligo* or butterfish and up to 5,000 lb of *Illex*. The levels for *Loligo* and butterfish correspond to the initial bycatch specifications for non-moratorium vessels approved in Amendment 5. The specification of 5,000 lbs for *Illex* is proposed in the resubmission of Amendment 5. These levels will allow the fishery to be prosecuted as a bycatch fishery only after 95% of DAH is taken. These specifications should satisfy the enforcement concerns brought before the Council by both the Regional Director and the Coast Guard since they are relatively easy to enforce. It is expected that this alternative would provide stability in terms of product supply, product price and revenue flow.

3.3. Seasonal Closures in the *Illex* Fishery

The current FMP provides that seasonal quotas can be specified as a framework provision for *Loligo* only. A seasonal closure provision has been included in Amendment 6 for the *Illex* fishery. The rationale is that the new definition of overfishing will result in a lower annual quota given the previous MSY of 30,000 mt. It is likely that yield in the *Illex* fishery could be substantially increased by delaying entry into the fishery. This could be accomplished by delaying the opening of the *Illex* season, but the current plan does not provide for this mechanism. By delaying the opening of the *Illex* season, substantial increases in yield will result since the cohort will be given more time to grow before they are harvested (Section 9.2.1.1.4 of the Amendment).

This action will not have immediate effects on the fishery. The extent of the effect of a specific action may have some economic impacts on fishery participants. However, the consequences of such actions cannot be assessed until such time as the actions are implemented. When implemented this action would provide additional management flexibility, this in turn can be expected to provide positive net benefits for participants in the fishery.

3.4. Alternatives to the Amendment

3.4.1. Take No Action at this Time

3.4.1.1. Description

This would mean that the FMP would continue in effect unchanged.

3.4.1.2. Evaluation

The current overfishing definitions for *Loligo*, *Illex* and Atlantic butterfish are as follows: "For the purposes of meeting the 602 guidelines, overfishing is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Center autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present)." When these definitions were developed, the squid species were believed to live up to 2-3 years. Recent advances in the aging of squid using statoliths indicate that both species of squid live only one year. As a result, this definition has been characterized as "risky" by a review panel which evaluated overfishing definitions used in US management Plans (Rosenberg *et al.* 1994). Atlantic butterfish are also short-lived, with few individuals observed beyond age 3. In light of their short lifespan, Rosenberg *et al.* (1994) also considered the current overfishing definition for Atlantic butterfish to be risky. The purpose of this amendment is to establish new overfishing definitions for *Loligo*, *Illex*, and Atlantic butterfish which provide adequate protection from recruitment overfishing for each of these short lived species. If new definitions of overfishing are not developed for these species, it could lead to recruitment failure which would jeopardize both the stocks and the fisheries.

3.4.2. Close Directed Fisheries for any of the Species Covered Under the FMP When 100% of DAH is Taken.

3.4.2.1. Description

NMFS shall close the US fishery for *Loligo*, *Illex*, mackerel, or butterfish when US fishermen have harvested 100% of the allowable domestic harvest if such closure is necessary to prevent DAH 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.

3.4.2.2. Beneficial and Adverse Impacts

This is a modification of the language in the current FMP. This provision was made part of the FMP when fishery landings data were inadequate in both scope and availability to adequately monitor the fisheries. The most recent Amendment added a provision which requires mandatory reporting of catch by both dealers and vessels. This should result in improved monitoring of the fishery within the fishing season. Premature closure of the fishery could have unequal effects by time and area. The current catch reporting system should allow for adequate monitoring of the fishery. It is conceivable under this provision the entire DAH could have been taken by the large boat offshore fishery. If this measure had been adopted, it could have negatively impacted smaller scale vessels which fish for the squids and/or butterfish in the late part of the fishing season.

3.5. Summary of Impacts of Proposed Action

Amendment 6 would establish overfishing definitions and general catch limitations for *Illex*, *Loligo* and Atlantic butterfish, in addition to seasonal closures in the *Illex* fishery.

The only new overfishing definition that is expected to result in a change from recent fishing patterns due to changes in the annual quota is that for *Loligo*. Changes in revenues from the implementation of this alternative could be positive or negative depending on the time frame used for comparison. For example when the new quota is compared to the 1994 fishing pattern, it is estimated that a revenue reduction of $2,231,455 will occur, on the other hand when compared to the average fishing pattern for the 1989 to 1994 period a revenue increase of $1,171,620 will occur. The overall economic effect

from the implementation of this action is to secure the long-term benefits from this fishery by avoiding over-harvest and collapse of stock and fisheries.

The alternative dealing with general catch limitations is expected to increase net benefits due to prevention of premature closure of fisheries, in addition to this it will provide stability in terms of product supply, product price and revenue flow.

The measure addressing seasonal management of the *Illex* fishery has been addressed in a framework format. Delaying entry of the fishing season should increase net benefits by increasing yield from the fishery.

4. DETERMINATIONS OF A SIGNIFICANT REGULATORY ACTION

Pursuant to E.O. 12866, a regulation is considered a "significant regulatory action" if it is likely to result in: (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.

Based on unpublished NMFS weighout data (Maine through Virginia) the 1994 total commercial value for *Illex* in 1994 was estimated at $10,432,781, $31,947,680 for *Loligo*, and $4,082,560 for butterfish. Since the measures considered in this amendment do not significantly affect the total revenues generated by the commercial sector, a $100 million annual economic impact from the implementation of this measure it is not likely to occur.

Based on the preceding information, it is concluded that this regulation if enacted would not constitute a "significant regulatory action."

The Amendment 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.

5. IMPACTS OF THE PLAN RELATIVE TO THE REGULATORY FLEXIBILITY ACT

5.1. Regulatory Flexibility Analysis

5.1.1. 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 category of small entities likely to be affected by the proposed plan is that of commercial *Illex*, *Loligo*, and Atlantic butterfish fishermen. The impacts of the proposed action on the fishing industry and the economy as a whole were discussed above. The following discussion of impacts centers specifically on the effects of the proposed actions on the mentioned small businesses entities.

5.1.2. 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 entries is more than 20 percent of those small entries engaged in the fishery (NMFS 1994a). There were 3,061 vessels with Federal commercial permits issued pursuant to the Atlantic Mackerel, Squid, and Butterfish FMP in 1993. Based on unpublished NMFS weighout data (Maine through Virginia), 478 commercial vessels landed *Loligo*, 75 landed *Illex* and 814 landed butterfish in 1994. All of these vessels readily fall within the definition of small business. Since the proposed action will directly and indirectly affect many of these vessels, the "substantial number" criterion will be met.

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 forced to cease business operations (NMFS 1994a).

It is not expected that the new overfishing definitions for *Illex* and butterfish would affect the current fishing patterns in these fisheries (Section 3.1). The new overfishing definition for *Loligo* is expected to have an economic effect on this fishery. As it was described in Section 3.1, the potential effects would differ according to the used time frame of comparison. For instance the effects of the new overfishing definition on revenues when compared to the 1994 season is a reduction of $2,231,455. Assuming this is the initial decrease in annual revenues for all participants in the fishery, and that it is evenly distributed over all participants in the fishery, each business unit would lose $4,668 (2.46% decrease in total gross revenue). On the other hand, the effects of the new overfishing definition on revenues when compared to the average landings for the 1989-1994 season is an increase of $1,171,620. Assuming this is the initial increase in annual revenues for all participants in the fishery, and that it is evenly distributed over all participants in the fishery, each business unit would earn $2,451 (1.29% increase in total gross revenue).

The general catch limitations measure is expected to avoid the premature closure of the fisheries. It is anticipated that this action will provide stability in terms of product supply, product price and revenue flow.

The seasonal closure in the *Illex* fishery is stated as a framework provision. It is likely that yield in the *Illex* fishery could be substantially increased by delaying entry into the fishery. The current plan does not provide a mechanism for this action. By delaying the opening of the *Illex* season, substantial increases in yield will result since the cohort will be given more time to grow before they are harvested. This action will not have immediate effects on these fisheries. The extent of the effect of specific actions may have some economic impacts on fishery participants, however the consequences of such actions cannot be assessed until such time as the actions are implemented. However, when implemented this action would provide additional management flexibility, this in turn can be expected to provide positive net benefits for participants in the fishery.

5.1.3. Explanation of Why The Action is Being Considered

Refer to the section on Problems for Resolution of the Amendment.

5.1.4. 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.

5.1.5. Demographic Analysis

There is no need to change this section at this time.

5.1.6. Cost Analysis

Refer to the section on Regulatory Impact Analysis.

5.1.7. Competitive Effects Analysis

There are no large businesses involved in the industry, therefore, there are no disproportional small versus large business effects. There are no disproportional costs of compliance among the affected small entities.

5.1.8. Identification of Overlapping Regulations

The proposed action does not create regulations that conflict with any state regulations or other federal laws.

5.1.9. Conclusions

The preceding Regulatory Flexibility Analysis indicates that the proposed regulations in this Amendment do not result in significant economic impacts on small entities.

6. PAPER WORK 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.

No data or permit collection program has been proposed within this Amendment.

7. 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 4. ENVIRONMENTAL ASSESSMENT

1. INTRODUCTION

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.

Amendment 5 was approved by NMFS 9 February 1996. It lowered the *Loligo* MSY, eliminated the possibility of directed foreign fisheries for *Loligo*, *Illex*, and butterfish; instituted a dealer and vessel reporting system; instituted an operator permitting system; and expanded the management unit to include all Atlantic mackerel, *Loligo*, *Illex*, and butterfish under US jurisdiction.

2. PURPOSE OF AND NEED FOR ACTION

The problems to be addressed in Amendment 6 are set forth in section 4.2 of the Amendment.

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. MANAGEMENT UNIT

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

5. MEASURES TO ATTAIN MANAGEMENT OBJECTIVES

5.1. Overfishing Definitions

5.1.1. *Illex illecebrosus*

Overfishing for *Illex* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{20} (a fishing mortality rate which results in 20% of the maximum spawning potential of the stock). is exceeded. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50} (a fishing mortality rate which results in 50% of the maximum spawning potential of the stock). Maximum OY will be specified as the catch associated with a fishing mortality rate of F_{20}. Quotas will be set annually by the Regional Director according to the current FMP.

5.1.2. *Loligo pealei*

Overfishing for *Loligo* will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{max} (a fishing mortality rate which results in the maximum yield per recruit) is exceeded. Annual quotas will be specified which correspond to a target fishing mortality rate of F_{50}. Maximum OY will be specified to be the catch associated with a fishing mortality rate of F_{max}. Quotas will be set annually by the Regional Director according to the FMP.

5.1.3. Atlantic Butterfish

Overfishing for Atlantic butterfish will be defined to occur when the catch associated with a threshold fishing mortality rate of F_{msy} (a fishing mortality rate which results in the maximum sustainable yield) is exceeded or 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). Maximum OY will be specified to be the catch associated with a fishing mortality rate of F_{msy}. Quotas will be set annually by the Regional Director according to the FMP.

5.1.4. General Catch Limitations: Close Directed Fisheries for Squids or Butterfish When 95% of DAH is Taken

NMFS shall close the US fishery for *Loligo*, *Illex*, or butterfish when US fishermen have harvested 95% of the allowable domestic harvest if such closure is necessary to prevent DAH 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 as follows: *Loligo*-2,500 lbs, *Illex*-5,000 lbs and butterfish-2,500 lbs. The trip limits shall remain in effect until the end of the fishing year.

5.1.5. Seasonal Closures in the *Illex* Fishery

The Regional Director, based upon the recommendation of the Council, may impose seasons in the *Illex* fishery to improve yield per recruit from the fishery. These closures may include delaying the opening of the directed *Illex* fishery if substantial increases in yield will result from such closures.

6. ALTERNATIVES

6.1. Take No Action at this Time

6.1.1. Description

This would mean that the FMP would continue in effect unchanged.

6.2. General Catch Limitations: Close Directed Fisheries for the Squids or Butterfish When 100% of DAH is Taken

6.2.1. Description

NMFS shall close the US fishery for *Loligo*, *Illex*, or butterfish when US fishermen have harvested 100% of the allowable domestic harvest. 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.

7. ENVIRONMENTAL IMPACTS

7.1. Impacts of the Preferred Alternative on the Environment

7.1.1. Overfishing Definitions

In the development of Amendment 6, the Council is incorporating the recommendations of SAW 21 in the development of new definitions of overfishing. For *Loligo* and *Illex*, the Council has chosen a conservative approach by proposing an annual quota associated with a fishing mortality rate of F_{50}, (a fishing mortality rate which results in 50% of maximum spawning potential). This fishing mortality rate (F_{50}) was the recommended target fishing mortality rate from SAW-21. It is believed to be a risk averse level of harvest which should be sustainable over a wide range of recruitment and subsequent population abundance levels. For butterfish, specification of Max OY as the harvest associated with F_{msy} should satisfy the concerns raised by Rosenberg *et al.* (1994).

SAW-21 recalculated biological reference points for *Illex* based upon the assumption of an annual life span. Based on these analyses, *Illex* are now considered to be fully-exploited and the stock is at a medium stock level. Domestic landings are at an all time high and have increased to over 18,000 mt in 1993 and 1994. The domestic fishery is now approaching the levels sustained by foreign fleets from 1973 through 1982. The quota associated with this level of fishing mortality is 19,000 mt based on the most recent estimates of stock size (1982-1993). This level of harvest is believed to be sustainable over a wide range of stock sizes. This conclusion is supported by the performance of the *Illex* fishery in the US EEZ during the period 1973-1982 when foreign landings were at their peak. Total landings in the US EEZ during this time period averaged 19,400 mt. The NMFS all sizes mean catch per tow of *Illex* from the autumn bottom trawl survey during this same time period was 19.3, about 40% higher than the mean for the entire time series from 1967-1991. These data support the conclusion that 19,000 mt is a sustainable level of harvest in the *Illex* fishery over broad range of stock sizes.

7.1.2. General Catch Limitations

The change in the percentage at which the directed fishery for the squids and butterfish are closed reflects the improved data collection procedures implemented in Amendment 5. The current FMP specifies that the

directed fishery will be closed when 80% of the DAH is taken if such closure is necessary to prevent the domestic allowable harvest from being exceeded. This clause was placed in the FMP at a time when the catch data available to monitor the fisheries were not available on a timely basis and coastwide coverage of the fisheries was generally poor. Since then logbook and dealer reporting have been made mandatory as a part of Amendment 5. As a result, the need for a mechanism to close the fisheries prematurely to prevent overfishing is greatly reduced. Hence under the preferred alternative the directed fishery would be closed when 95% of DAH was projected to be taken. Moreover, the new definitions of overfishing are much more conservative than those specified in Amendment 5 and earlier Amendments.

The retention of the 80% closure clause would likely lead to the unnecessary premature closure of the squid fisheries in years of very high abundance since the proposed definition already specifies the quota in a conservative manner. The inshore/small boat fishery should benefit since the fishery will remain open as a bycatch fishery for the remainder of the fishing year. This will allow small vessels to retain up to 2,500 lbs of *Loligo* or butterfish and up to 5,000 lb of *Illex*. These levels correspond to the non-moratorium bycatch specifications in Amendment 5. They will allow the fishery to be prosecuted as a bycatch fishery only after 95% of DAH is taken. These specifications should satisfy the enforcement concerns brought before the Council by both the Regional Director and the Coast Guard since they are relatively easy to enforce.

7.1.3. Seasonal Closures in the *Illex* Fishery

The current FMP provides that seasonal quotas can be specified as a framework provision for *Loligo* only. A seasonal closure provision has been included in Amendment 6 for the *Illex* fishery. The rationale is that the new definition of overfishing will result in a lower annual quota given the current fishing pattern. It is likely that yield in the *Illex* fishery could be substantially increased by delaying entry into the fishery. This could be accomplished by delaying the opening of the *Illex* season, but the current plan does not provide for this mechanism. By delaying the opening of the *Illex* season, substantial increases in yield will result since the cohort will be given more time to grow before they are harvested. Preliminary analyses conducted by the NEFSC indicate that yield could be increased by roughly 30% by delaying the beginning of the *Illex* season until July 1 (P. Rago, pers. comm.). Because of their rapid growth rate, substantial benefits due to increases in yield in the *Illex* fishery could be realized due to seasonal delays in harvest because the fishery would be harvesting larger, more valuable squid.

The increased ability to export domestic squid has caused an expansion of U.S. processing and harvesting of squids. Amendment 5 eliminated the possibility of JV or TALFF for both species of squid since both fisheries are fully utilized by the US fishing fleet. The annual quotas which will be specified based on the new definitions of overfishing for both squids essentially cap the annual harvest of both species at recent performance levels. Based on the modeling results and subsequent recommendations of SAW-21, allowing the domestic fishery to develop and expand any further could be deleterious to both squid stocks and the fisheries which they support. In addition, a wide variety of predatory fish and mammals utilize both the squids and butterfish as food. Prevention of overfishing of these forage species should result in positive benefits to these resources as well.

There are no significant negative environmental effects of this Amendment. The new definitions of overfishing in this Amendment are more conservative than those specified in the current FMP. The impacts of the new definitions are summarized in Section 9.2 of the Amendment.

7.2. Social and Economic Impacts

7.2.1. Overfishing Definitions

The new overfishing definitions for *Illex*, *Loligo* and Atlantic butterfish were established in order to provide adequate protection from recruitment overfishing for each of these short lived species. The NMFS has concluded that the sustainable level of harvest in the *Illex*, *Loligo* and Atlantic butterfish fisheries to be 19,000, 21,000, and 16,000 metric tons (mt), respectively. These sustainable harvest levels will in turn be used to establish annual quotas for these fisheries.

Based on unpublished NMFS Weighout data (Maine through Virginia) the 1994 total commercial landings for *Illex* was estimated at 18,344 mt (Table 1). The proposed *Illex* overfishing definition will not affect current fishing patterns for this species. Therefore, it is not expected that significant changes in revenues or production costs for the vessels participating in *Illex* fishery to occur from the implementation of the new overfishing definition. In 1994, Atlantic butterfish landings totaled 3,631 mt (Table 1). The proposed Atlantic butterfish overfishing definition will not affect current fishing patterns for this species. Therefore, it is not expected that significant changes in revenues or production costs for the vessels participating in the Atlantic butterfish fishery to occur from the implementation of the new overfishing definition.

Based on the same weighout data the 1994 total commercial landings for *Loligo* were estimated at 22,577 mt (Table 1). Given the 1989-1994 historical landings for *Loligo* , the new annual quota of 21,000 mt would be lower than the commercial landings for three of the years in the time series (1989, 1993, and 1994), and higher than the commercial landings for the remaining years (1990,1991, and 1992). *Loligo* is an annual species subject to variability and abundance. Therefore, for comparison purposes the new annual quota is compared to the 1994 landings and to the average landings for the 1989-1994 fishing period in order to obtain the potential effects of the new quota versus the 1994 landings and versus landings from a historical pattern. Average landings for the 1989-1994 period were estimated at 20,172 mt. The new *Loligo* overfishing definition will result in a lower annual quota given the 1994 fishing pattern, and in a higher annual quota given the average 1989-1994 fishing pattern. Revenue changes as a consequence of the new quota derived from the new overfishing definition for *Loligo* can be generated to assess the economic effect of the proposed alternative.

Since no study has estimated the ex-vessel demand function for *Loligo*, changes in revenues will be estimated assuming the 1994 ex-vessel value for *Loligo*. Based on unpublished NMFS weighout data (Maine through Virginia) the 1994 ex-vessel value for *Loligo* was estimated at $1,415/mt. An annual quota of 21,000 mt would result in a decrease in landings from the 1994 level of 1,577 mt. In this case the revenue reduction from the implementation of this alternative would be $2,231,455 (1,577 mt x $1,415/mt). On the other hand, an annual quota of 21,000 mt would result in an increase in landings from the 1989-1994 average of 828 mt. In this case the revenue increase from the implementation of this alternative would be $1,171,620 (828 mt x $1,415/mt).

Table 1. *Illex*, *Loligo* and Atlantic butterfish commercial landings (mt) from Maine to Virginia.

Year	*Illex*	*Loligo*	Atlantic butterfish
1989	6,802	23,650	3,203
1990	11,316	14,954	2,298
1991	11,908	19,409	2,189
1992	17,827	18,172	2,754
1993	18,012	22,269	4,430
1994	18,344	22,577	3,631
Average	**14,035**	**20,172**	**3,084**

7.2.2. General Catch Limitations

The current FMP specifies that the directed fishery will be closed when 80% of the DAH is taken if such closure is necessary to prevent the domestic allowable harvest from being exceeded. This clause was placed in the FMP at a time when the catch data available to monitor the fisheries were not available on a timely basis and coastwide coverage of the fisheries was generally poor. Since then logbook and dealer reporting have been made mandatory as a part of Amendment 5. As a result, the need for a mechanism to close the fisheries prematurely to prevent overfishing is greatly reduced. Hence under the preferred alternative the directed fishery would be closed when 95% of DAH was projected to be taken. Moreover, the new definitions of overfishing

are much more conservative than those specified in Amendment 5 and earlier Amendments. The retention of the 80% closure clause would likely lead to the unnecessary premature closure of the squid fisheries in years of very high abundance since the proposed definition already specifies the quota in a conservative manner. The inshore/small boat fishery should benefit since the fishery will remain open as a bycatch fishery for the remainder of the fishing year. This will allow small vessels to retain up to 2,500 lbs of *Loligo* or butterfish and up to 5,000 lb of *Illex*. The levels for *Loligo* and butterfish correspond to the initial bycatch specifications for non-moratorium vessels approved in Amendment 5. The specification of 5,000 lbs for *Illex* is proposed in the resubmission of Amendment 5. These levels will allow the fishery to be prosecuted as a bycatch fishery only after 95% of DAH is taken. These specifications should satisfy the enforcement concerns brought before the Council by both the Regional Director and the Coast Guard since they are relatively easy to enforce. It is expected that this alternative would provide stability in terms of product supply, product price and revenue flow.

7.2.3. Seasonal Closures in the *Illex* Fishery

The current FMP provides that seasonal quotas can be specified as a framework provision for *Loligo* only. A seasonal closure provision has been included in Amendment 6 for the *Illex* fishery. The rationale is that the new definition of overfishing will result in a lower annual quota given the previous MSY of 30,000 mt. It is likely that yield in the *Illex* fishery could be substantially increased by delaying entry into the fishery. This could be accomplished by delaying the opening of the *Illex* season, but the current plan does not provide for this mechanism. By delaying the opening of the *Illex* season, substantial increases in yield will result since the cohort will be given more time to grow before they are harvested (Section 9.2.1.1.4 of the Amendment).

This action will not have immediate effects on the fishery. The extent of the effect of a specific action may have some economic impacts on fishery participants. However, the consequences of such actions cannot be assessed until such time as the actions are implemented. When implemented this action would provide additional management flexibility, this in turn can be expected to provide positive net benefits for participants in the fishery.

7.3. Impacts of the Alternatives

7.3.1. Take No Action at this Time

The current overfishing definitions for *Loligo*, *Illex* and Atlantic butterfish are as follows: "For the purposes of meeting the 602 guidelines, overfishing is defined as occurring when the three year moving average of pre-recruits from the Northeast Fisheries Center autumn bottom trawl survey (mid-Atlantic to Georges Bank) falls within the lowest quartile of the time series (1968 to present)." When these definitions were developed, the squid species were believed to live up to 2-3 years. Recent advances in the aging of squid using statoliths indicate that both species of squid live only one year. As a result, this definition has been characterized as "risky" by a review panel which evaluated overfishing definitions used in US management Plans (Rosenberg *et al.* 1994). Atlantic butterfish are also short-lived, with few individuals observed beyond age 3. In light of their short lifespan, Rosenberg *et al.* (1994) also considered the current overfishing definition for Atlantic butterfish to be risky. The purpose of this amendment is to establish new overfishing definitions for *Loligo*, *Illex*, and Atlantic butterfish which provide adequate protection from recruitment overfishing for each of these short lived species. If new definitions of overfishing are not developed for these species, it could lead to recruitment failure which would jeopardize both the stocks and the fisheries.

7.3.2. General Catch Limitations: Close Directed Fisheries for the Squids or Butterfish When 100% of DAH is Taken

This is a modification of the language in the current FMP. This provision (the 80% closure rule) was made part of the FMP when fishery landings data were inadequate in both scope and availability to adequately monitor the fisheries. The most recent Amendment added a provision which requires mandatory reporting of catch by both dealers and vessels. This should result in improved monitoring of the fishery within the fishing season. Premature closure of the fishery could have unequal effects by time and area. The current catch reporting system should allow for adequate monitoring of the fishery. It is conceivable under this provision

that the entire annual quota could have been taken by the large boat offshore fishery. If this measure had been adopted, it could have negatively impacted smaller scale vessels which fish for the squids and butterfish in the late part of the fishing season.

7.3.3. General Catch Limitations: Close Directed Fisheries for the Squids or Butterfish When 80% of DAH is Taken

This is the language in the current FMP. This provision (the 80% closure rule) was made part of the FMP when fishery landings data were inadequate in both scope and availability to adequately monitor the fisheries. The most recent Amendment added a provision which requires mandatory reporting of catch by both dealers and vessels. This should result in improved monitoring of the fishery within the fishing season, thus greatly reducing the need to close the directed fishery prematurely (i.e., at 80% of DAH). Premature closure of the fishery could have unequal effects by time and area.

8. MANAGEMENT COSTS

There will be no new management costs associated with this Amendment since the permitting and quota setting processes are already in effect. The impacts of options are presented in Section 9.2 of this Amendment.

9. TRADEOFFS BETWEEN THE BENEFICIAL AND ADVERSE IMPACTS OF THE AMENDMENT

The impacts of options are presented in Section 9.2 of the Amendment.

10. EFFECT ON ENDANGERED SPECIES AND ON THE COASTAL ZONE

The relationships among this Amendment and various existing applicable laws and policies are fully described is section 9.3 of Amendment 5. Section 9.3.3.1 addresses marine mammals and endangered species, while 9.3.4.2 deals with Coastal Zone Management Program consistency. Since the new definitions of overfishing are more conservative and will result in lower annual quotas relative to previous specifications, the possible interactions with and negative effects on marine mammals should be less than in the current FMP. By reducing the chance of overfishing of these annual species the chances that their populations will be reduced due to fishing will be greatly diminished. This should have a positive effect on marine predators, including whales and dolphins, which depend, in part, on these species as prey. The overall effect on marine mammals should be positive relative to the current specifications.

At the time of submission of this Amendment for Secretarial approval, the States of Rhode Island, New Hampshire, Pennsylvania and Connecticut have determined that Amendment 6 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan is consistent with the goals and objectives of their respective Coastal Zone Management Programs. The provisions of this Amendment relative to CZM programs of Maine, Massachusetts, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina are currently under review by those States.

11. EFFECTS ON FLOOD PLAINS OR WETLANDS

The adopted management measures or their alternatives will not adversely affect flood plains or wetlands, and trails and rivers listed or eligible for listing on the National Trails and Nationwide Inventory of Rivers. Management of these species are in the EEZ only.

12. LIST OF AGENCIES AND PERSONS CONSULTED IN FORMULATING THE PROPOSED ACTION

In preparing the Amendment, the Council consulted with the NMFS, the New England Fishery Management Council, the South Atlantic Fishery Management Council, the Fish and Wildlife Service, the Department of State, and the States of New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia through their membership on the Council. In addition to the States that are members of this Council, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and North Carolina were also consulted through the Coastal Zone

Management Program consistency process.

13. FINDINGS OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

For the reasons discussed above, it is hereby determined that neither approval and implementation of the proposed action nor the alternatives would affect significantly the quality of the human environment, and that the preparation of an environmental impact statement on the Amendment is not required by Section 102(2)(c) of the National Environmental Policy Act nor its implementing regulations.

_____ _____

Assistant Administrator for Fisheries, NOAA Date

APPENDIX 5. ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FMP REGULATIONS

Subpart B--Management Measures for the Atlantic Mackerel, Squid, and Butterfish Fisheries is amended as follows.

Sec. 648.20 Maximum optimum yield (OYs).

The OYs specified pursuant to Sec. 648.21 during a fishing year may not exceed the following amounts:

(a) Mackerel--that quantity of mackerel that is less than or equal to the allowable biological catch (ABC) in U.S. waters specified pursuant to Sec. 648.21.

(b) *Loligo*--catch associated with a fishing mortality rate of F_{max}.

(c) *Illex*--catch associated with a fishing mortality rate of F_{20}.

(d) Butterfish-catch associated with a fishing mortality rate of F_{msy}.

Sec. 648.21 Procedures for determining initial annual amounts.

(a) *Initial recommended annual specifications.* The Atlantic Mackerel, Squid, and Butterfish Monitoring Committee (Monitoring Committee) shall meet annually to develop and recommend the following specifications for consideration by the Mackerel, Squid, and Butterfish Committee of the MAFMC: (1) Initial OY (IOY), domestic annual harvest (DAH), and domestic annual processing (DAP) for the squids; (2) IOY, DAH, DAP, and bycatch level of the total allowable level of foreign fishing (TALFF), if any, for butterfish; and (3) IOY, DAH, DAP, joint venture processing (JVP), if any, and TALFF, if any, for mackerel. The Monitoring Committee may also recommend that certain ratios of TALFF, if any, for mackerel to purchases of domestic harvested fish and/or domestic processed fish be established in relation to the initial annual amounts.

(b) *Guidelines*. As the basis for its recommendations under paragraph (a) of this section, the Monitoring Committee shall review available data pertaining to: Commercial and recreational landings, discards, current estimates of fishing mortality, stock status, the most recent estimates of recruitment, virtual population analysis results, levels of noncompliance by harvesters or individual states, impact of size/mesh regulations, results of a survey of domestic processors and joint venture operators of estimated mackerel processing capacity and intent to use that capacity, results of a survey of fishermen's trade associations of estimated mackerel harvesting capacity and intent to use that capacity, and any other relevant information. The specifications recommended pursuant to paragraph (a) of this section must be consistent with the following:

(1) *Squid*. (i) The ABC for any fishing year must be either the maximum OY specified in Sec. 648.20, or a lower amount, if stock assessments indicate that the potential yield is less than the maximum OY.

(ii) IOY is a modification of ABC based on social and economic factors.

(2) *Mackerel*. (i) Mackerel ABC must be calculated from the formula ABC = S - C - T, where C is the estimated catch of mackerel in Canadian waters for the upcoming fishing year; S is the mackerel spawning stock size at the beginning of the year for which quotas are specified; and T, which must be equal to or greater than 900,000 mt (1,984,050,000 lb), is the spawning stock size that must be maintained in the year following the year for which quotas are specified.

(ii) IOY is a modification of ABC, based on social and economic factors, and must be less

than or equal to ABC.

(iii) IOY is composed of DAH and TALFF. DAH, DAP, and JVP must be projected by reviewing data from sources specified in paragraph (a) of this section and other relevant data, including past domestic landings, projected amounts of mackerel necessary for domestic processing and for joint ventures during the fishing year, projected recreational landings, and other data pertinent for such a projection. The JVP component of DAH is the portion of DAH that domestic processors either cannot or will not use. In addition, IOY is based on the criteria set forth in the Magnuson Act, specifically section 201(e), and on the following economic 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 United States 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.

(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.

(3) *Butterfish*. (i) If the Monitoring Committee's review indicates that the stock cannot support a level of harvest equal to the maximum OY, the Monitoring Committee shall recommend establishing an ABC less than the maximum OY for the fishing year. This level represents the modification of maximum OY to reflect biological and ecological factors. If the stock is able to support a harvest level equivalent to the maximum OY, the ABC must be set at that level.

(ii) IOY is a modification of ABC based on social and economic factors. The IOY is composed of a DAH and bycatch TALFF that is equal to 0.08 percent of the allocated portion of the mackerel TALFF.

(c) Recommended measures. Based on the review of the data described in paragraph (a) of this section, the Monitoring Committee will recommend to the Squid, Mackerel, and Butterfish Committee the measures it determines are necessary to assure that the specifications are not exceeded from the following measures:

(1) Commercial quotas.

(2) The amount of Loligo and butterfish that may be retained, possessed and landed by vessels issued the incidental catch permit specified in Sec. 648.4(a)(5).

(3) Commercial minimum fish sizes.

(4) Commercial trip limits.

(5) Commercial seasonal quotas.

(6) Minimum mesh sizes.

(7) Commercial gear restrictions.

(8) Recreational harvest limit.

(9) Recreational minimum fish size.

(10) Recreational possession limits.

(11) Recreational season.

(12) Seasonal closures for Illex.

(d) *Annual fishing measures.* (1) The Squid, Mackerel, and Butterfish Committee shall review the recommendations of the Monitoring Committee. Based on these recommendations and any public comment received thereon, the Squid, Mackerel, and Butterfish Committee shall recommend to the MAFMC appropriate specifications and any measures necessary to assure that the specifications will not be exceeded. The MAFMC shall review these recommendations and based on the recommendations and any public comment received thereon, the MAFMC shall recommend to the Regional Director appropriate specifications and any measures necessary to assure that the specifications will not be exceeded. The MAFMC's recommendations must include supporting documentation, as appropriate, concerning the environmental, economic, and social impacts of the recommendations. The Regional Director shall review the recommendations, and on or about November 1 of each year, shall publish notification in the Federal Register proposing specifications and any measures necessary to assure that the specifications will not be exceeded and providing a 30-day public comment period. If the proposed specifications differ from those recommended by the MAFMC, the reasons for any differences shall be clearly stated and the revised specifications must satisfy the criteria set forth in this section. The MAFMC's recommendations shall be available for inspection at the office of the Regional Director during the public comment period.

(2) On or about December 15 of each year, the Assistant Administrator will make a final determination concerning the specifications for each species and any measures necessary to assure that the specifications will not be exceeded contained in the Federal Register notification. After the Assistant Administrator considers all relevant data and any public comments, notification of the final specifications and any measures necessary to assure that the specifications will not be exceeded and responses to the public comments will be published in the Federal Register. If the final specification amounts differ from those recommended by the MAFMC, the reason(s) for the difference(s) must be clearly stated and the revised specifications must be consistent with the criteria set forth in paragraph (b) of this section.

(e) *Inseason adjustments*. The specifications established pursuant to this section may be adjusted by the Regional Director, in consultation with the MAFMC, during the fishing year by publishing notification in the Federal Register stating the reasons for such an action and providing a 30-day comment public comment period.

Sec. 648.22 Closure of the fishery.

(a) *General*. The Assistant Administrator shall close the directed mackerel fishery in the EEZ when U.S. fishermen have harvested 80 percent of the DAH of that fishery if such closure is necessary to prevent the DAH from being exceeded. The closure shall remain in effect for the remainder of the fishing year, with incidental catches allowed as specified in paragraph (c) of this section, until the entire DAH is attained. When the Regional Director projects that DAH will be attained for mackerel, the Assistant Administrator shall close the fishery in the EEZ to all fishing for that species, and the incidental catches specified in paragraph (c) of this section will be prohibited. The Secretary shall close any domestic fishery in the EEZ for *Loligo, Illex,* or butterfish when U.S. fishermen have harvested 95 percent of the allowable domestic harvest (see §648.21(a)), if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure of the directed fishery will be in effect for the remainder of the fishing year with incidental catches allowed as specified in paragraph (c) of this section.

(b) *Notification*. Upon determining that a closure is necessary, the Assistant Administrator will notify, in advance of the closure, the Executive Directors of the MAFMC, NEFMC, and SAFMC; mail notification of the closure to all holders of mackerel, squid, and butterfish fishery permits at least 72 hours before the effective date of the closure; provide adequate notice of the closure to recreational participants in the fishery; and publish notification of closure in the Federal Register.

(c) Incidental catches. During the closure of the directed mackerel fishery, the trip limit is 10 percent, by weight of mackerel, of the total amount of fish on board. During a period of closure of the directed fishery for Loligo, Illex, or butterfish, the trip limit for those species is the allowed level of incidental catch specified in Sec. 648.4(e)(2) and 5,000 lbs for Illex.

Sec. 648.23 Gear restrictions.

(a) Mesh restrictions and exemptions. Owners or operators of otter trawl vessels possessing Loligo harvested in or from the EEZ may only fish with nets having a minimum mesh size of 1\7/8\ inches (48 mm) diamond mesh, inside stretch measure, applied throughout the entire net, unless they are fishing during the months of June, July, August, and September for Illex seaward of the following coordinates (copies of a map depicting this area are available from the Regional Director upon request):

Point	N. Lat.	W. Long.
M1	43 deg.58.0'	67 deg.22.0'
M2	43 deg.50.0'	68 deg.35.0'
M3	43 deg.30.0'	69 deg.40.0'
M4	43 deg.20.0'	70 deg.00.0'
M5	42 deg.45.0'	70 deg.10.0'
M6	42 deg.13.0'	69 deg.55.0'
M7	41 deg.00.0'	69 deg.00.0'
M8	41 deg.45.0'	68 deg.15.0'
M9	42 deg.10.0'	67 deg.10.0'
M10	41 deg.18.6'	66 deg.24.8'
M11	40 deg.55.5'	66 deg.38.0'
M12	40 deg.45.5'	68 deg.00.0'
M13	40 deg.37.0'	68 deg.00.0'
M14	40 deg.30.0'	69 deg.00.0'
M15	40 deg.22.7'	69 deg.00.0'
M16	40 deg.18.7'	69 deg.40.0'
M17	40 deg.21.0'	71 deg.03.0'
M18	39 deg.41.0'	72 deg.32.0'
M19	38 deg.47.0'	73 deg.11.0'
M20	38 deg.04.0'	74 deg.06.0'
M21	37 deg.08.0'	74 deg.46.0'
M22	36 deg.00.0'	74 deg.52.0'
M23	35 deg.45.0'	74 deg.53.0'
M24	35 deg.28.0'	74 deg.52.0'

Vessels fishing under this exemption may not have available for immediate use, as defined in paragraph (b) of this section, any net, or any piece of net, with a mesh size less than 1\7/8\ inches (48 mm) diamond mesh or any net, or any piece of net, with mesh that is rigged in a manner that is inconsistent with such minimum mesh size, when the vessel is landward of the specified coordinates.

(b) *Definition of "not available for immediate use."* A net that can be shown not to have been in recent use and that is stowed in conformance with one of the following methods is considered to be not available for immediate use:

(1) *Below deck stowage.* (i) It is stored below the main working deck from which it 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) *On-deck stowage.* (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) *On-reel stowage.* (i) It is on a reel and it's entire surface 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 and stored below deck.

(4) *Other methods of stowage.* Any other method of stowage authorized in writing by the Regional Director and published in the Federal Register.

(c) *Mesh obstruction or constriction.* The owner or operator of a fishing vessel shall not use any combination of mesh or liners that effectively decreases the mesh size below the minimum mesh size, except that a liner may be used to close the opening created by the rings in the rearmost portion of the net, provided the liner extends no more than 10 meshes forward of the rearmost portion of the net.

(d) *Net obstruction or constriction.* 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 chafing gear, on the top of the regulated portion of a trawl net that results in an effective mesh opening of less than 1-7/8 inches (48 mm) diamond mesh, inside stretch 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 an effective mesh opening of 1-7/8 inches (48 mm), diamond mesh, inside stretch measure. Net strengtheners (covers) may not have an effective mesh opening of less than 4.5 inches (11.43 cm), diamond mesh, inside stretch measure. "Top of the regulated portion of the net" means the 50 percent of the entire regulated portion of the net that (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 (d), head ropes are not to be considered part of the top of the regulated portion of a trawl net.

APPENDIX 6. 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 6 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.

F_{max} - the rate of fishing mortality for a given method of fishing which maximizes yield in weight per recruit.

F_{20} - the rate of fishing mortality for a given method of fishing that results in 20% of maximum spawning potential.

F_{50} - the rate of fishing mortality for a given method of fishing that results in 50% of maximum spawning potential.

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.