AMENDMENT #3 TO THE FISHERY MANAGEMENT PLAN

FOR THE

ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

October 1981

Mid-Atlantic Fishery Management Council

in cooperation with the

National Marine Fisheries Service

New England Fishery Management Council

and the

South Atlantic Fishery Management Council

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II. SUMMARY

This Amendment to the Squid, Atlantic Mackerel, and Butterfish Fishery Management Plans (Plans) extends the Atlantic Mackerel and Butterfish Plans beyond the end of fishing year 1981-82 (31 March 1982), and merges the three Plans into one Plan.

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

The objectives of the amended (merged) Plan are:

(1) Prevent the exploitation of these resources from exceeding those levels which reduce the probability of successful (i.e., the historic 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 Plan.

(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.

Alternatives considered for Amendment #3 are (see Section XII for details):

(1) Take no action at this time. The Atlantic Mackerel and Butterfish Plans would lapse at the end of fishing year 1981-82.

(2) Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83. The Atlantic Mackerel Plan would be extended for 1 more fishing year with no changes. The Butterfish Plan would be extended for 1 more fishing year with Optimum Yield (OY) increased from 11,000 mt to 13,000 mt and estimated US harvest increased from 7,000 mt to 9,000 mt in order to minimize the possibility of a closure in the US fishery.

(3) Merge the Atlantic Mackerel, Butterfish, and Squid Plans and Extend Them Through Fishing Year 1984-85 (with the changes summarized below).

Alternative (3) is the alternative adopted for this Amendment.

The permitting and reporting requirements of the current Plans would be combined and revised to permit data collection by means other than logbooks (Section XIV-1).

The annual OYs for Loligo and Illex would be 44,000 mt and 30,000 mt respectively. US harvesting estimates would be made annually between 7,000 - 44,000 mt for Loligo and 5,000 - 30,000 mt for Illex. The differences between the OYs and US harvest estimates, if any, initially would be allocated 1/2 to Total Allowable Level of Foreign Fishing (TALFF) and 1/2 to Reserve. That portion of the Reserve not needed for increases in the US harvest could be allocated to TALFF.

During August for Illex and during September for Loligo, the Regional Director would project the total amounts of squid that would be harvested by US fishermen during the entire fishing year. For Illex, monthly catches from April through July (exclusive of joint venture harvest) would be multiplied by no less than 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August (exclusive of joint venture harvest) would be multiplied by no less than 1.3 to obtain a projected annual harvest. Amounts authorized for joint ventures would be added to these projections (Section XIII-3). If the projected amount of either species to be harvested by US fishermen, including joint ventures, exceeded the initial US harvest estimate, the Regional

Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. The remainders of the Reserves would then be allocated to TALFF. After the initial allocation, the Regional Director may allocate any remaining portions of the Reserves to TALFF if he determines that the domestic harvest, including joint ventures, will not attain the projected level, if such allocation is consistent with the objectives of the Plan.

The annual OY, US harvest estimate, and TALFF for Atlantic mackerel would be set using a series of procedures that depend on the predicted spawning stock size. The capacity for Mackerel in the US recreational fishery would be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - 1.15$$

where Y is the predicted recreational catch and X is the mackerel spawning stock size the upcoming fishing year in thousands of metric tons (Section VIII).

If the spawning stock size would be less than or equal to 600,000 mt after the expected harvests in US and Canadian waters were taken, the mackerel TALFF could be no greater than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. US harvest would be whatever US fishermen catch up to 30,000 mt minus the bycatch TALFF. OY would equal the sum of the US harvest and TALFF, but could not exceed 30,000 mt.

If the spawning stock size would be larger than 600,000 mt after the full US and Canadian estimated harvests were taken, the OY would equal that amount which, when taken in addition to the predicted Canadian catch, would result in a spawning stock size of 600,000 mt the following year, but the total mackerel catch (all waters, all nations) could not result in a fishing mortality rate greater than 0.4, the best present estimate of $F_{0.1}$. The TALFF would equal the difference between OY and estimated US catch (which could be no less than 30,000 mt), but could not be less than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. If the TALFF were greater than 10,000 mt, 1/2 would be allocated to the initial TALFF and 1/2 would be placed in a Reserve.

If such a Reserve were created, during October of each year, the Regional Director would project the total amount of mackerel that would be harvested by US fishermen during the entire year. If that amount exceeded the initial US harvest estimate, the Regional Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. That part of the Reserve not needed to meet the projected US harvest could be allocated to TALFF.

The butterfish TALFF would be 6% of the allocated portion of the Loligo TALFF plus 1% of the allocated portions of the Illex, mackerel (if a targeted foreign fishery were allowed), silver hake, and red hake TALFFs. OY would equal the US harvest plus TALFF, but could not exceed 16,000 mt.

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APPENDICES

IV. INTRODUCTION

This document amends the Squid, Atlantic Mackerel, and Butterfish Plans by extending the Atlantic Mackerel and Butterfish Plans beyond the end of fishing year 1981-82 (31 March 1982) and merging the three Plans into one Plan.

The Squid Plan was approved by NOAA on 6 June 1979 and implemented 1 January 1980. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan indefinitely beyond fishing year 1979-80, was approved by NOAA on 19 March 1980.

The Atlantic Mackerel Plan was approved by NOAA on 3 July 1979 and implemented on 21 February 1980. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan through fishing year 1980-81 was approved by NOAA on 17 March 1980. Amendment #2, extending the Plan for up to 1 year beyond the end of fishing year 1980-81 was approved by NOAA on 29 January 1981.

The Butterfish Plan was approved by NOAA on 9 November 1979. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan through fishing year 1980-81, was approved by NOAA on 5 March 1980. The Plan as amended by Amendment #1 was implemented on 26 November 1980. Amendment #2, extending the Plan for up to 1 year beyond the end of fishing year 1980-81 was approved by NOAA on 26 February 1981.

The management unit for the Squid Plan is all Loligo pealei and Illex illecebrosus under US jurisdiction in the northwestern Atlantic. The management unit for the Atlantic Mackerel Plan is all Atlantic mackerel (Scomber scombrus) under US jurisdiction. The management unit for the Butterfish Plan is all butterfish north of Cape Hatteras. The proposed management unit of the amended (merged) Plan is all Atlantic mackerel, Loligo pealei, Illex illecebrosus, and butterfish under US jurisdiction.

The objectives of the Squid Plan currently are:

(1) Achieve and maintain optimal stocks for future recruitment.

(2) Prevent destructive exploitation of squid species.

(3) Minimize capture of nontarget species.

(4) Achieve efficiency in harvesting and use.

(5) Improve understanding of the condition of the stocks, including predator-prey relationships.

(6) Minimize user conflicts.

(7) Encourage increased American participation in the squid fishery.

The objectives of the Atlantic Mackerel Plan currently are:

(1) Provide opportunity for increased domestic recreational and commercial catch.

(2) Maximize the contribution of recreational fishing for Atlantic mackerel to the national economy.

(3) Maintain the spawning stock size of Atlantic mackerel at or above its size in 1978.

(4) Achieve efficiency in harvesting and use.

(5) Minimize costs to taxpayers of development, research, management, and enforcement in achieving these objectives.

The objectives of the Butterfish Plan currently are:

(1) Promote the growth of the US butterfish export industry.

(2) Minimize cost of harvesting butterfish.

(3) Increase employment opportunities for commercial fishermen.

(4) Prevent exploitation of the resource beyond that level producing the maximum sustainable yield.

(5) Minimize costs of enforcement and management of the resource.

The following are the management measures of the current Plans, as amended:

(1) Restriction of catches (in metric tons) as follows:

	Mackerel*	Illex	Loligo	Butterfish*
OY	30,000	30,000	44,000	11,000
DAH	20,000	5,000	7,000	7,000
DAP	5,000	5,000	7,000	7,000
TALFF	4,000	12,000	18,000	4,000
Reserve	6,000	13,000	19,000	-

*For fishing years 1980-81 and 1981-82 only.

Allocations from the Reserves for mackerel, Illex and Loligo to DAH may be made at any time during the year that they are needed. Allocations from the Reserves to the TALFF are made in accordance with specific procedures. For mackerel, during October of each year, the Regional Director projects the total amount of mackerel that will be harvested by US fishermen during the entire fishing year. If the projected amount to be harvested by US fishermen exceeds the initial DAH specified, the Regional Director must leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. That part of the Reserve not needed to meet the projected US harvest can be allocated to TALFF.

The process of allocation of the Reserve for the squids is that, during August in the case of Illex and during September in the case of Loligo, the Regional Director projects the total amounts of squid that will be harvested by US fishermen during the entire fishing year. For Illex, the monthly catches from April through July (exclusive of joint venture harvest) are multiplied by 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August are multiplied by 1.3 to obtain a projected annual harvest. Amounts authorized for joint ventures are added to these projections. If the projected amount of either species to be harvested by US fishermen, including joint ventures, exceeds the initial DAH, the Regional Director leaves the excess in the Reserve to allow the US fishery to continue without closure throughout the year. The remainder of the Reserve for each species then can be allocated to TALFF. After the initial allocation decision is made, the Regional Director may allocate any remaining portion of the Reserves to TALFF if he determines that the domestic harvest, including joint ventures, will not attain the level projected.

While the Butterfish Plan does not include a Reserve, it does provide for allocation of a portion of DAH to TALFF. NMFS determines the US harvest of butterfish for the period 1 April through 31 October of each year. If the reported US harvest is less than 40% of 7,000 (the DAH), NMFS may allocate up to one-half of the difference between the reported US harvest and 7,000 mt to TALFF.

(2) All vessels fishing commercially for Atlantic mackerel, squid, or butterfish, either directly or as a by-catch from other fisheries, must have permits. This provision also applies to all vessels for hire for fishing recreationally directly or indirectly for mackerel, squid, and/or butterfish. This does not apply to individual US fishermen catching mackerel, squid, or butterfish for their personal use.

(3) Weekly catch reports must be filed by all permitted fishermen and US dealers and processors must submit weekly reports on any transactions involving mackerel, squid, or butterfish.

(4) Part 611 of Title 50, Code of Federal Regulations, regulates foreign fishing.

Merger of the Squid and Butterfish Plans was proposed as an alternative in Amendment #1 to the Squid Plan. Comments during the review process on that Amendment favored the merger. In addition,

reviewers suggested that the Atlantic Mackerel Plan be merged with the Squid and Butterfish Plan. The merger concept presents a series of problems and opportunities that must be considered during the amendment process. The Butterfish Plan included the concept that the foreign fishery for this species should be mainly for incidental catches, primarily from the foreign Loligo fishery. The Atlantic Mackerel Plan included the concept that at low levels of spawning stock, foreign mackerel catches should be limited to only that amount needed for by-catches from other fisheries (primarily the silver hake fishery). All of the subject species and silver hake are, in fact, by-catches of varying importance in the foreign fisheries for each of these five species. Therefore, the establishment of TALFFs for these fisheries should be based, at least in part, on incidental catch relationships in the foreign fisheries, as well as resource surpluses and other factors. The US commercial harvesting and processing sectors for squid and butterfish seem to be developing in a related fashion and these dependencies should be considered in the amendment process.

Merger is facilitated by the fact that all three Plans are based on a fishing year that begins on 1 April. All three Plans provide for management of the foreign fishery through the existing Foreign Fishing Regulations. Amendments #1 to the Squid and Atlantic Mackerel Plans include Reserves in the management regime and provide similar procedures for allocation of the Reserves. The permitting, recordkeeping, and reporting requirements of all three Plans are identical. Additional advantages of merger are discussed in the evaluation of alternative 3 in Section XII-3.

V. DESCRIPTION OF THE STOCKS

V-1. Species Or Groups Of Species And Their Distribution

Atlantic mackerel

Atlantic mackerel (Scomber scombrus) ranges from Labrador and the Gulf of St. Lawrence (Parsons, 1970) to North Carolina (Anderson, 1976). The existence of separate northern and southern contingents was first proposed by Sette (1950). The northern contingent overwinters at the edge of the continental shelf off Long Island and east, and the southern from Long Island southward. The overwintering distribution of mackerel is Sable Island to Cape Hatteras (Anderson, 1976).

The southern contingent begins its spring migration by arriving offshore of North Carolina and Virginia in April, and moving steadily northward, reaching New Jersey and Long Island usually by May, where spawning occurs. These fish may spend the summer as far north as the Maine coast. In autumn this contingent moves southward toward Cape Cod and returns to deep offshore water near Block Island after October (Hoy and Clark, 1967).

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

These two contingents intermingle off southern New England in spring and autumn (Sette, 1950). Tagging studies reported by Beckett et al. (1974), Parsons and Moores (1974) and Moores (1975) indicate that some mackerel that summer at the northern extremity of the range overwinter south of Long Island. However, precise estimates of the relative contributions of the two contingents cannot be made (ICNAF, 1975). Both contingents have been fished by the foreign winter fishery and no attempt was made to separate these populations for assessment purposes by the International Commission for the Northwest Atlantic Fisheries (ICNAF), although separate TACs (Total Allowable Catch) were in effect for SA 5 - 6 and for areas to the north from 1973-1977. Thus, Atlantic mackerel may be considered to consist of one stock for fishery management purposes.

Loligo pealei (long-finned squid)

Known by the common names of long-finned squid, winter squid, common squid, and bone squid, Loligo pealei (Lesueur) is one of five Atlantic species of the genus Loligo of the squid family Loliginidae. L. pealei ranges over the continental shelf from Nova Scotia to the Gulf of Mexico. However, primary commercial concentrations occur from Corsair Canyon on Georges Bank to Cape Hatteras (Serchuk and

Rathjen, 1974).

Seasonal differences in geographic and bathymetric distribution of long-finned squid are evident and appear to be related to bottom water temperatures. Concentrations are usually found in areas where these temperatures are above 8° C (46° F). During winter, when water is coldest inshore, long-finned squid concentrate along the outer edge of the continental shelf in 8-12° C waters (Summers, 1967; Vovk, 1969). From late spring to early autumn the species disperses from the shelf edge into shallow coastal waters with heaviest concentrations usually occurring in the Cape Hatteras, New York Bight, and Nantucket Shoals areas. During summer, however, concentrations of Loligo may occur anywhere on the continental shelf. This dispersion is part of a spring inshore spawning migration which begins in the southern areas and as water temperatures rise, proceeds northward along the coast. By April or May, mature squid arrive in Massachusetts waters with smaller immature individuals arriving in May and June. During late spring and summer, long-finned squid may be found in harbors and estuaries, particularly in southern New England. In the fall, concentrations appear in the southern New England and Hudson Canyon area (ICNAF 5Zw and 6A) in water less than 110 m (361 ft) deep (Rathjen, 1973; Serchuk and Rathjen, 1974; Tibbetts, 1975). Vovk (1969) also found large fall concentrations of long-finned squid in the area between Block Island and southern Georges Bank.

NMFS spring bottom trawl surveys show primary concentrations of Loligo in depths of 111-183 m (364-600 ft) and lesser concentrations in other depths surveyed (27-110 m and 184-366 m). Size distribution correlates with depth in both spring and fall survey data, with the largest individuals usually taken at the greatest depths (Serchuk and Rathjen, 1974). Other investigators (Summers, 1967; Mercer, 1969) have found similar correlations.

Loligo pealei usually spawn in shallow waters between Delaware and eastern Cape Cod. A six-month spawning season which extends through the warmer half of the year is indicated by the annual cycle of sexual maturation of Loligo. Mesnil (1976) proposed the concept of two crossed life cycles for Loligo pealei based on various size groups found during research surveys and inferences to similar life cycles for Loligo vulgaris and the cuttlefish Sepia officinalis in the northeast Atlantic. Briefly, this theory is as follows: squid hatching in early summer spawn approximately 14 months later the following fall. These eggs hatch in late fall and mature about 20 months later in late spring - early summer. This cycle would then be repeated. However, much more study is necessary before this theory can be firmly established. It is believed that there is heavy mortality of both sexes after spawning, but this has not been conclusively established.

Squid age determination is not yet conclusive. Present data indicate that Loligo live for 14-24 months, although some males may reach 36 months of age. Individuals grow an average of 1.0-1.5 cm per month, reaching a dorsal mantle length of 16 and 18 cm (6-1/4 and 7 inches) at one year, and 27 and 32 cm (10-1/2 and 12-1/2 inches) at two years for females and males.

Illex illecebrosus (short-finned squid)

The summer or short-finned squid (Illex illecebrosus) (Lesueur) is one of three species of Illex found in the northwest Atlantic. Its range extends from Greenland to Florida and it is relatively abundant between Nova Scotia and New Jersey. However, it is most abundant in summer in the Gulf of Maine and in the Newfoundland region (Mercer, 1965).

Details of the life history and biology of Illex are not well known. During the spring and summer, they migrate into coastal waters about 10-15 m (33-50 ft) deep off Newfoundland and Nova Scotia and somewhat deeper in the New England area and may form large surface schools. This inshore movement may be in response to temperature and salinity preferences, and off Canada may be due to their pursuit of capeline (Mallotus villosus) which also move inshore at this time. In late fall (October-December) short-finned squid move offshore in SAs 5 and 6 and to the southeast and open ocean from Subareas 3 and 4 (see Figure 1).

Unlike Loligo, Illex is not restrictive to water above 8° C (Mercer, 1973). The optimum temperature range of Illex is about 7-15° C (45-59° F), although they were taken by Canadian research surveys on the Grand Banks at depths of 55-365 m (180-1200 ft) with bottom water temperatures of 0.5-8.0° C (Squires, 1957). However, large concentrations of short-finned squd are usually found along the edge of the

continental shelf where temperatures are greater than 5° C (41° F) (Tibbetts, 1975).

Spawning is usually assumed to take place in the deep waters of the continental slope from December through June with most individuals dying after spawning, but actual spawning grounds have not been documented. In fact, some short-finned squid have been taken on Georges Bank during the assumed winter spawning season.

Short-finned squid are usually shorter-lived than long-finned squid, reaching ages of 12-16 months. Maximum mantle length is approximately 24-35 cm (9-1/2 - 13-3/4 inches). Females grow larger than males, although males are heavier than females for any given length. Growth is rapid with an approximate doubling in mantle length between May and October and a resultant six- to eight-fold weight increase (Squires, 1967; Rathjen, 1973; Tibbetts, 1975).

Butterfish

Butterfish (Peprilus triacanthus) range from Nova Scotia to South Carolina (Bigelow and Schroeder, 1953). This species has also been observed in deeper offshore waters off Cape Hatteras and Florida, and infrequently as far north as Prince Edward Island (Nichols and Breder, 1927; Murawski et al., 1978).

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

Butterfish travel in small schools, usually near the surface when inshore during the warm months. Bigelow and Schroeder (1953) state that butterfish "seldom descend deeper than 15 to 30 fathoms during the summer," and the northern component of this stock spends winter and early spring offshore and near the bottom. Water temperature is probably the most significant factor affecting butterfish distribution. In winter in the Mid-Atlantic area, butterfish appear in water 660-690 ft (200 - 210 m) deep, at the edge of the continental shelf (Horn, 1970; Bigelow and Schroeder, 1953). South of New York Bight, from New Jersey to the Chesapeake Bay, butterfish overwinter along the 100 fm (600 ft) contour (Heald, 1968). Butterfish appear off Rhode Island by the end of April, at Cape Cod by May, and arrive in the Gulf of Maine usually by June.

Meristic and morphometric studies by Caldwell (1961) and Horn (1970) have concluded that depth isolated populations of butterfish exist in the Atlantic. Caldwell (1961) proposed one population south of Cape Hatteras to Florida, distributed to 22 m, and another group in all waters north of Cape Hatteras and deeper than 22 m to the south. Horn (1970) examined specimens from both localities and concluded the two groups were distinct.

V-2. Abundance, Present Condition, and Probable Future Condition

The original Plans contained extensive discussions for the four species based on stock assessments prepared by the NEFC. Updated assessments were included as appendices in Amendments #1 to the three Plans. The most recent stock assessments are available from the Council.

Butterfish

The results of the NEFC autumn 1979 offshore trawl survey (presented in Waring, 1980) indicated that the abundance of butterfish (based on catch-per-tow indices) was the highest ever observed. The survey also indicated that the butterfish recruitment index (age 0+ fish) was over 7 times greater in 1979 than in 1978 and was the highest ever observed. All available data indicated a strong 1979 year-class was recruiting to this fishery.

Preliminary results of the autumn 1980 NMFS groundfish survey confirm the results of the 1979 survey. Butterfish catch-per-tow in weight in 1980 surpassed the 1979 record level by 15%, and age 0+ abundance (in numbers), while apparently somewhat less than in 1979, was still almost three times greater than the

1968-1978 average (E. Anderson, NEFC, pers. comm.). There is no evidence that the proposed maximum OY for butterfish (16,000 mt) will adversely influence abundance or recruitment in the foreseeable future. Unless butterfish abundance is significantly affected by other factors, such as environmental fluctuations or other natural phenomena, the population should remain at a relatively high level in 1982-1985.

Loligo pealei and Illex illecebrosus

The short life spans of these species (usually 2 years or less), the timing and location of the NEFC stock assessment surveys, the amount of time needed to interpret the survey data, and the amount of time needed to effect changes in Plan regulations, in combination, make it very difficult to make timely adjustments to squid OYs to parallel changes in stock abundance. In addition, the relationship between stock size and recruitment is not known for either species. Therefore, even if timely assessment data were always available and could be acted on promptly, it would be difficult to justify such adjustments to the OYs, unless stock sizes increased or decreased dramatically.

The Loligo and Illex OYs which were chosen for the original Plan, Amendment #1, and this Amendment were based on maximum sustainable yield (MSY) estimates, which were developed assuming (conservatively) a moderate to strong relationship between stock size and recruitment. The OY for Illex has been set somewhat lower than the MSY estimate because the biological and fishery information is less complete than for Loligo, and because of rapidly increasing Illex catches in Canadian waters and uncertainties as to the discreteness of Illex stocks in the northwest Atlantic. The most recent NEFC assessment (Lange, 1981) indicated high Loligo and Illex abundance in 1980, and the possibility of unusually high Loligo abundance in 1981 and 1982. There is, however, no new information which would warrant a change in the OYs.

Atlantic mackerel

Preliminary results of the spring 1981 NEFC bottom trawl survey (E. Anderson, NEFC, pers. comm.) support the conclusion of the previous stock assessment (Anderson, 1980) of a relatively strong 1978 year-class, now estimated at about 2.3 billion fish at age 1. The most recent data, however, also result in a downward revision of the estimated sizes of the 1976, 1977 and 1979 year-classes, to perhaps only a total of one-third as many fish (at age 1) as had been estimated in 1980. The estimate of the size of the 1980 year-class has been increased from about 350 to 1,100 million fish at age 1. Over the past 20 years, the average and median year-class sizes at age 1 are about 1.8 and 1.4 billion, respectively. Thus, while the 1978 and 1980 year-classes are probably much larger than the others of the late 1970s, they are unimpressive compared with those of the late 1960s and early 1970s.

The total and spawning stock sizes of mackerel appear to be increasing, although not as rapidly as estimated in 1980. The preliminary estimate of spawning stock size at the start of 1981 is about 648,000 mt, up from about 467,000 mt in 1979 and 523,000 in 1980 (E. Anderson, NEFC, pers. comm.). It is tentatively projected that total catches in 1981 of 30,000, 42,000, and 100,000 mt would result in changes in spawning stock sizes (1982 vs. 1981) of about +2%, 0%, and -8%, respectively. Unless the sizes of the 1976-1980 year classes have been significantly underestimated, it is unlikely that spawning stock size would increase greatly over these levels in 1983. Unless any of the 1981-1983 year-classes is very large, mackerel abundance should not change drastically from current levels during the life of this Amendment.

V-3. Estimates of Maximum Sustainable Yield (MSY)

Atlantic mackerel

The MSY estimate used in the original Plan and in Amendments #1 and #2 was 210,000 - 230,000 mt. This estimate was refined by Anderson (1980).

$F_{0.1}$ (the instantaneous fishing mortality rate at which the additional yield per recruit gained from an additional mortality unit is 10% of the gain per unit of mortality in a lightly exploited stock) has been estimated for Atlantic mackerel to be equal to 0.4, while F_{max} (the fishing mortality rate at which yield per recruit is maximum) may be about 1.2 (Anderson, 1980). Simulated long-term equilibrium yields under conditions of constant recruitment at the median level observed during 1962-1979 corresponding to these values are about 200,00 mt (F = 0.4) and about 224,000 mt (F = 1.2). Thus, the theoretical Atlantic

mackerel yield per recruit curve (see Ricker, 1975) is relatively flat-topped. In other words, a relatively large amount of fishing effort (the difference between $F_{0.1}$ and F_{max}) would be required in order to increase total catches by a relatively small amount (the difference between 200,000 and 224,000 mt). This consideration is the primary reason why the practice of limiting catches to the $F_{0.1}$ level was recommended under ICNAF regulation, and why this Amendment proposes its use in the determination of OY during years of high abundance.

Loligo

Recent minimum stock size estimates indicate from about 1.0 billion to 4.6 billion Loligo in Subarea 5 and Statistical Area 6 during the fall of each year, most of which are new recruits. Sissenwine and Tibbetts (1977) estimated MSY at about 44,000 mt, based on the assumptions of a moderate stock-recruitment relationship and an annual recruitment of about 1.5 billion individuals.

Illex

There are no reliable estimates of stock size nor certainty as to catches of Illex until recent years. The MSY of Illex has been estimated by Anderson (1976) as 40,000 mt, but this is a very preliminary estimate (see stock assessment accompanying the original Plan).

Butterfish

A preliminary estimate of MSY is 21,635 mt (see stock assessment accompanying the original Plan). This estimate, however, presupposes certain mesh sizes are used in the fishery and an average level of annual recruitment to the stock, and these conditions may not be completely met in the future. Mesh sizes used by foreign and domestic vessels frequently will vary from that which theoretically will produce this 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 and 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 original Plan and in Amendments #1 and #2. There is no reason to change the estimate at this time.

V-4. Ecological Relationships

Ecological (predator-prey) relationships were discussed in detail in each of the original Plans. The following is a summary discussion.

Atlantic mackerel[1]

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

Prey - Mackerel prey most heavily on crustaceans such as copepods, krill, and shrimp. They also feed on squid, and less intensively on fish and ascidians.

1 From R.W. Langton and R.E. Bowman. An abridged account of predator-prey interactions for some northwest Atlantic species of fish and squid. 1977. NMFS, NEFC, Woods Hole Lab. Reference No. 77-17.

Loligo[1]

Predators - Bluefish, sea ravens, spiny dogfish, and the Atlantic angel shark are known to be major predators of the longfin squid. The fourspot flounder, witch flounder, roughtail stingray, and white hake are also known to prey on Loligo. In many cases, squid remains in the stomach of fish are only identified as "squid" with no reference to the species. It is likely that some of these animals are Loligo and there are at least 42 other species of "squid"-eating fish in addition to those identified above.

Prey - Loligo is known to feed on fish, possibly silver hake, mackerel, herring, and menhaden, among others, and also on squid and crustaceans. However it is difficult to identify the species of fish eaten or to quantify the diet because squid do not swallow their prey whole.

Illex[1]

Predators - Known predators of Illex are the fourspot flounder, goosefish, and swordfish. Illex is probably eaten by a substantially greater number of fish, however, partially digested animals are often difficult to identify and are simply recorded as squid remains, with no reference to the species. There are at least 47 other species of fish that are known to eat "squid".

Prey - Food habits of squid are difficult to quantify because the squid do not swallow their prey whole. They are known to prey on other squid, fish, and crustaceans such as krill.

Butterfish

Predators - As is typical of a small, schooling, pelagic finfish, butterfish are subject to predation by a number of larger species. Haddock, silver hake, swordfish, bluefish, weakfish, goosefish, sand tiger, porbeagle, and red hake are several species which are known to consume butterfish specifically. The relative importance of butterfish, however, to the diet of any other species is unknown.

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

VI. DESCRIPTION OF HABITAT

VI-1. Description Of The Habitat

Climatic, physiographic, and hydrographic differences separate the ocean region from Cape Hatteras to the Gulf of Maine into two distinct areas: the Mid-Atlantic - Southern New England Region and the New England Region, with the natural division occurring at Nantucket Shoals.

The Middle Atlantic - Southern New England Region is fairly uniform physically and is influenced by many large coastal rivers and the Chesapeake Bay, the largest estuary in the United States. Additional significant estuarine influences are Narragansett Bay, Long Island Sound, the Hudson River, Delaware Bay, and the nearly continuous band of estuaries behind the barrier beaches along southern Long Island, New Jersey, Delaware, Maryland, and Virginia. The southern edge of the region includes the estuarine complex of Currituck, Albemarle, and Pamlico Sounds behind the outer banks of Cape Hatteras.

At Cape Hatteras, the continental shelf (characterized by waters less than 200 meters (656 ft. deep) extends seaward approximately 32 km (20 miles), widens gradually to 113 km (70 miles) off New Jersey and Rhode Island and then broadens to 193 km (120 miles) off Cape Cod forming Georges Bank. The substrate of the shelf in this region is predominantly sand interspersed with large pockets of sand-gravel and sand-shell. Beyond 200 m, the substrate becomes a mixture of silt, silt-sand, and clay. As the continental slope turns into the Abyssal Plain (at depths greater than 2,000 m (6,560 ft)), clay predominates over silt and becomes the major substrate.

Mineral resources of the area include large sand and gravel deposits, now being mined in some localities near shore. There are potentially recoverable offshore deposits of phosphate rock, placer deposits of

titanium, monazite, and zircon, and oil. Locally important concentrations of sulfur, salt, anhydrite, potash, and magnesium are known. It is also probable that manganese oxide nodules occur offshore. However, current technology is inadequate for economic recovery of most placer and hard rock deposits.

Water temperatures range from less than 3° C in the New York Bight in February to approximately 27° C off Cape Hatteras in August. The annual range of surface temperature at any location may be 15° C in slope waters to greater than 20° C near shore. During winter the vertical thermal gradient is minimized. In late April - early May, a thermocline develops although storm surges over Nantucket Shoals retard thermocline development there. The thermocline persists through the summer. Surface waters begin to cool in early autumn, weakening the thermocline so that by mid-November surface to bottom water termperature is nearly homogeneous.

The salinity cycle results from stream flow and the intrusion of slope water from offshore. The winter salinity maximum is reduced to a minimum in early summer by large volumes of runoff. Inward drifts of offshore saline water in autumn eventually counterbalance fresh water outflow and return the region's salinity distribution to the winter maximum. Water salinities near shore average 32°/oo, increase to 34-35°/oo along the shelf edge, and exceed 36.5°/oo along the main lines of the Gulf Stream.

On the continental shelf, surface circulation is generally southwesterly during all seasons, although this may be interrupted by coastal indrafting and some reversal of flow at the northern and southern extremities of the area. Speeds of the drift are on the order of 5 knots per day. There may be a shoreward component to this drift during the warm half of the year and an offshore component during the cold half. This drift, fundamentally the result of temperature-salinity distribution, may be made final by the wind. A persistent bottom drift at speeds of tenths of nautical miles per day extends from beyond mid-shelf toward the coast and eventually into the estuaries. Offshore, the Gulf stream flows northeasterly.

The New England region from Nantucket Shoals to the Gulf of Maine includes two of the worlds most productive fishing grounds: Georges Bank and Browns Bank. The Gulf of Maine, which is a deep cold water basin, is nearly sealed off from the open Atlantic by these two Banks. The outer edges of Georges and Browns Banks fall off sharply into the continental shelf. Other major features include Vineyard and Nantucket Sounds, Cape Cod Bay, and Cashes Ledge and Stellwagen Basin within the Gulf of Maine.

Water temperatures range from 2° C to 17° C at the surface and over the banks, and 4° C to 9° C at 200 meters in the inner Gulf of Maine. Mean salinity values vary from about 32 to 34°/oo depending on depth and location. However, lower salinity values generally occur close to shore. In addition, both water temperatures and salinities within the Region, but especially along the southern boundary of Georges Bank and the deep basins of the inner Gulf of Maine, are influenced by intrusions of slope water.

Surface circulation within the Gulf of Maine is usually counterclockwise. Cold Nova Scotian waters enter through the Eastern Channel and move acress Browns Bank while slope waters enter through the Northeast (Fundian) Channel. Gulf of Maine waters spill out over Georges Bank and through Great South Channel onto Nantuckett Shoals. The anticyclonic eddy over Georges Bank that develops in spring breaks down into a westerly and southerly drift by autumn.

Gulf Stream meanders and warm core eddies, two oceanographic phenomena which normally remain in deep offshore water, can profoundly effect environmental conditions on the fishing grounds off the northeast United States when either one moves close along the continental slope. The warm core eddies seen off the New England coast mostly form in the slope water region southeast of Georges Bank by detaching from meanders of the Gulf Stream. Rotation is in a clockwise direction at speeds varying from 0.6 to 1.8 knots.

Environmental effects and their possible influence on fishery resources resulting from meanders and eddies have been identified by Chamberlin (1977) and are:

(1) Warming of the upper continental slope and outer shelf by direct contact of a meander or eddy. This may influence the timing of seasonal migrations of fish as well as the timing and location of spawning.

(2) Injection of warm saline water into the colder less saline waters of the shelf by turbulent mixing at the inshore boundary of a meander or eddy. This may have influences on the fishery resource similar to that of direct warming, and also cause mortality of fish eggs and larvae on the shelf when the colder water in which they live is warmed beyond their tolerance by the mixing-in of warm slope water.

(3) Entrainment of shelf water off the shelf, an effect frequently seen in satellite imagery. Mortality of Georges Bank fish larvae is known to occur, presumably because of temperature elevation when shelf water in which they occur is carried into the slope water. The most profound effects of entrainment on the fishing grounds may be changes in circulation and in water mass properties resulting from the replacement of the waters lost from the shelf.

(4) Upwelling along the continental slope, which may result in nutrient enrichment near the surface and increased primary biological productivity.

The annual cycle of the plankton community of the region is typical of the temperate zone. During the winter, phytoplankton (plant plankton) and zooplankton (animal plankton) populations are low. Nutrients are available, but production is surpressed by low levels of solar radiation and low temperatures. As spring approaches and the level of solar radiation increases, an enormous diatom bloom occurs. As the bloom progresses, concentrations of inorganic nutrients decrease.

As water temperatures increase during late spring and summer, phytoplankton and zooplankton become increasingly abundant because of the more rapid development of early life stages, the spawning of fish and benthos, and the abundant food supply.

During summer, zooplankton reaches maximum abundance while phytoplankton declines to a level near the winter minimum. Dinoflagellates and other forms apparently better suited than diatoms to warm, nutrient-poor waters become more abundant during summer. Bacteria in the sediment actively regenerate nutrients, but because of vertical temperature and salinity gradients, the water column is stable and nutrients are not returned to the euphotic zone (where solar radiation and nutrients are "Fixed" into organic matter). On Georges Bank, nutrients regenerated by sedimentary bacteria are immediately available to phytoplankton because of mixing (Cohen, 1975).

During autumn, as water temperatures decrease, the water column becomes unstable due to mixing and nutrients are recycled to the euphotic zone. This stimulates another phytoplankton bloom which is limited by decreasing levels of solar radiation. Phytoplankton and zooplankton levels then decline to their winter minimum while nutrient levels increase to their winter maximum.

Anomalous conditions within the generalized annual cycles are probably common. The stability of the water column which affects nutrient availability may be disrupted by severe storms. Anomalies in temperature may disturb the timing between the annual cycles of interacting species.

VI-2. Habitat Areas Of Particular Concern

During the summer and early autumn of 1976, oxygen concentrations at bottom were severely depleted and widespread mortalities of benthic organisms occurred in a section of the New York Bight off New Jersey. This near-anoxic (and in places anoxic) region of oxygen levels less than 2 parts per million (ppm) was located approximately 4 miles off New Jersey and covered an areas bout 100 miles long as 40 miles wide during the most critical phases of the depletion (Sharp, 1976). Normal oxygen levels in this region are greater than 4 ppm.

Investigations indicate that this state was probably induced by a combination of meteorological and circulatory conditions in conjunction with a large-scale algal bloom (predominantly Ceratium tripos). Lack of normal seasonal turbulence occasioned by relatively few storms, unusual wind patterns, and above-average surface water temperatures probably all contributed to depletion of the oxygen content of waters beneath the thermocline (Sharp, 1976). It is not known to what degree the routine dumping of sewage sludge and dredge spoils contributed to the depletion, but it is reasonable to assume that any effect would have been detrimental (Atkinson, 1976).

The species affected by the anoxia of most commercial importance were surf clam, red hake, lobster, and crabs. Finfish were observed to be driven to inshore areas to escape the anoxia, or were trapped in water with concomitant high levels of hydrogen sulfide (Steimle, 1976). Freeman and Turner (1977) pointed out that "...it is difficult to measure with any precision the extent of damage to highly mobile organisms, especially the fishes. Sublethal effects can also occur. Among the observed effects of the anoxic water on fishes were behavioral changes involving vertical distribution and migratory routes which in turn may affect feeding and spawning habits."

Reduction in oxygen levels in New York Bight below normal levels has been observed several times in recent history (Atkinson, 1976) although not to levels as low as those observed in summer 1976. The relative contribution of any of the above mentioned factors to the anoxia cannot yet and may never fully be assessed. However, it is important to note that each of these conditions, by itself, was not a unique, previously unobserved phenomenon. It is as yet too early to predict the long-term effects of the anoxic condition on any of the affected resources or their habitats.

Dumping also needs to be considered in terms of habitat. Trace metals, suspended solids, and organic wastes are introduced into the marine environment at 6 sites in the New York Bight (Environmental Protection Agency, 1979). Each area is designated for a specific type of material so that it can be monitored more effectively. The Environmental Protection Agency (EPA) monitors areas to determine the extent to which the marine environment has been affected by released material. EPA has established impact categories in its Ocean Dumping Regulations which specify impacts detected by site monitoring which dictate modifications in the use of disposal sites.

VI-3. Habitat Protection Programs

No special habitat protection programs exist in the habitat of the species that are the subjects of this Plan. Sampling for pollution is carried out by both NMFS and EPA.

Habitat protection programs are administered by a variety of Federal agencies including the Bureau of Land Management of the Interior Department, the Coast Guard, EPA, and NMFS. The NMFS Northeast Region Habitat Protection Branch actrively reviews applications for permits to discharge or dump pollutants. Coastal zone management is discussed in Section XV-4.

VII. FISHERY MANAGEMENT JURISDICTION, LAWS, AND POLICIES

VII-1. Management Institutions

The US Department of Commerce, acting through the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils, pursuant to the MFCMA, has authority to manage the stocks under US jurisdiction.

VII-2. Treaties And International Agreements

Foreign fishing for mackerel, squid, and butterfish is regulated by the MFCMA pursuant to which Governing International Fishery Agreements are negotiated with foreign nations for fishing within the FCZ.

VII-3. Federal Laws, Regulations, And Policies

The only known Federal law that regulates the mackerel, squid, or butterfish fisheries is the MFCMA. Currently the fisheries are managed through individual Plans.

No Indian treaty rights are known to exist relative to these species.

VII-4. State Laws, Regulations, And Policies

Several States have minimum size limits for the commercial sale or possession of mackerel: Massachusetts, 6 inches (15 cm); Connecticut, 7 inches (18 cm); New York, 7 inches (18 cm); and New Jersey, 7 inches (18 cm).

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

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

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

VII-5. Local And Other Applicable Laws, Regulations, And Policies

No local or other laws, regulations, or policies are known to exist relative to these fisheries.

VIII. DESCRIPTION OF FISHING ACTIVITIES

The original Plans contain histories of the US and foreign fisheries for these species. The following sections update those descriptions.

US Commercial Fisheries

Reported US commercial squid landings (Loligo and Illex combined) in 1980 were over twice the average annual catch of the previous 15 years, despite the fact that the Illex catch was only two-thirds its normal level. The 1980 US commercial mackerel catch was 35% greater than in 1979, and 8% greater than the 1965-1979 average. Landings of butterfish also jumped in 1980 reflecting a strengthening of the export market which began in 1978 (Tables 1 and 2).

Total combined US commercial landings of these species in 1979 accounted for between 3 and 4% of the total catch and ex-vessel value of all food finfish and squid from Maine - North Carolina. The combined squid, mackerel, and butterfish catch from the FCZ in 1979 represented about 2% of the weight and about 1% of the ex-vessel value of the catch from all species from the FCZ for the same region.

Almost all of the butterfish, three-quarters of the squid, and about one-third of all Atlantic mackerel landing commercially in 1978 were taken by otter trawls, with pound nets/floating traps accounting for almost all of the remaining catches. The 1978 otter trawl catches of these species accounted for 2.6% of the total landings and 3.4% of the total ex-vessel value from the Maine -North Carolina otter trawl industry, more than double the same contributions a decade earlier.

Figure 2 shows the distribution of the US commercial landings of these species by month. Commercial landings of Atlantic mackerel usually are concentrated in the spring, those of squid in late spring-summer, and those of butterfish in the autumn. In 1978, about 80% of the commercially caught mackerel, about 70% of the squid, and about 40% of the butterfish were taken in what is now the first six months of the fishing year for these Plans (1 April - 30 September).

The dramatic growth in squid landings during the spring and summer of 1979 was due mainly to a large inshore fishery in Massachusetts. Reported Massachusetts commercial landings of squid in May that year were over 3 million pounds (worth over $1.3 million ex-vessel) and were landed primarily in Chatham and

New Bedford. The squid landings in New Bedford that month brough over $500,000 at the dock, about 20% of the total ex-vessel value from all finfish and squid. This fishery was possible only because of the beginning development in 1979 of a US squid export fishery. The rapid shift of fishing effort to squid and the proportional increase in economic importance of the species are similar to what occured in Rhode Island in 1978 in response to foreign demand for butterfish (Figure 2; see also the Butterfish Plan). Foreign demand for US caught mackerel has not changed significantly in recent years. The increase in mackerel landings in 1979 and 1980 was probably due more to increased availability of good market quality fish to commercial fishermen than to shifts in either the domestic or foreign market.

Table 1. Reported US Commercial Landings of Atlantic Mackerel, Squid (East Coast), and Butterfish by Distance Caught Offshore (quantity in thousands of pounds, value in thousands of dollars)

	0-3 Miles				3-200 Miles				Total	
Year	Quantity	% of Total Value	$/lb.	Weight	Quantity	% of Total Value	$/lb.	Weight	Quantity	Value
					ATLANTIC MACKEREL					
1975	1121	162	0.14	27	3036	322	0.11	73	4157	484
1976	2021	355	0.18	37	3400	300	0.09	63	5421	655
1977	1926	402	0.21	63	1117	145	0.13	37	3043	547
1978	1985	528	0.27	59	1384	192	0.14	41	3369	720
1979*	1921	605	0.31	49	1962	306	0.16	51	3883	911
1980*	3584	512	0.14	61	2329	304	0.13	39	5913	816
					SQUID					
1975	1840	334	0.18	42	2542	471	0.19	58	4382	806
1976	3491	696	0.20	41	4940	890	0.18	59	8431	1585
1977	2215	771	0.35	38	3587	762	0.21	62	5802	1533
1978	1938	738	0.38	52	1789	715	0.40	48	3727	1453
1979*	6781	2538	0.37	51	6410	1682	0.26	49	13191	4221
1980*	6583	2229	0.34	67	3211	948	0.30	33	9794	3177
					BUTTERFISH					
1975	1973	438	0.24	40	2683	642	0.24	60	4477	1079
1976	1545	425	0.28	50	1543	446	0.29	50	3087	871
1977	847	274	0.32	29	2057	543	0.26	71	2904	817
1978	821	266	0.32	10	7259	2646	0.36	90	8081	2912
1979*	954	379	0.40	16	5059	1738	0.34	84	6013	2117
1980*	984	445	0.45	9	10584	3403	0.32	91	11568	3848

* preliminary estimates.

Source: 1975-1979: unpubl. NMFS stats., 1980: Fisheries of the US, 1980. Current Fish. Stat. No. 8100. NMFS, NOAA, US Dept. of Comm., 1981.

TABLE 2

FIGURE 2

Table 3. Reported Commercial Landings of Atlantic Mackerel by State, 1965-1980 (thousands of pounds and thousands of dollars)[1]

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	Total	(mt)
1965	670	1	1997	489	4	91	648	28	17	383	*	4327	1963
	43	*	142	63	1	13	72	3	2	45	*	382	
1966	690	4	2919	580	14	400	547	28	38	778	13	6009	2726
	23	1	182	80	2	27	55	7	3	88	1	468	
1967	353	5	6015	658	8	360	401	31	43	645	1	8520	3865
	16	1	204	59	1	26	40	4	5	74	*	430	
1968	388	-	4321	868	67	810	669	2	49	440	-	7614	3454
	17	-	237	61	4	50	35	*	2	26	-	432	
1969	248	-	6956	625	13	492	296	-	30	246	-	8906	4040
	12	-	329	61	1	33	22	-	4	22	-	484	
1970	482	-	5003	556	16	368	1313	-	3	273	-	8014	3635
	22	-	247	39	2	31	61	-	*	14	-	416	
1971	225	3	3117	179	11	502	979	-	10	124	-	5150	2336
	14	*	147	16	2	30	49	-	*	7	-	265	
1972	92	3	2561	747	8	544	1511	-	7	55	-	5528	2508
	14	*	208	47	1	46	105	-	1	5	-	427	
1973	379	-	1263	1297	22	323	1155	-	20	14	-	4473	2029
	40	-	205	142	4	50	94	-	4	2	-	541	
1974	284	-	604	236	26	322	774	2	68	54	-	2370	1075
	34	-	129	45	5	39	109	*	10	12	-	383	
1975	145	*	992	357	-	357	1498	*	205	498	105	4156	1885
	22	*	90	40	-	63	143	*	33	81	12	484	
1976	404	*	1551	410	13	249	1852	*	224	277	440	5421	2459
	81	*	191	87	5	40	151	*	21	40	40	655	
1977	330	5	919	273	33	561	547	1	98	11	266	3043	1381
	78	1	201	63	13	95	49	*	20	3	26	547	
1978	484	20	1159	237	16	511	848	*	10	55	23	3362	1525
	97	4	331	48	7	127	88	*	2	9	6	719	
1979#	334	11	720	790	12	696	1214	-	58	20	28	3883	1761
	84	2	154	229	3	249	161	-	13	6	7	911	
1980#	543	14	2550	426	12	719	1605	*	13	12	2	5896	2674
	79	3	300	103	3	163	157	*	1	4	*	814	

1 = first row for each year is quantity, second row is value
* = less than 500 lbs or $500.
# = preliminary

Source: NMFS Fish. Stats. of the US, 1965-1976, Unpubl. NMFS Stats., 1977-1980

Table 4. Squid Landings by State: New England
(in thousands of pounds and thousands of dollars)

	ME		NH		MA		RI		CT		Total		Regional Average Price/Lb.
	lbs	$	lbs	$	lbs	$	lbs	$	lbs	$	lbs	$	(1980 $)
1965	-	-	-	-	436	31	357	45	47	5	840	81	.268
1966	-	-	-	-	35	2	386	44	102	8	523	54	.278
1967	-	-	-	-	885	46	910	53	24	2	1819	101	.149
1968	4	a	-	-	710	45	996	67	132	8	1842	120	.171
1969	-	-	-	-	537	59	1123	116	269	27	1929	202	.264
1970	a	a	-	-	505	49	559	104	31	6	1095	159	.353
1971	a	a	-	-	979	76	703	128	86	16	1768	220	.293
1972	2	a	-	-	688	85	750	134	6	1	1446	220	.343
1973	3	a	-	-	924	143	1621	361	19	4	2567	508	.395
1974	21	3	-	-	1431	241	1376	286	13	2	2840	532	.314
1975	12	2	-	-	832	122	1776	334	17	3	2637	460	.268
1976	43	6	-	-	3597	502	2571	612	35	10	6245	1131	.266
1977	28	4	-	-	3463	569	975	416	35	15	4501	1004	.309
1978	5	1	-	-	1239	240	820	417	37	16	2100	673	.411
1979	38	9	-	-	7021	1942	2641	953	23	6	9723	2910	.341
1980	8	1	-	-	3593	959	2374	895	23	6	5998	1861	.310

a = amounts less than 500 lbs. or $500.
1979 and 1980 data preliminary.
Sources: 1965-1976: NMFS Fish. Stats. of the US; 1977-1980: unpub. NMFS Stats.

Table 5. Squid Landings by State: Mid-Atlantic
(in thousands of pounds and thousands of dollars)

	NY		NJ		DE		MD		VA		Total		Regional Average Price/Lb.
	lbs	$	lbs	$	lbs	$	lbs	$	lbs	$	lbs	$	(1980 $)
1965	974	66	453	33	-	-	32	3	223	10	1682	112	.185
1966	1238	110	419	31	-	-	62	6	364	16	2083	163	.211
1967	772	58	621	33	-	-	42	4	542	20	1977	115	.156
1968	973	69	406	27	-	-	15	1	430	19	1399	116	.217
1969	532	55	374	36	-	-	14	1	375	19	1295	111	.216
1970	404	51	352	43	-	-	10	2	422	25	1188	121	.248
1971	311	56	205	38	-	-	11	2	410	38	937	134	.337
1972	764	100	412	77	-	-	4	1	262	29	1442	207	.324
1973	537	97	585	135	-	-	13	4	160	20	1295	256	.394
1974	964	178	1287	237	-	-	64	15	169	25	2484	456	.308
1975	569	134	942	174	-	-	41	13	101	11	1653	332	.308
1976	1108	225	875	197	-	-	39	11	113	13	2135	446	.307
1977	484	223	685	275	-	-	27	10	61	13	1257	521	.573
1978	907	468	431	215	-	-	10	4	131	41	1478	727	.631
1979	1795	721	562	219	-	-	77	30	443	145	2877	1114	.441
1980	2659	980	573	195	-	-	103	32	282	53	3617	1261	.349

1979 and 1980 data preliminary
Source: 1965-1976: NMFS Fish. Stats of the US; 1977-1980: unpub. NMFS Stats.

Table 6. Squid Landings By State: South Atlantic
(in thousands of pounds and thousands of dollars)

	North Carolina		South Carolina		Georgia		East Coast Florida		Total		Regional Average Price/Lb.
	lbs	$	lbs	$	lbs	$	lbs	$	lbs	$	(1980 $)
1965	27.8	2.8	.2	a	-	-	6.8	1.3	34.8	4.2	.336
1966	27.3	2.8	.1	a	-	-	7.7	1.5	35.1	4.3	.330
1967	38.5	3.1	-	-	-	-	3.2	0.7	41.7	3.7	.238
1968	42.1	2.1	-	-	-	-	3.9	0.8	46.0	2.8	.160
1969	24.5	1.2	-	-	-	-	4.3	0.8	28.8	2.1	.184
1970	21.2	1.2	-	-	-	-	5.5	1.1	26.7	2.3	.210
1971	10.4	0.9	-	-	-	-	9.9	1.9	20.3	2.7	.314
1972	15.1	1.1	-	-	-	-	8.0	1.4	23.1	2.5	.244
1973	28.2	3.2	5.1	0.6	-	-	12.5	2.0	45.8	5.8	.253
1974	75.1	11.9	6.0	0.9	-	-	22.4	1.7	103.5	14.5	.235
1975	60.1	6.8	25.5	5.2	-	-	6.4	0.9	92.0	12.8	.214
1976	35.6	4.8	12.5	3.3	-	-	53.6	10.5	101.7	18.6	.269
1977	20.9	3.2	12.2	3.0	0.1	a	11.6	2.2	44.9	8.5	.262
1978	132.5	48.6	9.8	2.7	-	-	6.2	1.5	148.5	52.8	.456
1979	564.0	190.1	19.5	5.5	0.5	0.2	7.0	1.0	591.0	196.8	.380
1980	302.3	75.1	10.8	3.1	a	a	4.0	1.0	317.1	79.2	.250

a = less than 100 lbs. or $100.
1979 and 1980 data are preliminary.
Source: 1965-1976: NMFS Fish. Stats. of the US; 1977-1980: unpub. NMFS Stats.

Table 7. Reported Commercial Landings of Butterfish by State, 1965-1980 (thousands of pounds and thousands of dollars)[1]

Year	ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA	NC	SC	Total[2]
1965	1	-	220	1181	66	766	1181	7	164	2905	367	-	6858
	*	-	24	171	10	70	95	1	14	230	29	-	644
1966	-	-	42	1115	28	593	1475	4	131	2037	503	-	5928
	-	-	5	157	4	65	115	1	9	152	33	-	541
1967	-	-	23	1327	11	1120	1312	-	45	110	384	12	4344
	-	-	3	188	2	123	122	-	4	89	16	1	548
1968	1	-	44	958	74	974	727	-	18	698	107	-	3601
	*	-	5	146	11	150	86	-	2	70	8	-	584
1969	*	-	66	1141	68	763	1663	-	31	1112	130	-	4974
	*	-	10	191	11	110	166	-	3	85	8	-	478
1970	-	-	53	641	25	521	962	-	11	1603	133	-	3949
	-	-	10	152	6	142	120	-	1	202	11	-	644
1971	-	-	70	1098	11	353	1244	-	19	659	58	-	3512
	-	-	6	205	2	95	193	-	3	100	5	-	609
1972	1	1	120	267	3	411	492	-	5	252	88	-	1640
	*	*	23	84	1	139	93	-	1	56	7	-	404
1973	3	-	134	1304	8	668	1030	*	7	199	40	-	3393
	*	-	34	354	2	232	158	*	1	45	4	-	830
1974	-	-	163	1770	11	797	979	*	12	186	76	-	3994
	-	-	38	453	2	300	135	*	3	39	9	-	979
1975	-	-	182	1900	8	1239	856	*	23	143	127	-	4477
	-	-	41	507	2	327	157	*	5	30	10	-	1079
1976	9	-	289	1273	21	959	336	-	21	125	54	-	3087
	5	-	81	382	4	274	83	-	6	30	6	-	871
1977	1	-	56	1529	28	650	436	*	26	132	48	-	2904
	*	-	19	425	7	215	105	*	7	30	8	-	817
1978	*	-	67	6297	66	926	482	-	22	117	111	-	8088
	*	-	18	2340	18	354	123	-	6	28	26	-	2913
1979#	1	-	113	3813	26	1020	574	*	13	273	180	-	6013
	*	-	38	1287	6	452	196	*	4	86	46	-	2117
1980#	3	-	405	9369	26	1134	334	4	12	135	149	-	11570
	1	-	135	2913	6	597	106	2	4	42	42	-	3847

1 = first row for each year is quantity, second row is value.
2 = totals may not equal sum of states due to rounding.
* = less than 500 pounds or $500.
# = preliminary.
- = zero.
Source: 1965-1976: NMFS Fish. Stats. of the US; 1977-1980: unpub. NMFS Stats.

Although it is known that recreational marine anglers occasionally take squid and butterfish, no estimates of these catches have resulted from any of the national or regional angler surveys. Any sport catches of these species are likely to be negligible, although significant portions of the commercial catches may be used as bait in recreational fisheries for other species. The following discussions are directed at the Atlantic mackerel sport fishery.

Estimates of Recreational Catches

The National Salt-Water Anglers Surveys (Clark, 1962; Deuel and Clark, 1968; Deuel, 1973) and the survey of the Northeast Region (Maine - Virginia) in 1974 (Deuel, NMFS, pers. comm.) produced the following estimates of recreational mackerel catches:

Table 8. Recreational Atlantic Mackerel Catches 1960, 1965, 1970 & 1974 (metric tons and thousands of fish)

	1960	1965	1970	1974
North Atlantic				
Total weight caught	4,581	8,167	18,816	
Total number caught	10,097	21,809	33,573	
Average kg/fish	0.45	0.38	0.56	
Middle Atlantic				
Total weight caught	376	417	13,268	
Total number caught	750	936	18,441	
Average kg/fish	0.50	0.44	0.72	
South Atlantic				
Total weight caught	-	-	-	
Total number caught	-	-	-	
Average kg/fish	-	-	-	
Total				
Total weight caught	4,958	8,584	32,084	7,641
Total number caught	10,847	22,745	52,014	9,963
Average kg/fish	0.46	0.38	0.62	0.77

In the 1960, 1965, and 1970 surveys, the North Atlantic Region was defined as Maine - New York, the Middle Atlantic Region as New Jersey - Cape Hatteras, North Carolina, and the South Atlantic Region as Cape Hatteras - the Florida Keys.

NMFS performed small scale, limited area, limited season surveys of the recreational mackerel fishery in 1976, 1977, and 1978 (Christensen, et al., 1976, 1979a; Anderson, 1980). These studies produced coastwide estimates of mackerel catches of 4,202 mt in 1976, 522 mt in 1977, and 6,571 mt in 1978.

No distinctions were made in any of the above surveys as to the definition of "catch", i.e., it must be assumed that the figures cited above represent estimates of all mackerel taken, regardless of whether they were landed, released alive, or discarded dead.

The results of the 1979 national survey of marine recreational fisheries have recently been released (Dept. of Commerce, 1980). This survey departed in many respects from previous national anglers surveys, and has produced data that are not strictly comparable to the earlier surveys' estimates.

In the 1979 survey, the North Atlantic Region was defined as Maine - Connecticut, the Mid-Atlantic Region was defined as New York - Virginia, and the South Atlantic Region was defined as North Carolina - Florida (east coast).

In Table 9, "total number landed" refers to fish brought back whole to shore which were sampled by

interviewers and subject to measurement. "Total number released" is an estimate of the number of mackerel released by anglers, presumably alive. "Total number harvested" is an estimate of the number of mackerel which were killed, but which were not directly intercepted by the interviewers (e.g., fish previously given away, filleted before reaching shore, discarded dead, etc.). "Total number removed" is the sum of the "landed" and "harvested" estimates.

Table 9. Estimates of Recreational Mackerel Catches, 1979 (thousands of fish and metric tons)

	North Atlantic	Mid-Atlantic	South Atlantic	Total
Number landed (A)	626	1,538	0	2,163
Number harvested (B1)	1,376	330	0	1,705
Number released (B2)	171	3	0	174
Number removed (A + B1)	2,002	1,868	0	3,870
Total Number Caught (A + B1 +B2)	2,172	1,870	0	4,043
Weight, landed fish	548	1,163	0	1,711
Avg. weight/landed fish (kg)	0.88	0.76	0	0.79

Presumably, the "grand total" estimates are more comparable to the results of the earlier surveys than any of the individual category estimates. If the average weight of all fish caught was equal to the average weight of the fish landed given above, the total weight caught in each region in 1979 was 4.19 million pounds for the North Atlantic, 3.12 million pounds for the Mid-Atlantic, and 7.31 million pounds (3,315 mt) total. If the average weights of the released and discarded mackerel were less than the average weight of the retained fish, these estimates are too high. There is, however, no way at present to adjust the above figures to account for such possibilities.

Relationship Between Stock Abundance and Recreational Mackerel Catch

The NMFS, in the Mackerel Preliminary Fishery Management Plan, and subsequently the Council, in the Plan and Amendments #1 and #2, have based their estimates of US recreational capacity for mackerel on the assumption that the sport catch is directly proportional to species abundance.

After a survey of the Mid-Atlantic fishery in 1975-76, Christensen et al. (1976) concluded: "A variety of factors affect angler harvest of mackerel including population size, availability of more desirable species, and weather conditions during the relatively brief Middle Atlantic fishing season... Therefore, it does not necessarily follow that the recreational catch is directly proportional to mackerel stock size. Nonetheless, it is believed that angler catches follow general trends set by other indicators of stock size... Indicators included in this comparison are biomass estimates, US research vessel autumn and spring bottom trawl survey indices (Anderson et al., 1976), and the international catch per standard US day fished. The trends in recreational mackerel catch exhibit a similar pattern... Length frequency data from this survey indicate that recreational fishermen primarily harvest the larger size mackerel which are part of the spawning stock. The estimated spawning stock biomass follows a similar trend..." Comparison of subsequent angler survey data and stock estimates (e.g., Anderson, 1980) supports these conclusions. Given the absence of more precise predictive relationships, the assumption that the size of the mackerel sport catch will depend on the size of the spawning stock, within limits, is reasonable given the current data on both mackerel stock abundance and recreational fishing activity for the species.

The recommended alternative for this Amendment proposes that the US recreational Atlantic mackerel capacity be predicted by the equation:

$$y = (0.008)(X) - (1.15)$$

where y = predicted recreational catch (in thousands of mt) and x = predicted spawning stock size (in thousands of mt) or, 9,000 mt, whichever is greater. The derivation of this equation is given in Mid-Atlantic Council (1981a). Nine thousand metric tons is the estimate of recreational mackerel capacity in the original Mackerel Plan, and, based on the 1965 - 1979 national angler surveys, should be sufficient to encompass the wide range of possible recreational catches during years of low species abundance.

Table 10. Estimated Total Recreational Catches[1] by Region[2] and Species/Species Group, Ranked by Number of Fish Caught, 1979 (in thousands)

New England			Mid-Atlantic			South Atlantic		
Species	Number Caught	% of Total Regional Catch	Species	Number Caught	% of Total Regional Catch	Species	Number Caught	% of Total Regional Catch
Winter flounder	12,448	31.1	Bluefish	15,610	18.9	Spot	8,840	13.4
Bluefish	4,824	12.0	Summer flounder	12,652	15.3	Catfishes	5,517	8.3
Scup	4,796	12.0	Winter flounder	10,107	12.3	Bluefish	4,994	7.6
Cod	2,602	6.5	Spot	8,708	10.6	Croaker	3,778	5.7
Pollock	2,277	5.7	Scup	5,887	7.1	Pinfish	3,720	5.6
Atlantic mackerel	2,172	5.4	White perch	5,284	6.4	Sea basses	3,341	5.1
Cunner	2,083	5.2	Weakfish	4,234	5.1	Mullets	3,198	4.8
Tautog	999	2.5	Searobins	2,499	3.0	Grunts	3,187	4.8
Tomcod	833	2.1	Sea basses	2,181	2.6	Herrings	2,927	4.4
Herrings	800	2.0	Tautog	1,883	2.3	Dolphins	2,766	4.2
All others	6,230	15.6	All others	13,406	16.3	All others	23,867	36.1

(1) includes all catches including those discarded or released alive.

(2) New England = Maine - Connecticut, Mid-Atlantic = New York - Virginia, South Atlantic = North Carolina - Florida Keys.

Source: US Dept. of Commerce, NOAA, NMFS, 1980.

Table 11

Foreign Fisheries

The reported foreign catches of the squids, Atlantic mackerel, and butterfish from 1965 through 1980 are shown in Table 2. Foreign squid (Illex and Loligo combined) catches in calendar 1980 were 38,124.1 mt. The TALFFs for fishing year 1980-81 were 25,000 mt of Illex and 37,000 mt of Loligo.

Foreign Atlantic mackerel landings in calendar 1980 were 383 mt. The 1979 landings, 63 mt, were the lowest during the period from 1965 and were negligible relative to the foreign peak of 385,358 mt in 1972. Final Atlantic mackerel TALFFs were 10,000 mt in fishing year 1980-81 and 1,200 mt in calendar 1979.

The foreign butterfish catch was 884 mt in calendar 1980, and 1,115 mt in fishing year 1980-81. TALFFs were 4,000 mt in fishing year 1980-81 and calendar 1979.

Incidental catch relationships among the foreign fisheries for the squids, mackerel, butterfish, and the hakes are important relative to management of these species. These relationships were discussed in the original Plans and have been analyzed under both ICNAF and MFCMA management (Mid-Atlantic Fishery Council, 1981b).

Loligo/Butterfish: Table 12 shows foreign catches and allocations of the subject species on both a fishing and calendar year basis since 1979. Assuming that all butterfish was caught incidentally in the Loligo fishery, the by-catch rates (butterfish catch as a percentage of the Loligo catch) for all foreign nations combined were 6.5% and 5.5% in fishing years 1979-80 and 1980-81, respectively, and average 6.0%. Of the nations with significant catches during this period, the butterfish-Loligo percentages ranged from 1.0% (Spain, 1979-80) to 15.3% (Japan, 1980-81). By nation, for the 2 fishing years combined, the by-catch rates were Spain = 1.8%, Italy = 3.4%, Mexico = 8.0% and Japan 12.7%. It should be noted that the fishing year 1980-81 allocations would have allowed for a butterfish-Loligo by-catch rate of 10.5%. The assumption that all butterfish was taken as a by-catch overestimates the incidental catch rate, since some of the butterfish was taken either as a by-catch in fisheries for species other than Loligo or by effort aimed directly at butterfish (e.g., probably a large fraction of the Japanese catches).

Mackerel/Silver Hake: The foreign silver hake catches in calendar years 1979 and 1980, and fishing years 1979-80 and 1980-81, respectively, despite much larger TALFFs in those years (e.g., 60,400 mt in calendar 1980). As discussed in Mid-Atlantic Council (1981b), there has been no large directed silver hake fishery since the implementation of the MFCMA. Assuming, however, that all mackerel taken by foreign fleets in calendar 1979 and calendar 1980 was a by-catch in the hake fishery, the overall percentages were 1.3% and 22.6%, respectively, averaging 6.8%. It is known, however, that much if not most of the mackerel taken in recent years has been taken either in targeted fisheries (e.g., Poland in 1981) or as by-catch in the squid fisheries. Examination of historical records, NMFS observer reports, and other material supports the conclusion that mackerel by-catch can be kept to 2% or less in a directed hake fishery (Mid-Atlantic Council, 1981b).

Other Species: In addition to the two main by-catch relationships discussed above, small, irregular, but not infrequent by-catches of all the subject species may result from foreign effort aimed at any one species (for instance, mackerel in the Loligo fishery) based on examination of NMFS foreign fishing observer reports. All evidence indicates that these by-catches are trivial, usually a fraction of a percent of the target species, but also that such by-catches cannot be fully eliminated. For this reason, this Amendment proposes additional butterfish and Atlantic mackerel by-catch allowances for the foreign fisheries in which either butterfish or mackerel is not a significant component of the incidental catch.

Table 12

Table 13. Loligo, Illex, Mackerel, Butterfish, Silver Hake & Red Hake OY, DAH/DAP, Initial TALFF, & Allocations (in metric tons)

Year	Species	Optimum Yield	Initial DAH/DAP	Initial TALFF	Initial Reserve	Final TALFF	Final Allocation
Calendar 1978	Loligo	44000	25000	19000	-	20900	20900
	Illex	35000	11500	23500	-	39000	27360
	Mackerel	15500	14300	1200	-	1200	1132
	Butterfish	18000	14000	4000	-	4000	3739
	Silver Hake	97000	46600	45400	-	50400	46615
	Red Hake	36500	9100	27400	-	27400	26304
Calendar 1979	Loligo	44000	14000	30000	-	30000	30000
	Illex	30000	10000	20000	-	24000	23910
	Mackerel	15500	14300	1200	-	1200	1100
	Butterfish	18000	14000	4000	-	4000	3600
	Silver Hake	98800	46600	52200	-	52200	41470
	Red Hake	32000	8600	23400	-	23400	18970
Calendar 1980	Loligo	x	x	x	x	x	x
	Illex	x	x	x	x	x	x
	Mackerel	x	x	x	x	x	x
	Butterfish	x	x	x	x	x	x
	Silver Hake	90000	29600	60400	-	60400	23500
	Red Hake	17000	8500	8500	-	8500	4260
Fishing Year 1979-80	Loligo	44000	14000	30000	-	35500	30570
	Illex	30000	10000	20000	-	24730	23165
	Mackerel	15200	14000	1200	-	1200	1104
	Butterfish	x	x	x	x	x	x
	Silver Hake	x	x	x	x	x	x
	Red Hake	x	x	x	x	x	x
Fishing Year 1980-81	Loligo	44000	7000	18000	19000	37000	35075
	Illex	30000	5000	12000	13000	25000	25000
	Mackerel	30000	20000	4000	6000	10000	9950
	Butterfish	11000	7000	4000	-	3685	
	Silver Hake	x	x	x	x	x	x
	Red Hake	x	x	x	x	x	x
Fishing Year 1981-82	Loligo	44000	7000	18000	19000	unk	unk
	Illex	30000	5000	12000	13000	25,000	unk
	Mackerel	30000	20000	135*	-	unk	unk
	Butterfish	11000	7000	759*	-	unk	unk
	Silver Hake	x	x	x	x	x	x
	Red Hake	x	x	x	x	x	x

- = zero.
x = not applicable.
* = The annual fishing levels certified by the Council.

IX. DESCRIPTION OF ECONOMIC CHARACTERISTICS OF THE FISHERY

IX-1. Domestic Harvesting Sector

Commercial Fishery

During the period since 1965, the commercial ex-vessel value of the Atlantic mackerel catch reached a low of $265,000 in 1971, a high of $911,000 in 1979, and decreased to $816,000 in 1980. Using the wholesale price index to adjust for inflation, the real value of mackerel in terms of 1967 dollars peaked in 1966 at $468,900 and reached a low of $232,700 in 1971. The 1980 value of commercial landings in inflation adjusted dollars was $303,800. (It must be noted that deflation by the wholesale price index may be misleading since fishery products are a very small sector of the economy while the wholesale price index covers all sectors of the economy. Its use is just to indicate that while nominal prices have increased over the long term, some of this increase may have been due to inflationary causes occurring outside the fishery.)

The US squid fishery has traditionally been incidental in nature. The main reason for little domestic interest in squid harvesting has been lack of a substantial US market; thus, prices remained low until recent years.

Squid landings (Loligo and Illex) have risen from 2.6 million pounds in 1965 to a peak of 13.2 million pounds in 1979. Combined 1980 landings were at least 9.9 million pounds. The dramatic increase in squid landings since 1978 is largely due to increased in exports. Squid prices have also increased in nominal terms since 1965, from $.08/pound to a 1980 level of $.32/pound. Adjusted for inflation, however, the real price of squid has fallen from a 1978 peak of $.19/pound to $.12/pound in 1980, its lowest level since 1976.

Butterfish has been an important component of the foodfish fisheries of this region since at least the 1930s. The lowest total ex-vessel value in recent years was in 1972 at $404,000. Value of landings peaked in 1980 at $3,848,000, due largely to the expansion of an export market that began in 1978.

While landings and values of the landings for Atlantic mackerel, squid, and butterfish have been increasing, these species continue to be relatively unimportant to the overall commercial fisheries of the Atlantic Coast. In only 10 counties from Maine through South Carolina did these species combined account for more than three percent of the total county ex-vessel value in 1978. These counties were Lincoln, Maine (3.64%), Newport (5.46%) and Washington (27.47%), Rhode Island, Fairfield (3.45%), New Haven (8.49%) and New London (4.49%), Connecticut, Kings (3.39%) Nassau (5.74%) and Suffolk (10.86%), New York and Cape May, New Jersey (5.42%).

Pursuant to the existing Plans, vessel permits in the squid and mackerel fisheries have been required for the past 2 years. As of mid-June 1981, the number of commercial squid permits has increased 57% to 674 permits, party/charter boat permits decreased 14% to 37, and incidental commercial squid permits dramatically increased 247% to 125. Similarly, commercial mackerel increased 66% to 769 permits, party/charter boat permits increased 16% to 196, and incidental commercial mackerel permits increased by 254% to 177.

For vessels with commercial squid permits, the average hold capacity is 60,178 pounds, with a range of from 1 to 800,000 pounds. Average crew size in approximately 4, with a range of from 1 to 17.

Vessels with permits for the commercial mackerel fishery have an average hold capacity of 52,246 pounds, with a range of from 1 to 800,000 pounds. Average crew size is approximately 4, with a range of from 1 to 17.

The Butterfish Plan has been implemented for only 1 year. As of June, 1981, there were 345 commercial vessels permitted with an average hold size of 80,535 pounds (range from 2 - 800,000 pounds) and an average crew size of approximately 5 (range from 1 - 17). These statistics also show 10 butterfish party/charter boat and 75 incidental commercial permits issued for 1981.

None of the Plans has been in effect long enough to permit the development of meaningful vessel performance indicators based on fishing vessel records. Such information is necessary to develop

harvesting capacity estimates. However, using the average hold capacity for the permitted vessels it seems reasonable to conclude that the fleet would have the physical capacity to harvest Illex, Loligo, mackerel, and butterfish the maximum sustainable yield levels without extensive amounts of effort, if adequate markets existed. Given the average hold capacity of the permitted squid vessels (60,178 pounds or 27.3 mt) and the number of vessels (674), the total capacity of the fleet is 18,398 mt per trip. Using the same procedures for the permitted mackerel and butterfish vessels, the capacity is 18,221 mt and 12,600 mt per trip, respectively.

Table 14. National Average Ex-Vessel Price Per Pound of Butterfish, Squid, and Mackerel, Unadjusted and Adjusted for Inflation*

	Butterfish		Squid		Mackerel	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1965	$0.09	$0.10	$0.08	$0.08	$0.09	$0.09
1966	0.09	0.09	0.08	0.08	0.08	0.08
1967	0.13	0.13	0.06	0.06	0.05	0.05
1968	0.13	0.13	0.07	0.06	0.06	0.06
1969	0.12	0.11	0.10	0.09	0.05	0.05
1970	0.16	0.15	0.12	0.11	0.05	0.05
1971	0.17	0.15	0.13	0.12	0.05	0.05
1972	0.25	0.21	0.15	0.12	0.08	0.07
1973	0.24	0.18	0.20	0.15	0.12	0.09
1974	0.25	0.15	0.19	0.12	0.16	1.10
1975	0.24	0.14	0.18	0.11	0.12	0.07
1976	0.28	0.15	0.19	0.10	0.12	0.07
1977	0.28	0.15	0.26	0.14	0.18	0.09
1978	0.36	0.17	0.39	0.19	0.21	0.10
1979	0.35	0.15	0.32	0.13	0.24	0.10
1980	0.33	0.12	0.32	0.12	0.14	0.05

* Index used is national "Producer Price Index" (all goods).

Source: NMFS Statistics

Table 15. 1978 Reported Commercial Landings of Atlantic Mackerel, Butterfish, and Squid by Fishing Gear

	Mackerel		Butterfish		Squid	
	lbs	%	lbs	%	lbs	%
Haul Seines	91,400	2.7	15,700	0.2	-	-
Fish otter trawls	1,088,500	32.4	7,724,400	95.5	2,856,400	76.6
Mid-water/shrimp/other trawls	69,600	2.1	2,700	<0.1	11,400	0.3
Gill nets	406,950	12.1	22,200	0.3	800	<0.1
Lines	65,000	1.9	7,300	0.1	-	-
Purse seines	324,600	9.7	-	-	-	-
Pound nets/floating traps	1,306,000	38.9	310,400	3.8	848,600	22.7
Other gear	9,500	0.3	5,200	0.1	13,700	0.4
TOTAL	3,361,550	100.0	8,087,900	100.0	3,730,900	100.0

< = less than.

Source: Unpublished NMFS Statistics.

Table 16

Table 17

Table 17 continued

Table 18. Contribution of Commercial Landings of Squid, Atlantic Mackerel, and Butterfish to Selected New England and Mid-Atlantic Port Landings, 1979 (By Weight)

Port and State	Total Finfish and Squid (metric tons)	Squid %	Atlantic Mackerel %	Butterfish %
Portland, ME	26,257.3	0.03	0.11	-
Gloucester, MA	72,464.7	1.58	0.10	<0.01
Chatham, MA	6,086.7	6.47	1.85	0.21
New Bedford, MA	34,247.0	2.46	-	0.07
Provincetown, MA	11,047.8	3.42	0.92	0.08
Newport, RI	10,326.7	4.33	1.63	3.73
Pt. Judith, RI	24,697.0	2.86	0.56	5.42
Pt. Pleasant, NJ	5,253.8	1.08	0.51	2.29
Cape May, NJ	9,212.2	2.02	5.26	1.12

< = less than

Source: NMFS Weighout Files.

Table 19. Top Twenty US Counties in the 1978 Commercial Fisheries for Squid, Atlantic Mackerel, and Butterfish

By Percent of Total US Landings of Squid, Atlantic Mackerel, and Butterfish

State	County	%
RI	Washington	87.70
NY	Suffolk	47.13
MA	Barnstable	36.45
NJ	Cape May	32.99
MA	Essex	26.03
RI	Newport	19.15
NJ	Ocean	8.77
ME	Lincoln	7.97
ME	Cumberland	4.68
MA	Dukes	4.07
NC	Dare	4.02
VA	Hampton (city)	3.75
NY	Nassau	2.19
NY	Kings	1.64
CT	New London	1.62
MA	Bristol	1.60
ME	York	1.60
VA	Norfolk (city)	1.22
VA	Accomack	1.19
MD	Worcester	0.82
	TOTAL[1]	294.59%

By Contribution of Landings to Total County Ex-Vessel Value of All Finfish and Squid

State	County	%
RI	Washington	27.47
NY	Washington	10.86
CT	New Haven	8.49
NY	Nassau	5.74
RI	Newport	5.46
NJ	Cape May	5.42
CT	New London	4.49
ME	Lincoln	3.64
CT	Fairfield	3.45
NY	Kings	3.39
NJ	Ocean	2.69
SC	Beaufort	2.04
MA	Barnstable	2.00
VA	Norfolk (city)	1.86
VA	Hampton (city)	1.65
MD	Worcester	1.27
NC	Dare	1.21
VA	Accomack	1.12
MA	Dukes	0.93
NJ	Atlantic	0.80
	AVERAGE[2]	6.57

1 Out of a possible total of 300%.

2 The sum of the 20 county ex-vessel total revenues from squid, Atlantic mackerel, and butterfish divided by the sum of the 20 counties total ex-vessel revenues from food finfish and squid.

Recreational Fishery

The recreational fishing industry is important in the New England and Mid-Atlantic areas. Table 20 presents estimated values for 1975 (Centaur, 1977).

Table 20. 1975 Economic Impacts of Marine Recreational Fishing Maine - Cape Hatteras, North Carolina

Sales	$633,750,000
Value-added	$238,940,000
Wages and salaries	$116,960,000
Employment	17,350 person years
Annual capital expenditures	$ 17,631,000

No data are available on the specific value of the recreational fisheries for the species that are included in this Plan. However, as noted above, there are 196 party/charter boats with permits in the mackerel fishery, 37 in the squid fishery, and 10 in the butterfish fishery.

IX-2. Domestic Processing Sector

Since mackerel, squid, and butterfish have small markets in comparison with groundfish and other major fisheries of the Atlantic coast, processing sector and export information is generally unavailable. The following discussion is based on the most recent data available.

It is estimated that approximately 10 plants process mackerel in the northeast, although mackerel constitutes only a small percentage of the total volume processed. Similarly, a limited number of firms process mackerel in the Mid-Atlantic area. Processing for domestic consumption primarily involves filleting and canning. A substantial portion of the catch is also sold for bait. In 1963, 1965 and 1975, the value of processed mackerel from New England was $5,000, $21,000 and $75,000, respectively.

A total of 29 processing firms reportedly participate in the squid fishery. Of the total, eleven are located in Massachusetts, eight in Rhode Island, seven in Virginia, and one each in Maine, New York and New Jersey. All of these firms handle other fish products in addition to their seasonal squid supply.

The New England, Mid-Atlantic, and Pacific sections are the dominant producers of frozen squid (Table 21). New England's dominance through the mid-1950s has been replaced by the Pacific section, suggesting limited market opportunities.

Canned squid has reportedly been produced by New York and New Jersey firms. While east coast production has increased in recent years, it is still a minor commodity when compared to Pacific coast production. At present, canned squid is the only US commercially prepared squid product.

Most butterfish reported landed is sold fresh or frozen for human consumption. Demand in the US for butterfish as food is concentrated mainly on the largest and best quality fish.

A small fraction (approximately 0.6 - 2.0% of all landings) of the catches of the largest butterfish is smoked and sold in specialty markets. This processing is carried out almost exclusively in New York City, and most of these fish come from Suffolk County, New York, landings in the autumn, when large butterfish are most available in this area.

About 20% on average of the annual reported butterfish catch was used industrially from 1965 -1975 (the latest year for which data are available). This percentage has probably declined greatly because of the recent increase in landings used for exports. Most of this fraction of the catch is used for bait. Large quantities of butterfish have been periodically taken by industrial (scrap fish) fisheries which do not report landings by species. The composition of such "trash" fish landings may fluctuate markedly from year to year.

Comprehensive data on processing by simple freezing and exports of this production are not collected by the NMFS. No precise estimates are, therefore, available on these sectors of the processing and export

industries. Over 2,000 mt of butterfish were estimated to have been frozen and exported in 1978. This market declined in 1979. A very preliminary estimate indicates that 85% of the 1980 butterfish catch (4,459 mt) was exported. Exports of US caught and frozen Atlantic squid were probably negligible prior to 1979, in which year this industry also began to develop. The most recent survey of US processors indicates their capacity and desire to enter this export market to be substantial. The export market for US caught mackerel (other than the traditional, sporadic and relatively small export market for canned mackerel) has not yet been developed.

The US physical capacity to catch, freeze, and export squid, mackerel, and butterfish undoubtedly is equal to or exceeds the OYs recommended in this Amendment, but much of this capacity is now used for other species which are currently more profitable for the US industries. Processor reporting requirements (instituted pursuant to the original Plans) have not been in effect long enough to derive more precise estimates of shore-based and freezer trawler processing capacities.

Table 21. Production of Frozen Squid by Section[1/ 2/]
(thousands of pounds)

Year	NE	MID-A	SA	NC	SC	PAC	TOTAL[3/]
1965	18	238	9	---	9	3998	4272
1966	30	963	5	---	101	3494	4593
1967	372	384	111	---	105	625	1597
1968	527	164	29	---	118	1806	2644
1969	268	471	53	---	175	3225	4192
1970	51	55	10	---	69	2984	3179
1971	58	369	70	---	--	2215	2712
1972	275	182	40	---	--	1458	1955
1973	470	94	5	---	--	2371	2993[4/]
1974	858	118	144	---	--	5602	6722
1975	432	149	91	---	--	3190	3862
1976	2994	211	179	---	--	2740	6124
1977	1632	131	43	---	--	3346	5152
1978	415	73	9	---	--	7544	8041
1979	3596	315	-	---	--	8595	12506
1980	1094	146	-	---	--	5474	6674

1. Production by firms voluntarily reporting to NMFS. Excludes freezings by firms not reporting to NMFS on a monthly basis, by firms operating plate freezers at the end of fillet lines, and production of fishery products frozen on US vessels.
2. NE = ME, MA, RI, CT, and NH; MID-A = NY, NJ, DE, and PA; SA = MD, DC, VA, NC, SC, GA, and FL; NC = OH, IN, IL, MI, WI, MN, IA, MO, NE KS, ND, and SD; SC = AR, OK, TN, AL, MS, LA, and TX; PAC = WA, OR, CA, AZ, UT, CO, NV, and ID.
3. % of total freezings used for human comsumption, bait, and for other purposes are unknown.
4. Includes 53,000 lbs. from the State of Alaska.

Source: NOAA-NMFS Fish. Stats. of the US 1965-1976, NMFS Curr. Fish. Stats. 1977-1980.

IX-3. International Trade

In 1979, approximately 5.0 million pounds of "mackerel" (fresh or frozen) worth $1.6 million were imported into the US. In addition, 1.3 million pounds of salted or pickled mackerel worth $482,000 were imported. In 1980, 10.4 million pounds of US canned mackerel worth $13.8 million were exported from the US.

Exports of US canned squid (east and west coast combined) totalled 8.5 million pounds, worth $2.3 million in 1980. No data on imports of squid are available.

Prior to 1978, US butterfish exports, if any, were negligible. A US butterfish fishery for export was begun in 1978, based almost entirely on Rhode Island landings. Approximately 2,400 mt of whole frozen butterfish were exported in 1978, mainly to Japan (Pt. Judith Fishermen's Cooperative, personal communication). The ex-vessel value of this exported butterfish was approximately $2 million. Detailed

information on the processed value of these exports are unavailable, although it is estimated that US processors grossed between $3 and $4 million from these sales.

In 1979 butterfish exports for 1979 were reported to be 200 metric tons. This sharp reversal from 1978 may have been due to (1) Japanese reports of poor quality or (2) the lack of Japanese import licenses for butterfish that prevented willing wholesalers from importing butterfish. It is estimated that 85% of the 1980 butterfish landings were exported, implying a level of exports of approximately 4,500 metric tons. The value of these exports is unknown. The exact reasons for the renewal of butterfish exports to Japan during 1980 are unknown. Japanese statistical digests do not record buterfish exports and prices separately, consequently, little evidence is available concerning the Japanese markets for 1978-80. An 1979 assessment of the Japanese wholesale market for butterfish by the US Embassy in Tokyo indicated that Atlantic butterfish sold in institutional food markets and were significantly higher priced than their chief substitute, Pacific butterfish. The prices of Atlantic and Pacific butterfish were rising relative to 1978 and their markets appeared to be expanding. More recent evaluations of the Japanese butterfish wholesale markets have not been made.

It is impossible to predict the magnitude of butterfish exports in 1981. At present, foreign demand is greatest for large and roe free butterfish, which are most available to domestic fishermen during autumn and early winter.

The world supply of butterfish (butterfish and Pacific butterfish, Pampus echinogaster) is heavily dependent upon the Atlantic species (74% by weight of total landings of both species from 1970 -1977). From 1970 - 1976, the last year of unrestricted (except by area) foreign fishing for butterfish in the Atlantic Ocean, foreign butterfish catches from what is now the FCZ accounted for about 60% on average of the total harvest of both species (Pacific butterfish are not found within the US FCZ). In 1977, due mainly to enactment of the MFCMA, the total foreign catch of Atlantic butterfish fell to 2,077 tons, resulting in a total (all nations) catch of Atlantic and Pacific butterfish that year of about 5,400 mt, about one-third of the previous year's catch. The total foreign catch of both species, which averaged over 14,000 mt from 1970 - 1976, dropped to about 4,000 mt in 1977. The failure of foreign nations to harvest the entire butterfish TALFF in 1978 -1980 reflects not a lack of demand for butterfish, but probably a combination of other factors including (a) the failure of some nations with butterfish allocations to fish for any species in 1978, and (b) the possibility that foreign nations may have purposely minimized their catches of butterfish to the greatest extent practicable in order to prevent closure of their squid fisheries, which at present are of far greater importance to foreign fishing nations, and in which butterfish is an unavoidable by-catch.

The annual TALFF for butterfish has been 4,000 mt for 1978, 1979, and 1980. Japan, traditionally the largest harvester of butterfish, was allocated 672 mt of butterfish in 1978, 1,016 mt in 1979, and 1,050 mt in fishing year 1980-81, which is a small fraction of its average annual catch of butterfish from the Atlantic Ocean in the years prior to enactment of the MFCMA. It is likely that, as foreign butterfish allocations are limited, these countries will seek to maintain their supplies through imports from the US.

X. DESCRIPTIONS OF THE BUSINESSES, MARKETS, AND ORGANIZATIONS ASSOCIATED WITH THE FISHERIES

X-1. Relationship Among Harvesting and Processing Sectors

Squid, butterfish, and mackerel landings are only a small percentage of the potential capacities of harvesters and processors. These species have very small US markets for they are primarly consumed by ethnic communities in the Mid-Atlantic and New England. Given this limited demand, ex-vessel prices are very sensitive to landings. Harvesters are unwilling to land these species if their prices are not high enough relative to alternative species and if increased landings will cause ex-vessel prices to decline rapidly. Processors have shown a willingness to expand their production of these species in recent years because of increased demand for US caught squid and butterfish by foreign countries. This demand has stabilized ex-vessel prices with respect to landings and harvesters have responded accordingly.

So far there has been only one joint venture implemented. It occurred in June-July, 1981, and involved an agreement with a Japanese firm to purchase 1,000 mt of Loligo and up to 1,000 mt of mackerel, if it was caught as by-catch by US fishermen. A total of 323 mt of Loligo and no mackerel was taken in this joint

venture.

X-2. Fishery Cooperatives Or Associations

There are three active fishermen's cooperatives in the Mid-Atlantic area. Although some purchasing of expendable equipment for fishing vessels is undertaken, their main business is marketing members landings. Cooperative operations are typical of Mid-Atlantic packing or dock practice, supplying fuel, ice, water, and trip services to members. All three cooperatives are located in New Jersey. The three cooperatives are the Belford Seafood Cooperative Association, Inc., the Point Pleasant Fishermen's Dock Cooperative, Inc., and the Cape May Fishery Cooperative.

X-3. Labor Organizations

Labor organizations identified with the harvesting and processing sectors of the fisheries in the Mid-Atlantic area are limited to four organizations: the Seafarers International Union of North America, the International Longshoremen's Association, the United Food and Commercial Workers International Union (UF & CW) of the AFL-CIO, and the International Brotherhood of Teamsters. The following discussion relates to Mid-Atlantic fisheries generally. Information is not available to identify activities that relate directly to Atlantic mackerel, squid, or butterfish.

In the Mid-Atlantic area union involvement is almost entirely limited to onshore seafood handling, processing, and distribution activities. Vessel crews are not organized by any of the identified unions although some attempts have been made in the past to include fishermen in organized unions. The UF & CW recently attempted to organize vessel crews who were employees of a seafood processing company. Although their efforts were met favorably by the crew members, the National Labor Relations Board ruled that the UF & CW was in violation of labor law because each boat was owned by a separate owner and, therefore, all boat crews could not be organized under the same union. Since that ruling, the UF & CW has not attempted to organize vessel crews in any other locations.

Onshore seafood handling is generally non-unionized. To the extent that it is, the International Longshoremen's Association is the primary national union involved in seafood handling workers. Most union activity occurs in the region's major urban centers (New York, Philadelphia, Baltimore, and Norfolk) and includes handling workers at boat docks and in warehousing facilities located at processing plants.

Fish processing workers, when unionized, are represented by the UF & CW. This union represents oyster and clam shuckers, fish cleaners and cutters, freezermen, warehousemen, some distribution workers, and wholesale retail clerks.

Transportation of seafood products, especially from processing facilities to wholesale and retail fish distributors is organized under the International Brotherhood of Teamsters, with headquarters in Washington, D.C. and regional offices in major urban centers throughout the Mid-Atlantic region.

Preliminary analysis of labor union activity in the Mid-Atlantic region indicates that the seafood harvesting, handling, and processing industry is not highly organized. Although union activity occurs in all major urban centers, the overall percentage of union members employed in the seafood industry is relatively low. For example, in the Hampton Roads area, only five percent of all workers employed in the seafood harvesting processing industry are organized by the unions.

The reasons for limited union involvement include the low-wage, seasonal nature of employment in the processing industry and the diverse, highly competitive, independent small businessman characteristics of fishermen, brokers, and processors. In many instances, wages are extremely low, approaching minimum wage in some localities. Often fish processing employees are the lowest paid employees covered by the unions. These employees, subject to difficult working conditions and unstable employment prospects, change employment continuously, leaving employers with no work and hiring on with companies that do have work. Seasonality of employment and constant changeover from shellfish to finfish processing affect steady employment and limit the unions' ability to organize on-shore workers.

Unionization of vessel crews and fishermen is limited by the small size of individual crews and the investor-owner fishing boats. National Labor Relations Board rulings against organization of fishing fleets

have added to the organization and administrative problems of including fishermen in national union structures.

X-4. Foreign Investment In The Domestic Fishery

No significant foreign investment is known to exist in these fisheries.

XI. DESCRIPTION OF SOCIAL AND CULTURAL FRAMEWORK OF DOMESTIC FISHERMEN AND THEIR COMMUNITIES

Uniform socio-economic data on fishing communities are not available. Certain information is available from the federal censuses on a county basis. Therefore, Atlantic mackerel, squid, and butterfish landings were tabulated by county and analyzed to identify those counties with a significant involvement in those fisheries. Barstable and Essex, Massachusetts, Newport and Washington, Rhode Island, Suffolk, New York, and Cape May, New Jersey were selected as being relatively important in these fisheries.

The only one of the counties that may have been in some economic difficulty was Cape May, with many indicators significantly differing from the national averages. For example, median age was 38.9 relative to the US average of 28.3. Educational achievement of residents aged 25 years and more was 11.3 years for Cape May County and 12.1 for the US. Unemployment was 6.5% relative to 4.4% for the nation.

Data on fisheries employment are not available at the county level.

Table 22. Selected 1970 Socio-Economic Characteristics for Counties with Significant Mackerel, Squid, and/or Butterfish Landings

	US	Barnstable MA	Essex MA	Cape May NJ	Newport RI	Washington RI	Suffolk NY
Population							
Total (000)	203,212	97	638	60	95	86	1,295
% Change, 60-70	13.3	37.5	12.1	22.7	15.1	45.1	69.0
% Net mig. 60-70	1.7	32.4	4.4	21.9	0.4	24.6	49.3
% 18 yrs. & over	65.6	68.5	66.4	71.7	69.6	68.0	60.3
% 65 yrs. & over	9.9	16.9	11.9	10.0	7.2	7.8	7.6
Median age	28.3	34.4	31.0	38.9	23.9	23.7	26.4
Over 25, median school yrs. completed	12.1	12.6	12.3	11.3	12.2	12.2	12.2
Labor force							
Total (000)	82,049	37	272	21	47	37	404
Civilian (000)	80,051	34	271	20	27	28	403
% Fem. with husb.	57.0	58.5	54.2	54.8	56.9	58.3	61.3
% Unemployed	4.4	3.9	6.5	4.6	4.3	3.5	
% Emp. in mfg.	25.9	7.6	34.5	11.4	17.0	27.9	21.8
% Emp. outside county	17.8	6.1	20.9	15.8	13.2	22.1	34.4
% Families/female head	10.8	10.5	11.3	10.1	14.1	10.4	7.2
Median family income	$ 9,586	$ 9,242	$10,935	$8,295	$9,162	$ 9,603	$12,081
% Families low income	10.7	8.3	5.9	8.9	11.7	9.0	4.8
Mfg. estab.							
Total	311,140	96	1,294	52	53	74	1,475
% 20-99 emp.	24.3	10.4	26.5	26.9	13.2	31.1	26.5
% Total Retail Sales							
Eating & drinking places	7.7	12.4	9.1	19.6	10.2	7.6	7.1
% Selected Services Receipts							
Hotels, etc.	11.6	55.7	11.3	58.3	27.8	25.7	7.4
Amusements	13.7	8.8	13.1	18.1	22.5	D	15.8

D = Data not reported
Source: County and City Data Book, 1972.

XII. DETERMINATION OF OPTIMUM YIELD

XII-1. Specific Management Objectives

The objectives and management measures of the Atlantic Mackerel, Squid, and Butterfish Plans are presented in Section IV of this Amendment. The objectives of the mergered Atlantic Mackerel, Squid, and Butterfish Plan are:

(1) Prevent the exploitation of these resources from exceeding those levels which reduce the probability of successful (i.e., the historic average) recruitment to the fisheries.

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

(3) Provide the greatest degrees of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this Plan.

(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 management unit of the amended (merged) Plan is all Atlantic mackerel (Scomber scombrus), long-finned squid (Loligo pealei), short-finned squid (Illex illecebrosus), and butterfish (Peprilus triacanthus) under US jurisdiction.

XII-2. Description of Alternatives

(1) Take no action at this time.

This would mean that the Atlantic Mackerel and Butterfish Plans would lapse at the end of fishing year 1981-82. The Squid Plan has no fixed duration and would continue indefinitely under this alternative.

(2) Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83.

This would extend the Atlantic Mackerel Plan for 1 more fishing year with no changes. The Butterfish Plan would be extended for 1 more fishing year with OY increased from 11,000 mt to 13,000 mt and DAH increased from 7,000 mt to 9,000 mt.

(3) Merge the Atlantic Mackerel, Butterfish, and Squid Plans and Extend Them Through Fishing Year 1984-85.

The Plan would be extended for a total of 3 years. This period is considered long enough to evaluate whether the regime is workable. It is also possible that, by the end of 3 years, the US fishery will have developed to the point where additional revisions may be required in the management regime.

Since this alternative would extend the Plan for three years, it is possible that a US/Canadian bilateral fisheries agreement may be developed and implemented during the life of the Plan. In order for the Plan to remain valid following such an agreement, and to the extent that the species included in this Plan are jointly managed pursuant to such an agreement, all of the OYs discussed in this alternative are conditioned so that the OYs would be developed as described below or would be the US share of the Total Allowable Catch of the species developed through joint management procedures, whichever is less. If the US share of the TAC was less than the OY in any year, the OY would be reduced by reducing the TALFF by the appropriate amount, unless the TALFF was only for by-catch that year.

None of the following provisions limit the Council's ability to certify annual fishing levels for these species pursuant to the MFCMA.

The permitting requirements of the current Plans would be combined with no substantive changes (see Section XIII-1). The reporting requirements would be combined and revised to provide for reporting by means other than logbooks (see Section XIV-1).

LOLIGO AND ILLEX

The annual OYs for Loligo and Illex would be 44,000 mt and 30,000 mt, respectively. DAH and DAP would be between 7,000 and 44,000 mt for Loligo and 5,000 mt to 30,000 mt for Illex. The differences between the OYs and the DAHs, if any existed, initially would be allocated one-half to TALFF and one-half to Reserve. That portion of the Reserve not needed for increases to DAH could be allocated to TALFF.

ATLANTIC MACKEREL

The annual values for OY, DAH, DAP, and TALFF for Atlantic mackerel would be set in accordance with a series of procedures that depend on the predicted spawning stock size. DAH and DAP would be estimated annually but could be no less than 14,000 mt. The capacity for mackerel in the US recreational fishery would be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - (1.15)$$

where Y is the predicted recreational catch and X is the mackerel spawning stock size in the upcoming fishing year in thousands of metric tons (MAFMC, 1981a).

If the spawning stock size would be less than or equal to 700,000 mt after the US and Canadian estimated harvests were taken, the mackerel TALFF would be no greater than 2% of the allocated portion of the silver hake TALFF, plus 1% of the allocated portions of the red hake, Loligo, and Illex TALFFs. DAH would be set equal to 14,000 mt, or that amount which would leave a spawning stock size of 700,000 mt, whichever is greater. The OY would equal the sum of DAH and TALFF.

If the spawning stock size would be larger than 700,000 mt after the US and Canadian estimated harvests were taken, then the OY would equal that amount which, when taken in addition to the expected harvest in Canadian waters, would result in a spawning stock size of 700,000 mt the following year. Additionally, the mackerel OY would be adjusted appropriately downward if necessary in order to prevent the total mackerel catch (all waters, all nations) from resulting in a fishing mortality rate greater than 0.4, the present best estimate of $F_{0.1}$ (see Section V). The TALFF would equal the difference between the OY and DAH, but would not be less than 2% of the allocated portion of the silver hake TALFF, plus 1% of the allocated portions of the red hake, Loligo, and Illex TALFFs. If the TALFF thus derived were greater than 10,000 mt, one-half would be allocated to the initial TALFF and the other half would be placed in Reserve. That portion of the Reserve not needed for increases to DAH could be allocated to TALFF.

The separate harvest estimates for the US recreational and commercial mackerel fishery sectors are not separate quotas for these sectors. That is, no reallocation between the US sport and commercial fisheries would be necessary, even if it appeared likely that one sector would exceed its initial capacity estimate. There would also be no reallocation between DAH and TALFF.

Foreign fisheries are currently restricted to five areas ('windows') in the Atlantic. These windows are open at various months of the year for various gear types. Targeted foreign Atlantic mackerel fisheries may decrease the availability of mackerel to US fishermen by dispersing the schools immediately prior to their inshore migrations. Therefore, the recommended alternative included a change in the times when the windows are open for targeted foreign fisheries for Atlantic mackerel. Directed foreign fishing for Atlantic mackerel would be prohibited from 1 March through 31 October, but incidental catches in other authorized foreign fisheries would be permitted at any time, so long as TALFFs were not exceeded.

BUTTERFISH

The butterfish TALFF would be 6% (page 30) of the allocated portion of the Loligo TALFF, plus 1% of the allocated portions of the Illex, mackerel (if a targeted foreign fishery is allowed), silver hake, and red hake TALFFs. DAH would be whatever US fishermen catch up to 16,000 mt minus the TALFF. The butterfish OY would equal DAH plus TALFF, but could not exceed 16,000 mt.

The butterfish management unit would be expanded to include all butterfish under US jurisdiction.

XII-3 Analysis of Beneficial and Adverse Impacts of Potential Management Options

(1) Take no action at this time.

This alternative would free domestic harvesters and processors of mackerel and butterfish of Federal recordkeeping requirements and thus, presumably, reduce industry costs. This alternative would probably reduce enforcement, administrative, and data collection/processing costs of the Federal government. Based on data available to the Council, it is impossible to quantify these cost savings to the public or private sectors.

This alternative could benefit foreign harvesters because the TALFFs under preliminary fishery management plans or Secretarial amendments could be greater than those resulting from Plan management. The current Plans and alternatives (2) and (3) explicitly seek to foster development of the US fisheries for the subject species and restrict foreign harvests of these species in such a way so as to promote that growth. This alternative could undermine this US development, because a reversion to preliminary fishery management plan management would probably result in a relatively large annual reallocation of mackerel and/or butterfish to foreign nations.

Lack of a Plan could lead to overfishing, since US fishermen would not be regulated.

While Secretarial amendments would regulate the US as well as the foreign fisheries, the Council believes this alternative to be both undesirable and counter to the intent of the MFCMA. Under the Act, it is the responsibility of the Regional Councils to develop and amend management plans. The membership and operations of the Councils are specifically designed to provide the greatest possible opportunity for the public, affected industries, and the states to participate in the management process. Preliminary management plans, Secretarial plans, and Secretarial amendments are provided for in the MFCMA only so that some controls are possible under critical circumstances and when a Council is unable or unwilling to formulate a plan which meets the National Standards. Such a situation has not arisen with respect to the fisheries encompassed by these Plans.

Another effect of this alternative would be that data on US harvesting and processing capacities that would be collected as a result of the recordkeeping provisions of the Plan could not be collected, or could not be collected as effectively. This would seriously limit assessments of the scope and development of the US commercial and recreational fisheries, and would eliminate other fishery and biological information needed to assess OY, DAH, DAP, and condition of the stocks.

In addition, it is possible that the US and Canada will conclude and implement a bilateral fisheries treaty in the near future. Since the mackerel resource and fishery extends significantly into Canadian waters, it is highly probable that such a treaty would specify bilateral management of this resource. If this occurred, the US would be required to manage the US (sport and commercial) and foreign fisheries for mackerel in US waters in conformace with the terms of such a treaty and whatever management measures (such as quotas) as might be promulgated on an annual basis by the international management authority. Established Plan management would facilitate implementation of such a treaty, since bilateral management might require regulation of US fishermen. Under the MFCMA, such regulation is possible only with a Plan. Established Plan management would also ensure equitable treatment of US commercial and recreational fishermen under international management.

(2) Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83.

It is the Council's intent that this alternative be submitted for implementation only if the recommended alternative (3) is judged to be unapprovable or if substantial opposition to alternative (3) is raised during public hearings. In other words, this alternative is proposed mainly to provide for short-term management continuity, if it becomes necessary. In that context, this alternative would have a beneficial impact relative to No Action or another one year extension of the Plans without changes because it would continue management and recordkeeping and adjust the butterfish OY and DAH to levels appropriate for 1982-83.

This alternative would require additional amendments to the Atlantic Mackerel and Butterfish Plans to extend them beyond the end of fishing year 1982-83. It would not have the flexibility associated with the merger of the three Plans.

(3) Merge the Plans and Extend Them Through Fishing Year 1984-85.

This alternative would result in cost savings to the public and private sectors by reducing the number of permits and sets of regulations currently imposed by the three separate Plans.

At present, the export markets and development of the US harvesting and processing capabilities for these species, especially squid and butterfish, are closely related. One plan for these species would facilitate more meaningful estimates of DAH and DAP.

Another major advantage of the recommended alternative is increased management effectiveness relative to foreign fisheries in the FCZ. As discussed in Section VIII, the foreign fisheries for the subject species and the hakes are interrelated, at least to the extent that by-catches of each species regularly occur in targeted foreign fisheries for each of the other species. For example, it is impossible to regulate the foreign butterfish fishery without affecting the Loligo fishery. Similarly, but to a lesser extent, mackerel and silver hake traditionally have been consistently occurring by-catches in the foreign fisheries for each other. With or without merger of all three Plans, such interactions must be recognized in the management of each fishery, and the recommended alternative will facilitate such management to the greatest degree possible at the present time. Similarly, the recommended alternative would facilitate the addition of other species to the Plan. It should also be noted that the Council would retain the ability to amend the Plan at any point in the future. There would be no loss of flexibility or responsiveness over the present system of annual amendments to the Plans.

The recommended alternative would have an impact on foreign fisheries in that it may reduce foreign catches of the subject species. As a consequence, there would be a loss of revenue from foreign fishing fees to the US. However, the long-term economic benefits to the private and public sectors of successful US export and recreational fisheries would far outweigh these short-terms losses.

One of the major objectives established in the original Butterfish Plan is the development of the US fishery for export. It was determined by the Council that a reduction in the foreign butterfish fishery was a necessary initial step in accomplishing this goal. This reduction in foreign catch is not only designed to secure a greater potential export market for US processors, but also to provide the highest possible butterfish availability and catch-per-unit-of-effort for US harvesters in their still largely inshore and high cost (compared to other nations) butterfish fisheries. The OY for butterfish was accordingly set beneath the maximum sustainable yield level in the original Plan and its Amendments. Another major consideration in butterfish management is the fact that butterfish is an unavoidable and relativley large (in fact, the primary) by-catch in the foreign Loligo fishery, and is a comparatively minor but consistently occurring by-catch in other foreign fisheries.

Because of these considerations, this alternative would establish the butterfish TALFF (and thus, in part, OY) as only that amount necessary for foreign nations to harvest their allocations of the squids, mackerel, and silver and red hake. This is in keeping with the policy established in the original Preliminary Fishery Management Plan for the Trawl Fisheries of the Northwest Atlantic and the original Butterfish Plan.

The maximum US butterfish harvest would equal 16,000 mt minus the TALFF. While this may constrain the US industry to slightly less than the full amount of butterfish available for harvest, this formulation is preferable to reductions of the butterfish TALFF to beneath by-catch requirements and, eventually, to zero, i.e., making butterfish a 'prohibited species' to foreign fleets. A "prohibited species" is defined by the Foreign Fishing Regulations to be any species for which a foreign vessel does not have an allocation, and which, thus, must be discarded at sea. "Prohibited species" status, therefore, does not prevent mortalities of that species through foreign fishing, but only prevents retention of such catches. It should also be noted that while foreign nations must pay fees (based on species tonnage) to the United States for by-catch allocations, no fees are collectible for discarded catches of "prohibited species". A third consideration is that specific by-catch TALFFs constrain foreign catches of a species - when an allocation has been taken, a foreign nation must cease all fishing operations which could lead to significant further catches of that species. A by-catch allocation thus forces foreign nations to fish as cleanly as possible.

These constraints are not available under "prohibited species" regulations; a foreign nationa may pursue its permitted fisheries for other species so long as all catches of the prohibited species are discarded at sea. There is less incentive to foreign nations to fish cleanly under "prohibited species" regulation, and there is less US control over the size of those discarded catches, than exists with by-catch-only TALFFs. It is the Council's belief that conservation cannot be assured under "prohibited species" regulation.

The acceptability of setting TALFFs to account for bycatches was established in the original Atlantic Mackerel Plan. The procedure was also used in the original Butterfish Plan. The Amendment does not change the approach. It merely substitutes percentages for fixed values in an attempt to provide flexibility within the framework plan context.

In summary, while a butterfish by-catch TALFF may reduce the amount of butterfish available to US fishermen as the US harvest begins to approach MSY, the use of a by-catch TALFF, instead of prohibited species status, will ensure that total butterfish catches do not exceed the OY and will provide some revenue, through foreign fishing fees. Using the by-catch percentage allocations in this Plan, the maximum butterfish TALFF would not exceed about 3,700 mt. That estimate, however, assumes 1) a Loligo TALFF of 37,000 mt; 2) Illex, silver and red hake, and mackerel TALFFs totalling 150,000 mt; and 3) all TALFFs are allocated to foreign nations. The butterfish TALFF in fishing year 1980-81 would have been 2,732 mt, if the proposed system had been in effect, given the final allocations of silver and red hake, Loligo, Illex, and mackerel (23,500 mt, 4,260 mt, 35,075 mt, 25,000 mt, and 9,950 mt, respectively).

As Table 2 and Figure 2 indicate, the US fisheries for both Loligo and Illex also have begun to develop in response to foreign demand, and the Council has determined that protection of this growing US export industry is an important consideration for this Amendment. Support of US industry efforts to enter international squid markets will be especially important over the next few years, while the new US industry is still highly vulnerable to foreign competition.

XII-4. Tradeoffs Between the Beneficial and Adverse Impacts of the Preferred Management Option

The impacts of the recommended alternative are discussed in Section XII-3. No adverse impacts have been identified except those to foreign fleets.

Following public hearings the Council reviewed the recommended alternative and made certain revisions. All of the revisions were made to the mackerel regime. The provision to close the foreign directed mackerel fishery from March through October was deleted. The mackerel spawning stock size above which a directed foreign mackerel fishery is possible was lowered from 700,000 mt to 600,000 mt. The minimum US allocation when the spawning stock size is equal to or less than 600,000 mt was changed from 14,000 mt to a range of from 9,000-30,000 mt minus the bycatch TALFF and the OY when the spawning stock size is less than or equal to 600,000 mt was specified as whatever US fishermen catch up to 30,000 mt minus the bycatch TALFF. When the spawning stock size is greater than 600,000 mt, the minimum US allocation is 30,000 mt.

The removal of the seasonal closure of the foreign directed mackerel fishery was made because the provision received no support, but significant opposition, during the hearings.

The revisions to the mackerel regime were made to provide a greater opportunity for the development of the US fishery than would have been possible with the provisions of the recommended public hearing alternative. The mackerel regime has operated under Amendments 1 and 2 to the Atlantic Mackerel Plan with an OY of 30,000 mt and a spawning stock size of less than 700,000 mt. Recent developments in the mackerel fishery, particularly with regard to joint ventures, led the Council to conclude that limiting the US fishery to 14,000 mt when there is no critical stock problem is too constraining on the development of the US fishery. The minimum spawning stock size was reduced not only to provide more flexibility for the development of the US fishery, but also to provide an increased possibility for a directed foreign mackerel fishery which could in turn be used to provide incentives for foreign purchases of US harvested mackerel. In the hearing recommended alternative the only foreign incentives were Loligo and Illex TALFFs, that is, the State and Commerce Departments could operate their "fish and chips" policy by making foreign allocations of Loligo and Illex in exchange for foreign purchases of US harvested Loligo, Illex, mackerel, and butterfish. Increasing the possibility of a directed foreign mackerel fishery by lowering the minimum spawning stock size adds mackerel to Loligo and Illex on the list of species that are available for "fish and

chips" bargaining. The net effect of these changes to the mackerel regime is to make mackerel a target for development along with butterfish. The impetus for these changes were presentations made to the Council concerning potential joint ventures for mackerel.

The recommended alternative includes a mechanism for automatically estimating the US sport catch of mackerel for the upcoming fishing year. It is highly unlikely that this method would underestimate that capacity, but it may overestimate it in some years. The amount of the overestimate would certainly always be small relative to the total resource. No better method for predicting recreational capacity exists at present.

The general beneficial and adverse impacts of using by-catch ratios (fixed percentages) in setting TALFFs are discussed in Section XII-3. More specifically, the by-catch percentages proposed in this Amendment are generous allowances compared to most nations' performances in the last two years (Mid-Atlantic Council, 1981b). It is impossible to predict the impact of these ratios on specific nations, since allocations to individual nations may not themselves be distributed according to the by-catch nations by the State Department. As a general conclusion, the proposed by-catch allowances should not force foreign fishermen, as a group, to fish any more cleanly than they have been voluntarily (Mid-Atlantic Council, 1981b). In particular, it should be noted that butterfish abundance has been very high in the last two years, and thus the butterfish by-catch allowance for the Loligo fishery, which is slightly larger than the actual by-catch rates during this period, should not be restrictive if relative species abundances change.

The choice of 600,000 mt as the mackerel spawning stock size beneath which there exists no surplus for a directed foreign fishery or a large scale US commercial fishery represents a balance between the needs to (1) maintain a spawning stock size adequate to produce, under normal environmental conditions, average recruitment; (2) maintain a total stock size large enough to provide ample opportunities for a successful recreational fishery; and (3) provide for and promote the growth of the US commercial fishery, especially for export. It is recognized that the larger the spawning stock size, the larger the probability of both good recruitment and large recreational catches, even beyond 600,000 mt. It is, however, both impossible and undesirable to maintain constantly a mackerel stock size at the highest levels ever observed. It is reasonable to assume that, past some (unknown) level, increases in stock size do not influence recruitment/catches as much as natural environmental and other factors, and would not outweigh the losses to the commercial fishery that would be required. Maintaining the spawning stock at some intermediate level (600,000 mt) and limiting catches to an intermediate fishing rate ($F_{0.1}$) is a reasonable compromise which safeguards all recreational and commercial interests. Technical discussions of the relationships between spawning stock size, recruitment, and sport catches are given in Anderson (1980) and Mid-Atlantic Council (1981a).

One objective of the Amendment is the development of the US commercial fishery, including the fishery for export. This concept was advanced in the original Butterfish Plan and continued in its Amendments and in Amendment #1 to the Squid Plan. The approach used to achieve the objective is to set foreign allocations at levels that will reduce the share of foreign supplies that foreign nations can harvest directly, in anticipation that foreign nations will purchase US-caught fish to, at least in part, make up the difference between foreign demand and what the foreign nations may harvest directly. Elimination of large-scale foreign butterfish catches is also designed to provide the highest possible butterfish availability and catch per unit of effort for US harvestors in their still largely inshore and high cost (compared to other nations) fisheries (see Section XII-3). Strand (1980) in a study of Spanish Loligo harvests, market prices, and imports, concluded that the price of Loligo in Spain was negatively correlated to Spanish Loligo harvests, and that allocations to foreign fleets in the FCZ can retard the development of the US export industry. It would be irresponsible to extrapolate this limited work to all of the fisheries included in this Amendment, but it is an indication that the concept of the Amendment may be valid. However, another indication that this concept is valid is the following statement from the European Weekly Frozen Fish Report (22 April 1981) concerning Loligo: "Spanish importers see no interest, at this time, in buying from US producers, as long as Spanish ships returning from northwest Atlantic waters can continue their fruitful fishing campaign in these waters. Furthermore, the quality of land frozen squid produced by USA processors cannot, apparently, compare with that of sea frozen squid." With respect to the quality issue, unless there is a large enough constant demand for US produced squid, US processors are unlikely to invest in quality improving changes in their technology.

It is logical to conclude that, if TALFFs were high enough to satisfy foreign demand, there would be no demand by foreign nations to purchase US-caught fish. Obviously, the development of export markets for US-caught fish involves more than simply reducing foreign allocations. This is recognized in Section XIII-8 of this Amendment, which endorses recent Commerce Department initiatives to develop export markets by giving preferential allocations to foreign nations that agree to purchase US-harvested fish. The Council believes that the TALFFs proposed in this draft Amendment are reasonable to achieve the objective, that is, low enough to provide some foreign demand for US-caught fish and high enough to permit effective implementation of the Commerce Department initiative of giving preferential allocations to foreign nations that agree to purchase US-harvested fish. The proposed quantities are subject to revision following the public review of this Amendment.

Relationships Between the Adopted Alternative and the Objectives

(1) Prevent the exploitation of these resources from exceeding those levels which reduce the probability of successful (i.e., historic average) recruitment to the fisheries.

The OYs for Illex, Loligo, and butterfish reflect the best current estimates of maximum sustainable yields, except for Illex, for which the OY was reduced from MSY in the original Squid Plan to account for biological uncertainties, and this reduction is continued in the recommended alternative. The recommended management procedures for Atlantic mackerel derive the annual OY from the most recent stock assessments, with prescribed systems based upon fluctuations in abundance to assure reduced catches during times of reduced stock abundance.

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

The only significant limits placed on the US fishery by the recommended alternative are biological, except for the by-catch TALFFs for butterfish and mackerel and the reduction of the Illex OY from MSY. The butterfish TALFF is restricted to by-catch levels to enhance the development of an export fishery. The use of similar measures for the squids and mackerel is felt to be premature at this time.

(3) Provide greatest degrees of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this Plan.

The recommended alternative places no constraints on US fishermen relative to harvesting their allocations. Constraints on foreign fishermen, except for the reduced season for a directed Atlantic mackerel fishery, are continued unchanged from the current Plans.

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

This objective relates primarily to the Atlantic mackerel fishery. The management of mackerel toward an optimum stock size will accomplish this objective by maintaining a biomass level sufficient for high recreational opportunities and catches. The recommended alternative establishes a system for forecasting the demand for Atlantic mackerel by US recreational anglers based on the apparent historical relationship between the recreational catch and spawning stock size, with a minimum estimate of 9,000 mt.

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

The recommended alternative continues the permitting and reporting requirements of the original Plans as amended, which will result in the collection of necessary data on the US and foreign fisheries. In addition, additional stock assessment, recreational fisheries, and by-catch relationship research is recommended in Section XVI of the Amendment.

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

The recommended alternative, by adopting the Foreign Fishing Regulations by reference, adopts the fixed gear avoidance requirements of those regulations. In addition, the New England and Mid-Atlantic Fishery Management Councils are working on the development of gear marking and reporting regulations.

The Adopted Alternative Relative to the National Standards

Section 301(a) of the MFCMA states: "Any fishery management plan prepared, and any regulation promulgated to implement such plan ... shall be consistent with the following national standards for fishery conservation and management." The following is a discussion of the standards and how this Plan meets them:

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

The best scientific evidence available indicates that neither species of squid or butterfish is currently overfished or at a reduced level of abundance. The mackerel population is rebuilding. Harvests at the OY levels described in the recommended alternative should not endanger future harvests at comparable levels.

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

This Plan is based on the best and most recent scientific evidence available.

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

The recommended alternative meets the requirements of this standard by simultaneously managing Atlantic mackerel, butterfish, Loligo, and Illex in a complementary manner. The recommended alternative also takes into account catches of mackerel outside of US waters.

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

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

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

The recommended alternative permits growth in the US fishery up to the maximum conservative biological levels. No restrictions, other than overall quotas, the need to have permits, and reporting, would be imposed on US fishermen by the recommended alternative.

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

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

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

The recommended alternative is consistent with and complements, but does not duplicate, management measures contained in other plans or preliminary fishery management plans. Costs of management should decrease from the costs associated with implementing the current Plans.

XII-5. Specification of Optimum Yield

The Council has adopted this Amendment of the Squid, Atlantic Mackerel, and Butterfish Plans which merges them into one Plan, extends the merged Plan through 31 March 1985, and establishes a management system that will permit OY, DAH, DAP, and TALFF to be estimated annually through an administrative process rather than by Plan Amendment.

MSY for Loligo has been set at 44,000 mt, which is also the quantity specified for OY. DAH is specified as a range bounded on the bottom by 7,000 mt and on the top by OY. The specific value for any year will be determined administratively (see Section XIII-3). The difference between OY and the initial annual estimate of DAH is will be divided ½ to TALFF and ½ to Reserve. Allocations from the Reserve are made following the procedures discussed in Section XIII-3, which are virtually identical to those used in the current Squid Plan.

MSY for Illex has been set at 40,000 mt. OY has been and continues to be specified at 30,000 mt, the difference between MSY and OY being an allowance for biological uncertainities. DAH for Illex is a range with the regime operating similar to that outlined above for Loligo. The details for the Illex regime are set forth in Section XIII-3.

MSY for butterfish has been set at 16,000 mt. The OY specified in the adopted alternative may not exceed that quantity, but may be less. The MFCMA provides that OY may differ from MSY for economic reasons. In this case, the reason for the difference is the development of the US fishery for export. The concept is simply that if foreign nations are not permitted to directly harvest butterfish, there will be a greater incentive to purchase the fish from US harvesters and processors. It is recognized that butterfish are a by-catch in other foreign fisheries and it is necessary, therefore, to provide a TALFF in keeping with those by-catch requirements. This concept was included in the original Butterfish Plan and Amendments #1 and #2. The recommended alternative modifies the way the concept is stated. The restatement introduces more flexibility into the system by eliminating the use of specific values for OY, DAH, and TALFF. OY is specified as whatever quantity of butterfish US fishermen harvest annually plus a TALFF equal to 6% of the allocated portion of the Loligo TALFF and 1% of the allocated portions of the Illex, Atlantic mackerel, silver hake, and red hake TALFFs, up to 16,000 mt. DAH would equal whatever quantity of butterfish US fishermen harvest, not to exceed 16,000 mt minus the TALFF.

The mackerel MSY has been estimated to be 210,000 - 230,000 mt. The relationship between the limiting fishing mortality rate ($F_{0.1}$ = 0.4) and the rate that would generate the MSY is discussed in Section V-3. The long-term average yield produced from $F_{0.1}$ would be about 90% of the MSY. The additional restriction of the 600,000 mt spawning stock size 'floor' could additionally reduce this percentage over the long term. It should also be pointed out, however, that this Amendment's OY-setting formula might still allow for an OY larger than the MSY, if mackerel abundance were extremely high, as it was in the early 1970s. (It is unlikely that the stock size will increase that much during the life of this Amendment.) This modification of OY from MSY provides some insurance against recruitment overfishing and protection of the US sport fishery while still allowing development of the domestic commercial fishery and appropriately large harvests when the resource is unusually abundant. Specifying the OY at 30,000 mt when the spawning stock is 600,000 mt or less is considered necessary to achieve objectives (1) and (2).

The initial OYs, DAH, DAP, TALFFs, and Reserves for Illex, Loligo, and butterfish would be set as indicated by the values shown in Table 23. The initial DAH and DAP for the squids and butterfish may be increased during any fishing year from the Reserves for the squids and by increases within the OY range for butterfish if actual catches by vessels of the United States exceed the initial estimates of DAH for that fishing year. The annual OY for Atlantic mackerel will be set in accordance with a set of defined procedures depending on the Atlantic mackerel spawning stock size. The system for annually establishing OY, DAH, DAP, TALFF, and Reserves is discussed in Sections XII-2 and XII-3.

Table 23 provides no estimate of Joint Venture Processing, that is, those fish that could be harvested by US fishermen from the DAH but transferred at sea to foreign vessels. No data are available to produce a reasonable estimate for Joint Venture Processing. Joint ventures were not considered in the Atlantic Mackerel and Butterfish Plans or in Amendments to those Plans. In Amendment #1 to the Squid Plan, joint ventures were permitted on a case-by-case basis, so long as joint ventures did not result in a negative impact on US processors. The Council believes that this is a reasonable approach and proposes to

extend it to this Amendment. In other words, joint ventures would be considered on a case-by-case basis for Atlantic mackerel, Illex, Loligo, and butterfish and would be permitted if such joint ventures would not have a negative impact on the development of the US harvesting and processing sectors.

Table 23. Optimum Yield, Domestic Annual Harvest, Domestic Annual Processing, and Total Allowable Level of Foreign Fishing for Illex, Loligo, Butterfish, and Atlantic Mackerel

	Illex	Loligo	Butterfish	Mackerel(1)	Mackerel(2)
OY	30,000	44,000	up to 16,000	up to 30,000	up to F= 0.4
DAH	5,000 to 30,000	7,000 to 44,000	up to 16,000 - TALFF	up to 30,000 - TALFF	at least 30,000
DAP	5,000 to 30,000	7,000 to 44,000	up to 16,000 - TALFF	up to 30,000 -TALFF	at least 30,000
TALFF	½ of OY - DAH	½ of OY - DAH	by-catch only (3)	by-catch only (4)	OY - DAH (5)
Reserve	½ of OY - DAH	½ of OY - DAH	no reserve	no reserve	(5)

(1) When spawning stock size is less than or equal to 600,000 mt (see Section XIII-3).
(2) When spawning stock size is greater than 600,000 mt (see Section XIII-3).
(3) 6% of the allocated portion of the Loligo TALFF and 1% of the allocated portions of the Illex, silver hake, and red hake TALFFs.
(4) by-catch = 2% of allocated portion of the silver hake TALFF and 1% of the allocated portions of the Loligo, Illex, and red hake TALFFs.
(5) If OY - DAH is greater than 10,000 mt, ½ the difference is TALFF and the other ½ is Reserve.

XIII. MEASURES, REQUIREMENTS, CONDITIONS, OR RESTRICTIONS PROPOSED TO ATTAIN MANAGEMENT OBJECTIVES

Note: The following measures are intended to implement the adopted alternative. All references to the Foreign Fishing Regulations are intended to adopt by reference except the Foreign Fishing Regulations as they may exist at the time of the adoption of this Plan by the Secretary of Commerce and as they may be amended from time to time following Plan adoption.

XIII-1. Permits and Fees

These requirements are identical to those in the current Atlantic Mackerel, Squid, and Butterfish Plans and are presented here to facilitate understanding of Amendment. It is the Council's intent that permits issued pursuant to the current Plans continue in effect upon implementation of this Amendment and be valid for the fisheries included in this Amendment.

Any owner or operator of a vessel desiring to take any Atlantic mackerel, squid, and/or butterfish within the FCZ, or transport or deliver for sale, any Atlantic mackerel, squid, and/or butterfish taken within the FCZ must obtain a permit for that purpose. Each foreign vessel engaged in or wishing to engage in harvesting the TALFF must obtain a permit from the Secretary of Commerce as specified in the MFCMA. This section does not apply to recreational fishermen taking Atlantic mackerel, squid, and/or butterfish for their personal use, but it does apply to the owners of party and charter boats (vessels for hire).

The owner or operator of a US vessel may obtain the appropriate permit by furnishing on the form provided by the NMFS information specifying, at least, the names and addresses of the vessel owner and master, the name of the vessel, official number, directed fishery or fisheries, gear type or types utilized to take Atlantic mackerel, squid, and/or butterfish, gross tonnage of vessel, crew size including captain, fish hold capacity (to the nearest 100 pounds), and the home port of the vessel. The permit issued by the NMFS must be carried, at all times, on board the vessel for which it is issued, mounted clearly in the pilothouse of such vessel, and such permit, the vessel, its gear and equipment and catch shall be subject to inspection by an authorized official.

Permits may be revoked by the Regional Director for violations of this Plan.

Vessel Identification

Each US fishing vessel shall display its official number on the deckhouse or hull and on an appropriate

weather deck. Foreign fishing vessels shall display their International Radio Call Signs (IRCS) on the deckhouse or hull and on an appropriate weather deck. The identifying markings shall be affixed and shall be of the size and style established by the NMFS.

Fishing vessel means any boat, ship or other craft which is used for, equipped to be used for, or of a type which is normally used for, fishing, except a scientific research vessel. For the purpose of this regulation, fishing vessel includes vessels carrying fishing parties on a per capita basis or by charter which catch Atlantic mackerel, squid, and/or butterfish for any use.

Sanctions

Vessels conducting fishing operations pursuant to this Plan are subject to the sanctions provided for in the MFCMA.

If any foreign fishing vessel for which a permit has been issued fails to pay any civil or criminal monetary penalty imposed pursuant to the Act, the Secretary may: (a) revoke such permit, with or without prejudice to the right of the foreign nation involved to obtain a permit for such vessel in any subsequent year; (b) suspend such permit for the period of time deemed appropriate; or (c) impose additional conditions and restrictions on the approved application of the foreign nation involved and on any permit issued under such application, provided, however, that any permit which is suspended pursuant to this paragraph for nonpayment of a civil penalty shall be reinstated by the Secretary upon payment of such civil penalty together with interest thereon at the prevailing US rate.

XIII-2. Time and Area Restrictions

Foreign nations fishing for Atlantic mackerel, squid and/or butterfish shall be subject to the time and area restrictions set forth in 50 CFR 611.50. Foreign nations fishing for Atlantic mackerel, squid, or butterfish shall be subject to the fixed gear avoidance regulations set forth in 50 CFR 611.50(e).

XIII-3. Catch Limitations

The fishing year for Atlantic mackerel, Illex, Loligo, and butterfish shall be the twelve (12) month period beginning 1 April.

The annual values for OY, DAH, DAP, and TALFF for Illex, Loligo, butterfish, and Atlantic mackerel will be determined according to the following procedures, except that, if a US/Canadian bilateral fisheries agreement is developed and implemented during the life of the Plan and to the extent that the species included in the Plan are jointly managed pursuant to such an agreement, all of the OYs are conditioned so that the OYs would be developed as described below or would be the US share of the Total Allowable Catch of the species developed through joint management procedures, whichever is less. The OY would be reduced by reducing the TALFF by the appropriate amount, unless the TALFF was only for by-catch needs that year.

None of the following provisions are interpreted as limiting the Council's ability pursuant to the MFCMA to certify annual fishing levels for these species.

Estimates of DAH and DAP will be made annually by the Regional Director, in consultation with the Council and with opportunity for public comment. The estimates will be based on information gathered from an annual survey of processors, landings and catch reports, NMFS stock assessments, and other sources as appropriate. The annual DAH and DAP values will be between 7,000 mt and 44,000 mt for Loligo, between 5,000 mt and 30,000 mt for Illex, up to 16,000 mt minus the TALFF for butterfish, and no less than 30,000 mt minus the TALFF when the spawning stock size is less than or equal to 600,000 mt and no less than 30,000 mt when the spawning stock size is greater than 600,000 mt for Atlantic mackerel.

LOLIGO AND ILLEX

The annual OYs for Loligo and Illex would be 44,000 mt and 30,000 mt, respectively. Estimates of DAH and DAP for Loligo and Illex would be made annually, as described above. The differences between the OYs and the DAHs, if any existed, initially would be allocated one-half to TALFFs and one-half to

Reserves. That portion of the Reserves not needed for increases to DAHs could be allocated to TALFFs.

The process for allocation of the Reserves currently used in Amendment #1 to the Squid Plan would be continued. That is, during August in the case of Illex and during September in the case of Loligo, the Regional Director, in consultation with the Council, would project the total amounts of squid that would be harvested by US fishermen during the entire fishing year. For Illex, the monthly catches from April through July (exclusive of joint venture harvest) shall be multiplied by no less than 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August (exclusive of joint venture harvest) shall be multiplied by no less than 1.3 to obtain a projected annual harvest. Amounts authorized for joint ventures shall be added to these projections. If the projected amount of either species to be harvested by US fishermen, including joint ventures, exceeds the initial DAH, the Regional Director shall leave the excess in the Reserve in order to allow the US fishery to continue without closure throughout the year. The remainder of the Reserve for each species could then be allocated to TALFF. After the initial allocation decision is made, the Regional Director may allocate any remaining portion of the Reserves to TALFF if he determines that the US harvest, including joint ventures, will not attain the projected level, if such allocation is consistent with the objectives of the Plan.

The above multiplication factors were derived by NMFS based on monthly US catches during 1979-1980 (Federal Register 45(150):51254-51256). The Regional Director, in consultation with the Council, shall review the multiplication factors prior to making the annual projections. The factors shall be increased by the Regional Director if US catch data for fishing years subsequent to fishing year 1979-80 indicate that US harvesting patterns have changed.

ATLANTIC MACKEREL

The estimates of spawning stock size and Canadian harvesting capacity will be made by the Council's Scientific and Statistical Committee based on a review of the latest NEFC stock assessment and other relevant data. 'Canadian harvest' means the total mackerel catch in Canadian waters by all nations. If no prediction of Canadian harvest is available, the actual or projected Canadian catch in the current year will be used for the estimate. The report of the Scientific and Statistical Committee will be reviewed by the Council. The report, along with any Council comments, will be submitted to the Regional Director, who will use it as the basis for the following calculations. If the Regional Director does not agree with the recommendations of the Council and Scientific and Statistical Committee, he must submit his reasons for disagreement in writing to the Council.

The capacity for mackerel in the US recreational fishery shall be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - (1.15)$$

where Y is the predicted recreational catch and X is the mackerel spawning stock size in the upcoming fishing year, as estimated following the procedures described above, in thousands of metric tons.

If the spawning stock size would be less than or equal to 600,000 mt after the full US and Canadian expected harvests were taken, the mackerel TALFF would be no greater than 2% of the allocated portion of the silver hake TALFF, plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. The DAH will be set within the range of 0 - 30,000 minus the TALFF. OY would equal the sum of DAH and TALFF, but could not exceed 30,000 mt.

If the spawning stock size would be larger than 600,000 mt after the full predicted US and Canadian harvesting capacities were taken, the OY would equal that amount which, when taken in addition to the predicted Canadian catch, would result in a spawning stock size of 600,000 mt the following year. Additionally, the mackerel OY would be adjusted appropriately downward, if necessary, in order to prevent the total mackerel catch (all waters, all nations) from resulting in a fishing mortality rate greater than 0.4, the best present estimate of $F_{0.1}$. DAH would equal at least 30,000 mt. The TALFF will equal the difference between OY and DAH, but would not be less than 2% of the allocated portion of the silver hake TALFF, plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. If the TALFF thus derived is greater than 10,000 mt, one-half of this surplus will be allocated to the initial TALFF and the other half will be placed in a Reserve.

If such a Reserve is created, during October of each year, the Regional Director shall project the total amount of mackerel that will be harvested by US fishermen during the entire fishing year. If the projected amount to be harvested by US fishermen exceeds the initial level of DAH specified, the Regional Director must leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. Whatever of the Reserve is not needed to meet the projected US harvest may be allocated to TALFF.

BUTTERFISH

The annual OY of butterfish would be whatever US fishermen catch plus the TALFF, the total not to exceed 16,000 mt. The annual allowable catch of butterfish by US fishermen would be whatever US fishermen catch, except that it could not exceed 16,000 mt minus the TALFF. The TALFF would be 6% of the allocated portion of the Loligo TALFF plus 1% of the allocated portions ot the Illex, mackerel (is a directed foreign fishery were allowed), silver hake, and red hake TALFFs.

This procedure would result in continual adjustments to the actual quantity of the TALFF as allocations of other species with TALFFs were made. However, the maximum TALFF for butterfish at the beginning of each fishing year could not exceed the quantity calculated from the maximum initial TALFFs. This maximum would change to the extent that there were any allocations from Reserves to TALFF during a fishing year.

The Council anticipates that the Regional Director, after consultation with the Council, will implement the intent of the Plan to restrict US harvest by imposing such measures including, but not limited to, trip limitations, quarterly or half yearly quotas, and closed areas, as deemed appropriate in the final regulations. The Council intends that these measures will enable fishermen to redirect their effort in a timely manner should a closure of a fishery or a substantial diminution in allowable catch become necessary. The Council does not believe that the US fishery will grow to the point that such regulations will be necessary during the period of this Amendment, but is providing for them in the event that growth is more rapid than anticipated.

EXAMPLE

(The 'stock assessment data' used in the following example are actual values taken from the 1981 Atlantic mackerel stock assessment (Anderson, 1981). The term 'stock assessment' is used here to mean the NEFC stock assessment, as revised and modified by the Council's Scientific and Statistical Committee and the Regional Director.)

Assume it is late 1981, and the best projection of the total 1981 mackerel catch is 50,000 mt (US and Canadian waters). The stock assessment estimates a spawning stock size, at the start of 1982, of 641,200 mt at that level of 1981 total catch.

The equation which predicts US recreational mackerel catch estimates a sport catch of about 4,000 mt in 1982 at that spawning stock level. The proposed minimum estimate of US recreational catch, 9,000 mt, is therefore used for 1982.

Assume also that the projected 1982 US commercial catch (estimated from a survey of industry and other sources) is 21,000 mt (for a total US mackerel capacity of 30,000 mt), and that the projected catch in 1982 in Canadian waters is 30,000 mt. Therefore, the total 1982 US and Canadian catch estimate is 60,000 mt.

The stock assessment indicates that a catch of 60,000 mt in 1982 would leave a mackerel spawning stock size of 623,200 mt at the start of 1983 (Assuming the 1981 catch projection was correct). Since the spawning stock would be greater than 600,000 mt if the full US and Canadian expected catches were taken, a targeted foreign mackerel fishery could be permitted in the FCZ in 1982.

The stock assessment indicates that a total catch (US and Canadian waters) of 85,900 mt in 1982 would leave a spawning stock size at the start of 1983 of 600,000 mt. Therefore, 25,900 mt (85,900 - 60,000 mt) would be allocated one-half to TALFF (12,950 mt) and one-half to Reserve at the beginning of 1982.

Assume that the silver hake, red hake, Loligo, and Illex TALFFs for 1981 are initially set at 10,000 mt, 4,000 mt, 18,000 mt, and 12,000 mt, respectively, and that all of the TALFFs are allocated. The maximum initial 1982 butterfish TALFF in this example would be 1,470 mt (6% of the Loligo TALFF plus 1% of all the others). If, later in the year, all of the Reserves for mackerel and squid were allocated to TALFF (12,950 mt of mackerel, 19,000 mt of Loligo, and 13,000 mt of Illex, for a total of 44,950 mt), another 450 mt could be added to the butterfish TALFF to provide for the additional butterfish by-catches which would result from increasing the mackerel and squid TALFFs. The butterfish OY would equal this TALFF plus the US harvest. The US harvest would not be permitted to exceed 14,08660 mt, in order that the maximum OY of 16,000 mt would not be exceeded.

XIII-4. Types of Gear

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

XIII-5. Incidental Catch

Foreign nations fishing for Atlantic mackerel, squid, and/or butterfish shall be subject to the incidental catch regulations set forth in 50 CFR 611.13, 611.14, and 611.50.

XIII-6. Restrictions

No foreign fishing vessel operator, including those catching Atlantic mackerel, squid, or butterfish for use a bait in other directed fisheries, shall conduct a fishery for mackerel, squid, or butterfish outside the areas designated for such fishing operations in this Plan.

XIII-7. Habitat Preservation, Protection, and Restoration

The Council is deeply concerned about the effects of marine pollution on fishery resources in the Mid-Atlantic. It is mindful of its responsibility under the MFCMA to take into account the impact of pollution on fish. The extremely substantial quantities of pollutants which are being introduced into the Atlantic Ocean pose a threat to the continued existence of a viable fishery. In the opinion of the Council, elimination of this threat at the earliest possible time is determined to be necessary and appropriate for the conservation and management of the fishery, and for the achievement of the other objectives of the MFCMA as well. The Council, therefore, urges and directs the Secretary to forthwith proceed to take all necessary measures including, but not limited to, the obtaining of judicial decrees in appropriate courts to abate, without delay, marine pollution emanating from the following sources: (1) the ocean dumping of raw sewage sludge, dredge spoils, and chemical wastes; (2) the discharge of raw sewage into the Hudson River, the New York Harbor, and other areas of the Mid-Atlantic Region; (3) the discharge of primary treated sewage from ocean outfall lines; (4) overflows from combined sanitary and storm sewer systems; and (5) discharges of harmful waster of any kind, industrial or domestic, into the Hudson River or surrounding marine and estuarine waters.

XIII-8. Development of Fishery Resources

The US commercial fisheries for Atlantic mackerel, squid, and butterfish are relatively minor at this time. Their expansion can be into both US and foreign markets. Development of export markets for these species depends on cooperative and complementary efforts on the part of the Commerce and State Departments, the Council, and the industry. The recommended alternative in this Amendment is intended to establish a management regime that will enhance the probability of export market development. However, assistance is needed from the Commerce and State Departments to implement fully the objectives of this Plan by giving favorable allocations to foreign nations that purchase species included in the management unit of this Plan harvested by US fishermen, by negotiating with foreign nations to minimize barriers to the importation of US harvested fish and by other related means.

XIII-9. Management Costs and Revenues

Costs to develop and implement this Amendment are estimated as follows:

Council development	$37,900
Council implementation (monitoring)	9,000
NMFS data collection and enforcement	*
NMFS Northeast Region administration	*
NMFS Washington Office administration	*
Federal Register publications	*
US Coast Guard costs	*
TOTAL	

* Data to be developed and submitted by NMFS and Coast Guard, as appropriate.

XIV. SPECIFICATIONS AND SOURCES OF PERTINENT FISHERY DATA

XIV. US Fishermen and Processors

NMFS shall provide, on a timely basis, adequate commercial and recreational catch data to develop domestic annual harvest for plan review and development and to implement the reallocation procedures of the Plan. Catch data shall be provided to the Secretary. At a minimum these data shall include amounts of fish landed, the capacity to process squid, Atlantic mackerel, and butterfish, and the amount of that capacity actually used. The Council does not require additional data to meet its planning needs, but NMFS should collect all data required by the MFCMA. The Secretary may require further specific data relating to the harvesting of squid, Atlantic mackerel, and butterfish be submitted if necessary to manage or plan for management of the fishery.

Due to the 3 year limit of this Plan, the large growth in the domestic fishery which could occur before US catch would near MSY, and the current research into data collection methods being pursued by NMFS and the Northeast Task Force, no more specific data collection methods or procedures are suggested. It is anticipated that a uniform collection system for the region will be in place prior to the expiration of this Amendment.

XIV-2. Foreign Fishermen

Foreign fishermen will be subject to the reporting and recordkeeping requirements set forth in 50 CFR 611.9.

XV. RELATIONSHIP OF THE ADOPTED MEASURES TO EXISTING APPLICABLE LAWS AND POLICIES

XV-1. Fishery Management Plans

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

XV-2. Treaties or International Agreements

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

XV-3. Federal Laws and Policies

The only Federal Law that controls the fisheries covered by this Plan is the MFCMA.

Marine Sanctuary and Other Special Management Systems

The USS Monitor Marine Sanctuary was officially established on January 30, 1975, under the Marine Protection, Research, and Sanctuaries Act of 1972. Rules and regulations have been issued for the Sanctuary (15 CFR 924). They prohibit deploying any equipment in the Sanctuary, fishing activities which involve "anchoring in any manner, stopping, remaining, or drifting without power at any time" (924.3 (a)), and "trawling" (924.3(h)). Although the Sanctuary's position off the coast of North Carolina at 35°00'23"N, 75°24'32"W is located in the Plan's designated management area, it does not occur within, or in the vicinity of, any foreign fishing area. Therefore, there is no threat to the Sanctuary by allowing foreign fishing operations under this Plan. Also, the Monitor Marine Sanctuary is clearly designated on all National Ocean Survey charts by the caption "protected area". This minimized the potential for damage to the Sanctuary by US fishing operations.

Potential Impact on Marine Mammals and Endangered Species

Numerous species of marine mammals and sea turtles occur in the northwest Atlantic Ocean. The most recent comprehensive survey in this region was done in 1979 by the Cetacean and Turtle Assessment Program (CeTap), at the University of Rhode Island, under contract to the Bureau of Land Management (BLM), Department of the Interior*. The following is a summary of some of the information gathered in that study, which covered the area from Cape Sable, Nova Scotia, to Cape Hatteras, North Carolina, from the coastline to 5 nautical miles seaward of the 1000 fathom (1.8 km) isobath.

The following table lists the 21 cetaceans and the 4 turtle species encountered in the survey, ordered from most to least frequently sighted. Also given are the study term's "estimated minimum population number" for the area, if calculated, and those species currently included under the Endangered Species Act. All information is preliminary.

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

Loggerhead turtles were found throughout the study area, but appear to migrate north to about Massachusetts in summer and south in winter. Leatherbacks appear to have a more northerly distribution. The study team hypothesized a "northward migration in the Gulf Stream with a southward return in continental shelf waters nearer to shore." Both species usually were found " over the shoreward half of the slope" and in less than 60 m. No live green or Kemp's ridley turtles were found, and the latter's population has been estimated at only about 500 adults (Carr and Mortimer, 1980). The study area may be important for sea turtle feeding or migrations, but the nesting areas for these species generally are in the South Atlantic and Gulf of Mexico.

Outside of the above, the only endangered species occurring in the northwest Atlantic is the shortnose sturgeon (Acipenser brevirostrum). The Council urges fishermen to report any incidental catches of this species to the NMFS Shortnose Sturgeon Recovery Program.

The ranges of the subject species of this Plan and the above marine mammals and endangered species overlap to a large degree, and there always exists a potential for an incidental kill. Except in unique

*Annual Report for 1979. A characterization of marine mammals and turtles in the Mid- and North-Atlantic areas of the US outer continental shelf. Contract #AA551-CT8-48.

situation (e.g., tuna-purposie in the central Pacific), such accidental catches should have a negligible impact on marine mammal/endangered species abundances, and the Council does not believe that implementation of this Amendment will have any adverse impact upon these populations. As additional information on this subject becomes available, it will be integrated into future Amendments to this Plan.

Cetaceans and Turtles Found in Survey Area

Scientific name	Common name	Estimated Minimum Population Number in Study Area	Endangered	Threatened
LARGE WHALES				
B. physalus	fin whale	1,102	X	
M. novaeangliae	humpback whale	684	X	
B. acutorostrata	minke whale	162		
P. catodon	sperm whale	300	X	
E. glacialis	right whale	29	X	
B. borealis	sei whale	109	X	
O. orca	killer whale			
SMALL WHALES				
T. truncatus	bottlenose dolphin	6,254		
Globicephala spp.	pilot whales	11,448		
L. acutus	Atl. white-sided dolphin	24,287		
P. phocoena	harbor porpoise	2,946		
G. griseus	grampus	10,220		
D. delphis	saddleback dolphin	17,606		
Stenella spp.	spotted dolphine	22,376		
S. coeruleoalba	striped dolphin	unk		
L. albirostris	white-beaked dolphin	unk		
Z. cavirostris	Cuvier's beaked dolphin	unk		
S. longirostris	spinner dolphin	unk		
S. bredanensis	rough-toothed dolphin	unk		
D. leucas	beluga	unk		
Mesoplodon spp.	beaked whales	unk		
TURTLES				
C. caretta	logggerhead turtle	4,017		X
D. coriacea	leatherback turtle	636		X
L. kempi	Kemp's ridley turtle	unk		X
C. mydas	green turtle	unk		X

Oil, Gas, Mineral, and Deep Water Port Development

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

XV-4. State, Local, and Other Applicable Laws and Policies

No State or local laws control the fisheries that are the subject of this management plan exist other than

those listed in Section VII.

Coastal Zone Management (CZM) Programs

The CZM Act of 1972, as amended, is primarily protective in nature, and provides measures for ensuring stability of productive fishery habitat within the coastal zone. Therefore, State CZM programs will probably assimilate the ecological principles upon which this Plan is based. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals. States in the region with approved CZM programs are Maine, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, and North Carolina. Copies of this Amendment have been submitted to states with CZM programs for a determination of consistency. Available approved CZM programs have been reviewed relative to this Amendment by the Council and no inconsistencies have been identified.

XVI. COUNCIL REVIEW AND MONITORING OF THE PLAN

The Council will review the Plan annually. The review will include the most recent stock assessment data and data on the US harvesting and processing industries. This will permit a review of MSY, OY, DAH, DAP, and TALFF and the development of required annual estimates of OY, DAH, DAP, and TALFFs, and any modifications to the Plan. These reviews will be carried out so that any amendments to the Plan can be reviewed by the Council and the public and be implemented by the Secretary of Commerce by 1 April of each year. This schedule may be modified as the US fishery evolves.

In order to make the required annual estimates of OY, DAH, DAP, and TALFFs in addition to the reports required by this Plan, information must be developed by NMFS on the status of the stocks involved and on the capacity of the processing sector.

It is recognized that additional research must be carried out to refine the by-catch estimates. NMFS is requested to carry out such studies. Refinements of these estimates will be included, as appropriate, in future amendments to this Plan.

Additional data are also needed on recreational fishing to refine the relationships discussed in Section VIII. NMFS is requested to continue the annual National Marine Angler Surveys, or other similar appropriate studies, and to supply the Council with the necessary data for future amendments.

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APPENDIX I. ENVIRONMENTAL ASSESSMENT ON PROPOSED AMENDMENT OF SQUID, ATLANTIC MACKEREL, AND BUTTERFISH FISHERY MANAGEMENT PLANS

Description of the Action

The Squid Fishery Management Plan (Plan) was approved by the National Oceanic and Atmospheric Administration (NOAA) on 6 June 1979. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan beyond fishing year 1979-80, was approved by NOAA on 19 March 1980.

The Atlantic Mackerel Plan was approved by NOAA on 3 July 1979. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan through fishing year 1980-81, was approved by NOAA on 17 March 1980. Amendment #2, extending the Plan through fishing year 1981-82, was approved by NOAA on 29 January 1981.

The Butterfish Plan was approved by NOAA on 9 November 1979. The Plan was for fishing year 1979-80 (1 April 1979 - 31 March 1980). Amendment #1, extending the Plan through fishing year 1980-81, was approved by NOAA on 5 March 1980. Amendment #2, extending the Plan through fishing year 1981-82, was approved by NOAA on 16 February 1981.

The proposed action consists of merging the Squid, Atlantic Mackerel, and Butterfish Plans, extending them through fishing year 1984-85, and revising the management regime.

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

The objectives of the amended Plan are:

(1) Prevent the exploitation of these resources from exceeding those levels which reduce the probability of successful (i.e., the historic 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 Plan.

(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.

Failure to extend the Butterfish and Atlantic Mackerel Plans would mean that the Plans would lapse at the end of fishing year 1981-82 unless extended by a Secretarial amendment. If there were no Secretarial amendment, the National Marine Fisheries Service (NMFS) would be required to prepare Preliminary Fishery Management Plans (PMPs) for these fisheries. PMPs, however, regulate foreign, but not domestic, harvesting. Given the development of the domestic fisheries for these species, this alternative might benefit US interests in the short-term by allowing free growth of the fisheries. Within the next few years, however, the US fisheries could grow, if unrestricted, to annual levels of harvest in excess of the estimated maximum sustainable yields. This would have adverse impacts on US interests in the long-term.

Alternatives

In the development of the original Plans, earlier Amendments, and previous drafts of this Amendment, the Council considered many other alternatives. For any and all of the subject species, these included reversion to PMP management; different Optimum Yield (OY) and capacity values, including value ranges; the use of Reserves; different combinations of species for merger into one or more management plans, including species for which plans have not yet been prepared; and continuation of the current management

measures with no changes. The Council considers the alternatives presented in this draft Amendment to be the most appropriate under current and foreseeable future circumstances, but also considered modifications of the alternatives proposed during the public review process.

The alternatives considered for this Amendment are detailed in Section XII and are:

(1) Take no action at this time.

This would mean that the Atlantic Mackerel and Butterfish Plans would lapse at the end of fishing year 1981-82.

(2) Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83.

The Atlantic Mackerel Plan would be extended for 1 more fishing year with no changes. The Butterfish Plan would be extended for 1 more fishing year with OY increased from 11,000 mt to 13,000 mt and Domestic Annual Harvest (DAH) increased from 7,000 mt to 9,000 mt to minimize the possibility of a closure in the US fishery.

(3) Merge the Atlantic Mackerel, Butterfish, and Squid Plans and Extend Them Through Fishing Year 1984-85.

Since this alternative would extend the Plan for three years, it is possible that a US/Canadian bilateral fisheries agreement may be developed and implemented during the life of the Plan. In order for the Plan to remain valid following such an agreement, and to the extent that the species included in this Plan are jointly managed pursuant to such an agreement, all of the OYs discussed in this alternative are conditioned so that the OYs would be developed as described below or would be the US share of the Total Allowable Catch of the species developed through joint management procedures, whichever is less. If the US share of the TAC was less than the OY in any year, the OY would be reduced by reducing the TALFF by the appropriate amount, unless the TALFF was only for by-catch that year.

None of the following provisions are interpreted as limiting the Council's ability to certify Annual Fishing Levels for the species involved pursuant to the MFCMA.

The permitting and reporting requirements of the current Plans would be combined and revised to permit data collection by means other than logbooks (Section XIV-1).

LOLIGO AND ILLEX

The annual OYs for Loligo and Illex would be 44,000 mt and 30,000 mt respectively. Estimates of DAH and DAP would be made annually between 7,000 - 44,000 mt for Loligo and 5,000 - 30,000 mt for Illex. The differences between the OYs and US harvest estimates, if any, initially would be allocated 1/2 to Total Allowable Level of Foreign Fishing and 1/2 to Reserve. That portion of the Reserve not needed for increases in the US harvest could be allocated to TALFF.

During August for Illex and during September for Loligo, the Regional Director would project the total amounts of squid that would be harvested by US fishermen during the entire fishing year. For Illex, monthly catches from April through July (exclusive of joint venture harvest) would be multiplied by no less than 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August (exclusive of joint venture harvest) would be multiplied by no less than 1.3 to obtain a projected annual harvest. Amounts authorized for joint ventures would be added to these projections (Section XIII-3). If the projected amount of either species to be harvested by US fishermen, including joint ventures, exceeded the initial US harvest estimate, the Regional Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. The remainders of the Reserves would then be allocated to TALFF. After the initial allocation, the Regional Director may allocate any remaining portions of the Reserves to TALFF if he determines that the domestic harvest, including joint ventures, will not attain the projected level, if such allocation is consistent with the objectives of the Plan.

ATLANTIC MACKEREL

The annual OY, US harvest estimate, and TALFF for Atlantic mackerel would be set using a series of procedures that depend on the predicted spawning stock size. The capacity for mackerel in the US recreational fishery would be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - (1.15)$$

where Y is the predicted recreational catch and X is the mackerel spawning stock size the upcoming fishing year in thousands of metric tons (see Section VIII).

If the spawning stock size would be less than or equal to 600,000 mt after the US and Canadian estimated harvests were taken, the mackerel TALFF could be no greater than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. The US harvest would be up to 30,000 mt minus the TALFF. OY would equal the sum of the US harvest and TALFF.

If the spawning stock size would be larger than 600,000 mt after the US and Canadian estimated harvests were taken, the OY would equal that amount which, when taken in addition to the estimated Canadian catch, would result in a spawning stock size of 600,000 mt the following year, but the total mackerel catch (all waters, all nations) could not result in a fishing mortality rate greater than 0.4, the best present estimate of $F_{0.1}$. The TALFF would equal the difference between OY and estimated US catch (which could be no less than 30,000 mt), but could not be less than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. If the TALFF were greater than 10,000 mt, 1/2 would be allocated to the initial TALFF and 1/2 would be placed in a Reserve.

If such a Reserve were created, during October of each year, the Regional Director would project the total amount of mackerel that would be harvested by US fishermen during the entire fishing year. If that amount exceeded the initial US harvest estimate, the Regional Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. That part of the Reserve not needed to meet the projected US harvest could be allocated to TALFF.

BUTTERFISH

The butterfish TALFF would be 6% of the allocated portion of the Loligo TALFF plus 1% of the allocated portions of the Illex, mackerel (if a targeted foreign fishery were allowed), silver hake, and red hake TALFFs. OY would equal the US harvest plus TALFF, but could not exceed 16,000 mt.

Environmental Impacts

The environmental impacts of the management regimes instituted in the original Plans were detailed in the Environmental Impact Statements accompanying the Plans and in the Supplemental Environmental Impact Statements or Environmental Assessments accompanying Amendments to the Plans. Those analyses included potential impacts resulting from the OYs and other management measures. The environmental impacts of the proposed action should be the same as the impacts of the current Plans since, while changes are proposed in the management regimes, especially through the recommended alternative, the maximum harvest levels are the same as the maximum sustainable yields previously established for the squids and butterfish and the recommended Atlantic mackerel regime is consistent with Amendment #2 and conservative management of the stock. The harvest levels proposed in the recommended alternative are compatible with the latest stock assessments produced by the Northeast Fisheries Center.

The only alternative that could have a negative effect on the natural environment would be 'no action'. No control could lead to overfishing if the Plans were permitted to lapse and management were through PMPs, which could not regulate domestic fishermen.

APPENDIX III. REGULATORY IMPACT REVIEW

I. Introduction

In compliance with Executive Order 12291, this Regulatory Impact Review (RIR) has been prepared for Amendment #3 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (Plan) by the Mid-Atlantic Fishery Management Council (Council), with assistance from the National Marine Fisheries Service (NMFS). The RIR evaluates impacts of the alternatives proposed for Amendment #3 relative to the provisions of the current Plans.

II. Identification Of Problems Addressed By The Plan

The original Plans were prepared for fishing year 1979-80, which expired 31 March 1980. Amendments #1 extended the Atlantic Mackerel and Butterfish Plans through the end of fishing year 1980-81 (31 March 1981) and extended the Squid Plan without time limit. Amendments #2 to the Atlantic Mackerel and Butterfish Plans extended them through the end of fishing year 1981-82. Amendment #3 is intended to extend the Atlantic Mackerel and Butterfish Plans beyond that date, to merge all three Plans, and to make appropriate changes in the management regimes.

The primary problem addressed by the Atlantic Mackerel Plan is rebuilding the mackerel stock. The primary problem addressed by the Butterfish and Squid Plans is the development of the US fishery, particularly the fishery for export.

The alternatives discussed within this Amendment revolve around administrative issues of whether the three Plans should be merged into a single Plan, be kept separate, allow or the Atlantic Mackerel and Butterfish Plans to lapse into preliminary fishery management plan (PMP) management regimes. Given the emerging export markets and recent joint venture developments (squid with Japan, mackerel and squid with Bulgaria; see Sections IX-3 and X-1), all of these fisheries are experiencing growth. The Council's position is that a Plan provides the best long term management of the fisheries and will more fully facilitate the export expansion of these fisheries relative to management with PMPs. Merging the three Plans into one would facilitate administration of the Plans and reduce management costs because otherwise, setting Optimum Yield (OY), Domestic Annual Harvest (DAH), and Total Allowable Level of Foreign Fishing (TALFF) would require costly additional amendments and a loss of administrative flexibility inherent in the merger.

The major source of economic impacts is derived from the issue of the size of the squid, mackerel, and butterfish TALFFs. The Council's position is that the greater the reduction in the TALFFs, the higher the potential for export expansion, and that it is likely that a Plan will have greater TALFF reductions than a PMP.

See Section IV of Amendment #3 for a review of the current Plans, including their objectives and management measures.

III. Specific Objectives Of The Plan

The objectives of the amended Plan are:

(1) Prevent the exploitation of these resources from exceeding those levels which reduce the probability of successful (i.e., the historic 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 Plan.

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

IV. Alternatives For Amendment #3

The alternatives for Amendment #3 are discussed in detail and evaluated in Section XII of Amendment #3. They are:

(1) Take no action at this time.

This would mean that the Atlantic Mackerel and Butterfish Plans would lapse at the end of fishing year 1981-82.

(2) Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83.

The Atlantic Mackerel Plan would be extended for 1 more fishing year with no changes. The Butterfish Plan would be extended for 1 more fishing year with OY increased from 11,000 mt to 13,000 mt and Domestic Annual Harvest (DAH) increased from 7,000 mt to 9,000 mt to minimize the possibility of a closure in the US fishery.

(3) Merge the Atlantic Mackerel, Butterfish, and Squid Plans and Extend Them Through Fishing Year 1984-85.

Since this alternative would extend the Plan for three years, it is possible that a US/Canadian bilateral fisheries agreement may be developed and implemented during the life of the Plan. In order for the Plan to remain valid following such an agreement, and to the extent that the species included in this Plan are jointly managed pursuant to such an agreement, all of the OYs discussed in this alternative are conditioned so that the OYs would be developed as described below or would be the US share of the Total Allowable Catch of the species developed through joint management procedures, whichever is less. Allocations of the resulting OYs between DAH and Total Allowable Level of Foreign Fishing (TALFF) would then be made following the procedures described below.

None of the following provisions are interpreted as limiting the Council's ability to certify Annual Fishing Levels for the species involved pursuant to the MFCMA.

The permitting and reporting requirements of the current Plans would be combined and revised to permit data collection by means other than logbooks (Section XIV-1).

LOLIGO AND ILLEX

The annual OYs for Loligo and Illex would be 44,000 mt and 30,000 mt respectively. Estimates of DAH and DAP would be made annually between 7,000 - 44,000 mt for Loligo and 5,000 - 30,000 mt for Illex. The differences between the OYs and US harvest estimates, if any, initially would be allocated 1/2 to Total Allowable Level of Foreign Fishing and 1/2 to Reserve. That portion of the Reserve not needed for increases in the US harvest could be allocated to TALFF.

During August for Illex and during September for Loligo, the Regional Director would project the total amounts of squid that would be harvested by US fishermen during the entire fishing year. For Illex, monthly catches from April through July (exclusive of joint venture harvest) would be multiplied by no less than 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August (exclusive of joint venture harvest) would be multiplied by no less than 1.3 to obtain a projected annual harvest. Amounts authorized for joint ventures would be added to these projections (Section XIII-3). If the projected amount of either species to be harvested by US fishermen, including joint ventures, exceeded the initial US harvest estimate, the Regional Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. The remainders of the Reserves would then be allocated to TALFF. After the initial allocation, the Regional Director may allocate any remaining portions of the Reserves to TALFF if he determines that the domestic harvest, including joint ventures, will not attain the projected level, if such allocation is consistent with the objectives of the

Plan.

ATLANTIC MACKEREL

The annual OY, US harvest estimate, and TALFF for Atlantic mackerel would be set using a series of procedures that depend on the predicted spawning stock size. The capacity for Mackerel in the US recreational fishery would be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - (1.15)$$

where Y is the predicted recreational catch and X is the mackerel spawning stock size in the upcoming fishing year in thousands of metric tons. For an econometric discussion of this equation, see Background Paper #1.

If the spawning stock size would be less than or equal to 600,000 mt after the estimated US and Canadian harvests were taken, the mackerel TALFF could be no greater than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. US harvest would be up to 30,000 mt minus the TALFF. OY would equal the sum of the US harvest and TALFF, the total not to exceed 30,000 mt.

If the spawning stock size would be larger than 600,000 mt after the estimated US and Canadian harvests were taken, the OY would equal that amount which, when taken in addition to the predicted Canadian catch, would result in a spawning stock size of 600,000 mt the following year, but the total mackerel catch (all waters, all nations) could not result in a fishing mortality rate greater than 0.4, the best present estimate of $F_{0.1}$. The TALFF would equal the difference between OY and estimated US catch (which could not be less than 30,000 mt), but could not be less than 2% of the allocated portion of the silver hake TALFF plus 1% of the allocated portions of the red hake, Illex, and Loligo TALFFs. If the TALFF were greater than 10,000 mt, 1/2 would be allocated to the initial TALFF and 1/2 would be placed in a Reserve. The minimum US allocation would be 30,000 mt.

If such a Reserve were created, during October of each year, the Regional Director would project the total amount of mackerel that would be harvested by US fishermen during the entire fishing year. If that amount exceeded the initial US harvest estimate, the Regional Director would leave the excess in the Reserve to allow the US fishery to continue without closure throughout the year. That part of the Reserve not needed to meet the projected US harvest could be allocated to TALFF.

BUTTERFISH

The butterfish TALFF would be 6% of the allocated portion of the Loligo TALFF plus 1% of the allocated portions of the Illex, mackerel (if a targeted foreign fishery were allowed), silver hake, and red hake TALFFs. OY would equal the US harvest plus TALFF, but could not exceed 16,000 mt.

V. Methodology

The procedure for describing regulatory impacts was to analyze the alternatives for Amendment #3 to determine whether there would be any incremental changes relative to the prevailing conditions under the current Plans. Under E.O. 12291 a proposed regulation is a "major" rule if it is likely to result in:

(1) An annual effect on the economy of $100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions;

(3) 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.

Within those broad criteria, any fishery management plan or amendment is a "major" rule if it is likely to result in:

(1) An increase in total cost or price of goods or services to the national economy of $5 million or more in any year.

(2) An increase in total cost or price of goods or services of 10% or more, in any one year, in any industry or market, level of government, or geographical region; provided that the incremental cost or incremental revenues paid for goods or services so affected exceeds $1 million annually.

(3) An adverse impact on competition. This is defined as a regulation that restricts entry into a fishery or imposes a limited entry system, or in any way directly limits the number of US fishing vessels that may participate in a fishery.

(4) An adverse impact on investment. This is defined as a regulation which reduces the incentive to invest in innovative gear and equipment or increases the risk of investment.

(5) An adverse impact on productivity. This is defined as a regulation which reduces gross revenues to the participants in a fishery by 10% or more in any one year, provided that the reduction in gross revenues is at least $1 million (evaluated at the most recent prices).

(6) Adverse impact on exports. This is defined as any regulation that constrains the ability of US fishermen or processors to export fishery products; provided that there is no biological emergency.

VI. Impacts of the Alternatives

In general terms, the major economic impacts of each of the alternatives will depend on the size of their corresponding TALFFs. In particular there are three potential sources of costs to the economy from these alternatives:

(1) The administrative costs of the three alternatives.

(2) The loss of foreign fishing fees due to reduced TALFFs.

(3) The loss of US exports due to increased TALFFs.

The additional administrative costs of a Plan relative to a PMP is probably slight, for the same kinds of information, record keeping (except for US fishermen), and enforcement costs would be incurred under either system. Council management costs to develop and implement this Amendment have been estimated to be approximately $47,000 (The NMFS aand Coast Guard costs are unknown; see Section XIII-9). Merging the three separate Plans into one single, multi-year, framework Plan will reduce administrative costs beyond current levels.

In regards to the second and third sources of costs, the issue as to whether tradeoffs exist between foreign fishing fees and exports requires not only good information and analysis of foreign fisheries and export markets, but of the US fisheries and markets as well. To date, such information and analysis is woefully lacking, presumably because these fisheries have historically existed in the shadow of the groundfish fishery while their exports are a recent phenonmenon. Therefore, an empirical analysis of these tradeoffs cannot be performed.

What can be offered in defense of the Council's position is that in the development of the current butterfish management regime, the Council continuously fought for reduced TALFFs; the butterfish TALFF was reduced; and butterfish exports subsequently increased. (These events are similar to the history of the Tanner Crab Plan.) It must also be noted that the export markets for the fisheries have been inhibited by foreign tariffs, import quotas, and shortages of licenses needed by willing foreign wholesalers to import these species.

In general terms, the adopted alternative should have beneficial impacts on the economy for the following reasons:

(1) These species are harvested by vessels which would otherwise fish in many of the overcapitalized groundfish fisheries and any transfer of capital away from these fisheries is a more efficient use of the economy's resources.

(2) The potential long term benefits of export development are greater than the collection of foreign fishing fees from increased TALFFs.

(3) Relative to a PMP, a Plan will provide a sharper focus in which to jointly stimulate export markets and maintain and improve biological health of the stocks while permitting the public, affected industries, and the States to participate in the management process.

(4) Under Plan, rather than PMP, management, the data base upon which future management decisions will be made, will be improved.

(5) The merger of the three Plans for these species will increase management flexibility and reduce management costs.

The following discussion describes the estimated impacts of the alternatives relative to the six criteria. See Sections VIII - X for an economic description of these fisheries and Section XII for a more extensive discussion of the impacts of these alternatives..

1. **Take No Action At This Time.**

The No Action alternative would mean that the Atlantic Mackerel and Butterfish Plans would lapse at the end of fishing year 1981-82. If that were to happen, NMFS would be required to prepare PMPs in order for the foreign fisheries to continue. PMPs would not regulate US fishermen, so there would be a possibility that US fishermen could overfish the species involved, which could lead to stock depletion. The Council believes that this alternative would also result in higher TALFFs.

This alternative should not result in an increase in total cost or price of goods or services to the national economy of $5 million or more in any year and should have no impact on costs or prices. (See RIR VI.3)

It should not result in an increase in the cost or price of goods or services of 10% or more, in any one year, in any industry or market, level of government, or geographical region. (See RIR VI.3)

It should have no adverse impact on competition since it would not restrict entry into the fishery or impose a limited entry system or in any way directly limit the number of US fishing vessels that may participate in the fishery.

It could have an adverse impact on investment to the extent that PMPs could have higher foreign fishing allocations than those in the current Plans or those recommended in the other alternatives. Higher foreign fishing levels would tend to increase the risk of investing in the US export fishery.

It should not have an adverse impact on productivity since it should not reduce gross revenues to the participants in the fishery by 10% or more in any one year.

It could have an adverse impact on exports since higher foreign fishing allocations, which could result from PMPs, could constrain the ability of US fishermen or processors to export fishery products.

2. **Extend the Atlantic Mackerel and Butterfish Plans Through Fishing Year 1982-83.**

This alternative would not affect the Squid Plan. It would extend the Atlantic Mackerel Plan for 1 year with no change. It would extend the Butterfish Plan for 1 year and increase OY and DAH by 2,000 mt each.

This alternative should not result in an increase in total cost or price of goods or services to the national economy of $5 million or more in any year. It would have no effect on squid or mackerel. In 1980, butterfish landings were 45,348 mt valued at $3,849,000, or approximately $720/mt, so an increase in the allowable US harvest of 2,000 mt should not have an impact of $5 million or more.

It should not lead to an increase in the cost or price of goods or services of 10% or more, in any one year, in any industry or market, level of government, or geographical region. There are no changes to the squid or mackerel regimes. The increase in the butterfish DAH should be ample to provide for catch increased without creating price increases as a result of quota restrictions. In 1980 the butterfish catch was 5,348

mt and the DAH was 7,000 mt. This alternative would increase DAH to 9,000 mt.

It would not have an adverse impact on competition since it would not restrict entry into the fishery or impose a limited entry system or in any way directly limit the number of US fishing vessels that may participate in the fishery.

It should not have an adverse impact on investment since it would not reduce the incentive to invest in innovative gear and equipment or increase the risk of investment.

This alternative should not have an adverse impact on productivity since it should not reduce gross revenues to the participants in the fishery by 10% or more in any one year.

It could have an adverse impact on exports to the extent that US fishermen could be limited by the 7,000 mt butterfish DAH if the US fishery for export continued to develop.

3. Merge the Atlantic Mackerel, Butterfish, and Squid Plans and Extend Them Through Fishing Year 1984-85.

It is unlikely that this alternative would result in an increase in total cost or price of goods or services to the national economy of $5 million or more in any year. On an individual fishery basis, $5 million is 512% larger than 1980 ex-vessel mackerel revenues, 56% larger than 1980 squid revenues, and 30% larger than 1980 butterfish revenues.

This alternative should not result in an increase in cost or price of goods or services of 10% or more, in any one year, in any industry or market, level of government, or geographical region. There are two sources of possible increases in prices: (1) direct reduction in US landings and (2) expansion of export markets to the extent that prices paid by US consumers are impacted. Given the allocation guidelines in this alternative, the only fishery where there may be a reduction in landings as a result of the Plan is the mackerel fishery, but that would only occur if stock abundance were low and predicted catches in Canadian waters high. Under that circumstance, the US allocation would be 14,000 mt, of which 9,000 mt is the anticipated US recreational catch. Since 1980 mackerel landings were only 2,874 mt (an increase of 44% over the 1979 level), it is highly unlikely that in the next three years (the life of this Amendment), there will be a significant impact from the 14,000 mt minimum US allocation.

Increased export demand for squid and butterfish may increase consumer prices. However, in 1980 prices, $1 million represents 1,417 mt of squid and, given estimates of squid landings prior to 1979 (i.e., before the export market began to develop) and assuming these are high estimates of US consumption, then consumers would have to almost double their consumption before any price increase effects would be required to be considered. Furthermore, there are west coast squid substitutes that should keep any Atlantic coast squid prices from rising noticably. A similar analysis applies to butterfish, but there is an additional reason why export expansion should not impact consumer prices significantly. The domestic market for butterfish is based on fresh butterfish; the export market on frozen. Processors sign export contracts for butterfish and to fulfill these contracts harvesters land additional butterfish beyond what is needed for the domestic markets. Since these markets are based on different product forms and the abundance of buttterfish has not been a constraining factor, expansion of the export market should not increase consumer prices significantly. Finally, expanding export markets may induce harvesters and processors to undertake technological improvements such as freeziong the product at sea as opposed to onshore. These improvements will not only improve the quality of fish to the consumer but may lead to lower consumer prices as fishermen tend to land more fish in general.

This alternative should have no adverse impact on competition since it does not restrict entry into the fishery or impose a limited entry system, or in any way directly limit the number of US fishing vessels that may participate in the fishery.

This alternative should have a positive impact on exports. It gives US fishermen first access to the resources by reducing TALFFs as US capacity increases and by reducing the butterfish and, under certain conditions, mackerel TALFFs to bycatches only. This should reduce the proportion of the supply of fish to foreign nations that those nations harvest themselves. The squid TALFFs and Reserve provisions are considered sufficient to permit the development of trade arrangements that would give foreign allocations in exchange for agreements to purchase US harvested fish.

If foreign nations retaliate to the loss of fishing privileges by reducing their imports of US caught fish, the dollar loss to the economy should not be high. Complete loss of export is unlikely because butterfish has very few substitutes and US Loligo and Illex are preferred species relative to other common species of squid. Finally, major distant water fishing nations faced with the loss of access to stocks because of the extension of national fishing zones tend to initiate joint venture programs with the coastal nation, as Japan has done with New Zealand and Spain has done in South America. While such joint ventures would not have impacts as positive as the development of export fisheries, they would have a positive impact relative to permitting direct foreign harvesting.

One negative impact on the US economy of developing the export fishery and reducing direct foreign harvesting is the loss of foreign fishing fees. This loss is not expected to be high relative to the growth of revenues from increased exports. However, reduction of direct foreign harvests would have a positive impact of reducing Federal government enforcement costs.

VII. Conclusions

The recommended alternative for Amendment #3 (alternative 3), should not result in "major" impacts relative to the current Plans with regard to the specified criteria. In addition, the recommended alternative has several other benefits relative to the current Plans. Merger of the Plans should reduce governmental and private sector costs by decreasing the regulations and permits required, i.e., one set of regulations would replace the current three sets and one permit would cover all three fisheries. Costs would also be decreased by extending the Plan for 3 years relative to the cost of annual amendments.

Since the benefits of the recommended alternative are mainly expansion of exports and domestic capacity whereas the costs of such actions fall upon foreign nations, adoption of this alternative should be a net benefit to the US economy.

The recommended alternative should also have a positive impact in that the mandatory reporting requirements of the current Plans would be revised to the extent that NMFS would be permitted to replace the current reporting systems which include fishermen's logbooks and weekly reports by processors with alternative systems so long as the revised system resulted in the collection of data adequate to monitor and update the Plan.

APPENDIX IV. PROPOSED REGULATIONS

Subpart A - General Provisions

Subpart B - Management Measures

Authority: 16 U.S.C. 1801 et seq.

Subpart A - General Provisions

656.1 Purpose and Scope.

(a) The regulations in this Part (1) implement the Fishery Management Plan for the Squid, Atlantic Mackerel, and Butterfish Fisheries of the Northwestern Atlantic Ocean, which was prepared and adopted by the Mid-Atlantic Fishery Management Council and approved by the Assistant Administrator; and (2) govern fishing for mackerel, Illex, Loligo, or butterfish by fishing vessels of the US within that portion of the Atlantic Ocean over which the US exercised exclusive fishery management authority, excluding the Gulf of Mexico.

(b) The regulations governing fishing for mackerel, Illex, Loligo, or butterfish by foreign vessels in the Fishery Conservation Zone are contained in 50 CFR Part 611.

656.2 Definitions. In addition to the definitions in the Act, the terms used in this Part shall have the following meanings:

Act means the Magnuson Fishery Conservation and Management Act of 1976, as amended, 16 U.S.C. 1801 et seq.

Assistant Administrator means the Assistant Administrator for Fisheries of the National Oceanic and Atmospheric Administration, Department of Commerce, or an individual to whom appropriate authority has been delegated.

Atlantic mackerel or mackerel means the species Scomber scombrus.

Authorized officer means:

(a) Any commissioned, warrant, or petty officer of the US Coast Guard;

(b) Any certified enforcement officer or special agent of the National Marine Fisheries Service;

(c) Any officer designated by the head of any Federal or State agency which has entered into an agree-

ment with the Secretary of Commerce and the Commandant of the US Coast Guard to enforce the provisions of the Act; or

(d) Any US Coast Guard personnel accompanying and acting under the direction of any person described in paragraph (a) of this definition.

Butterfish means the species Peprilus triacanthus.

Catch, take, or harvest includes, but is not limited to, any activity which results in mortality to any mackerel, Illex, Loligo, or butterfish or bringing any mackerel, Illex, Loligo, or butterfish on board a vessel.

Charter or party boat means any vessel which carries passengers for hire to engage in fishing.

Fishery Conservation Zone (FCZ) means that area adjacent to the United States which, except where modified to accomodate international boundaries, encompasses all waters from the seaward boundary of each of the coastal States to a line on which each point is 200 nautical miles from the baseline from which the territorial sea of the United States is measured.

Fishery Management Plan (FMP) means the Fishery Management Plan for the Squid, Mackerel, and Butterfish Fisheries of the Northwest Atlantic Ocean, and any amendments thereto.

Fishing includes any activity, other than scientific research activity conducted by a scientific research vessel, which involves:

(a) The catching, taking, or harvesting of butterfish, Illex, Loligo, or mackerel;

(b) The attempted catching, taking, or harvesting of mackerel, Illex, Loligo, or butterfish;

(c) Any other activity which can reasonably be expected to result in the catching, taking, or harvesting of butterfish, Illex, Loligo, or mackerel; or

(d) Any operations at sea in support of, or in preparation for, any activity described in paragraphs (a), (b), or (c) of this definition.

Fishing Trip means a period of time during which fishing is conducted, beginning when the vessel leaves port and ending when the vessel returns to port.

Fishing vessel means any vessel, boat, ship, or other craft which is used for, equipped to be used for, or of a type which is normally used for: (a) fishing; or (b) aiding or assisting one or more vessels at sea in the performance of any activity related to fishing, including, but not limited to, preparation, supply, storage, refrigeration, transportation, or processing.

Fishing week means the weekly period beginning 0001 hours Sunday and ending 2400 hours Saturday.

Illex means the species Illex illecebrosus.

Joint venture harvest means US harvested Illex, Loligo, mackerel, or butterfish transferred at sea to foreign processing vessels.

Loligo means the species Loligo pealei.

Metric ton (mt) means 1,000 kilograms, which is equal to 2,204.6 pounds.

Operator, with respect to any fishing vessel, means the master or other individual on board and in charge of that vessel.

Owner, with respect to any fishing vessel, means:

(a) Any person who owns that vessel in whole or in part;

(b) Any charterer of the vessel, whether bareboat, time, or voyage;

(c) Any person who acts in the capacity of a charterer, including but not limited to parties to a management agreement, operating agreement, or any similar agreement that bestows control over the destination, function, or operation of the vessel; or

(d) Any agent designated as such by a person described in paragraphs (a), (b) or (c) of this definition.

Person means any individual (whether or not a citizen or national of the United States), corporation, partnership, association, or other entity (whether or not organized or existing under the laws of any State), and any Federal, State, local or foreign government or any entity of any such government.

Person who receives Atlantic mackerel, Illex, Loligo, or butterfish for commercial purposes means any person (excluding governments and governmental entities) engaged in commerce who is the first purchaser of mackerel, Illex, Loligo, or butterfish. The term includes, but is not limited to, dealers, brokers, processors, cooperatives, or fish exchanges. It does not include a person who only transports mackerel, Illex, Loligo, or butterfish between a fishing vessel and a first purchaser.

Regional Director means the Regional Director, Northeast Region, National Marine Fisheries Service, Federal Building, 14 Elm Street, Gloucester, Massachusetts 01930, Telephone (617) 281-3600; or a designee.

Regulated species means any species for which fishing by a vessel of the US is regulated pursuant to the Act.

United States harvested butterfish, Atlantic mackerel, Illex, or Loligo means butterfish, mackerel, Illex, or Loligo caught, taken, or harvested by vessels of the US under this Part, whether or not such butterfish, mackerel, Illex, or Loligo is landed in the US.

Vessel of the United States means:

(a) Any vessel documented or numbered by the US Coast Guard under United States law; or

(b) Any vessel under five net tons which is registered under the laws of any State.

656.3 Relation to other laws.

(a) Persons affected by these regulations should be aware that other Federal and State statutes and regulations may apply to their activities.

(b) All fishing activity, regardless of species sought, is prohibited pursuant to 15 CFR Part 924, on the U.S.S. Monitor Marine Sanctuary, which is located approximately 15 miles off the coast of North Carolina (35°00'23"N.,75°24'32"W).

656.4 Vessel permits and fees.

(a) General. Every fishing vessel, including party and charter boats, which fishes for mackerel, Illex, Loligo, or butterfish under this Part must have a permit issued under this section. Vessels are exempt from this requirement if they catch no more than 100 pounds of mackerel, Illex, Loligo, or butterfish per trip.

(b) Eligibility. (Reserved)

(c) Application.

(1) An application for a permit under this Part must be submitted and signed by the owner or operator of the vessel on an appropriate form obtained from the Regional Director at least 30 days prior to

the date on which the applicant desires to have the permit made effective.

(2) Applicants shall provide all the following information:

(i) The name, mailing address including Zip code; and telephone number of the owner of the vessel;

(ii) The name of the vessel;

(iii) The vessel's US Coast Guard documentation number or the vessel's State registration number for vessels not required to be documented under provisions of Title 46 of the US Code;

(iv) The home port or principal port of landing, gross tonnage, radio call sign, and length of the vessel;

(v) The engine horsepower of the vessel and the year the vessel was built;

(vi) The type of construction, type of propulsion, and type of echo sounder of the vessel;

(vii) The permit number of any current or previous Federal fishery permit issued to the vessel;

(viii) The approximate fish hold capacity of the vessel;

(ix) The type and quantity of fishing gear used by the vessel;

(x) The average size of the crew, which may be stated in terms of a normal range; and

(xi) Any other information concerning vessel characteristics requested by the Regional Director.

(3) Any change in the information specificd in 656.3(c)(2) shall be submitted by the applicant in writing to the Regional Director within 15 days of the change.

(d) Fees. No fee is required for any permit issued under this Part.

(e) Issuance. The Regional Director shall issue a permit to the applicant no later than 30 days from the receipt of a completed application.

(f) Expiration. A permit shall expire upon any change in vessel ownership, registration, name, length, gross tonnage, fish hold capacity, home port, or the regulated fisheries in which the vessel is engaged.

(g) Duration. A permit shall continue in effect until it expires or is revoked, suspended, or modified pursuant to 50 CFR Part 621.

(h) Alteration. No person shall alter, erase, or mutilate any permit. Any permit which has been intentionally altered, erased, or mutilated is invalid.

(i) Replacement. Replacement permits may be issued by the Regional Director when requested in writing by the owner or operator stating the need for replacement, the name of the vessel, and the fishing permit number assigned. An application for a replacement permit shall not be considered a new application.

(j) Transfer. Permits issued under this Part are not transferable or assignable. A permit shall be valid only for the fishing vessel and owner for which it is issued.

(k) Display. Any permit issued under this Part must be carried on board the fishing vessel at all times. The operator of a fishing vessel shall present the permit for inspection upon request of any Authorized Officer.

(l) Sanctions. Subpart D of 50 CFR Part 621 (Civil Procedures) governs the imposition of sanctions against a permit issued under this Part. As specified in that Subpart D, a permit may be revoked,

modified, or suspended if the permitted fishing vessel is used in the commission of an offense prohibited by the Act or these regulations, or if a civil penalty or criminal fine imposed under the Act is not paid.

656.5 Recordkeeping and reporting requirements. (Reserved)

656.6 Vessel identification.

(a) Official number. Each fishing vessel subject to this Part and over 25 feet in length shall display its Official Number on the port and starboard sides of the deckhouse or hull and on an appropriate weather deck so as to be clearly visible from enforcement vessels and aircraft. The Official Number is the documentation number issued by the US Coast Guard for documented vessels or the registration number issued by a State or the US Coast Guard for undocumented vessels.

(b) Numerals.

(1) The Official Number shall be at least 18 inches in height for fishing vessels over 65 feet in length and at least 10 inches in height for all other vessels over 25 feet in length.

(2) The Official Number shall be permanently affixed to or painted on the vessel and shall be block Arabic numerals in contrasting color. However, charter or party boats may use non-permanent markings to display the Official Number whenever the vessel is fishing for mackerel, Illex, Loligo, or butterfish.

(c) Vessel length. The length of a vessel, for purposes of this section, is that length set forth in US Coast Guard or State records.

(d) Duties of operator. The operator of each fishing vessel shall:

(1) Keep the Official Number clearly legible and in good repair, and

(2) Ensure that no part of the fishing vessel, its rigging or its fishing gear obstructs the view of the Official Number from any enforcement vessel or aircraft.

656.7 Prohibitions. It is unlawful for any person to:

(a) Use any vessel for the taking, catching, harvesting, or landing of any mackerel, Illex, Loligo, or butterfish (except as provided for in 656.4(a)) unless the vessel has a valid permit issued pursuant to this Part, on board the vessel;

(b) Fail to report to the Regional Director within 15 days any change in the information contained in the permit application for a vessel;

(c) Falsify or fail to make, keep, maintain, or submit any fishing vessel record or fish dealer or processor report or other record or report required by this Part;

(d) Make any false statement, oral or written, to an Authorized Officer, concerning the taking, catching, landing, purchase, sale, or transfer of any mackerel, Loligo, Illex, or butterfish;

(e) Fail to affix and maintain markings as required by 656.6 of this Part;

(f) Possess, have custody or control of, ship, transport, offer for sale, sell, purchase, import, export, or land any mackerel, Illex, Loligo, or butterfish taken in violation of the Act, this Part, or any regulation promulgated under the Act;

(g) Fish for, take, catch, or harvest any mackerel, Illex, Loligo, or butterfish from the FCZ after the fishery has been closed pursuant to 656.23;

(h) Transfer directly or indirectly, or attempt to so transfer, any US harvested mackerel, Illex, Loligo, or

butterfish to any foreign fishing vessel, which such vessel is within the FCZ, unless the foreign fishing vessel has been issued a permit, under section 204 of the Act, which authorizes the receipt by such vessel of US harvested mackerel, Illex, Loligo, or butterfish;

(i) Refuse to permit an Authorized Officer to inspect any fishing vessel record;

(j) Refuse to permit an Authorized Officer to board a fishing vessel subject to such person's control for purposes of conducting any search or inspection in connection with the enforcement of this Act, this Part, or any other regulation promulgated under the Act;

(k) Fail to comply immediately with enforcement and boarding procedures specified in 656.8;

(l) Forcibly assault, resist, oppose, impede, intimidate, threaten, or interfere with any Authorized Officer in the conduct of any search or inspection under the Act;

(m) Resist a lawful arrest for any act prohibited by this Part;

(n) Interfere with, obstruct, delay, or prevent by any means the apprehension or arrest of another person knowing that such other person has committed any act prohibited by this Part;

(o) Interfere with, obstruct, delay, or prevent by any means the lawful investigation or search in the process of enforcing this Part;

(p) Violate any other provision of this Part, the Act, or any regulation promulgated pursuant thereto.

656.8 Enforcement

(a) General. The operator of any fishing vessel subject to this Part shall immediately comply with instructions issued by an Authorized Officer to facilitate safe boarding and inspection of the vessel, its gear, equipment, fishing record, and catch for the purposes of enforcing the Act and this Part.

(b) Signals. Upon being approached by a US Coast Guard vessel or aircraft, or other vessel or aircraft authorized to enforce the Act, the operator of the fishing vessel shall be alert for communications conveying enforcement instructions. VHF-FM radiotelephone is the normal method of communicating between vessels. Should radiotelephone communication fail, however, other methods of communication including visual signals, may be employed. The following signals extracted from the International Code of Signals are among those which may be used, and are included here for the safety and information of fishing vessel operators:

(1) "L" meaning "You should stop your vessel instantly."

(2) "SQ3" meaning "You should stop or heave to; I am going to board you." and

(3) "AA AA AA etc." which is the call to an unknown station, to which the signaled vessel shall respond by illuminating the vessel's Official Number required by 656.6.

(c) Boarding. A vessel signaled to stop or heave to for boarding shall:

(1) Stop immediately and lay to or maneuver in such a way as to permit the Authorized Officer and his/her party to come aboard;

(2) Provide a safe ladder for the Authorized Officer and his/her party;

(3) When necessary to facilitate the boarding or when requested by an Authorized Officer, provide a man rope, safety line and illumination for the ladder; and

(4) Take such other actions as are necessary to ensure the safety of the Authorized Officer and his/her party to facilitate the boarding.

656.9 Penalties. Any person or fishing vessel found to be in violation of this Part will be subject to the civil and criminal penalty provisions and forfeiture provisions prescribed in the Act, and to 50 CFR Part 620 (Citations) and Part 621 (Civil Procedures).

Subpart B - Management Measures

656.20 Fishing year. The fishing year for mackerel, Illex, Loligo, and butterfish is the 12-month period beginning on 1 April and ending on 31 March of the following year.

656.21 Allowable levels of harvest.

(a) Squid and butterfish. The allowed levels of harvest on a fishing year basis are 30,000 mt of Illex, 44,000 mt of Loligo, and up to 16,000 mt of butterfish. The level of harvest by vessels of the US is between 5,000 mt and 30,000 mt of Illex, between 7,000 mt and 44,000 mt of Loligo, and up to 16,000 mt minus the allowable level of foreign fishing of butterfish. The initial level of harvest of Illex and Loligo by vessels of the US shall be estimated prior to the beginning of each fishing year by the Regional Director, in consultation with the Council and with opportunity for public comment, within the ranges specified above. The differences between the allowed levels of harvest and the initial levels of harvest by vessels of the US for Illex and Loligo, if any exist, shall be allocated one-half to the initial level of foreign fishing and one-half to Reserve. The allowed level of foreign fishing of butterfish shall be 6% of the allocated portion of the Loligo allowed level of foreign fishing plus 1% of the allocated portions of the Illex, mackerel, silver hake, and red hake allowed levels of foreign fishing.

(b) Mackerel. The allowed level of harvest on an annual basis will be determined by the Regional Director, in consultation with the Council and with opportunity for public comment, in accordance with the following procedures.

(1) Estimates of spawning stock size and Canadian harvest will be made by the Council's Scientific and Statistical Committee based on a review of the latest NMFS Northeast Fisheries Center stock assessment and other relevant data. If no estimate of Canadian harvest is available, the actual Canadian catch for the current year will be used for the estimate. The report of the Scientific and Statistical Committee will be reviewed by the Council. The report, along with any Council comments, will be submitted to the Regional Director, who will use it as the basis for the calculations in 656.21(b)(2), (3), and (4).

(2) The capacity for mackerel in the US recreational fishery shall be the greater of 9,000 mt or the amount predicted by the equation

$$Y = (0.008)(X) - (1.15)$$

where Y is the estimated recreational catch in the upcoming fishing year, in thousands of metric tons, and X is the mackerel spawning stock size the upcoming fishing year. The capacity for mackerel in the US commercial fishery shall be estimated by the Regional Director, based on reported catches and other relevant information. These estimates of US capacity shall be used in the calculations in 656.21(b)(3) and(4).

(3) If the spawning stock size would be less than or equal to 600,000 mt after the US and Canadian estimated harvests were taken, the mackerel allowable level of foreign fishing would be 2% of the allocated portion of the silver hake allowable level of foreign fishing plus 1% of the allocated portions of the red hake, Illex, and Loligo allowable levels of foreign fishing. The level of harvest of vessels of the US would be up to 30,000 mt minus the allowable level of foreign fishing.

(4) If the spawning stock size would be larger than 600,000 mt after the US and Canadian estimated harvests were taken, the allowed level of harvest would be that amount which, when taken in addition to the estimated Canadian catch, would result in a spawning stock size of 600,000 mt the following year or that amount which would result in a fishing mortality rate of 0.4 taking into consideration catches in both US and Canadian water, whichever is less. The difference between the allowed level of harvest and the initial level of harvest by vessels of the US (which could be no

less than 30,000 mt), as calculated in 656.21(b)(2), shall be the allowed level of foreign fishing; except that the level of foreign fishing shall be no less than 2% of the allocated portion of the silver hake allowed level of foreign fishing plus 1% of the sum of the allocated portions of the allowed levels of foreign fishing for red hake, Illex, and Loligo. If the difference between the allowed level of harvest and the initial level of harvest by vessels of the US is greater than 10,000 mt, one-half of the difference shall be allocated to the initial level of foreign fishing and one-half shall be allocated to Reserve.

(c) Territorial waters. These regulations do not limit harvests of mackerel, Illex, Loligo, or butterfish in the waters landward of the FCZ. Harvests from these waters, however, shall be subtracted from the annual domestic levels of harvest set forth in 656.21(a) and (b).

656.22 Allocation. If Reserves are established pursuant to 656.21, they shall be allocated as follows:

(a) Projection. During August in the case of Illex, during September in the case of Loligo, and during October in the case of mackerel, the Regional Director will project the total amounts of squid and mackerel that will be harvested by US fishermen during the entire fishing year. For Illex, monthly catches from April through July (exclusive of joint venture harvest) will be multiplied by a factor of at least 2.9 to obtain a projected annual harvest. For Loligo, monthly catches from April through August (exclusive of joint venture harvest) will be multiplied by a factor of at least 1.3 to obtain a projected annual harvest. For mackerel, the Regional Director will consider not only the actual reported domestic harvest through 30 September, but also the ability and intent of domestic harvesters and processors to harvest and process mackerel during the remainder of the fishing year.

(b) Joint ventures. If any permits authorizing receipt of US harvested Illex, Loligo, or mackerel, have been issued to foreign processing vessels by 15 August for Illex, by 15 September for Loligo, and by 15 October for mackerel, the Regional Director will add to the projected annual harvest the amounts of Illex, Loligo, or mackerel authorized to be received by such permits.

(c) Allocation of reserves. If the projected amount of Illex, Loligo, or mackerel to be harvested by US fishermen, including joint venture harvest, exceeds the initial level of harvest specified in 656.21(a) for Illex and Loligo and in 656.21(b) for mackerel, the Regional Director shall leave the excess in the Reserve to allow the US fishery for that species to continue throughout the year. The Regional Director may allocate the rest of the Reserve for that species to the total allowable level of foreign fishing (TALFF). If the projected amount of Illex, Loligo, or mackerel to be harvested by US fishermen, including joint venture harvest, does not exceed the initial level of harvest specified in 656.21(a) for Illex or Loligo and in 656.21(b) for mackerel, the Regional Director may allocate the entire reserve for that species to TALFF.

(d) Notice of allocation.

(1) Illex and Loligo. On or about September 1 for Illex and on or about October 1 for Loligo, the Regional Director shall:

(i) Notify the Executive Directors of the Mid-Atlantic, New England, and South Atlantic Councils of his decision; and

(ii) Publish a notice of the decision on allocation in the Federal Register.

(2) Atlantic mackerel.

(i) By November 1 the Regional Director will publish a notice stating the amount of mackerel proposed to be allocated from Reserve to TALFF in the Federal Register. It will contain the latest catch statistics available for mackerel. The public will be given 15 days from the date of publication to comment on the proposed allocation. Before the end of the comment period, the Regional Director will consult with the Mid-Atlantic Council on the consistency of the proposed allocation with the objectives of the FMP.

(ii) The Regional Director will publish a final notice of the decision on allocation in the Federal

Register. It will contain a summary of all comments and relevant information received during the comment period.

(e) Subsequent allocation. After the initial allocation, the Regional Director may allocate any remaining portion of reserve to TALFF, if he determines that the domestic harvest, including joint venture harvest, will not attain the projected level under 656.22(a) or (b) plus any joint venture harvest authorized after the initial decision and if such allocation is consistent with the objectives of the FMP. Notice of subsequent allocations will be made according to the procedures in 656.22(d).

656.23 Closure of fishery.

(a) General. The Regional Director shall periodically monitor catches and landings of mackerel, Illex, Loligo, and butterfish.

(b) Decision to close. The Regional Director shall close the domestic fishery for mackerel, Illex, Loligo, or butterfish when the domestic harvest of that species has reached 80% of the total of the initial level of domestic harvest plus the part of any reserve which has not been allocated to the allowed level of foreign fishing, if he finds that this action is necessary to prevent the allowed level of domestic harvest from being exceeded.

(c) Notice of closure. If the Regional Director determines that a closure of the fishery for mackerel, Illex, Loligo, or butterfish is necessary, he shall:

(1) Notify in advance the Executive Directors of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils of the closure;

(2) Mail notification to all persons holding permits issued under 656.5 of the closure at least 72 hours prior to the effective date of the closure; and

(3) Publish a notice of closure in the Federal Register.

(d) Incidental catch. During a period of closure, fishing vessels may catch, take, or harvest the relevant species incidental to fishing for other species of fish; provided that such species for which the closure is in effect constitutes no more than 10% by weight of the total catch of all other fish on board the vessel at the end of any fishing trip.

656.24 Area/time restrictions. (Reserved)

656.25 Gear/vessel equipment restrictions. (Reserved)

656.26 Effort restrictions. (Reserved)

REGULATORY IMPACT REVIEW

FOR THE FISHERY MANAGEMENT PLAN

FOR THE

ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

10 MAY 1983

Revised 25 July 1983

Revised 9 September 1983

Mid-Atlantic Fishery Management Council
Room 2115 Federal Building
300 South New Street
Dover, DE 19901

I. Introduction

In compliance with Executive Order (E.O.) 12291, this Regulatory Impact Review (RIR) has been prepared for the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (Plan) by the Mid-Atlantic Fishery Management Council (Council), with assistance from the National Marine Fisheries Service (NMFS). The RIR evaluates impacts of the Plan as adopted by the Council and approved by NMFS as well as the alternatives considered and rejected relative to the provisions of the three separate plans previously in effect. This document also evaluates impacts relative to the Paperwork Reduction Act (PRA) and Regulatory Flexibility Act (RFA).

II. Identification of problems addressed by the Plan

The primary problem addressed by the Atlantic Mackerel Plan was rebuilding the mackerel stock. The primary problem addressed by the Butterfish and Squid Plans was development of the US fishery, particularly the fishery for export. The alternatives discussed within this Plan revolve around administrative issues of whether the three Plans should be merged into a single Plan, be kept separate, or allow the Atlantic Mackerel and Butterfish Plans to lapse into preliminary fishery management plan (PMP) management regimes.

In the squid, Atlantic mackerel, and butterfish fisheries, management has evolved from a series of separate one year plans to a joint multi-year framework plan. Management began with the original Atlantic Mackerel Plan in mid-1977, primarily in response to a resource that was severely depleted and declining. The stock condition was caused by the catch of mackerel by foreign fleets in US waters between 1970 and 1976 which ranged between 206,000 and 385,000 metric tons (mt) annually. During the same period the US commercial fishery generally accounted for less than 4,000 mt (Table 1). The original Plan reduced the total allowable foreign catch to 1,200 mt, a level intended to limit the foreign catch to only bycatch in other fisheries. The total US catch (commercial and recreational) was limited to 14,000 mt. This strategy was successful to the point that the allowable mackerel catch in US waters for fishing year 1983-84 is 102,000 mt. (The Plan operates on a 1 April - 31 March fishing year, which herein is designated, for example, 1983-84.)

Management of Illex illecebrosus (Illex or I. illecebrosus) and Loligo pealei (Loligo or L. pealei) squid and butterfish was undertaken primarily to establish a basis for the development of the US fishery for these species. Historically these species had small markets in the US but substantial foreign markets, as demonstrated by significant foreign catch which averaged approximately 25,000 mt of Loligo and 16,000 for Illex annually for the period 1970-1977. The Council adopted the philosophy that as long as foreign nations were allowed to harvest these species at high levels, there would be no opportunity for US fishermen to enter the potential export market.

The Council decided to initially target on butterfish. The original Butterfish Plan set the maximum allowable catch at 11,000 mt, well below the biologically acceptable maximum (16,000 mt) and established a maximum foreign catch of 4,000 mt (the foreign catch ranged from 9,000 to 32,000 mt during the decade prior to implementation of this policy). As with mackerel, the foreign allocation was intended to give foreign nations only the butterfish they needed as bycatch in other fisheries. This strategy has paid off handsomely. In 1976, the year the Magnuson Act became law, the butterfish catch was 1,528 mt by the US and 14,309 mt by foreign nations. In 1982 the catch was 8,036 mt by the US and 819 mt by foreign nations. In 1976, the US catch amounted to $977,000 paid to US fishermen (ex-vessel value). For 1982, the ex-vessel value was $5,500,000. When adjusted for inflation this represents a real increase of 290%. Much of the butterfish catch is exported. For 1982, the total value to the US industry of butterfish evaluated at export prices (export prices are slightly higher than domestic wholesale prices) is estimated at $15,484,000 including the price paid to fishermen, processing, and shipping. These exports not only provided employment opportunities for the US fishing industry, but also helped reduce the trade deficit.

In response to Plan initiatives, the squid fishery is also developing. While the Loligo fishery is showing some growth (from 3,602 mt in 1976 to 4,864 mt in 1982), Illex fishery development is significant. US landings increased from 229 mt in 1976 to 10,000 mt in 1982 (industry estimates) while the foreign catch decreased from 24,707 mt in 1976 to 12,965 mt in 1982. Joint ventures led to the harvest of 2,338 mt of the Illex and 1,094 mt of the Loligo by US vessels in 1982, an

important interim mechanism for the development of these fisheries because of marketing and technical processing problems associated with exports. In terms of ex-vessel value, Illex increased from $40,388 in 1976 to be no less than $1,527,000 in 1982. When adjusted for inflation this represents a real increase of 3,680%. The total value of the 1982 US Illex fishery, using FOB export prices which include payments for harvesting, processing, and shipping, is estimated to be no less than $5,090,000.

The development of the squid and butterfish fisheries and the rebuilding of the mackerel stock led the Council to develop a multi-year framework plan combining the Atlantic Mackerel, Squid, and Butterfish Plans. The fisheries for these species are interrelated. Joint ventures and other market development strategies are facilitated by managing the species jointly. Additionally, this joint plan not only eliminates the need to amend the original plans to set annual allowable catch levels, but also permits in-season adjustments to those levels in order to enhance market development.

The total growth potential of these fisheries must be recognized. The maximum allowable US catch of butterfish, Illex, and Loligo is approximately 16,000 mt, 30,000 mt, and 44,000 mt, respectively. At 1982 ex-vessel prices, this catch level amounts to $10,935,000 for butterfish, $7,937,000 for Illex, and $37,831,000 for Loligo. Mackerel is more difficult to forecast because of natural stock fluctuations but, if it is assumed that the total allowable catch averages what it is for 1983-84, 102,000 mt, and assuming 1982 prices, then the US fishery could amount to $33,631,000. If processing and shipping are added to the prices paid to fishermen, and using 1982 prices provided by industry experts, then the total value of the butterfish, Illex, and Loligo fisheries to the US economy is approximately $31,746,000, $26,455,000, and $74,692,000, respectively. With Illex joint ventures for 1983-84, Illex has reached this level while butterfish is rapidly approaching its maximum level. Developing market conditions indicate that Loligo will soon follow the pattern set in the Illex fishery. Mackerel development will depend on the outcome of future European Economic Community (EEC) quotas and the abundance levels of European stocks.

The Council's position is that a Plan provides the best long term management of the fisheries and will more fully facilitate the export expansion of these fisheries relative to management with PMPs. Merging the three Plans into one facilitates administration of the Plans and reduces management costs because otherwise, setting Optimum Yield (OY), Domestic Annual Harvest (DAH), and Total Allowable Level of Foreign Fishing (TALFF) would require costly additional amendments and a loss of administrative flexibility inherent in the merger.

The major source of economic impacts is derived from the issue of the size of the squid, mackerel, and butterfish TALFFs. The Council's position is the greater the reduction in the TALFFs, the higher the potential for export expansion and that TALFFs will be lower with the Plan rather than with a PMP.

See Section IV of the Plan for a review of the previous Plans, including their objectives and management measures. (All Section references refer to the Plan).

III. Plan objectives

The objectives of this Plan are:

1. Prevent the exploitation of these resources from exceeding those levels which reduce 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 Plan.

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.

IV. Provisions of the Plan as amended.

The Plan extends management through 1984-85. The management unit is all Atlantic mackerel (Scomber scombrus), long-finned squid (Loligo pealei), short-finned squid (Illex illecebrosus), and butterfish (Peprilus triacanthus) under US jurisdiction, excluding the Gulf of Mexico and the Caribbean Sea. The provisions of the Plan, as amended, are presented in this section.

The initial DAH for the squids and butterfish may be increased during any fishing year from the Reserves. They also may be increased up to their maximum through increases of their OYs during the fishing year if actual US catch exceeds initial DAH estimates. The annual OY for Atlantic mackerel will be set in accordance with a set of defined procedures depending on the Atlantic mackerel spawning stock size. The system for annually establishing OY, DAH, DAP, TALFF, and Reserves is discussed in Sections XII-2 and XII-3.

Loligo

Maximum sustainable yield (MSY) for Loligo has been set at 44,000 mt, which is also the upper limit of OY. The DAH is specified as a range limited only by the upper limit of OY. The specific value for any year will be determined administratively (see Section XIII-3). The difference between OY and DAH will be divided $\frac{1}{2}$ to initial TALFF and $\frac{1}{2}$ to Reserve, with the constraint that the sum of initial TALFF plus Reserve cannot exceed 37,000 mt. Allocations from the Reserve are made following the procedures discussed in Section XIII-3, which are virtually identical to those used in the previous Squid Plan. The precise specification of OY is made by the following statements:

OY = m + DAH
m = initial TALFF + Reserve and is less than or equal to 37,000 mt
OY is less than or equal to 44,000 mt

Obviously, with this specification, OY in some years can be less than MSY. As discussed in Section XII-4, the reason for this difference is to limit maximum foreign allocations to increase the probability of foreign purchases of US caught squid. This procedure is consistent with the Council's long term policy, established in the original Butterfish Plan, that if foreign nations are permitted to harvest fish directly there is no incentive for them to purchase US harvested fish.

Illex

Illex MSY has been set at 40,000 mt. Maximum OY has been specified at 30,000 mt, the difference between MSY and OY being an allowance for biological uncertainties. However, a range is provided, as discussed above for Loligo, to increase the probability of the development of a US export fishery. The DAH for Illex is a range bounded at the top by the maximum OY (30,000 mt) with annual estimates made administratively (see Section XIII-3). The precise specification of OY is:

OY = n + DAH
n = initial TALFF + Reserve and is less than or equal to 25,000 mt
OY is less than or equal to 30,000 mt

This specification can result in annual OY values less than MSY reduced for biological considerations, that is, OY could be less than 30,000 mt. This is done for the same reasons discussed above for Loligo.

Atlantic mackerel

The mackerel MSY has been estimated to be 210,000 - 230,000 mt. The relationship between the limiting fishing mortality rate ($F_{0.1} = 0.4$) and the rate that would generate the MSY is discussed in Section V-3. The long-term average yield produced from $F_{0.1}$ would be about 90% of the MSY.

The additional restriction of the 600,000 mt spawning stock size 'floor' could additionally reduce this percentage over the long term. It should also be pointed out, that the Plan's OY-setting procedure might still allow for an OY larger than the MSY, if mackerel abundance was extremely high, as it was in the early 1970s. (It is unlikely that the stock size will increase that much during the life of this Plan.) This modification of OY from MSY provides some insurance against recruitment overfishing and protection of the US sport fishery while still allowing development of the domestic commercial fishery and appropriately large harvests when the resource is unusually abundant. Specifying the OY up to 30,000 mt when the spawning stock is 600,000 mt or less is considered necessary to achieve objectives (1) and (2).

The specification of OY for mackerel can perhaps best be made in a series of mathematical expressions.

C = estimated mackerel catch in Canadian waters for the upcoming fishing year.
US = estimated US mackerel catch for the upcoming fishing year.
S = mackerel spawning stock size in the year after the upcoming fishing year.
Bycatch = 2% of allocated portion of the silver hake TALFF and 1% of the allocated portions of the Loligo, Illex, and red hake TALFFs.
AC = acceptable catch in US waters.

If S - US - C is less than or equal to 600,000 mt; use case 1. If S - US - C is greater than 600,000 mt; use case 2.

Case 1: OY is less than or equal to 30,000 mt.
DAH is less than or equal to 30,000 mt - TALFF.
TALFF = Bycatch.

Case 2: AC = S - C - 600,000 and is less than or equal to F = 0.4.
OY is less than or equal to AC
TALFF is greater than or equal to Bycatch.

In addition, Case 2 provides that US fishermen are entitled to a minimum allocation of 30,000 mt. This minimum may only be reduced to the extent necessary to assure that AC is not exceeded and the foreign fishery receives the bycatch requirements. Since it is not legally possible to set a minimum DAH value, OY and TALFF must be adjusted to account for the minimum US allocation. It must be recognized that while such an adjustment at the beginning of a fishing year may result in an initial OY less than that which is biologically acceptable (i.e., less than AC), if the US catch during the year, including amounts authorized for joint ventures, increases above the initial estimates, DAH and OY may be increased by similar amounts up to the point where OY = AC. The TALFF would not change from its value at the beginning of a year as a result of these adjustments to DAH and OY. The following statements are intended to illustrate the way that initial OY, initial DAH, and TALFF would be developed for alternative values of AC and US.

Subcase 2a: AC less than 30,000 mt and US less than 30,000 mt.

DAH = US - Bycatch (to the extent necessary)
TALFF = Bycatch
OY = DAH + TALFF

Subcase 2b: AC equal to or greater than 30,000 mt and US less than 30,000 mt.

OY = AC - (30,000 - US)
DAH = US - Bycatch (to the extent necessary)
TALFF = OY - DAH

Subcase 2c: US equal to or greater than 30,000 mt.

OY = AC

DAH = US - Bycatch (to the extent necessary)
TALFF = OY - DAH

The minimum US allocation for mackerel in Case 2 is provided to enhance the achievement of objective (2) since it has the effect of reducing the maximum possible TALFF and it provides for increases in US catch, including the development of joint ventures, that cannot be quantified prior to the beginning of the fishing year and cannot be included in the development of the estimate of US. Recent experience has shown that joint venture projects are developed randomly throughout the year. The minimum US allocation is a necessary safeguard to permit desirable joint ventures to proceed, even though they may not have been forecasted at the beginning of the year.

Butterfish

The MSY for butterfish has been set at 16,000 mt. The OY specified in the Plan may not exceed that quantity, but may be less. The MFCMA provides that OY may differ from MSY for economic reasons. In this case, the reason for the difference is the development of the US fishery for export. The concept is simple. If foreign nations are not permitted to directly harvest butterfish, there will be a greater incentive to purchase the fish from US harvesters and processors. It is recognized that butterfish are a bycatch in other foreign fisheries and therefore, it is necessary to provide a TALFF in keeping with these bycatch requirements. This concept was included in the original Butterfish Plan and Amendments #1 and #2. The Plan as adopted and approved modifies the way the concept is stated. The restatement introduces more flexibility into the system by eliminating the use of specific values for OY, DAH, and TALFF. The OY is specified as whatever quantity of butterfish US fishermen harvest annually plus a TALFF equal to 6% of the allocated portion of the Loligo TALFF and 1% of the allocated portions of the Illex, Atlantic mackerel, silver hake, and red hake TALFFs, up to 16,000 mt. The DAH would equal whatever quantity of butterfish US fishermen will harvest, not to exceed 16,000 mt minus the TALFF.

Permitting and Reporting Requirements

All vessels fishing commercially for Atlantic mackerel, squid, or butterfish, either directly or as bycatch in other fisheries, must have permits. This provision also applies to all vessels for hire for fishing recreationally, directly or indirectly, for mackerel, squid, or butterfish. It does not apply to individual US fishermen catching mackerel, squid, or butterfish for their personal use. The permitting requirements are detailed in Section XIII-1.

NMFS is responsible for the collection of harvesting and processing data for mackerel, squid, and butterfish. The reporting requirements are detailed in Section XIV-1.

Part 611 of Title 50, Code of Federal Regulations, regulates foreign fishing.

V. The Regulatory Impact Review

A regulatory impact review, as required by E.O. 12291, requires two kinds of analysis: (1) an impact review, and (2) a cost-benefit analysis that states whether or not the benefits of the proposed regulations outweigh their costs. Specifically, E.O. 12291 states that a proposed regulation is a "major" rule if it is likely to result in:

1. An annual effect on the economy of $100 million or more;

2. A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or

3. Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

If a rule is determined to be "major" then the Regulatory Impact Analysis needs to address the following:

1. A description of the potential benefits of the rule, including any beneficial effects that cannot be quantified in monetary terms, and the identification of those likely to receive the benefits;

2. A description of the potential costs of the rule, including any adverse effects that cannot be quantified in monetary terms, and the identification of those likely to bear the costs;

3. A determination of the potential net benefits of the rule, including an evaluation of effects that cannot be quantified in monetary terms;

4. A description of alternative approaches that could substantially achieve the same regulatory goal at lower costs, together with an analysis of this potential benefit and costs and a brief explanation of the legal reasons why such alternatives, if proposed, could not be adopted; and

5. Unless covered by the description required under paragraph (4) of this subsection, an explanation of any legal reasons why the rule cannot be based on the requirements set forth in Section 2 of this Order.

The Regulatory Impact Review is to assure that:

1. Administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action;

2. Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society;

3. Regulatory objectives shall be chosen to maximize the net benefits to society;

4. Among alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen; and

5. Agencies shall set regulatory priorities with the aim of maximizing the aggregate net benefits to society, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.

An impact analysis differs from a cost-benefit analysis in several ways. In an impact analysis, a proposed regulation is analyzed through its potential for changes to the current levels of employment and spending of the various impacted user groups (processors, fishermen, ship chandlers, etc.). A cost-benefit analysis is an attempt to determine whether society (the economy) is made better off if a proposed regulation is adopted. That is, to assure that the proposed regulation will lead to a net increase in the value of goods and services produced by the economy (Anderson and Settle, 1977). The methodological approach at the heart of a cost-benefit analysis is to determine what society will be foregoing if the proposed regulation is adopted. What goods and services would have been produced by available resources (land, labor, capital, etc.) if the proposed regulations divert these resources from their current uses? Once this question is answered, the analyst has determined the "cost" of the regulation which is then compared to the benefits or the goods and services produced by the regulation.

One striking difference between an impact analysis and a cost-benefit analysis is their differing treatment of unemployed resources. Under an impact analysis, the cost of labor used is equal to the prevailing wage rate multiplied by the labor employed. A cost-benefit analysis, in asking the question of what is society foregoing, will use the wage rate if the proposed regulation diverts previously employed labor to other positions. When resources such as labor are fully employed, their hiring price reflects their contribution to the value of goods and services produced in the economy. If the labor (resource) used was previously unemployed (under a cost-benefit analysis) their cost is essentially zero, for by employing idle labor (resources) society is not giving up any goods and services that are currently being produced. (The net return or benefit of society in this case is the increased goods and services that are produced through the employment of the idle labor.) In sum, under an impact analysis, consideration is given to the total economic effects of the

regulation upon government, businessmen, consumers, etc., while a cost-benefit analysis weighs these effects in total to determine whether society as a whole profits from implementation of the regulation.

The analysis below addresses primarily the impacts of the proposed squid management regulations. Within the context of a spectrum, the squid fishery lies between butterfish and mackerel. At one end is the butterfish fishery which is well on its way to being fully developed. On the other end of this spectrum is the mackerel fishery which is not yet showing significant signs of development but has strong potential given the strong foreign fishing pressure in the past and the probabilities of declining European stocks. In the middle of this spectrum are the US fisheries for Illex and Loligo squid with the possibility that the entire Illex OY will be taken in the upcoming years, primarily by joint ventures, and, Loligo, as will be shown below, has strong potential for future development.

With butterfish and mackerel at opposite ends of the spectrum, the analysis of the squid management regime should show the kinds of impacts, costs, and benefits of developing the mackerel fishery while indicating the kinds of benefits, costs, and impacts that may have already occurred under the Butterfish Plan. (Since butterfish can only be caught as bycatch by foreign vessels, who are primarily seeking squids, many of the impacts of varying the butterfish OY are indirectly assessed in the analysis of the squid management regime.)

Recent Trends in the US Illex and Loligo Fisheries

Domestic Landings

Loligo landings, including joint ventures, in 1982 reached a peak of 4,864 mt (Table 1). In only one other year during the period 1963-82 (1979) have Loligo landings reached the 4,000 mt level. US landings averaged approximately 1,000 mt from 1963 thru 1975. From 1976 thru 1982 annual landings averaged 3,058 mt, a 200% increase over the 1963-75 average.

Illex landings, including joint ventures, also reached a new peak in 1982 of at least 5,772 mt. The previous peak of 1,780 mt occurred in 1979. From 1976 thru 1982 annual landings averaged 1,453 mt, as compared to a 1963-75 annual average of 472 mt.

Total squid landings in 1982 were at least 10,636 mt. This is 76% higher than the previous peak of 6,032 mt in 1979. From 1976 thru 1982, total squid landings averaged 4,511 mt per year, while for the period 1963-75, total squid landings averaged 1,467 mt annually.

Domestic Prices

For Loligo and Illex, separate prices were not published consistently until 1978 (Tables 2 and 3). In nominal terms, 1982 Loligo prices are equivalent to 1978 ex-vessel prices, but when adjusted for inflation, 1982 Loligo prices are the lowest prices shown. In 1980 the deflated ex-vessel price was $.14/lb. while landings were approximately 4,000 mt. This price decline relative to the surrounding years could possibly be explained by the recession of 1980, causing a decrease in the overall US demand for Loligo, and by the decline in world demand for squid because of the glut caused by record 1979 world landings. The 1982 price decline could have been caused by recessionary forces but may also have been the result of the Loligo joint ventures, for their presence is the only significant difference between the fishery in 1982 and 1979. Joint venture landings may have replaced the export demand that occurred in 1979. A simpler reason may be that 1982 abundance levels were higher. Illex prices exhibit a pattern of a wide variation in total landings with little change in ex-vessel price. The peak price of $.20/lb. for Illex in 1979 has no rational explanation except that for some reason demand increased since 1979 landings are significantly higher than 1978 landings.

Total Revenues

With little change in ex-vessel prices, the primary reason for changes in ex-vessel revenues is due to the mixture of species landed. Total revenues reached a nominal peak of at least $5.7 million in 1982 due to the growth in Illex landings but in deflated dollars total revenue approximated 1979

revenues largely because of the fall in Loligo prices.

Domestic Exports

US exports of squid product has grown dramatically since 1975. NMFS has been recording squid exports since 1978. (Export estimates are based on shipments from East Coast ports so that the chance of including California squid in the estimates is minimized.) For the years 1978-80 squid exports were mainly canned products and were shipped to a few countries (Tables 4 and 5). In 1981, frozen squid exports were approximately 500 mt at $1 million FOB. In 1982 frozen squid increased to 2,584 mt and $4.1 million FOB. In 1981, US product was exported to 14 different countries, while in 1982 to 15 countries, four of which did not receive exports in 1981. Exports to traditional foreign harvesters of squid (Italy, Portugal, Spain, and Japan) increased in 1982 to 1,073 mt, from 293 mt in 1981, a 266% increase.

Joint Ventures

There has been an increasing trend toward joint venture arrangements in the harvest of fish. A joint venture is a contract between a foreign firm to buy fish at sea that is harvested by US fishermen. This usually requires a foreign processing vessel, but the processing vessel may also harvest fish, or be supplied in conjunction with US vessels by foreign vessels. Sometimes the processing vessel will be served by a refrigerated transport vessel where the processed frozen product is transferred and sent to markets.

For 1981-82, 1982-83, and 1983-84, the number of countries, the number of US companies, the number of species, and the amount of squid applied for has increased (Table 6). The actual joint venture catch for 1981-82 was 323 mt of Loligo, while the 1982-83 catch was 2,338 mt of Illex and 1,094 mt of Loligo.

Joint ventures have been very beneficial to US fishermen and processors (many US processors who export the same species are involved in coordinating US joint venture vessels). One fishermen involved in two different squid joint ventures estimated that his vessels earned an average $250,000 more in gross revenues through the joint venture than if they had fished normally for groundfish (John Holt, pers. comm.). Joint ventures have supplied a new market for underutilized fish and new alternatives for US fishermen who would otherwise, because of the season, either not be fishing or be fishing for other species (e.g., yellowtail flounder, summer flounder, sea trout, cod, and haddock) which are already heavily exploited or overfished. While frequently being paid a little less than the shoreside ex-vessel price, fishermen benefit from joint ventures in three ways. First, they can stay at sea and fish for several days rather than daily steaming to port, thus they catch more fish and use less fuel. Secondly, fishermen not participating in the joint venture find an increased demand for either their harvest of the joint venture species or other species that would normally have been supplied by the joint venture vessels. Finally, in periods of domestic market glut, these vessels can then attempt to sell their excess through the joint venture. In short, joint ventures strengthen the export market by giving fishermen another source of demand for product and fishermen catch more fish while receiving better prices for their efforts.

Besides the increase in the number of countries, the number of US processors, and requests for squid, the joint ventures for 1983-84 differ from their predecessors. One important difference is related to direct exports by US processors. In the Lund-Portugal joint venture, 70% of the Illex will be marketed under the US processor's name. In both the Scan Ocean-Portugal and Scan Ocean-USSR applications, the foreign company has agreed to buy an additional one million pounds and four million pounds, respectively, of whole round product from the US processor while the entire joint venture catch will be marketed under the name of the US partner to the venture. Finally, within the International Seafood Trading Corporation-Italy joint venture, a long term plan is presented that involves: (1) marketing the catch under the US partner's name in traditional Italian markets; (2) intent to develop a domestic market in the US through the adoption of Italian technology for improved product quality; (3) by the second or third year expanding beyond the traditional Italian markets to world markets; and (4) investment in new plant capacity. The foreign company involved, besides requesting the joint venture allocations, requested equal amounts of direct allocations (7,000 mt Illex, 6,000 mt Loligo). This joint venture highlights the trend in squid joint

ventures by including technology transfer and market development for the US partner. It also, by its request for TALFF, symbolizes the trend where foreign countries recognize that the total TALFF is decreasing; to maintain their share of the resource they must be willing to invest in US companies in exchange for direct allocations.

Domestic Consumption

Time series data on US retail consumption of east coast squid are unavailable. However, Fulton Fish Market landings and prices are available. This New York market received approximately 33% of the 1982 non-joint venture domestic catch of Loligo. (It is assumed that almost all of the squid received by this market is Loligo.) Since 1978, squid receipts have increased from approximately 1.6 million pounds to 2.5 million pounds in 1982 (Table 7). Correspondingly, wholesale prices have varied with the landings but in current and deflated dollars, 1982 prices were below 1978 prices.

Foreign Catch

The total foreign catch of Loligo, Illex, Atlantic mackerel and butterfish for 1982-83 was 12,734 mt, 12,940 mt, 1,192 mt, and 803 mt, respectively (preliminary estimates provided by Northeast Region, NMFS). Only the butterfish catch exceeds the previous fishing year but if one considers the 1982-83 joint venture catch of 1,094 mt of Loligo and 2,338 mt of Illex, then foreign countries collectively have received catches of Loligo and Illex greater than their previous years catches, when only 323 mt of Loligo was provided through joint ventures (Table 8). As of 5 February, Italy and Japan had already caught more than their 1981-82 Loligo catch even though they were involved in joint ventures. In 1981-82, for the months of February and March, these two countries caught, respectively, 25% and 31% of their total catch. For Spain, Loligo landings must have decreased since total Loligo catch has declined. Since very little Illex is caught in February and March, the only country showing an increase in Illex landings is Italy whose landings are almost double the previous years.

World Market for Squids, 1976-1982

This section reviews the world market for squid. The basic conclusion is that the potential for US exports and joint ventures is strong. While the analysis addresses export potential, the same conclusions hold for joint ventures, which are seen as a first step toward expanding exports. In particular, the Japanese market is described since it is the largest in the world. The Spanish market is described for it shows how US exports are inhibited by trade restrictions. Illex landings from Canadian and South American waters are also described for they are direct substitutes for US Illex. An analysis of squid processed in Europe is provided to illustrate the price competitiveness of US caught Loligo and Illex in the world market. New Zealand joint ventures are discussed because New Zealand fisheries are undergoing a transformation similar to the US east coast squid fisheries. Finally, the impacts of international policies, exchange rates, sales of foreign caught US squid to third party countries, and trade barriers such as tariffs and import quotas are briefly discussed as additional constraints to US exports and joint ventures.

World

Along with the increase in the total world catch of fish, crustaceans, and mollusks, total squid catch and total world trade in squid products have correspondingly increased. Total squid landings increased from 827,000 mt in 1976 to 1,119,000 mt in 1980 (Figure 1). This rapid growth is from the increased number of and landings by countries that are harvesting squid primarily for export purposes. In 1975 there were 22 countries that reported at least 1,000 mt of squid for any of the species and in 1980 there were 28 countries (Table 9). In both 1975 and 1980, the top five harvesting countries were Japan, Korea, Spain, the USSR, and China. These countries landed approximately 680,000 mt in 1975 (85% of the catch) while in 1980 these same countries landed 883,000 mt (79% of the catch). The remaining countries landed 123,000 mt in 1975 and 236,000 mt in 1980, an increase by 1980 of almost 100% over 1975. (These same countries had peak landings of 430,000 mt for 39% of total world landings in 1979, primarily from the high catches of Illex by Canada and Argentina.)

While Food and Agricultural Organization (FAO) data for 1981 and 1982 are unavailable, world catch probably declined in 1981 and increased in 1982. Japanese landings of squid and cuttlefish and Japanese squid imports both declined 25% in 1981, while squid inventories at year end were down 50% from what they were 12 months earlier. Japanese imports decreased to 71,000 mt in 1981 from 94,000 mt in 1980 and 156,000 mt in 1979. European imports were also down in 1981. From January to September 1981 imports into Spain, Italy, and France were 28,000 mt, a 50% decline from the previous year import total of 56,000 mt (OECD, 1982a). During this period the catch of Illex from Canadian waters declined to 30,000 mt from 70,000 mt in 1980 (NAFO, 1981 and 1982a) and landings in Argentina declined drastically from existing national social, political, and economic problems that severely impacted Argentina's fishing industry (Juanico, 1982).

Based on the reported landings by Canadian, French, Japanese, and US fishermen for 1980 and 1981 (OECD, 1982c) and the proportion of these landings relative to total world catch in 1980 (these countries caught approximately 66% of the world catch in 1980), world landings in 1981 are predicted to be 842,000 mt (Figure 1).

Preliminary 1982 data show the following:

1. Japanese landings from coastal waters of common squid (Toradoes pacificos) for the months January to October are up 12% from the previous year (Japan, 1982). Annual coastal landings of squid were 138,200 mt in 1981 and 212,000 mt in 1980; 19% of the total 1980 world catch (Japan, 1982) (see Figure 2).

2. Japanese imports of squid and cuttlefish as of October 1982 were 17% higher than total 1981 reported imports of squid and cuttlefish (Japan, 1982).

3. Landings of Illex from Canadian waters have declined further. As of October-November 1982, landings by Canadian, Japanese, Soviet, Polish, Cuban, and EEC fishermen were 12,000 mt, a decline of 50% from the previous year (NAFO, Monthly Statistics 1981, 1982a, 1982b).

4. Estimates of the total squid catch from Argentinean waters, sea and land frozen, will amount to 30,000 - 40,000 mt for 1982. These catch figures are less than the 1981 catch because of the Falkland Islands issue (US Dept. Comm., 1983c, 26 April 1982).

5. Landings of squid from New Zealand waters continue to increase (US Dept. Comm., 1983c, 26 April 1982).

6. Combined US Illex and Loligo landings, foreign and domestic, have increased 8,000 mt from approximately 31,000 mt in 1981 to at least 39,000 mt in 1982 (Table 1).

The Japanese, through imports and landings, dominate the world market. In 1978, the Japanese consumed 546,000 mt of squid (Anders et al., 1982); equal to about 58% of the total 1978 world catch. The increase in Japanese coastal landings and imports along with the increased landings from US and New Zealand waters, should outweigh the decline in catch from Canadian and Argentinean waters, such that, if the other geographic areas of harvest show no decline in 1982, total world catch should be higher in 1982 relative to 1981, but probably not as high as 1980.

Japan

The total demand for squid by the Japanese is well over 500,000 mt per year (Court, 1982). The demand for squid is increasing. Imports as well as Japanese ex-vessel and wholesale prices (fresh and frozen) are increasing even though Japanese landings from coastal waters, the major area of harvest, are up 12% from 1981 levels. As of October 1982, Japanese imports of squid and cuttlefish were 17% higher than total 1981 imports (Japan, 1982), which are approximately 60-70% squid (Table 10). While 1982 imports will not reach the 1979 level of 156,000 mt, they are much higher than the 1970-76 average of 35,000 mt. Since 1967, imports have been steadily increasing except for the period 1980-82 (Tables 11 and 12). During this period, imports from Canada and Argentina increased dramatically and subsequently declined, presumably due to declining Illex abundance in Canadian waters, the strike by Canadian fishermen in 1980, and the economic

instability in Argentina. Imports also declined because of high Japanese inventories, low import quotas, and because the Spanish supply was constricted by the Spanish-Morrocan dispute over fishing rights in the Morrocan EEZ (Court, 1982).

Not only have imports increased to Japan, but ex-vessel and wholesale prices (fresh and frozen) are at all time highs (Figure 2). When adjusted for inflation, wholesale prices of fresh squid show a three year upward trend that may by the end of 1982, approach the 1979 peak price.

The relationship between consumer and ex-vessel prices of domestically caught squid has followed a similar pattern to that of fish in general, where there is a growing wedge between the two price levels. From 1968 - 1980 Japanese consumer fish prices have increased 450% while ex-vessel fish prices have increased by only 260% (Court, 1982). This wedge between prices indicates that there is room in the market place for increased US exports to Japan. The size of this wedge, however, is strongly regulated. The Japanese change squid import quotas as Japan's total landings change. Japanese landings are forecasted twice yearly and these forecasts are used to determine the amount of quota which is set by the Japanese government with consultation of industry. In 1978 the government set quotas to obtain a shortage of 40,000 mt. This policy, while protecting Japanese fishermen, led to high domestic prices and a corresponding decrease in consumption (Court, 1980). Therefore, the size of the quota is a key policy tool to control the Japanese market. These quotas have varied from zero (July 1980 to December 1980) to a peak of 40,000 mt (July 1979 to December 1979). The last known quota is 18,000 mt (December 1980 to June 1981). Once the quota has been determined it is divided between approximately 210 trading companies and processor cooperatives with a 'set aside' for fishery development. (In 1979 approximately 70% went to processors, 25% to trading companies, and 5% for fishery development (Court, 1980).) The quota is also simultaneously subdivided into nine catagories: live squid, fresh squid, frozen squid, chilled squid, salted squid, brine soaked squid, dried squid, smoked squid, and prepared or preserved squid. The imports of smoked and prepared or preserved squid are not regulated by the import quotas. In order to export to Japan a US firm has to locate a Japanese company or importer who either owns a quota or can lease a quota. This usually carries a 2-6% commission charge. This charge is above an import tarriff (8.8% in 1980). Court (1982) summarizes the extent of Japanese protectionism:

> "However, the Japanese will make every attempt to minimize exports into Japan. Although a large portion of Japan's 'domestic' squid landings is caught in the waters of Canada, New Zealand, United States, Argentina and other nations, Japanese industry sources who wish to remain anonymous can foresee no reasonable likelihood that the quota system will be abolished or even substantially altered within the near future. It is standard Japanese practice to make every effort to maintain their position in an industry of those already established, and because the squid fishing industry employs many fishermen and resources and is in very severe financial condition, rather than do anything which could further aggravate this situation, the Japanese government is apt to seek ways to ameliorate the plight of its beleaguered squid fishermen."

While demand is rising, the percentage of total supply that comes from Japanese coastal and distant water fleets will probably decline in the coming years. Larger vessels have been regulated out of the coastal areas in favor of smaller vessels because there has been declining resource and overcapitalization problems in the T. pacificus stocks (Court, 1980). These problems probably still exist, for the Japanese fleet has increased from 277 thousand total vessels with 250 thousand vessels under five mt in 1971 to 401 thousand total vessels with 365 thousand vessels under five mt in 1980 (Taguchi, 1983). The coastal stocks also migrate through the offshore waters of South Korea, North Korea, and the Soviet Union, nations that are politically diverse and quite reliant on fish as a food source, making unified management of the T. pacificus difficult (Court, 1980).

In 1979, the Japanese harvested squid in the extended economic zones of New Zealand, Australia, Canada, and the US (Table 13). They currently have agreements where they are allocated rights to fish in the Soviet and Korean EEZs. For the years 1978-82, Japan, in exchange for granting the USSR fishing rights in her EEZ, is entitled to 143,000 mt of squid annually from the Soviet EEZ. While the allocation has remained constant, fishing fees are increasing (OECD, 1982a). In 1979, at least 26% of the Japanese catch came from non-Japanese waters. While landings from Soviet waters are not listed in Table 13, if the 1979 Soviet EEZ catch by Japan equals the 1976 catch of 111,000 mt, the Japanese catch from non-Japanese waters including joint ventures would equal

55%. In 1980 the Japanese squid catch from the waters of New Zealand, Argentina, Australia, South Africa, and the US was over 107,000 mt (Raynes, 1982).

The Japanese have increased their use of joint ventures to maintain their supply of fish and employment of vessels. They were involved in 175 joint ventures in 1977 and 193 in 1981. These joint ventures had a total capital value of $146.7 million in which the Japanese investment was $98.2 million (66.9%). They are distributed around the world with 25 joint ventures taking place in Central and South America, 104 in Asia and Oceania, 16 in Africa, one each in the Middle East and Europe, and 46 in North America. For the next few years it is expected that the total number of joint ventures will stabilize or diminish. Apparently joint ventures are being analyzed by the Japanese companies for profit maximizing purposes (US Dept. Comm., 1983e).

Since much of the Japanese squid supply is from outside of Japanese waters, these sources of supply should decline as countries reduce their allocations and raise their fees in order to stimulate joint ventures and domestic activity. These patterns are not only developing in the US, but in New Zealand, Canada, Australia, and Argentina. With increased demand and declining Japanese catch, US catch should increase through increased joint ventures and exports either directly with the Japanese or by agreements with non-Japanese foreign firms that supply the Japanese market. This conclusion is supported by the analysis found in Combs (1979) as well as by Anders et al. (1982), where squid was given high marks for export potential into Japan. For 1983, Japanese squid imports are expected to maintain their current high levels (Ohtagaki, 1983).

Spain

It is estimated that Spain has an annual consumption of 75,000 mt of squid per year; 45,000 mt Loligo spp. and 30,000 mt Illex spp. (Milnes, 1982a). Approximately 10,000 mt of L. vulgaris, primarily taken from the Canary Island - Sahara fishing grounds within the EEZs of Mauritania and Morroco, is consumed annually. In 1980-81, the Spanish consumed approximately 28,000 mt of Loligo, most of which was caught by Spanish vessels in US waters, although 1,500 mt was supplied by US producers. A minor source of squid is the Patagonian squid from the Falklands which is similar to L. pealei but has the quality of the California squid L. opalescens. The demand for California squid by the Spanish is minute for it has a thin body wall and shrinks dramatically when cooked. Other minor sources of squid are the squids from India, Malaysia, Taiwan, and Thailand. The supply to Spain from these Asian sources has been diminishing because Spanish duties on imports are higher relative to other European countries, so that these squids are being shipped to other European markets.

There are three major sources of Illex to Spain, I. illecebrosus from both the US and Canada and Argentinean squid (Illex argentinus). In 1981, roughly 16,500 mt of I. illecebrosus caught by Spanish vessels entered Spain. There were no reported US exports to Spain. In earlier years alternative sources of I. illecebrosus were from catches in US waters by Russia, Poland, Bulgaria, Romania, Japan, and by Spanish vessels fishing under the Mexican flag (Milnes, 1982a).

Spain has caught and received Canadian Illex harvested by Japan, the Eastern Bloc countries, and other countries since 1978 (primarily Japan and the Eastern Bloc countries). However, with Canada's policy of reducing foreign quotas in her EEZ and because of the disagreement between Spain and Canada (over cod quotas), Canada has not given any fishing quotas to Spain and Spain has denied the importation of Canadian fish products, including frozen squid.

Argentinean squid has been supplied to the Spanish market via exports and joint ventures for the past six years. In 1979, many of the Spanish joint ventures as well as Argentinean export companies went bankrupt from Argentina's massive inflation rate which greatly increased their operating costs. For the years 1980-81, only 5,000 mt of squid from this area was brought to the Spanish market. However, squid caught by the Eastern Bloc countries in the Falklands has been supplied to Spain. This supply was approximately 9,000 mt in 1981 (Milnes, 1982a).

Other sources of squid are available through New Zealand joint ventures, bycatch of squid in the Spanish hake fishery in the Southeast Atlantic, and attempts to develop fisheries in Norway and Mexico, where the size and texture of the squids are generally unsuitable to the Spanish consumer.

In 1976 Spain depended heavily on US squid (Table 14). At least 32% of the total Spanish supply of squid was from US waters with approximately 38% of the Spanish Loligo supply and at least 21% of the Spanish Illex supply. (The origin of the Illex imports from Japan, Poland, and the USSR is unknown; it could be from Argentinean, Canadian, or US waters (Earl, 1977).

Milnes (1982a) estimates that in 1980, between imports and Spanish catch, the Spanish received 35,000 mt of squid from US waters, or approximately 47% of their estimated annual consumption of 75,000 mt.

Spanish import levels show similar patterns to Japanese imports. In 1976, from January - September, Spain imported 16,600 mt (Earl, 1977), in 1978 28,500 mt (Anders, et al., 1982), in 1980 34,200 mt, and in 1981 12,400 mt (OECD, 1982c). Milnes (1982a) estimates that annual imports for 1978 were 28,600 mt, for 1979 26,600 mt, and for 1980 39,000 mt (Table 15). However, Spanish import levels are strictly controlled; importers are subject to import duties and special taxes as well as quota restrictions by government control of importers' licenses. The following statements are taken from the European Market Reports (US Dept. Comm., 1983c):

3/18/81 Reports from Spanish importers indicate that they have not been able to obtain import licenses for Loligo. Imports of Illex from the US have been banned for some time.

4/22/81 Spanish fleet owners can sell their squid free of import duties, at ship load prices payable at 30, 60, and even 90 days ex-frozen store. EEC minimum reference price does not affect large size squid as much because they are generally more expensive.

5/13/81 Illex. Spanish Commerce Ministry has communicated that from 4 May it will consider import license applications, but it has not stated what quantity will actually be granted. Also the Ministry announced increased special compensation tax on Illex imports, whole Illex 20 pesetas/kg (previously 10 pesetas/kg), squid tubes 50 pesetas/kg. These tax increases will probably make importing of Illex into Spain impossible.

11/25/81 Spanish government communicated on 23 November 1981 to importers that it will now consider license applications of Illex imports. This is the first time in six months that the Spanish government has been willing to issue licenses, however, it will neither say what quantity it will allow to be imported or what length of validity the licenses will have. Supplies will not be allowed in due to the continuing embargo on Canadian fish in Spain.

4/13/83 To avoid the 7.2% import duty on frozen products the Spanish government is allowing Spanish joint ventures (Loligo) to import frozen as "fresh" which are duty free. However, these imports will still be subject to (1) variable compensation duties of 15 pesetas/kg and (2) an additional 6% ad valorem on foreign products entering the country.

Furthermore, imports are strongly influenced by Spanish landings:

4/22/81 Spanish importers see no interest at this time in buying from US producers so long as Spanish ships returning from the northwest Atlantic waters can continue their fruitful fishing campaign in these waters.

8/25/82 Shortage of Illex squid, Spaniards awaiting news of catches in US waters, and arrival of Spanish fishing vessels to determine prices which will probably be increasing because of growing demand.

Strand's (1980) analysis of squid allocations to Spain indicates that US exports of squid to Spain are being limited because the Spanish catch in US waters increases the quantity available to Spanish markets, lowering prices received by US exporters, and that foreign catches in US waters decrease the US catch per unit of effort and therefore raise domestic harvesting costs.

Spanish Loligo and Illex prices have been increasing. March 1983 Loligo prices are almost three times higher than April 1981 prices, while for Illex March 1983 prices appear to be close to 25% higher than April 1981 prices (Table 16). These price increases suggest that there is a shortage of

Illex and Loligo in the Spanish market (April 1983 prices are presently unavailable).

Given rising prices, import restrictions (many of which are directed at US squid) and declining allocations, it appears that the Spanish industry market strategy is not to reduce import restrictions but to maintain the strongest possible market for Spanish caught squid, causing high prices to Spanish consumers and low prices to US exporters. Milnes (1982b) agrees:

> "The extent of government intervention in the squid industry. Measured by any standards, in Spain government intervention has been excessive. The government has pursued a policy of protectionism for the Spanish fleet by employing a combination of high import duties (20%), plus special regulatory taxes (ranging from $200 to $500/mt), plus outright suspension of import licenses. Such is the level of protectionism that Canada has accused Spain of violating the GATT Treaty to which it is a signatory.
>
> "These measures serve to create a level of uncertainty and risk for importers of large proportions. The species regulatory taxes can be changed overnight, with no prior warning and when the goods have been bought and are on route to Spain.
>
> "Unlike in Japan and the EEC countries, no clear overall government supply policy for squid exists in Spain. In those countries the government will assemble all interested parties to evaluate the total demand-supply situation, and after considering the catch expectation of its own fleet, will determine the quantity necessary to be imported, and in which periods of the year, in order to maintain orderly markets.
>
> "However, government policy seems to be based to an increasing extent on the thinking that access to the Spanish market for fishery products should only be given for something in return, and that this something should preferably be fishing quotas.
>
> "As consumers and importers we consider this to be a sensible policy. However, we also consider that for countries which have liberally granted fishing quotas to Spain, and in this respect the most generous by far has been the U.S.A... it is essential for these countries to make sure they have access to their own products in the Spanish market. At present this is not the case; during the last 12 months Spain has continually rejected applications for licenses to import Illex from the U.S.A."

Eventually, these import restrictions will have to be reduced since Spain is one of the world's major consumers of fish, but her total catch of all species under the current European Economic Community fishery regime is declining significantly, and while participating with Spain in joint ventures, many countries will soon want to exploit directly the squids in their own zones and are becoming increasingly able to do so. Spain might be faced with a doubly difficult situation of insufficient supplies and surplus fishing capacity (OECD, 1982c). In 1981, Spanish joint ventures had climbed to 71 (OECD, 1982c). In 1980 Spanish joint ventures provided approximately 13,000 mt of squid to the Spanish market (Milnes, 1982a).

If the Illex fishery in Canada for either political or biological reasons (see below) declines, the Canadian level of exports to Spain will decline. With the phase-out of other Spanish suppliers of Loligo and Illex (Japan, the USSR, etc.) from US waters, US exports to Spain should increase, perhaps even rapidly in the future, while there should be an increasing demand by the Spanish for joint ventures.

Canada

One of the major sources of competition for the US Illex export market is the Canadian Illex fishery. Much of the rise in world landings during 1979-81 were Illex landings by many nations from Canadian waters, many of which have vessels that also fish in US waters (Figure 1). As mentioned previously, during this period much of the Canadian catch was exported to Japan, with Japan also harvesting a significant amount. However, based on ICNAF/NAFO catch and scientific reports (Beck et al., 1982), the high abundance of Illex, and thus catch during 1979, in Canadian waters was abnormally high and is currently in a sharp decline. Since 1952 Illex peak catch from Canadian

waters have ranged from 8,000 -11,000 mt (1956, 1961, 1964, and 1967) and Canadian catch has fallen as low as 1,000 mt (1968-70, 1972-74) such that the 1979 peak catch of 162,000 mt is an order of magnitude above the previous peaks. Since 1979 total Illex catch has declined significantly toward average levels.

Recent data (Canada, 1982) indicate that Canadian catch has declined from 18,230 mt to 10,726 mt over the period January-October 1981 to January-October 1982.

The development of this fishery was largely from declining Japanese catch of common squid in 1976 and 1977. Exports grew to a peak of 35,984 mt in 1979 from minimal levels in 1975. Japan accounted for approximately 58% of these 1979 exports, with the remaining 42% being exported to Norway, Portugal, Spain, Italy, East Germany, Sweden, Bulgaria, Spanish Africa, and the US. From 1978 to 1980 the amount of whole squid exported (FOB Atlantic Canada) declined 39%, indicating that the demand for these exports slackened (Raynes, 1982). From January-November 1981 to January-November 1982 Canadian exports declined to 1,135 mt from 6,771 mt. Exports to Japan over the same period fell to 340 mt from 2,080 mt (Canada, 1982). Since little or no Illex is caught in December, these export estimates are essentially annual estimates.

South America

In South America, very little squid is kept for domestic use with almost all of the squid going towards export (Juanico, 1982; Table 17). (Most of the discussion of South American fisheries is a summary of Juanico). Attempts are being made to develop many of the squid fisheries. Guyana has received a loan of $12.7 million in 1981 from the Interamerican Development Bank to develop its fleet and plants. Squid is a bycatch in their shrimp fishery and new legislation requires shrimp vessels have at least 4,000 pounds of bycatch squid with each trip. Japan has entered into agreements with Equador and Peru to explore their "Giant" (Dosidicus gigas) squid fisheries, while some of the catch of the several Polish-Peru joint ventures contain unknown amounts of Giant squid. Spain is currently trying to develop joint ventures with the above mentioned countries as well as Brazil, Columbia, and El Salvador (US Dept. Comm., 1983a).

The Mexican catch of Giant squid was 22,000 mt in 1980 with a Mexico Department of Fisheries estimate that there is a biomass of 300,000 mt of these squids off Baha California. In 1981 this biomass estimate has been reduced to 100,000 mt. The 1981 Mexican catch was only 23,000 mt (Fishing News International, 1983)

Argentinean Illex stocks are the most important squid resource in South America. These stocks are somewhat exploitable beyond the EEZs of Uruguay and Argentina because the continental shelf extends beyond their 200 mile limits. In 1979 Argentineans caught 90,000 mt, the Japanese 25,000 mt, and the German, Soviet, and Polish fleets (combined) 25,000 mt of squid, for a total of 140,000 mt. This is relative to a 1980 estimate of a 500,000 mt biomass. Squid in both Uruguay and Argentina fisheries is a bycatch in their hake fisheries.

Both Uruguay and Argentina are actively seeking to develop their offshore fleets to harvest hake, croaker, anchovy, and squid, but with different approaches. In Uruguay the Fisheries National Institute (INAPE) was established to promote exports. INAPE controls the number of plants and ships in Uruguay and outlaws the use of freezer trawlers. Argentina has attempted to develop its fisheries through joint venture arrangements, primarily with Spain. This development has been hampered by Argentinean economic policy which has overvalued its currency which greatly increased vessel and processing plant operating costs. With peak catches in 1979 and high inventories in 1980 and 1981, total catch of all species has declined.

Unlike most other squid fisheries, Japan is not the major importer of Argentinean and Uruguayan squid (Table 18); Spain and Taiwan were during 1980.

New Zealand

Foreign vessels have been exploiting squid in New Zealand waters for over 20 years, while domestic vessels have shown little interest in the harvest of squid. During 1978-80, Japanese vessels caught

at least 2/3 of the total foreign catch, which ranged from 25,000-42,000 mt. Domestic catch declined from 1,800 mt in 1978 to 280 mt in 1980 (Jarman, 1982). Almost all of the squid catch occurred within New Zealand's 200 mile zone.

US east coast joint ventures for squid seem to be following the same pattern as the New Zealand joint venture situation. In calendar year 1977 approximately 1,000 mt of squid was caught by joint venture. The 1980-81 joint venture catch of squid was 33,000 mt. Similar to this Plan, the allocation of New Zealand squid is given to New Zealand vessels, with the remaining unallocated resource divided between foreign companies and governments and joint ventures. Fishing fees are collected (3.5 million NZ$ in 1980). Joint ventures according to Jarman (1982) are restricted by the following criteria:

1. Joint ventures must return at least 5% in new foreign exchange earnings.

2. Joint ventures must increase New Zealand participation in the manning of vessels and management.

3. Joint ventures must submit programs for increasing local employment, product quality improvement, increasing New Zealand equity in the company, and increasing shore-side capacity.

On the other hand, it must be noted that New Zealand joint ventures differ from US joint ventures in that there is little catch by New Zealand vessels, most of the catch is by chartered foreign vessels.

For the 1980-81 season, Japanese, South Korean, Soviet, Spanish, Polish, West German, and Singaporean companies (for a total of 13 companies and 38 large vessels) were operating for squid and finfish. Furthermore, another 41 applications were declined in 1980. In October 1981, joint venture and foreign allocations were extended for a 12 month period pending a government review of how to increase direct involvement by domestic companies in these fisheries in the future.

Provisional catch statistics show that the foreign catch of squid by trawlers declined from 13,577 mt during the 1980-81 season to 215 mt during the 1981-82 season (OECD, 1982c).

Frozen European Squid Prices

The European Weekly Frozen Fish Reports provide weekly price quotes for frozen squid in the major European markets (Madrid and Barcelona, Spain; Nice, France; and Milan, Italy). However, squid is quoted according to market size (length or weight), quality (sea frozen, land frozen, interleaved, with or without ink, whole or tubes), type of shipping (FOB, C + F, CIF, ex-coldstore, wholesale), area of origin (northwest Atlantic, Boston, Sahara Bank, etc.), and by nationality of vessels (Spain, Korea, Japan, unknown). The variations in price quotes with respect to these qualifiers make it exceedingly difficult to compare prices. The price quotes shown in Tables 19-22 were chosen by first locating all L. pealei and I. illecebrosus prices and then, if they were simultaneously reported with price quotes of other squids within roughly the same period of time they were presented in the Tables.

The time period chosen becomes crucial given the wide variation in exchange rates. That is, it is inappropriate to compare a May 1982 price of L. pealei to a January 1983 price of L. vulgaris. In general, FOB (Free on Board, exclude shipping costs) prices are lower than CIF (Cost, Insurance, and Freight to destination) prices, which in turn are lower than ex-cold store prices (include all costs to get the product to the country and all duties), which again are lower than wholesale prices (include the above plus the importer's cost of doing business). Therefore, in comparing price quotes, if an FOB price is higher than an ex-cold store price, it can be assumed that once that produce reached the ex-cold store stage, it would command a higher price than the product it is being compared to.

The purpose of these price comparisons is to indicate the relative scarcity or value of the various squids. High prices generally imply that a market will readily accept more product relative to

lower priced products.

In the Madrid market, it is apparent that over the months December to February, Korean supplied L. vulgaris commands higher prices than either Spanish caught L. pealei or L. vulgaris, because Korean FOB prices are almost as high as Spanish ex-cold store prices, so that when Korean L. vulgaris reaches the ex-cold store stage, their prices will be higher. Spanish caught L. pealei prices can be said to be higher than Spanish caught L. vulgaris for two reasons: in the 8 and 13 cm market categories, the prices for larger sized L. vulgaris are lower than for smaller sized L. pealei in the other categories. In general, the larger the squid size, the higher the price. In the Barcelona market, price relationships (May - June 1982) were contrary to the Madrid market. Spanish caught L. vulgaris received a higher price than L. pealei, with the Spanish caught L. vulgaris quite close in price to the Japanese caught L. vulgaris. Wholesale prices of land frozen squid depending on size is anywhere from 35 - 52¢ less than sea frozen L. pealei. (Land frozen L. pealei implies that the squid was processed in the US.)

With respect to Illex in Madrid and Barcelona, comparable price quotes indicate I. illecebrosus from US waters receives higher prices than squid from Argentina and Uruguay waters.

In Nice, sea frozen L. pealei commanded the highest prices in December 1982 and January 1983. Smaller sized L. pealei commanded higher prices than larger sizes of the other Loligos. It is assumed that since 25-50 g is the largest sizes reported for Thailand during this period, that L. pealei is higher valued. In Nice, L. opalescens has a very low value. There is little demand for L. opalescens in Spain because its characteristics are thought to be inferior (Milnes, 1982). There were no alternative price quotes for Illex to compare with the Canadian Illex.

In the Milan market, the highest prices were received by Japanese caught L. vulgaris. However, Japanese caught L. pealei received higher prices than Japanese caught L. reynaudi or European caught L. vulgaris.

In summary, L. vulgaris provided by east Asian countries seem to command the highest prices in the European markets. L. pealei, depending on its quality, may command higher prices than L. vulgaris and usually commands higher prices than L. reynaudi. Available Illex quotes indicate that I. illecebrosus commands higher prices than I. argentinus.

Other Factors

Four additional factors must be considered in the analysis of the US export market for squid: international political relations, foreign exchange rates, third party receipt of US species, and import restrictions.

Countries such as Japan and Spain are heavily dependent on imports of and access to foreign stocks of squid and as such, may be denied access or imports for non-fishery related reasons. For example: "Argentine Under-Secretary for Fisheries, Hugo Carlos Talamoni, in a recent interview stated that Argentina has been forced to shift its fishery exports to Africa and Middle Eastern countries. Talamoni stated that the shift resulted from the sanctions imposed by the European Economic Community during the Falkland crisis..." (US Dept. Comm., 1983d, 24 January 1983).

Another example of how international relations affect US markets is the controversy between Canada and the EEC concerning the EEC sealskin ban and also EEC compliance to a new six year agreement in which Canada receives low EEC tariff rates in exchange for granting EEC countries fishing licenses. So far these controversies have led to a ban on all Canadian fishery products in Spain, a boycott of Canadian salmon in the United Kingdom, and EEC nations being denied access to Canadian waters.

A more striking example that may take place in the near future is the potential for the US to impose economic and fishing priviledge sanctions upon Japan. Severe reductions of Japanese fishing priviledges in US waters and possibly US imports of Japanese fish products will be imposed if Japan does not comply with the 1986 whaling ban of the International Whaling Commission. In September 1982, 66 US Senators signed a letter in which the Pelly Amendment to Fishermens

Protective Act, and 1979 Packwood-Magnuson Amendment to the MFCMA would be invoked against any nation violating IWC decisions (Senate Committee on Commerce, Science and Transportation press release, 1 Sept. 1982).

While US exports of squid have grown, their increase has been restricted by foreign exchange rates. For example: "The most important factor in export sales of US fisheries products continues to be the appreciation of the US dollar against major European currencies. The US dollar gained 29% against the British pound, 45% against the French frank, 40% against the West German mark, 4% against the Spanish peseta, and 47% against the Italian lira as compared with August 1980. High interest rates and high inventory costs coupled with the strong US dollar are helping to price US fishery products out to the European market." (US Dept. Comm., 10 September 1981.) Since September of 1981, exchange rates have continued to rise, further hampering US exports (Table 23).

US exports are inhibited if foreign countries receive allocations, harvest US squid, and then export them to another country. For example, Japan, according to European Frozen Fish Market Reports, has exported Loligo pealei to Spain, France, and Italy. In fact, one recent Japanese joint venture application indicated that the Japanese company will sell all of the Loligo pealei harvested to European countries. Spain has exported Loligo pealei to Italy and to France. These exports are directly competing with US exports and taking away potential US markets.

Finally, the US export market is impeded by import restrictions through tariffs and quotas. Almost every foreign market is protected in some way by these trade barriers. In Europe, in addition to individual national restrictions, there exists the EEC Guideprices for squid imports, which increased 6% in 1983 to approximately $3,527/mt for Loligo species and $1,774/mt for Illex species (Lacerda, pers. comm.). From these guide prices, other support prices for reference, intervention, and producer prices are determined. When the import price of a product falls below a reference price, whch is a minimum import price, intervention measures are automatically triggered (Development Planning and Research Assoc., 1983).

Conclusions

The Council believes that high TALFFs diminish export demand and that by reducing them the squid fishery will develop. What can be offered in defense of the Council's position is that in the development of the current butterfish management regime, the Council continuously fought for reduced TALFFs, and when the butterfish TALFF was reduced, butterfish exports increased. (These events are similar to the history of the Tanner Crab Plan.) The analysis above shows that export demand will be increasing in the future for world squid demand is rising and the major consuming countries are losing their access to the primary fishing grounds. Furthermore the US squids are price competitive with the other squids if not even higher valued. All of these conditions are conducive to increased export demand. It must also be noted that the export markets for the fisheries have been inhibited by foreign tariffs, import quotas, and shortages of licenses needed by willing foreign wholesalers to import these species.

Impact Analysis of the Squid Regime

The Plan as adopted and approved merged the three separate Plans that cover these species into one Plan. Their commonality with respect to TALFF setting, export potential, and bycatch relationships lead to reductions in administrative costs as well as beneficial linkages where TALFFs of one species (i.e., mackerel) can be utilized to promote the export of another species (i.e., Loligo).

The Plan as adopted and approved supplants the previous squid management mechanism where a fixed OY (44,000 mt for Loligo and 30,000 mt for Illex) is divided into three portions; an initial DAH (7,000 mt for Loligo and 5,000 mt for Illex) with the difference between OY and DAH split evenly between initial TALFF and Reserve. If, in the fall of the year, forecasted DAH exceeds the initial DAH, the Reserve is diminished accordingly with the excess Reserve available for TALFF. If the forecasted DAH is less than the initial DAH, the entire Reserve can be allocated to TALFF.

The Plan attempts to encourage the development of US fisheries through varying TALFF levels so that the annual OY varies within the ranges provided. In order to assess the associated impacts Figure 3 will be used for explanatory purposes.

Foreign harvestors purchase supplies (food, fuel, repairs, etc.) from the US and pay foreign fishing fees. Foreign processing vessels pay only permit fees but they may also purchase supplies from the US. The foreign processor then takes the fish to market. Besides foreign fishing fees, the only return the US government receives are any intangible diplomatic benefits that accrue from foreign allocations that have been granted so that the State Department can achieve non-fishery diplomatic goals.

If squid is harvested by US harvestors, they sell their squid to a US processor who then finds an export shipper to bring the product to the foreign market. Along every step of production, supplies are purchased, US citizens employed and wages paid, and profits generated. Out of these profits and wages, taxes are paid and expenditures on other goods and services made. Finally, foreign exchange is earned by the US exporter which decreases the national trade deficit. (The expenditure patterns of joint ventures are a cross between the export and foreign harvest patterns for foreign processing vessels pay no fees; US vessels are harvesting the fish; and the final product may be sold under the joint venture company name, the foreign company name, or the US company name.) Therefore, impacts can be categorized into five major areas:

1. US supply of fishery inputs;

2. Government revenues;

3. Balance of trade;

4. Domestic employment; and

5. Industry profits.

Only the first three areas will be discussed. Domestic employment and industry profits will be indirectly discussed throughout the analysis. Throughout the analysis many assumptions, some of which are perhaps heroic, will be made. Since these are emerging fisheries, there is very little data available about the harvesting and processing of squids. This lack of data creates a dependence upon past studies of offshore fishing and groundfish processing. However, for comparative purposes this dependence should give estimates within the proper order of magnitude for many of the participants in the squid fishery are heavily involved in the species discussed in these studies. Table 25 outlines the major impacts discussed.

It is recognized that, since the basic purpose of the Plan is to reduce foreign catch to stimulate US exports, a precise formula that states that by reducing foreign fishing by "x" amount, exports will increase by "y" amount would be useful. It is further recognized that the resulting impacts should be evaluated at the "margin" or "incrementally" rather than on "average". Available data defy such sophisticated transformation. The basic approach taken here is first to show the average impacts if exports increase and if foreign catches decrease, then to show the range of trade-offs that lead to a balancing off of any of the negative impacts associated with reducing foreign fishing.

US Suppliers of Inputs

When it comes to detailed comparison of US versus foreign fishing, the only good or service that is not purchased by US vessels is the foreign use of marine transportation service to ferry crews and suppliers between their ships and shore. Both foreign and US vessels need food, fuel, ice, repair and maintenance services, etc. At this time no concrete estimates of foreign purchases of these supplies are available. The actual expenditures, based on comments received during the review period of the Plan, suggest that, at the most, in 1982 $5 million was spent by foreign fishing interests in their pursuit of 37,600 mt of fish, of which approximately 28,780 mt was squid. The simple addition of the purchases by foreign vessels, according to comment letters by American suppliers received by the Council, is less than $1 million. Doubling this figure to account for those

suppliers who did not comment leads to a minimum estimate of $2 million.

If foreign fishing is phased out, the question arises as to how much of this $5 million would be recovered by increased expenditures by US fishermen who will be catching more for export.

If we assume that the vessels used by US harvestors have cost structures similar to the offshore trawlers of Virginia (DuPaul and Baker, 1979) then on average, for every $100 of revenue generated at least $20 in non-labor variable costs (fuel, engine overhaul, gear, maintenance, electronics, food, ice, etc.) is incurred. (Ideally, expenditure calculations should be made based on the incremental costs the increased squid harvest has on the total operating costs of the vessels but such data are lacking. Use of averages allows crude calculations of the magnitudes of the impacts.) At estimated 1982 prices, the ex-vessel values of Loligo and Illex are $992/mt and $265/mt respectively. These values imply that for every ton of Loligo, $198 will be spent for supplies and for every ton of Illex harvested $53 will be spent. If processing expenditures on supplies are considered, approximately $127/mt will be spent on non-labor variable cost that will accrue for Loligo and $118/mt for Illex. This estimate is based on assuming that the value of processed Loligo and Illex equal $.77/lb. and $.40/lb., respectively, and assuming that the processor makes a profit of $.10/lb. After subtracting out the ex-vessel value of the squids, the remaining costs are determined on an approximate percent basis: 44% labor, 30% fixed cost, and 26% variable non-labor cost. These assumptions are based on the Hu et al. (1983) analysis of processing costs of the New England Groundfish industry (Table 24). Therefore, the total purchase of supplies incorporated with the harvesting and processing of one ton of Loligo is $325 and for one ton of Illex is $171.

Foreign fishermen do not cleanly catch Loligo and Illex but have bycatches of mackerel, butterfish, silver hake and red hake. For every 100 mt of Loligo, they are catching 32 mt of bycatch and for every 100 mt of Illex, they are catching 1.5 mt of bycatch (Mid-Atlantic Council, 1982b). If foreign vessels spent $5 million in total on supplies, given the total 1982 foreign catch of 37,600 mt, they averaged $133/mt in supply purchases. Since the loss of one mt of Loligo allocation implies 1.32 mt of catch when bycatch is considered, this yields a loss of $176 in supply expenditures. Similarly for Illex, one mt loss of allocation leads to a loss of $135 of expenditures.

Therefore, if one mt of reduced TALFF leads to a one mt reduction in allocation and therefore catch, but a one mt increase in US exports, the net purchase of supplies will increase by $325 -$176 or $149 for Loligo and $171 - $135 or $36 for Illex. These numbers suggest that for every two mt of allocation that is reduced if only one new ton of exports arises then total expenditures for supplies will not change significantly. For Illex total expenditures will not change significantly if five mt of foreign catch is replaced by four mt of US catch. With the minimum estimate of foreign expenditures of $2 million, these ratios expand approximately to five to one for Loligo and three to one for Illex. It must be noted that while total supply expenditures may not change, New York ship chandlers (the chief suppliers to foreign fishing vessels) will lose much of their current sales if foreign fishing is phased out. Ideally, foreign vessel activity will switch to other underutilized species so that some of these losses will be recouped.

Government Revenues

Foreign vessels must pay permit fees for their vessels and poundage fees for their catch. These fees are calculated to be at least "an amount sufficient to return to the United States an amount which bears the total cost of carrying out the provisions of this Act" (16 USC 1801, et seq.). The fee schedule is determined by a ratio of the total fish harvested by foreign vessels in the US FCZ to the total US and foreign FCZ catch (ratio in 1981 = .303). The NMFS then determines the total cost of carrying out the MFMCA (including Coast Guard and State Department costs) and multiplies this total cost ($62,245,700 for FY 1982) by the ratio to determine the foreign share of the MFMCA costs. This share determines the 1983 fee collection target which has been set at $87,400 in permit fees and $43.8 million in poundage fees for a total of $43.9 million. (NMFS has attempted to get approval of higher fishing fees.)

The poundage fee for Loligo is $114/mt and the poundage fee for Illex is $31. A one ton reduction of foreign catch in these species, as noted above, also implies, through bycatch relationships, reductions in the foreign catch of butterfish, silver hake, mackerel, and the other squid.

Therefore, including bycatch species in the poundage fee calculation, the foreign catch of one ton of Loligo leads to a collection of approximately $159 and a catch of one ton of Illex leads to approximately $41. With the 4% surcharge, these adjusted poundage fees are approximately $165 for Loligo and $44 for Illex.

Along with foreign fishing fees, the government collects taxes from the profits and employees of those firms that supply foreign fishing interests. Above, it was estimated that, at the most, foreign vessels were spending $176/ton on Loligo and $135/ton for Illex, so some fraction of these figures end up as tax payments.

In addition to the taxes paid by suppliers to the domestic harvestors and processors, taxes are generated through the wages paid to crew members and plant employees and the profits of the boat owners and processors. According to DuPaul and Baker (1979), owners of Virginia trawlers showed a net return of approximately 13% while crew share equaled approximately 50% of ex-vessel gross revenues. (These figures ignore property taxes of under .5% and payroll taxes paid by the boat owner. The study lumped these payroll taxes with settlement fees and miscellaneous expenses for a combined percentage of 3%.)

In the previous section, it was assumed that the processors' mark up was $.10/lb. or $220/mt for Loligo and Illex and that labor costs were $212/mt for Loligo and $172/mt for Illex. This implies that the taxable income from processing approximates $432/mt for Loligo and $392/mt for Illex. Similarly (also developed previously) assuming a 13% return and crew shares of 50%, taxable income at the ex-vessel level is $625/mt for Loligo and $167/mt for Illex. Combined, the taxable income from Loligo is $1.057 and from Illex is $559.

In asking the question does the US Treasury collect more revenue from foreign fishing fees or from the potential taxes of the increased exports caused by reducing TALFFs, two prior questions must be answered: (1) what are the increased tax collections from income generated in the fishing and processing sectors and (2) are there any multiplier effects? Multiplier effects are the effects when the wages paid to crew members and processing employees and the profits of boat and processing plan owners spent induces additional spending and income throughout the economy. One source of additional expenditure has already been identified: the purchase of supplies.

For Loligo, the average tax rate in order to outweigh the loss of foreign fishing fees, assuming that one ton of lost foreign catch is replaced by one ton of exports, would have to be 16% and for Illex it would have to be 8%. There is no precise estimate of these tax rates nor is there good financial data on vessel and processor tax payments. For comparative purposes, consider that in 1979 tax revenues averaged 20% of the total value of goods and services produced in the country (Tax Foundation, Inc., 1981). If tax rates were higher, the US treasury could collect more revenue under exports than under foreign fees.

With respect to the multiplier issue, DuPaul and Baker (1979) estimate a multiplier for the Hampton-Newport News, VA area of 2.49. That is, for every $1 of income generated at the crew level another $1.49 of income is generated at the service sector as the initial $1 is spent. Hu et al. (1983) cites studies that suggest the income multiplier for income generated in the processing sector is approximately 1.16 while DuPaul and Baker (1979) assume that this multiplier is also equal to 2.49. These income multipliers suggest that taxes collected from stimulated exports vis-a-vis reduced foreign catches, should not be significantly less and could be greater than what is currently collected with foreign fishing fees.

With respect to expenditures on supplies, income generated by these expenditures are taxable too. For both Loligo and Illex on a per ton basis, expenditures stimulated by exports outweigh ($325/mt for Loligo and $158/mt for Illex) those by foreign fishing nations ($176 for Loligo and $135 for Illex). Again, these figures support the contention that tax revenues generated under the proposed regulations should not significantly decrease and could potentially increase.

Foreign Exchange

As noted previously, exported squid and foreign fishing fees both bring into the country needed

foreign exchange. (Foreign exchange is the purchase or sale of one national currency for another.) Foreign exchange transfers purchasing power and provides credit for foreign trade (Kindleberger, 1968). The increased availability of foreign exchange makes it easier to export. However, exported squid, unlike foreign fishing fees, has significant trade effects. In general, exports stimulate the economy in terms of income and employment while imports do the opposite. For fisheries, the balance of trade is negative. In 1982, US exported $1.1 billion while importing $4.5 billion of fisheries (US Dept. Comm., 1983b). Excluding Canada and Mexico, Italy ($512 million) and Japan ($310 million) sell the US the most fish while Spain is further down the list at $38 million. On the export side, $9 million was exported to Italy, $3 million to Spain, and $620 million to Japan.

These numbers imply that the US buys approximately $228 million more from the top three squid consuming countries in the world than it sells to these three countries. Italy and Spain alone account for a trade deficit of $538 million. This trade deficit is 23% of the total trade deficit once Mexico and Canada are excluded. (These countries are excluded since a lot of the trade deficit can be attributed to exchange between companies that are wholly or partially US owned. If these countries are included, the trade deficit of Italy and Spain combined equals approximately 16%.) This trade deficit is illustrative of the potential leverage that can be used to stimulate exports within the "fish and chips" policy of NMFS. Once TALFFs are determined, the squid fisheries bring $165/mt of Loligo in foreign fees and $176/mt in purchases of domestically produced supplies while Illex brings in $44/mt in foreign fees and $135/mt in purchases. This implies that $5.4 million and $2.3 million of foreign exchange was needed by the foreign 1982 fisheries for Loligo and Illex, respectively, for a total of $7.7 million.

The 1982 estimates show that 4,864 mt of Loligo and 5,772 mt of Illex (including joint ventures) were harvested. Using the EEC minimum guide prices as minimum estimates of the export prices for Loligo ($3,527/mt) and Illex ($1,774/mt) suggests that above current levels, Loligo will only have to expand by 1,531 mt and Illex by 1,297 mt to achieve an equivalent level of foreign exchange. These estimates are equal to 18% of the foreign catch of Loligo and 19% of the Illex catch in 1982. Therefore, a mild expansion of exports will replace the total amount of foreign exchange earned from foreign fishing while reducing the fisheries trade deficit and increasing employment and income in the economy.

Impacts of Varying the Loligo and Illex OYs

Loligo

For Loligo, OY can range to 44,000 mt. It is the sum of the actual US catch and the foreign catch, so at any time of the year, OY is achieved. Prior to the start of a fishing year, an initial estimate of the OY is made. This estimate consists of a forecast of DAH (the sum of US catch for joint ventures and US catch for shoreside processing) and the level of TALFF that maximizes, in conjunction with DAH, the benefits received not only by fishermen and processors but also by the nation from the fishery. TALFF ranges from 0 to 37,000 mt. The specific level chosen is equally divided into initial TALFF and Reserve. The initial TALFF is immediately available to foreign vessels. The Reserve is held back until the Fall of the year, at which time the US catch for the balance of the year is forecasted. The difference between initial DAH and forecasted US catch is kept in the Reserve for use by US vessels, with the remaining portion of the Reserve released to TALFF for allocation to foreign vessels.

OY for any year can be set lower than the maximum level of 44,000 mt for economic reasons. In order to maximize the economic value of the fishery, the maximum amount of TALFF may be reduced such that, when combined with expected DAH, OY is less than 44,000 mt. As will be developed below, a strong case can be made that there is some point in the range of TALFF below which reductions in TALFF will lead to an expansion in DAH, either by stimulating exports directly or through stimulating joint ventures. During the year, US catch can exceed the sum of DAH and Reserve and cause OY to float up to its maximum level. At no time can the foreign catch exceed TALFF.

Beyond some point, a reduction in TALFF will lead to an expansion of DAH. This assertion cannot

be empirically verified from existing data, but a review of the most recent trend in foreign, US, and world catches are quite supportive. Since 1976 domestic landings have ranged from approximately 1,000 mt in 1977, a year when no joint ventures existed, to 5,000 mt in 1982 (Tables 1 and 2). Assuming 1982 export prices prices received by processors in domestic markets are equivalent, $1,698/mt, while joint ventures receive prices similar to ex-vessel prices, $992/mt, DAH levels over the past years range in value from approximately $1 to $6 million (Figure 4).

Over the same period TALFF has varied little from 37,000 mt, while actual foreign catch has ranged from 13,000 mt to 20,000 mt (Table 26). As developed earlier, in 1982 foreign fishing vessels paid $165/mt of Loligo in foreign fishing fees and they may have purchased as much as $176/mt of supplies, for an estimated total injection into the economy of $341/mt of Loligo harvested. In other words, for every metric ton of Loligo that TALFF is reduced, the economy could lose up to $341 in revenues. Using $341 as the price foreigners pay for fishing, the value of their catch has ranged from roughly $4 million to $7.5 million (Figure 4). Potentially, if the TALFF were set at 37,000 mt, $13 million could be injected into the economy. (This needs to be compared to a potential increase in DAH to about $54 million, as discussed below.)

The trends in US and foreign catch from 1976 to 1982 do not show an inverse relationship. TALFF levels have always been much greater than foreign catch and final allocations (Table 26). (Final allocation is the final amount of TALFF awarded to a specific country.) Therefore, TALFF levels have not been such that foreign access to Loligo was constrained. Furthermore, over the past four years, the overwhelming majority of the Loligo TALFF has been allocated to Spain, Italy, and Japan; three of the largest markets for US caught squid as well as competitors of the US industry. For 1981-82, 100% of the allocated TALFF went to these countries (Table 7). This suggests that not only the size of the TALFF but how it is allocated influences DAH.

If TALFFs and allocations have not been constraining foreign catches, then presumably world market conditions have caused them to range from 13,000 mt to 20,000 mt. World squid landings have increased steadily until 1980 (Figure 1) while the combined US and foreign catch of Loligo have declined as a percentage of world squid landings (Table 9). Since 1980, estimates and reports of world landings as well as market price trends indicate that for the years 1981 and 1982 world squid supply declined substantially relative to demand. A significant shortage of squid exists. The major squid producing and consuming countries are also simultaneously being denied access to foreign fishing grounds around the world. The decline in world landings and these fishing rights has increased the demand for Loligo so that at some point, because of this demand, reductions in TALFF should lead to increases in DAH. (On a smaller scale, this relationship was successfully tested in the butterfish fishery.) Very recent events suggest that this point has already been reached.

The Council has continually recommended reductions in foreign catch. The 1982-83 final allocations declined to their lowest level (Table 26). This is the first indication that the Departments of Commerce and State have been supportive of the Council's position relative to Loligo and the first indication to the foreign nations that their fishing rights to US stocks will decline. This probably led these nations to import US squid and participate in joint ventures in order to maintain squid supplies in their markets. Starting in 1982-83, US joint ventures and exports started to expand such that for 1983-84 the Loligo OY is 44,000 mt with a DAH of 22,000 mt, 11,700 mt of which is the JVP estimate (48 FR 18818, 26 April 1983). While the maximum TALFF is 22,000 mt, much larger than the 1982-83 foreign catch, half of this is held in Reserve, as discussed above. With a continuing world shortage of squid and early indications that US exports can be of high enough quality to compete with other squid products, coupled with significant increases in joint venture applications, it is likely that at least part of the Reserve will not be allocated to TALFF. This suggests that, if the TALFF is reduced below 20,000 mt, the substitution of DAH for TALFF will occur.

Evaluated at 1982 prices, the 1983-84 OY represents approximately $37 million, $7.5 of which will be earned from foreign fishing fees and foreign supply purchases if the entire TALFF is allocated and harvested. The DAH value is roughly $29 million (Figure 4).

The impacts of reducing TALFF below 20,000 mt depend on the degree of substitution. A one mt

reduction in TALFF leads to an estimated decrease in revenues to the fishery by foreign vessels of $341. Will this spending be replaced by a lesser, greater, or equivalent amount of revenues from increased exports or JVPs? This will depend on the rate of substitution between TALFF and DAH and the resulting degree to which DAH is made up of exports or joint ventures. To date, available data defy actual quantification of this relationship. However, the reduction in TALFF from 1982-83 by 15,000 mt to 22,000 mt and the simultaneous increase in DAH from 5,000 mt to 22,000 mt suggests a rate of substitution of one mt of DAH for every one mt of reduced TALFF.

If there actually is a one for one substitution between TALFF and DAH, and DAH expands by one mt of exports, the gross revenues received from the fishery will likely increase from the 1983 level as TALFF is reduced. The $341 not received from foreign vessels will be replaced by $1,698 of revenues from export, a net increase of $1,357. If this rate of substitution is reduced to zero, potentially OY and DAH could grow to a level of $64 million in gross revenues (Figure 4, solid increasing lines). This suggests that the risk of losing foreign revenues in excess of DAH generated revenues through reduced TALFFs is small.

If the trade off is less than one for one and DAH expands only through joint ventures, the rate of substitution can be no less than approximately three mt of reduced TALFF for one mt of JVP in order to maintain the 1983 level of gross revenues. If it is less, for example, four mt of TALFF for one mt of JVP, the total value of the OY will decline (Figure 4, dotted parallel lines).

The degree to which OY differs from 44,000 mt will depend on whether there is less than a one for one tradeoff. For example, if a reduction in TALFF by three mt leads to only a one mt increase in DAH, and TALFF is reduced to zero from its 1983 level, the resulting OY will be 37,000 mt. Only an increase in export of JVP demand beyond that which is caused from the reduced TALFF will lead to an OY of 44,000 mt. It must also be noted that in addition to the rate of substitution, if foreign fishing fees increase (decrease) or the average revenues from one mt of exports or JVP decrease (increase), the resulting net return to the economy from decreasing TALFF will decrease (increase).

Illex

The US Illex fishery has developed so rapidly that the issue of the substitution between DAH and TALFF as outlined in the Loligo analysis need not be addressed in detail. The projected maximum TALFF for 1983-84 is just 2,900 mt, an amount intended to satisfy the bycatch of Illex in other foreign fisheries (48 FR 18818, 26 April 1983). This TALFF level is a 20,000 mt reduction from the 1982-83 level. (Until 1983-84 TALFF varied little from its maximum allowable level of 25,000 mt, Table 26.) The main reason for the reduction in TALFF is the expansion of DAH from approximately 6,000 mt to 27,100 mt through joint ventures, which total 22,100 mt for 1983-84. This expansion may have resulted from the same factors that led to the increase in the Loligo DAH plus the additional factors of a shortage of Illex coming from Canadian and Argentinean waters as discussed earlier. The signals that early drafts of this Plan sent to foreign nations concerning possible TALFF reductions cannot be dismissed as one of the factors contributing to rapid development.

Using 1982 prices, the 1983-84 OY has an estimated value of $11 million, a $5 million increase from the 1982-83 value of $6 million. Foreign revenues declined from $2 million to $.5 million. If the demand for US harvested Illex remains high, then the only way the economic value of the OY will increase is if either joint venture and export prices increase or through exports increasing as a percentage of DAH.

OY could be reduced below its maximum 30,000 mt level. The demand for joint ventures may slacken greatly such that a potential for large TALFFs may exist. If so, the Loligo analysis and conclusions should be representative of the impacts of varying the OY level. The only difference will be the magnitude of the inputs since the foreign fishing fees, foreign expenditures, and Illex prices are all lower than their Loligo counterparts.

Benefit-Cost Analysis of the Squid Regime

A taxonomy of the benefits and costs are outlined in Table 25. The impacts of US suppliers, government revenues, and foreign exchange are not considered directly in the analysis. They are not directly considered because they reflect a substitution of claims upon the resource. They do not directly stimulate the production of new goods and services within the economy. All of the goods and services supplied by foreign fishermen will potentially be replaced or exceeded by US domestic purchases. Any excess purchases by US fishermen and processors should not cause a rise in prices by non-fishery sector purchasers of these goods and services. Taxes collected from fishermen and processors are not included in the analysis because they reflect a transfer of income to the government and to include them would be a double counting of the actual benefits (Anderson and Settle, 1977). Taxes are paid out of profits. To count tax collections as an additional benefit while also including them in profits would be double counting taxes. Only if estimates of after-tax profits were developed could taxes be legitimately included as a benefit. This analysis does not estimate after tax profits. Foreign exchange benefits are not included because they are to some extent reflected in the other benefit items and the other macro-economic benefits, besides increased income and employment, are too subtle to attempt to quantify.

The methodological approach taken here differs from the standard benefit-cost analysis because of data limitations, the exact relationship between export demand and foreign allocation cannot be specified. Consequently, benefits and costs cannot be associated with the standard approach of measuring the total changes in consumer and producer surpluses. (These are the differences between willingness to pay, opportunity cost, and the actual price paid or received.) Furthermore, the flow of benefits relative to costs cannot be specified because of the three year life of this Plan. Certain benefits and costs may not be immediately achieved unless the basic structure of the Plan is maintained for a longer period. For example, the reduction of the costs associated with foreign fishing may not be reduced since a large part of these costs are fixed (such as data collection procedures) and cannot be reduced gradually if foreign fishing is reduced gradually. The analysis below takes a static approach in which the magnitudes of the benefits and costs are compared on an average basis. The total benefits and costs will depend on the degree to which TALFFs are reduced by reduction of OY ot by increases in DAH.

Benefits

The benefits of the proposed regulations can be attributed to four areas: ex-vessel, processing, administrative, and technological. At the ex-vessel level, it is obvious that profits (revenues minus the total financial cost of harvesting) will be made, otherwise there will be no reason for the vessel owners to seek squid. These profits are a reward to the boat owners for putting together the resources (boats, crew, trucking, etc.) utilized in the harvest and sale of squid. In order to be willing to undertake this task, the boat owner expects to receive a certain level of profit. If he earns more, the difference is called the excess profit (economists call this economic profit) level. Only the excess profit level, not total profits, accrue as a benefit for they reflect income earned beyond the expected wages or return to the boat owner for his entrepreneurship. DuPaul and Baker (1979) estimate that the financial return to the average Virginia trawler was approximately 13% in 1978. If the assumption is made that a boat owner requires at least a 13% profit from harvesting using normal fishing patterns than the owner must expect to earn a greater than 13% profit on squid in order to change his normal fishing pattern.

Rationally, boat owners should expect as a return on their investment an excess of what they could earn in other financial markets. If this was equal to 10% in 1978, then the excess profits earned under normal fishing was 3% in 1978. If these excess profit levels still exist today, the squid will have to earn at least 4% in excess profits in order for the boat owner to pursue squid. Therefore, a minimum estimate of the excess profits from squid harvest could be 1% of the ex-vessel revenues of the squids. Otherwise, squid would not be landed.

Increased squid landings require increased labor, fuel, and other inputs, which may come from possibly three basic sources: (1) unemployed supplies, (2) fully employed supplies from non-fishery sectors, and (3) fully employed supplies from the fishery sector. If the supplies used were previously employed, then their social cost, as opposed to their financial cost, is zero.

Given that national unemployment is approximately 10% and that the major countries in the squid fishery, according to the 1970 Census, had unemployment rates 50% higher than the national level (6.5% versus 4.4%), it is highly likely that the increased labor required for squid export development will be previously unemployed. (Possible situations in the hiring of unemployed labor if unemployment in the fishing industry is similar to the national average: (1) at least one out of ten fishermen are unemployed and the unemployed are rehired; (2) if all fishermen are gainfully employed then out of every ten "new" fishermen employed, nine of them will have been previously employed; (3) finally, if the average crew member works an average of nine out of ten available fishing days, squid exports may increase crew employment another day.)

If the labor required for squid export comes from previous employment outside of fisheries, then the financial cost of harvesting is not reduced to reflect the social cost of production, for society would be giving up the goods and services that otherwise would be produced. (However, there would be a possibility that the vacant position would be replaced by a previously unemployed worker.)

With respect to the last category, "fully employed resources within the fishery", some of the effort attracted to the squid fishery is likely to come from fishermen currently exploiting species such as cod, haddock, yellowtail flounder, summer flounder, scup, and scallops. All of these species are fully exploited (US Dept. Comm., 1982a). In most fully exploited fisheries there exists an over-application of labor, fuel, and other resources in the harvesting sector, and thus the level of catch could be maintained with fewer resources. That is through a reduction in effort (boats, labor, fuel, etc.) applied to these fisheries, the remaining vessels can fish more effectively, while the potential for depressed stocks to rebound increases. The transfer of the redundant resources toward an underutilized species such as squid implies that society is not giving up any previously supplied goods and services, but gains the value of the increased production of squid. Society also gains from the increased production and reduced harvesting costs that accrue in these other fisheries. Therefore, the financial costs of harvesting squid should be appropriately discounted to reflect the true social cost of the additional squid harvest. Therefore, a minimum estimate of the social benefit from the harvest of Loligo for export would be the sum of: 1% of the ex-vessel gross revenues to account for the boat owner's profit and 10% of the wages paid to labor.

At the processing level many of the same assertions discussed with respect to crew employment can still be utilized in estimating the social cost of hiring processing employment. Hu et al. (1983), Georgianna et al. (1978), and Peterson and Smith (1979) all note that there is much idle physical capacity in the processing industry in the northeast region. All processing plants show strong seasonality in their production levels. Hu et al. (1983) shows that processing plants during the year will vary their number of employees from 40% to 80% of peak hiring levels. To the extent that squids are landed during off-peak months, the probability of utilizing unemployed labor is significantly higher than during peak months (off-peak months are January, February, and March). During this period very little Illex is landed, while over the past three fishing years, Loligo landings have ranged from 2 - 13% of annual landings.

During the peak production season the extent to which squid replaces other fish in the processing line is not entirely clear. Georgianna et al. (1978) stated: "There is other evidence that there is little or no causal connection between the development of non-traditional species and excess capacity of traditional species. World demand for squid was perceived to be very high and large amounts of it were landed in New Bedford and Cape Cod during May, 1979. Historically, according to our observations, May is a month of full or over-utilization in processing flounder and scallops, the traditional species in New Bedford. Yet there were large amounts of squid bought by New Bedford processors. According to the port agents in New Bedford, 1.3 million pounds of squid was purchased which is approximately the amount of scallop landings in the port over the same period. Every fresh fish processing firm except one purchased squid at an average ex-vessel price of 41 cents, roughly double the price of cod."

With this potential substitution in mind, and using the same arguments used in analyzing the benefits at the vessel level, a conservative estimate of the benefits of processing one mt of Loligo is: 1% of the final wholesale squid revenues plus 10% of the labor costs. This latter assumption is based on two assertions: (1) the likelihood that squid demand will be consistent and high enough

that processors will increase their use of physical capacity and (2) the studies cited above focused only on New England processors. Relative to New England processors, the Mid-Atlantic processors are not as large or as well developed, and presumably more eager to expand capacity. (The majority of joint ventures involve owners of Mid-Atlantic processing facilities.)

The Plan should reduce administrative costs. Under the present system, each plan and amendment goes through a process which entails Council development, a preliminary review by NMFS for public hearing purposes, public hearings, final adoption by the Council, final review and approval by NMFS, an environmental impact review, and a regulatory impact review. In addition to the public, Council, and NMFS reviews, each plan and amendment must work its way through administrative reviews by the State Department (if foreign issues are impacted), the Environmental Protection Agency, the Office of Management and Budget, and the general staffs of NOAA and the Commerce Department. Each State with an approved Coastal Zone Management Program is contacted to insure that the plan or amendment is consistent with that program. With the previous separate Atlantic Mackerel, Squid, and Butterfish Plans, any change to the OYs were considered amendments and required the full review process. The new merged Atlantic Mackerel, Squid, and Butterfish Plan, as approved, makes the setting of annual quantities a matter of administrative procedure rather than amendment, involving the Council, NMFS Regional office, and public. This procedure should reduce the amount of administrative review needed for effective management of these fisheries.

Another major advantage of the Plan is the increased management effectiveness relative to the foreign fisheries in the FCZ. The foreign fisheries for the subject species and the hakes are interrelated, at least to the extent that bycatch of each species regularly occur in targeted foreign fisheries for each of the other species (Mid-Atlantic Council, 1982b). For example, it is impossible to regulate the foreign butterfish fishery without affecting the Loligo fishery. Similarly, but to a lesser extent, mackerel and silver hake traditionally have been consistently occurring bycatch in the foreign fisheries for each other. With or without merger of all three Plans, such interactions must be recognized in the management of each fishery, and the Plan will facilitate such management to the greatest degree possible at the present time. Similarly, the recommended alternative would facilitate the addition of other species to the Plan. It should also be noted that the Council would retain the ability to amend the Plan at any time in the future. There would be no loss of flexibility or responsiveness over the present system of annual amendments to the Plans.

To put the potential cost saving in perspective, the Council cost of developing the current Plan (Amendment #3) was approximately $37,000, while the Council estimates the annual cost of implementing the Plan at $9,000. If one considers the chain of administrative review, it is not difficult to imagine a doubling or tripling of the $37,000 development cost to derive a total cost of implementing a single plan or amendment. With three simultaneous amendments (one each for mackerel, squid, and butterfish), it is possible that administrative costs could approximate $500,000 over the entire development and review period, which last approximately one to two years. Therefore, by going to a system where the annual values for OY, DAH, DAP, and TALFF are set administratively, and by merging the three Plans, a conservative estimate of the cost savings of the Plan as approved is at least 1/3 of the current costs, which is perhaps in the neighborhood of $150,000 annually. Even with the merger there will still be a basic level of analysis of each fishery, otherwise one would assume a cost savings of 2/3 of current costs. What is being saved are the costs in the duplication of administrative reviews.

A perspective of the foreign costs of fishing can be realized since approximately 90% of the total east coast foreign catch is associated with the squid fisheries, if one considers directed catch and bycatch (US Dept. Comm., 1983b; Canadian landings excluded). The total east coast foreign catch is approximately 35% of the total foreign catch in the US FCZ in 1982. If foreign fisheries are phased out, a portion of the resources being devoted by NMFS, the Councils, and the Commerce and State Departments towards foreign fishing could be reduced or applied to other fishery problems. Therefore, because foreign fishing fees presumably reflect only management costs and because there is Congressional intent under the MFCMA to phase out foreign fishing, the social cost of losing these foreign fishing fees is probably not substantial.

Similarly, Coast Guard costs could be reduced because there would be less need for ship patrols

(patrol effort ranges from $4,480/day for patrol boats to $39,640/day for high endurance cutters), fewer boardings (depending on the vessel used boarding costs range from $740 to $19,824/boarding), and reduced overflights (costs range from $400 -$2,479/hour).

Technological and market expansion benefits, from restricting foreign fishing are currently occurring. In many of the joint venture applications for 1983-84, foreign partners are: (1) offering training and expertise to US fishermen and processors to improve product quality, (2) willing to help finance the building and improving of processing facilities, (3) marketing part or all of the joint venture catch under the US company's name, and (4) buying additional fish from shore based processors. All of these actions benefit the US fishermen and processor, but they also may indirectly benefit the US consumer. With the quality improvement in US production, the consumer will have higher quality products. As discussed previously, there is no evidence that consumers have paid higher prices because of squid development (Table 7).

The Plan as approved would increase this transfer of technology and market information as foreign nations will want to maintain the quality and size of their squid supplies. In fact, it can be argued that the flurry of joint ventures and the various technological demonstrations by foreign nations that have occurred are the result of the Plan moving toward final approval and implementation. Joint ventures probably are being used to delay the time in which squid will only be available through export from the US. The nations participating in joint ventures realize that foreign access to the US FCZ, as in the zones of other countries in the world, will be phased out. The recent amendments to the MFCMA verify Congressional intent to phase out foreign fishing in the FCZ.

These technological and market expansion benefits cannot be quantified in a meaningful way. Therefore, they are categorized as "substantial" to imply that they will, in all likelihood, lead to benefit levels of million dollar magnitudes over the long term.

Costs

There are four major costs that accrue from phasing out foreign fishing: (1) loss of excess foreign fishing fees; (2) loss of State Department benefits; (3) loss of "fish and chips" flexibility; and (4) increased administrative and enforcement costs as the US fishery develops. (Frequently on behalf of the entire economy, the State Department issues fishing rights to nations in exchange for non-fishing related concessions. For lack of a better term, these are called State Department benefits.)

In order to assess the costs of losing foreign fishing fees, it must be realized that these fees end up in the general treasury and are only indirectly transferred to NMFS through budget appropriations. It must also be realized that the MFCMA reflects Congressional intent to phase out foreign fishing as the US fishery develops, such that there is a general acceptance of the foregoing of foreign fishing fees.

The foreign fishing fees are primarily collected to cover the costs of monitoring and regulating foreign fishing in the US FCZ. In the analysis that led to the establishment of these fees, there is no direct reference by NMFS that they are an attempt to generate revenues in excess of costs. Therefore, one could conclude that foreign fishing fees reflect only the costs to US taxpayers of allowing foreign fishing. (At one time NMFS was considering the concept of auctioning off east coast squid allocations; 47 FR 38947, 3 Sept. 1982). NMFS has the authority to charge higher fees but has not fully exercised this authority. (The impacts of reducing foreign catch were discussed previously, see Impacts of Varying the Loligo and Illex OYs.)

The State Department may use foreign allocations to receive a political good, such as military access in a foreign nation or to receive an economic good such as the lowering of a tariff on US produced goods. These "goods" are both examples of what could be labeled as State Department benefits. These benefits should not be substantial, for relative to the sum total of all international negotiations, foreign allocations of east coast squid probably play an unimportant role. While they may help smooth out the rough edges of such negotiations, there are many other substitutes that can accomplish the same goal. (For example, the lowering of import duties on Spanish produced products and Japanese cars.)

The Plan is a clear statement that TALFFs will be reduced to enhance US fishery development. Consequently, the diplomatic value of whatever TALFF is available should increase for the US. Policy makers should expect to receive a higher return from allocations to foreign nations in light of the world squid shortage and reduced TALFFs. That is, foreign nations should be willing to offer more in terms of diplomatic negotiations for a smaller TALFF, thereby strengthening the use of TALFFs for these purposes.

Another cost that needs to be considered is the loss of "fish and chips" flexibility. If TALFFs are reduced, the ability to use foreign allocations of squid to countries to stimulate the development of other species is diminished. (For example, foreign allocations of squid may be granted to Spain if Spain promises to buy US processed mackerel or to reduce import duties on US processed butterfish.) On the east coast, the likely species for development are mackerel and the hakes. These species, in terms of world markets, are not as highly ranked as the squids. Therefore, the loss of "fish and chips" flexibility in this vein should not be substantial, especially when the purpose of "fish and chips" is to develop US exports.

As the fishery develops, resources devoted toward the administration and enforcement of the regulations will incrementally increase. This incremental increase should not be substantial. The current level of management and enforcement is adequate until DAH approximates the maximum of the OY range. The only regulations that may potentially restrict US harvesters is when harvesting capacity exceeds the initial DAH and that part of the Reserve that has not been allocated to TALFF. When that occurs, the US fishery will have to be closed and harvesters will only be allowed to land the species in question as bycatch (no more than 10% of the vessel's total catch of all species). With shoreside processors having preferential access to US harvested squid, as long as joint ventures and TALFFs buffer the difference between shoreside landings and OY, these regulations are not likely to come into play. For the 1983-84 year, NMFS has estimated that shoreside landings are approximately 5,000 mt of Illex, 10,300 mt of Loligo, 5,000 mt of mackerel, and 10.000 mt of butterfish, which are 25.000 mt, 33,700 mt, 96,700 mt, and 5,000 mt less than maximum OY levels, respectively. Therefore, it is much too early to explore the costs of future regulations. The incremental costs of the administration and enforcement due to expanding US fisheries should not be substantial, especially when it is realized that the life of the Plan is only three years.

Impact and Benefit Cost Discussion of the Butterfish and Mackerel Regimes

Butterfish

One of the major objectives established in the original Butterfish Plan is the development of the US fishery for export. It was determined by the Council that a reduction in the foreign butterfish fishery was a necessary initial step in accomplishing this goal. This reduction in foreign catch is not only designed to secure a greater potential export market for US processors, but also to provide the highest possible butterfish availability and catch per unit of effort for US harvesters in their still largely inshore and high cost (compared to other nations) butterfish fisheries. The OY for butterfish was accordingly set beneath the maximum sustainable yield level in the original Plan and its Amendments. Another major consideration in butterfish management is the fact that butterfish is a relatively large bycatch in the foreign Loligo fishery, and is a comparatively minor but consistent bycatch in other foreign fisheries.

Because of these considerations, the Plan as adopted and approved establishes the butterfish TALFF (and thus in part, OY) as only that amount necessary for foreign nations to harvest their allocations of the squids, mackerel, and silver and red hake. This is in keeping with the policy established in the original Trawl Fisheries of the Northwest Atlantic PMP and the original Butterfish Plan.

The maximum US butterfish harvest equals 16,000 mt minus the TALFF. While this may constrain the US industry to slightly less than the full amount of butterfish available for harvest, this formulation is preferable to reductions of the butterfish TALFF to beneath by-catch requirements and eventually, to zero, i.e., making butterfish a 'prohibited species' to foreign fleets. A "prohibited species" is defined by the Foreign Fishing Regulations to be any species for which a

foreign vessel does not have an allocation, and which thus, must be discarded at sea. "Prohibited species" status therefore, does not prevent mortalities of that species through foreign fishing, but only prevents retention of such catches. It should also be noted that while foreign nations must pay fees (based on species tonnage) to the United States for bycatch allocations, no fees are collectible for discarded catch of "prohibited species". A third consideration is that specific bycatch TALFFs constrain foreign catch of a species - when an allocation has been taken, a foreign nation must cease all fishing operations which could lead to significant further catch of that species. A bycatch allocation thus forces foreign nations to fish as cleanly as possible. These constraints are not available under "prohibited species" regulations under which a foreign nation may pursue its permitted fisheries for other species so long as all catch of the prohibited species are discarded at sea. There is less incentive to foreign nations to fish cleanly under "prohibited species" regulations and there is less US control over the size of those discarded catches than exists with bycatch-only TALFFs. It is the Council's belief that conservation cannot be assured under "prohibited species" regulation.

In summary, while a butterfish bycatch TALFF may reduce the amount of butterfish available to US fishermen as the US harvest begins to approach the maximum limit of OY, the use of a bycatch TALFF, instead of prohibited species status, will ensure that total butterfish catch does not exceed the OY and will provide some revenue through foreign fishing fees. Using the bycatch percentage allocations in this Plan, the maximum butterfish TALFF would not exceed about 3,700 mt assuming: 1) a Loligo TALFF of 37,000 mt; 2) Illex, silver and red hake, and mackerel TALFFs totalling 150,000 mt; and 3) all TALFFs are allocated to foreign nations.

The bycatch percentages are generous allowances compared to the performance of most nations in the last two years (Mid-Atlantic Council, 1982b). It is impossible to predict the impact of these ratios on specific nations, since allocations to individual nations may not themselves be distributed according to the bycatch nations by the State Department. As a general conclusion, the proposed bycatch allowances should not force foreign fishermen, as a group, to fish any more cleanly than they have been voluntarily. In particular, it should be noted that butterfish abundance has been very high in the last two years, and thus the butterfish bycatch allowance for the Loligo fishery, which is slightly larger than the actual bycatch rates during this period, should not be restrictive if relative species abundances change. These impacts were indirectly included in the Loligo and Illex analysis for the foreign revenues received from these fisheries included revenues from the bycatch of butterfish.

The acceptability of setting TALFFs to account for bycatch was established in the original Atlantic Mackerel Plan. The procedure was also used in the original Butterfish Plan. The Plan does not change the approach. It merely substitutes percentages for fixed values in an attempt to provide flexibility within the framework plan context.

Mackerel

The mackerel regime provides a greater opportunity for the development of the US fishery. The mackerel regime operated under Amendments 1 and 2 to the Atlantic Mackerel Plan with an OY of 30,000 mt and a spawning stock size of less than 700,000 mt. Recent developments in the mackerel fishery, particularly with regard to joint ventures, led the Council to conclude that limiting the US fishery to 14,000 mt when there is no critical stock problem is too constraining on the development of that fishery. The minimum spawning stock size not only provides more flexibility for the development of the US fishery, but also provides an increased possibility for a directed foreign mackerel fishery which could in turn be used to provide incentives for foreign purchases of US harvested mackerel. Increasing the possibility of a directed foreign mackerel fishery adds mackerel to the list of species that are available for "fish and chips" bargaining. The intent is to make mackerel a target for development, particularly through joint ventures.

The choice of 600,000 mt as the mackerel spawning stock size beneath which there exists no directed foreign fishery or a large scale US commercial fishery represents a balance between the needs to: (1) maintain a spawning stock size adequate to produce, under normal environmental conditions, average recruitment; (2) maintain a total stock size large enough to provide ample opportunities for a successful recreational fishery; and (3) provide for and promote the growth of

the US commercial fishery, especially for export. It is recognized that the larger the spawning stock size, the larger the probability of both good recruitment and large recreational catch, even beyond 600,000 mt. It is, however, both impossible and undesirable to maintain constantly a mackerel stock size at the highest levels ever observed. It is reasonable to assume that, past some (unknown) level, increases in stock size do not influence recruitment/catch as much as natural environmental and other factors, and would not outweigh the losses to the commercial fishery that would be required. Maintaining the spawning stock at some intermediate level (600,000 mt) and limiting catch to an intermediate fishing rate ($F_{0.1}$) is a reasonable compromise which safeguards all recreational and commercial interests. Technical discussions of the relationships between spawning stock size, recruitment, and sport catch are given in Anderson (1980) and Mid-Atlantic Council (1982a). (The recreational catch projections are used to estimate DAH, they are not a specific recreational quota.)

In addition, it is possible that the US and Canada will conclude and implement a bilateral fisheries treaty. Since the mackerel resource and fishery extends significantly into Canadian waters, it is highly probable that such a treaty would specify bilateral management of this resource. If this occurred, the US would be required to manage the US (sport and commercial) and foreign fisheries for mackerel in US waters in conformance with the terms of such a treaty and whatever management measures (such as quotas) as might be promulgated on an annual basis by the international management authority. Established Plan management would facilitate implementation of such a treaty, since bilateral management might require regulation of US fishermen. Under the MFCMA, such regulation is possible only with a Plan. Established Plan management would also ensure equitable treatment of US commercial and recreational fishermen under international management.

It is logical to conclude that while butterfish and mackerel are at opposite ends of the spectrum in comparison to the squids, their bycatch relationships intertwine their future development. If their TALFFs were high enough to satisfy foreign demand of these species, there would be no demand by foreign nations to purchase US-caught fish. Obviously, the development of export markets for US-caught fish involves more than simply reducing foreign allocations. This is recognized in Section XIII-8 of this Plan, which endorses recent Commerce Department initiatives to develop export markets by giving preferential allocations to foreign nations that agree to purchase US-harvested fish. The Council believes that the TALFFs in this Plan are reasonable to achieve the objective, that is, low enough to provide some foreign demand for US-caught fish and high enough to permit effective implementation of the Commerce Department initiative of giving preferential allocations to foreign nations that agree to purchase US-harvested fish.

VI. Alternatives to the Plan and reasons they were rejected.

Two alternatives to the Plan as adopted and approved were considered. They are:

Take no action at this time

This would mean that the Atlantic Mackerel and Butterfish Plans would lapse at the end of 1981-82. The Squid Plan has no fixed duration and would continue indefinitely under this alternative.

The No Action alternative would mean that the Atlantic Mackerel and Butterfish Plans would have lapsed at the end of 1982-83. If that happened, NMFS would be required to prepare PMPs in order for the foreign fisheries to continue. The PMPs would not regulate US fishermen, so there would be a possibility that US fishermen could overfish the species involved, which could lead to stock depletion.

This alternative could benefit foreign harvesters because the TALFFs under preliminary fishery management plans or Secretarial amendments could be greater than those resulting from Plan management. The current Plans and alternatives (2) and (3) explicitly seek to foster development of the US fisheries for the subject species and restrict foreign harvests of these species in such a way so as to promote that growth. This alternative could undermine this US development, because a reversion to preliminary fishery management plan management would probably result in a relatively large annual reallocation of mackerel and/or butterfish to foreign nations.

While Secretarial amendments would regulate the US as well as the foreign fisheries, the Council believes this alternative to be both undesirable and counter to the intent of the MFCMA. Under the Act, it is the responsibility of the Regional Councils to develop and amend management plans. The membership and operations of the Councils are specifically designed to provide the greatest possible opportunity for the public, affected industries, and the states to participate in the management process. Preliminary fishery management plans, Secretarial plans, and Secretarial amendments are provided for in the MFCMA only so that some controls are possible under critical circumstances and when a Council is unable or unwilling to formulate a plan which meets the National Standards. Such a situation has not arisen with respect to the fisheries encompassed by these Plans.

Extend the Atlantic Mackerel and Butterfish Plans through 1982-83

This would extend the Atlantic Mackerel Plan for one more fishing year with no changes. The Butterfish Plan would be extended for one more fishing year with OY increased from 11,000 mt to 13,000 mt and DAH increased from 7,000 mt to 9,000 mt.

This alternative would not affect the Squid Plan. It would extend the Atlantic Mackerel Plan for one year with no change. It would extend the Butterfish Plan for one year and increase OY and DAH by 2,000 mt each.

It is the Council's intent that this alternative be submitted for implementation only if the adopted alternative is judged to be unapprovable. In other words, this alternative is proposed mainly to provide for short-term management continuity, if it becomes necessary. In that context, this alternative would have a beneficial impact relative to No Action or another one year extension of the Plans without changes because it would continue management and recordkeeping and adjust the butterfish OY and DAH to levels appropriate for 1982-83.

This alternative would require additional amendments to the Atlantic Mackerel and Butterfish Plans to extend them beyond the end of 1982-83. It would not have the flexibility associated with the merger of the three Plans.

VII. Final Conclusions

The Plan will not negatively impact the economy by $100 million or more. Even if foreign fishing is phased out completely, the loss in foreign fishing fees and expenditures for supplies would not be more than $10 million for either fishery. If the peak catch levels of foreign catches found in Table 26 were multiplied by the corresponding foreign fishing fees the value would be approximately $5 million. These catch levels reflect the magnitude of foreign usage of their allocations when it is considered that prior to 1979-80 there was little direct management of these species and that TALFFs and allocations are seldom converted to actual catch. This $5 million when added to the estimate of $5 million worth of purchases of US goods and services by foreign vessels is far below $100 million. Furthermore this sum or joint ventures will have to be discounted by the benefical impacts of any increased exports (increased taxes from US citizens, increased employment, foreign exchange earnings, and reduced management costs due to lower foreign fishing.)

There should not be a major increase in the costs or prices for consumers, if anything consumers will be consuming higher quality products at lower prices given the technology transfer effects and market development of the Plan. Since the Plan is not restricting or distributing rights to the the supply of fish there should be no major increase in prices or costs to industry or to governmental agencies beyond present levels. Adequate safeguards are present such that US vessels and processors operating for supplying domestic markets will not be restricted unless for biological reasons.

The main objective of the Plan is to increase the competitiveness of the US fishermen in the world market, increase employment opportunities and investment , increase overall fishery productivity and promote US exports. There are no significant adverse effects in this area except on a very local level, those suppliers of goods and services located around the New York Harbor that supply foreign fishing vessels. How strongly they are impacted depends on what proportion of their

business relies on foreign fishing vessels; this is unknown.

Net Benefits

There is a strong potential for US exports and joint ventures to expand. The major consumers of squids are also the major harvestors. Their distant water fleets are and will be continously phased out of prime squid areas located in the Exclusive Economic Zones of other countries while the demand for squids in their home markets seems to be expanding. Furthermore, Loligo pealei and Illex illecebrosus receive high, if not premium, prices relative to other substitutable squids in their home markets. It is likely that these forces alone will stimulate US exports even if TALFFs are not reduced. If TALFFs are reduced, the resulting shortage of squid to these consuming nations should stimulate exports further. One third of the supply of squid to Spain, the second largest consumer of squid in the world, comes from US waters. A prime example of this assertion exists in the current butterfish regime where butterfish can only be taken as a bycatch to other foreign fisheries. Another example is the North Pacific Tanner Crab Regime where future TALFFs will be set to zero to stimulate exports.

In the Butterfish Plan, TALFFs have steadily declined until 1982-83 (Table 26). In this last year, TALFF was set at 4,000 mt but was increased by 2,582 mt, the TALFF from the previous fishing year that was deferred under the Annual Fishing Level Provisions of the MFCMA. However, allocations to foreign countries (the actual assignment of TALFF to specific foreign countries) has shown a decline with foreign catch correspondingly declining sharply to almost their lowest level since 1965 (Table 1). Over this same period, US domestic catch has increased dramatically to its highest level since 1965. While no specific butterfish export data exist, one can surmise that prior to 1976 there was little export of butterfish and, therefore, catch levels during the 1965 to 1976 period reflect domestic consumption. The highest level of domestic consumption would approximate 3,300 mt implying that in 1982 exports of butterfish were approximately 4,000 mt.

It is not completely accurate to state that the increase in butterfish harvest over the years has been primarily from the reduction in TALFFs, other factors need to be considered. For example, the demand for butterfish may have grown beyond pre-phaseout foreign catch levels. More importantly, foreign countries may have purchased butterfish as a "chip" in consort with the NMFS ongoing "fish and chips" policy to gain access to other foreign fishing allocations. This "fish and chips" policy has been greatly enhanced by the most recent amendments of the MFCMA. Under these amendments, once a TALFF is determined, only half of the TALFF can be allocated amongst the foreign countries. Each country can only have its allocation increased after showing proof that it has expanded the US export market by such means as increased purchases of US fishery products or by reducing trade barriers to US fishery exporters. These MFCMA amendments should go a long way in stimulating exports and joint ventures; not only for the squid fisheries but to the mackerel fishery as well.

Potentially the benefits of the Plan outweigh the costs. If the Plan is unsuccessful in promoting exports, the loss borne by society will be only those foreign fees and economic profits of foreign suppliers that would have been produced in excess of the associated administrative cost of managing and monitoring foreign fishing activity. This loss should not be substantial. Loss of "fish and chips" flexibility and State Department benefits will be eventually forthcoming without the Plan for the most recent MFCMA amendments have as one of their goals the phasing out of foreign fishing activity in US waters.

If there exists a one mt increase of exports for every one mt decline in foreign catch, it is obvious that the benefits will outweigh the costs. The analysis above shows that even if there is not a one for one replacement of export for foreign catch, the probability of the benefits outweighing the costs is quite high. On one hand, the benefits that the US receives from allowing foreign fishing seem to be low, especially when one considers that foreign fishing fees are assessed according to their administrative cost. On the other hand, the possibility of high exports due to reduced TALFFs is quite high when one considers: the history of the development of the butterfish fishery, that the largest foreign harvesters of squid are also the largest consumers and sellers of squid on the international market, that the world demand for squid seems to be rising, especially in the home markets of these foreign harvesters, and the ongoing growth in both the Loligo and Illex

fisheries.

In conclusion, there is a good chance that the Plan will be successful in promoting exports. Potentially the Plan will not only increase industry profits, management flexibility, income, and employment while reducing administrative cost and the national trade deficit, but will also hasten the attainment of the fishery development goals of the MFCMA.

Impacts of the Plan Relative to the Regulatory Flexibility Act and the Paperwork Reduction Act of 1980

The RFA required the examination of the impacts on small businesses, small organizations, and small jurisdictions. A "small business" is one that is independently owned and operated and is not dominant in its field of operation. A "small organization" is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field. A "small governmental jurisdiction" is a governmental jurisdiction with a population of less than 50,000. Foreign businesses, organizations, and governmental jurisdictions are not counted as "small entities" because the RFA was intended to protect small US entities.

The Plan does not adversely impact US fishermen and processors, but places the burden of regulation on foreign harvesters. Only through reductions in TALFF will there be a potential negative impact on US companies that supply foreign fishing vessels with fuel and supplies. Estimates of the annual value of foreign supply expenditures range from $1 to $5 million annually for all east coast foreign fisheries. It is not known whether these businesses are small or large; nor is the degree to which their profits depend on serving foreign fishing vessels known. Since most of the foreign vessels are supplied out of the Port of New York, the dependency is probably small for foreign fishing vessels are probably a small percentage of the total foreign vessel traffic in this harbor. Furthermore, foreign vessels may fish in the FCZ from mid-June through March and do not require servicing year round. The losses of these businesses may not be substantial since foreign vessels may increase their harvest of other species such as mackerel and, while reduced TALFFs may lead to lower foreign harvests. they may lead to increased joint ventures, where the foreign processing vessels will require supplies.

With respect to small entities, the Plan enhances the potential for increased profits by those companies involved in domestic harvesting, processing, joint ventures, and selling supplies to US vessels and processors. As of 30 June 1983, 1,047 US commercial vessels were licensed for squid, 711 for butterfish, and 1,262 for mackerel. Over the past few years, many of these vessels have gone from catching squid as a bycatch to fully directing on squid. There have been nine different US joint venture companies formed over the last three years, many of which have joint venture agreements with two different countries. Many of these joint ventures use three to twelve US fishing vessels. Based on comment letters received by the Council, there are approximately 20 known squid processors. The number of US companies that supply these vessels is large, for the US vessels fish out of ports that range from Maine to North Carolina. Supply purchases by US vessels should outweigh the range and level of purchases foreign vessels have been making (see RIR discussion). By reducing TALFF, exports and joint ventures should increase, the profit potential of all of these sectors should also increase. In conclusion, the Plan should not significantly impact "small" businesses in a negative way but actually provide conditions in which "small" businesses can expand and improve upon their profits.

Small governmental jurisdictions should be positively impacted to the extent that US fishing vessels and processors profit from the Plan. Most US fishing ports are small governmental jurisdictions, and to the extent that the economic condition of the fishing industry in those ports is improved, the overall economic condition of the ports should be improved.

The PRA concerns collection of information. The intent of the PRA is to minimize the Federal paperwork burden for individuals, small businesses, state and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government.

The Plan does not increase the associated paperwork burden. In the previous individual plans for Atlantic mackerel, squid, and butterfish, US fishermen and processors were required to report

weekly data concerning fish caught, processed, or sold. This Plan replaces that requirement with the voluntary data system of the Northeast Region of NMFS to the extent that the voluntary system can supply adequate data for plan monitoring. Therefore, this Plan reduced the paperwork burden on individuals and small businesses to the minimum level acceptable for sound management.

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Table 1. US Commercial, US Recreational, and Foreign Catches of Squid, Atlantic Mackerel, and Butterfish, Calendar Year 1965-1982 (metric tons)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Loligo		Illex		Squid	Atlantic Mackerel				Butterfish		
Year	US Comm.	Foreign in FCZ	US Comm.	Foreign in FCZ	Foreign outside FCZ	US Comm.	US Rec.	Foreign in FCZ	Foreign outside FCZ	US Comm.	Foreign in FCZ	Foreign outside FCZ
1965	709	99	444	78	8,000	1,998	4,292	2,540	11,590	3,340	749	-
1966	722	226	452	118	5,000	2,724	4,535	6,707	12,821	2,615	3,865	-
1967	547	1,130	707	285	7,000	3,891	4,498	18,985	11,243	2,452	2,316	-
1968	1,084	2,327	678	2,593	98	3,929	7,781	56,043	20,838	1,804	5,437	-
1969	899	8,643	562	975	-	4,364	13,050	108,811	18,636	2,438	15,378	15
1970	653	16,732	408	2,418	1,385	4,049	16,039	205,568	21,006	1,869	12,450	13
1971	727	17,442	455	159	8,906	2,406	16,426	346,338	24,496	1,570	8,913	3
1972	725	29,009	472	17,169	1,868	2,006	15,588	385,358	22,360	819	12,221	14
1973	1,105	36,508	530	18,625	9,877	1,336	10,723	379,829	38,550	1,557	31,679	-
1974	2,274	32,576	148	20,480	437	1,042	7,640	293,883	44,655	2,528	15,465	3
1975	1,621	32,180	107	17,819	17,744	1,974	5,190	249,005	36,258	2,088	12,764	119
1976	3,602	21,682	229	24,707	41,767	2,712	4,202	205,956	33,065	1,528	14,309	73
1977	1,088	15,586	1,024	23,771	83,480	1,377	522	53,664	22,765	1,447	2,846	-
1978	1,291	9,355	385	17,310	92,684	1,605	6,571	371	25,899	3,563	1,324	-
1979	4,252	13,068	1,780	15,742	162,091	1,990	3,315	63	30,612	2,707	835	-
1980	3,996	19,750	349	17,529	69,527	2,683	3,900	399	20,500	5,348	884	-
1981	2,316	13,566	631	14,723	29,666	2,951	4,000	5,282	19,319	4,801	681	-
1982	4,864	15,821	5,772#	12,965	*	3,382	*	2,280	*	8,036	819	*

- = zero.
* = data not available.
\# = The 5,772 mt reported by NMFS may significantly understate 1982 Illex landings. Processors from only 2 ports have reported to the Council that they handled 9,400 mt.
1982 US Illex and Loligo commercial landings from NMFS Quota Report as of 31 December 1982.
1982 foreign landings and mackerel and butterfish from Fisheries of the US 1982. NMFS Current Fishery Statistics No. 8300.

Area and Sources:

1. NAFO/ICNAF SA 5 and 6. From Lange, 1982 (NEFC Lab. Ref. Doc. No. 82-27).
2. NAFO/ICNAF SA 5 and 6. From Lange, 1982 (NEFC Lab. Ref. Doc. No. 82-27).
3. NAFO/ICNAF SA 5 and 6. From Lange, 1982 (NEFC Lab. Ref. Doc. No. 82-27).
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6. NAFO/ICNAF SA 5 and 6. 1965-1981 from Anderson (1982).
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Table 2. Loligo and Illex Ex-Vessel Prices ($/pound) by State, 1978-1982

	ME	NH	MA	RI	CT	NY	NJ	VA	NC
					Loligo				
1978	.15	N/A	.41	.51	N/A	N/A	.37	N/A	N/A
1979	.16	N/A	.39	.36	N/A	N/A	.38	N/A	N/A
1980	.15	N/A	.31	.38	N/A	.37	.34	.24	N/A
1981	.33	.28	.39	.49	.48	.50	.48	N/A	N/A
1982	N/A	N/A	.41	.07*	.38	.45	.34	.30	.32
					Illex				
1978	.12	N/A	.10	.10	N/A	N/A	N/A	N/A	.50
1979	.19	N/A	.20	.15	N/A	N/A	N/A	N/A	N/A
1980	.11	N/A	.10	N/A	N/A	.08	N/A	N/A	N/A
1981	.17	N/A	.12	N/A	.50	N/A	N/A	N/A	N/A
1982	.25	N/A	.12	N/A	N/A	N/A	.12	.12	N/A

* This price appears to be questionable.
N/A = Not available.
Source: unpublished NMFS Statistics.

Table 3. Average Ex-Vessel Price and Revenue, 1978-1982
(Ex-vessel price in $/pound, Revenue in thousands of dollars)
(Deflated using Consumer Price Index, 1967 = 100)

	Loligo				Illex			
	Ex-Vessel Price		Revenue		Ex-Vessel Price		Revenue	
	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated	Nominal	Deflated
1978	.48	.25	1,366	699	.10	.05	85	44
1979	.38	.17	3,563	1,639	.20	.09	785	361
1980	.35	.14	3,085	1,250	.10	.04	77	31
1981	.47	.17	2,399	882	.12	.04	167	61
1982	.39	.13	4,182	1,394	.12	.04	1,527*	508*

	Total Revenue	
	Nominal	Deflated
1978	1,451	743
1979	4,348	2,000
1980	3,162	1,281
1981	2,566	943
1982	5,709*	1,093*

* These values could be substantially higher, see note "#" on Table 1.
Source: Calculated from data in Tables 1 and 2.

Table 4. US Exports (metric tons) of Squid from East Coast Ports

Nation	Form	1978	1979	1980	1981	1982	1982 Share
Belgium & Luxemburg	Frozen	-	-	-	-	2	*%
Bermuda	Canned	4	2	2	2	11	
	Frozen	-	-	-	3	1	
	Total	4	2	2	5	12	*%
Canada	Canned	34	-	-	39	93	
	Frozen	-	-	-	55	540	
	Total	34	-	-	94	634	23%
Canary Islands	Frozen	-	-	-	14	-	-
France	Canned	-	-	16	-	-	
	Frozen	-	-	-	51	-	
	Total	-	-	16	51	-	-
Greece	Canned	1,509	1,156	2,620	627	51	2%
Iceland	Frozen	-	-	-	-	755	27%
Italy	Canned	-	-	-	-	14	
	Frozen	-	-	-	28	110	
	Total	-	-	-	28	123	4%
Japan	Canned	-	-	-	-	36	
	Frozen	-	-	-	112	127	
	Total	-	-	-	112	164	6%
Israel	Frozen	-	-	-	-	*	*%
Netherlands	Frozen	-	-	-	30	-	-
Norway	Frozen	-	-	-	-	120	4%
Portugal	Frozen	-	-	-	142	212	8%
Rep. of South Africa	Frozen	-	-	-	46	10	*%
Spain	Canned	-	-	41	-	-	
	Frozen	-	-	-	11	573	
	Total	-	-	41	11	573	21%
Taiwan	Frozen	-	-	-	-	38	1%
United Kingdom	Frozen	-	-	-	47	74	3%
German Federal Rep.	Canned	-	15	-	-	-	
	Frozen	-	-	-	1	21	
	Total	-	15	-	1	21	1%
Total	Canned	1,546	1,173	2,678	668	205	
	Frozen	-	-	-	538	2,584	
	Total	1,546	1,173	2,678	1,204	2,786	

* = less than 0.5 mt or 0.5%; - = Zero
Source: Unpublished NMFS Statistics

Table 5. Value (thousands of $) of US Exports of Squid from East Coast Ports

Nation	Form	1978	1979	1980	1981	1982	1982 Share
Belgium & Luxemburg	Frozen	-	-	-	-	3	*%
Bermuda	Canned	6	3	3	3	46	
	Frozen	-	-	-	5	2	
	Total	6	3	3	8	47	*
Canada	Canned	10	-	-	91	70	
	Frozen	-	-	-	160	1,292	
	Total	10	-	-	251	1,362	23%
Canary Islands	Frozen	-	-	-	30	-	
France	Canned	-	-	58	-	-	
	Frozen	-	-	-	75	-	
	Total	-	-	58	75	-	-%
Greece	Canned	1,233	618	1,310	592	57	2%
Iceland	Frozen	-	-	-	-	730	27%
Italy	Canned	-	-	-	-	14	
	Frozen	-	-	-	62	168	
	Total	-	-	-	62	183	4%
Japan	Canned	-	-	-	-	32	
	Frozen	-	-	-	185	162	
	Total	-	-	-	185	194	6%
Israel	Frozen	-	-	-	-	1	*%
Netherlands	Frozen	-	-	-	37	-	-%
Norway	Frozen	-	-	-	-	180	4%
Portugal	Frozen	-	-	-	273	112	8%
Rep. of South Africa	Frozen	-	-	-	53	14	*%
Spain	Canned	-	-	10	-	-	
	Frozen	-	-	-	13	1,068	
	Total	-	-	10	13	1,068	21%
Taiwan	Frozen	-	-	-	-	146	1%
United Kingdom	Frozen	-	-	-	84	172	3%
German Federal Rep.	Canned	-	12	-	-	-	
	Frozen	-	-	-	2	38	
	Total	-	12	-	2	38	1%
Total	Canned	1,546	1,173	1,380	686	219	
	Frozen	-	-	-	978	4,087	
	Total	1,546	1,173	1,380	1,664	4,301	

* = Less that $500 or less than 1%; - = Zero
Source: Unpublished NMFS Statistics

Table 6. Joint Ventures, Fishing Years 1981-82 to 1983-84 (metric tons)

Participants	Approved by Council	Approved by NMFS	Amount for US Vessels: Loligo	Illex	Mackerel	Butterfish
Fishing Year 1981-82						
Lund/JA	Yes	Yes	1,000	-	-	-
Total, 1981-82			1,000	-	-	-
Fishing Year 1982-83						
Fass/IT	Yes	Yes	800	800	-	-
Lund/JA	Yes	Yes	1,000	-	-	-
Joint Trawlers - Lund/PO	Yes	Yes	-	1,400	-	-
Joint Trawlers/BU	Yes	Yes	2,000	1,000	6,000	-
Mid-Atl. Fisheries Export Corp./USSR	Yes	No	-	-	8,000	-
Lund/PO	Yes	Yes	-	400	-	-
Joint Trawlers/GDR	Yes	Yes	2,500	-	5,000	-
Stinson/JA	Yes	No	300	-	300	1,000
Total, 1982-83			6,600	3,600	16,300	1,000
Fishing Year 1983-84#						
Joint Trawlers/GDR	Yes	Yes	2,500	-	5,000	-
Lund/PO	Yes	Yes	-	8,500	-	-
Sea Harvest/SP	Yes	Yes	2,700	-	-	-
ISTC/IT	Yes	Yes	6,000	5,950	-	-
Scan Ocean/USSR	No	No	-	-	-	-
Scan Ocean/PO	Yes	Yes	3,000	4,250	-	-
Joint Trawlers/PO	No	Yes	-	2,550	-	-
STONAVAR/SP	Yes	Yes	2,000	-	-	-
Lund/JA	Yes	Yes	1,000	850	-	-
Metafora/PO	Yes	Yes	1,500	-	-	-
Shoreside Company/SP	Yes	Yes	2,500	-	-	-
Total, 1983-84 (as of 7/25/83)			21,200	22,100	5,000	-

Table 7. Estimated Annual Squid Receipts (lbs.) and Wholesale Prices ($/lb.) from Fulton Fish Market, 1978-1982

	Landings	Nominal	Deflated
1978	1,600,000	$ .87	$ .45
1979	2,100,000	.71	.33
1980	2,300,000	.68	.28
1981	2,200,000	.81	.30
1982	2,500,000	.71	.25

Prices based on Tuesday and Thursday price quotes.
NMFS Market News Reports 1978-1982 (New York).
Deflated using Consumer Price Index, 1967 = 100.

Table 8. Foreign Catch (metric tons) by Species by Country by Fishing Year

		1981-82			1982-83
	Species	Total	As of 2/6/82	Between 2/6 & 3/31/82	As of 2/5/83#
Italy	Mackerel	1,869	*	100%	66
	Butterfish	67	60	10	215
	Loligo	3,265	2,434	25	3,535
	Illex	3,214	2,903	10	5,651
Japan	Mackerel	159	*	100	99
	Butterfish	303	145	52	210
	Loligo	1,930	1,336	31	2,088
	Illex	4,197	4,161	1	2,676
Spain	Mackerel	77	1	99	116
	Butterfish	147	49	67	88
	Loligo	8,260	5,292	36	3,358
	Illex	7,572	6,919	9	3,669
Total	Mackerel	2,104	1	100	281
	Butterfish	516	254	51	514
	Loligo	13,454	9,061	33	8,981
	Illex	14,982	13,983	7	12,003

= last month for which species by nation data are available.
* = less than 0.5 mt.
Source: Unpublished NMFS statistics.

Table 9. Squid Landings (thousands of metric tons) by Major Harvesting Nations

Nation	Species	1975	1976	1977	1978	1979	1980
Argentina	**Illex illecebrosus**	**4**	**7**	**2**	**59**	**87**	**9**
Canada	**Illex illecebrosus**	**3**	**11**	**31**	**36**	**90**	**30**
China	**Squids not elsewhere included**	**-**	**36**	**40**	**62**	**42**	**43**
Indonesia	**Loligo spp.**	**10**	**8**	**7**	**9**	**13**	**11**
Italy	Loligo pealei	3	3	2	1	2	1
	Loligo spp.	5	4	6	4	6	7
	Todarodes saggittatus	3	3	4	3	3	3
	Squids not elsewhere included	-	-	2	-	1	3
	Total	**11**	**10**	**14**	**8**	**12**	**14**
Japan	Loligo pealei	11	5	8	3	3	6
	Illex illecebrosus	3	6	8	8	34	28
	Todarodes pacificus	358	281	218	216	213	312
	Nototodarus sloani	19	20	27	26	21	44
	Squids not elsewhere included	116	155	210	242	234	279
	Total	**507**	**467**	**471**	**495**	**505**	**669**
Korea	Todarodes pacificus	40	45	18	18	26	48
	Squids not elsewhere included	19	28	20	23	22	21
	Total	**59**	**73**	**38**	**41**	**48**	**69**
Mexico	Loligo devli	-	-	-	1	4	-
	Illex illecebrosus	-	-	-	3	4	1
	Loligo spp.	-	1	1	3	11	19
	Total	**-**	**1**	**1**	**7**	**19**	**20**
New Zealand	**Nototodarus sloani**	**-**	**-**	**1**	**2**	**7**	**-**
Phillipines	**Loligo spp.**	**30**	**24**	**25**	**26**	**25**	**27**
Poland	Illex illecebrosus	7	8	4	2	11	1
	Squids not elsewhere included	-	-	-	4	15	13
	Total	**7**	**8**	**4**	**6**	**26**	**14**
Portugal	Illex illecebrosus	-	-	-	1	2	2
	Squids not elsewhere included	1	1	1	1	1	3
	Total	**1**	**1**	**1**	**2**	**3**	**5**
Spain	Loligo pealei	8	9	5	5	5	8
	Loligo spp.	22	12	6	20	13	16
	Illex illecebrosus	4	7	13	18	13	17
	Todarodes saggittatus	2	2	-	-	-	-
	Total	**36**	**30**	**24**	**33**	**31**	**51**
Thailand	**Loligo spp.**	**38**	**36**	**52**	**52**	**42**	**33**
US	Loligo pealei	-	1	1	1	4	4
	Loligo spp.	11	9	9	17	16	-
	Illex illecebrosus	-	1	-	2	-	-
	Squids not elsewhere included	2	2	1	1	1	12
	Total	**13**	**13**	**11**	**21**	**21**	**16**
USSR	Loligo pealei	-	1	-	-	-	-
	Illex illecebrosus	14	24	27	9	9	7
	Squids not elsewhere included	26	17	48	12	47	44
	Total	**40**	**42**	**75**	**21**	**56**	**51**
All Nations	Loligo pealei	25	21	16	11	17	19
	Loligo spp.	124	103	115	139	133	121
	Illex illecebrosus	40	78	108	153	275	108
	Nototodarus sloani	19	20	27	27	28	44
	Todarodes pacificus	399	326	226	234	239	360
	Todarodes saggittatus	4	5	4	3	5	5
	Squids not elsewhere included	192	274	348	371	415	462
	Total	**803**	**827**	**844**	**938**	**1,112**	**1,119**

Loligo spp. = L. vulgaris (European common squid), L. patagonica (Falkland Islands squid), L. opalescens (California squid), and L. indicus (Asian common squid).
Source: FAO Yearbook of Fishery Statistics, 1975-1980.

Table 10. Japanese Squid and Cuttlefish Imports (metric tons), 1978-1980

	Cuttlefish	Squid	Total	Squid as % of total
1978	42,897	75,245	118,142	62.7%
1979	48,206	107,662	155,868	69.1
1980	39,139	55,236	94,375	58.5

Source: Court, 1982.

Table 11. Japanese Annual Imports (metric tons) of Squid and Cuttlefish, 1967-1982

Year	Imports	Year	Imports	Year	Imports	Year	Imports
1967	5,000	1971	22,000	1975	59,000	1979	156
1968	9,000	1972	28,000	1976	69,000	1980	94
1969	9,000	1973	29,000	1977	75,000	1981	71,000
1970	15,000	1974	45,000	1978	118,000	1982	83,000*

* As of October 1982.
1967-76 - Combs (1978); 1977-79 - Japan Deep Sea Trawlers Assoc. (1980); 1980 - OECD (1981); 1981-82 -Japan (1981-82).

Table 12. Japanese Imports (thousands of mt) of Cuttlefish and Squid, by Nation, 1977-1982

	1977	1978	1979	1980	1981	1982*
Korea (1)	20	27	32	18	24	14
Taiwan	2	4	4	1	1	-
Thailand (2)	8	10	11	8	11	9
Yemen	5	2	2	5	2	-
Iceland	3	2	3	-	-	-
France	2	2	2	1	-	1
Spain (2)	8	14	15	10	12	11
Italy	-	2	2	-	-	-
Canada	7	27	15	17	3	1
US	2	2	3	2	2	3
Panama	1	2	2	-	3	2
Argentina	-	10	22	5	-	9
Morroco	1	3	4	4	7	9
Singapore (1)	3	1	5	-	-	2
Poland	-	-	8	4	-	7
New Zealand	-	-	7	-	-	3
Total (3)	75	118	156	94	71	83

(1) including cuttlefish.
(2) the majority is cuttlefish.
(3) includes other countries.
* = as of October 1982.
- = less than 1,000 mt

Adapted from 1980 Japanese Deep Sea Trawlers presentation to the Mid-Atlantic Council, and updated via Japan (1982).

Table 13. 1979 Japanese Squid Supply (metric tons)

Inventory		93,900
Japanese Catch		
Jigging		
	Japanese common squid	161,000
	Flying squid	125,000
	New Zealand squid	18,200
	New Zealand squid joint venture	5,600
	Australian squid	3,600
	Canadian Illex	7,000
	Sub-total	320,400
Trawling		
	New Zealand squid	4,000
	US Atlantic and Pacific	12,000
	Canadian coast	4,500
	Argentine squid	25,000
	Sub-total	45,500
Canadian Developmental Charter		19,000
Imports		90,000
Total Supply		568,800

Source: Japanese Deep Sea Trawlers Association, 1980

Table 14. 1976 Spanish Squid Supply (metric tons)

		Loligo	Illex	Total
Landings				
Frozen:	US waters	8,900	4,700	13,600
	Canadian waters	-	3,220	3,220
	Sahara Bank	12,000	-	12,000
	South Africa	-	4,000	4,000
	Total	20,900	11,920	32,820
Fresh:	Spanish coast, Portugal, Sahara, & NE Atlantic	7,000	4,000	11,000
Total:		27,900	15,920	43,820
Imports (as of Jan. - Sept. 1976)				
Japan	(Loligo from US waters, Illex origin unknown)	2,760	55	2,815
US	(from US waters)	871	-	871
Italy	(from US waters)	864	-	864
USSR	(Loligo from US waters, Illex origin unknown)	1,447	1,549	2,996
Canada	(origin unknown)	-	52	52
Poland	(origin unknown)	-	2,115	2,115
Total		11,036	5,546	16,582
Total		38,936	21,466	60,402

Source: Description of the Spanish squid fishery, Feb., 1977, unknown author.

Table 15. Spanish Squid Imports 1978 - 1980 (metric tons)

	1978	1979	1980
Loligo	5,700	9,000	12,300
Illex	22,900	17,600	27,000
Total	28,600	26,600	39,000
	Loligo		
Panama	1,600	2,100	900
Mexico	400	1,700	3,200
Japan	-	1,600	700
India	500	1,350	-
Morocco	800	850	2,000
US	-	400	1,500
Others	2,400	1,000	4,000
Total	5,700	9,000	12,300
	Illex		
Argentina	11,400	7,600	5,600
Poland	3,900	3,100	500
Mexico	2,300	2,300	5,600
Canada	1,000	1,500	6,000
New Zealand	600	1,200	5,000
USSR	2,000	-	2,400
Others	1,700	1,900	1,900
Total	22,900	17,600	27,000

Source: Milnes, 1982.

Table 16. Prices of Spanish Caught Loligo pealei and Illex illecebrosus ($/lb., whole ex-cold storage, Vigo; market sizes in cm)

Loligo pealei

Market Size:	Under 7	7-10	11-14	15-18	19-22	23-27
4/1/81	.88	.94	1.75	2.46	3.04	3.39
Market size:	Under 6	6-10	10-13	14-17	18-21	22-27
6/23/82	1.49	1.62	2.16	2.52	3.06	3.50
Market Size:	7	9	13	16	20	23-28
2/2/83	2.31	2.70	3.08	3.35	3.47	3.66
2/9/83	2.34	2.73	3.12	3.39	3.51	3.71-3.90
2/16/83	2.34	2.73	3.12	3.39	3.51	3.71-3.90
3/2/83	2.34	2.73	3.20	3.39	3.51	3.82
3/9/83	2.28	2.66	3.12	3.31	3.42	3.72

Illex illecebrosus

Market Size:	Average Price	15	17	18	19	20	22	26
4/1/81	.99							
5/13/81	.93-1.04							
8/26/81	.90							
11/25/81	1.00							
5/12/82	-	-	-	-	-	-	-	1.18
12/1/82	-	-	-	-	1.19	-	-	-
12/15/82	-	-	-	-	1.19	-	-	-
2/3/83	-	1.12	-	-	-	1.27	-	-
2/9/83	-	1.13	-	-	-	1.29		
2/16/83	-	-	1.13	-	-	-	1.25	-
3/2/83	-	-	-	1.13	-	-	1.29	-

Source: European Weekly Frozen Fish Reports.

Table 17. South American Squid Catch 1976-1980 (metric tons)

		1976	1977	1978	1979	1980
Argentina	Short-finned squid	7,493	1,986	59,001	86,869	9,110
	Common squid	128	255	238	349	185
Brazil	Common squid	848	556	598	641	350*
Chile	Squids	-	-	66	136	unk
Colombia	Squids	24	155	155*	78	unk
Peru	Squids	1,092	272	-	-	unk
Uruguay	Short-finned squid	773	362	2,182	4,668	2,300*
Venezula	Common squids	1,202	1,937	1,160	900*	700*

* = quantity estimated.

- = nil or negligible.

unk = unknown.

Ecuador, Guyana, Surinam, and Mexico squid catches unavailable.

Source: Juanico, 1982.

Table 18. Squid Exports from Uraguay and Argentina 1978-1980 (metric tons)

	Uraquay			Argentina	Uraguay & Argentina
	1978	1979	1980	1980	1980
Japan	672	2,103	-	138	138
South Korea	261	-	-	390	390
Hong Kong	7	-	-	-	-
Taiwan	-	-	-	4,818	4,818
Spain	285	54	518	3,865	4,383
Italy	26	-	-	219	219
France	30	-	-	-	-
Portugal	-	-	7	5	12
West Germany	-	32	-	70	70
England	-	2	-	11	11
US	12	-	-	-	-
Saudi Arabia	-	15	27	70	97
Kuwait	-	-	267	40	307
South Africa	-	-	-	44	44
Brazil	21	136	65	-	65
Argentina	-	9	-	-	-
Holland	-	-	-	62	62
Sweden	-	-	-	4	4
Total	1,314	2,351	884	7,397	8,281

Source: Juanico, 1982

Table 19. Spanish Frozen Loligo Prices ($/lb.)

Market Size (cm)	Madrid, Dec. 1982, whole L. pealei, Boston Area, sea frozen, Spanish vessels, wholesale	Madrid, Dec. 1982, whole L. vulgaris, Sahara Bank, Korean vessels, FOB Canary I.
13	1.35	1.27
17	1.47	-
18	-	1.57
20	1.54	-
23	-	1.77

Market Size (cm)	Madrid, Jan.-Feb. 1983, whole L. pealei, Boston Area, sea frozen, ex-cold store Vigo	Madrid, Jan.-Feb. 1983, whole L. vulgaris, Sahara Bank, Korean vessels, FOB Canary I.	Madrid, Jan.-Feb. 1983, whole L. vulgaris, Spanish vessels, ex-cold store Vigo
8	1.05-1.08	0.82-0.86	0.86
10	1.22-1.26	-	-
13	1.34-1.42	0.79-1.31	0.99-1.17
17	1.43-1.54	-	-
18	-	1.59-1.68	1.34-1.45
20	1.57-1.59	-	-
23	-	1.77-1.86	1.49-1.56
26	1.52-1.68	-	-
28	1.75-1.79	1.81	1.51-1.59

Market Size (g)	Barcelona, May-June 1983, whole L. pealei sea frozen, Spanish vessels, wholesale	Barcelona, May-June 1983, whole L. vulgaris, Canary I., Japanese vessels, wholesale	Barcelona, May-June 1983, whole L. vulgaris Spanish vessels, wholesale
less than 23	81	-	-
23-54	0.88-0.98	-	-
less than 50	-	1.26	1.28
50-100	-	-	1.71-1.91
54-100	1.38-1.41	-	-
less than 100	-	2.00-2.04	-
100-162	1.43-1.49	-	-
100-200	-	-	1.99-2.03
162-262	1.46-1.58	-	-
less than 262	1.61-1.65	-	-
200-400	-	2.10	2.06-2.08
400-600	-	-	2.08

Market Size (g)	Barcelona, Dec.-Jan. - 1982-83 whole L. pealei, sea frozen, Spanish vessels, wholesale	Barcelona, Dec.-Jan. - 1982-83 whole L. pealei, land frozen, Spanish vessels, wholesale
less than 23	0.77-1.15	-
23-54	1.22	-
54-100	1.35-1.43	1.00
100-162	1.58	1.12
162-262	1.79	1.23
less than 262	1.79	1.29-1.35

L. pealei market categories originally reported in cms. These categories convert to grams by the equation weight = 0.25662 X (length)2.15182 (Lange and Johnson, 1978).

Source: European Weekly Frozen Fish Report.

Table 20. Nice, France, Frozen Squid Prices ($/lb.), Dec. 1982 - Jan. 1983

	Size (g)	Price	Shipping Category
L. pealei, Boston, sea frozen	87-162	1.32	CIF
	162	1.54	CIF
L. vulgaris, Morroco, land frozen	500-1,000	1.57	CIF
L. reynaudi, South Africa, sea frozen	150-300	.95	CIF
Loligo spp., Ireland	400-600	1.30	CIF
L. indica., India, land frozen	100-167	.79	CIF
Loligo spp., Thailand	25-50	.77*	CIF
Illex, Canada, land frozen		.50-.57	ex-cold storage
L. opalescens., California, land frozen	50-65	.51-.52	CIF

* = March 1983.
Source: European Weekly Frozen Fish Report.

Table 21. Milan, Italy, Frozen Loligo Prices ($/lb.), Jan. 1983

Market Size (g)	Whole L. pealei sea frozen, Boston, Japanese vessels, CIF	Whole L. reynaudi, sea frozen, S. Africa, Japanese vessels, CIF	Whole L. vulgaris, sea frozen, Japanese vessels, CIF	L. vulgaris, North Atlantic, CIF
Mixed	-	.91	-	-
50-90	-	-	1.02	-
100	.79	.73	-	-
90-150	-	-	1.29	-
100-150	-	.98	-	-
100-250	1.20	-	-	-
150-210	-	-	.48*	-
150-250	0	1.11-	-	
200-500	-	-	-	1.27
250-350	-	1.27	-	-
250-500	1.56	-	-	-
350-450	-	1.41	-	-
500-1,000	-	-	-	1.44
500 & up	1.84	-	-	-
1,000 & up	-	-	-	1.49

* = probably a misquote, could be $1.48.
Source: European Weekly Frozen Fish Report.

Table 22. Spanish Frozen Illex Prices ($/lb.), 1982

Market/Species	Form	Origin (vessels, waters)	Shipping Class	Month	Price
Madrid					
I. illecebrosus	Whole	Spanish, NW Atlantic	ex-cold store, Vigo	May	.64
I. argentinus	Whole	Polish, Argentine	ex-cold store, Vigo	June	.50
I. argentinus	Whole	Spanish, Argentine	ex-cold store, Vigo	May	.53
Barcelona					
I. illecebrosus	Whole	Spanish, NW Atlantic	wholesale	May	.75-.79
I. argentinus	Whole	Spanish, Argentine	wholesale	July	.65
I. argentinus	unk	Spanish, Uruguay	wholesale	July	.50

Source: European Weekly Frozen Fish Report.

Table 23. Exchange Rates (national units per US $) of Selected Countries, 1978-1982

	Canada (dollar)	Japan (yen)	Italy (lira)	Portugal (escudo)	Spain (peseta)
1978	1.14	212.2	848.7	43.9	76.7
1979	1.17	219.2	830.9	48.9	67.1
1980	1.17	226.7	856.5	50.1	71.7
1981	1.20	220.5	1,136.8	61.6	92.3
October 1980	1.17	209.1	873.4	50.6	74.4
October 1981	1.20	231.4	1,191.5	64.5	95.8
October 1982	1.23	271.4	1,438.1	89.4	115.2

Source: Statistics of Foreign Trade, OECD, Dec. 1982.

Table 24. Costs and Percentage Share of Cost Components for Squid Processing

	% of Total Cost	Estimated Costs: Loligo $/lb.	Loligo $/mt	Illex $/lb.	Illex $/mt
Operating Costs					
Labor	43.5	.096	212	.078	172
Packaging	10.1	.022	49	.018	40
Utilities	10.1	.022	49	.018	40
Maintenance & repairs	1.4	.003	7	.003	7
Marketing	4.3	.010	22	.008	18
Fixed Costs					
Depreciation & rent	14.5	.032	71	.026	57
Interest	2.9	.006	13	.005	11
Administrative costs	10.1	.002	4	.018	40
Other	2.9	.006	13	.005	11
Total Cost of Processing (1)	100.0	.220	485	.180	397
Average Fish Cost (ex-vessel value) (2)		.450	992	.120	265
Processor Mark-up & Shipping (3)		.100	220	.100	220
Exported Price FOB (4)		.770	1,698	.400	882

Sources:
1. Based on processing costs of small manual plants assuming labor cost = .30 (Table 24, Hu, et al., 1983).
2. Average ex-vessel price, New York.
3. Assumption based on Hu, et al (1983).
4. Personal communication with a New Jersey processor, 1983.

Table 25. Impacts, Benefits, and Costs of the Plan*

	Estimate ($/mt)	
	Loligo	Illex
Impacts		
A. PURCHASES OF SUPPLIES BY:		
1. Foreign Fishermen	-176	-149
2. Domestic Fishermen and Processors	+325	+171
B. GOVERNMENT REVENUES FROM:		
1. Foreign Fishing Fees	-165	-44
2. Taxes collected from harvesting and processing revenues	+?	+?
C. FOREIGN EXCHANGE		
1. Foreign Fishing Fees and Supply Purchases	-349	-179
2. Export**/Joint Venture Sales	+3,527/992	+1,774/265
D. DOMESTIC FISHERY REVENUES		
1. Foreign Fishing	0	0
2. Export***/Joint Venture Sales	+1,698/992	+882/265
Benefits and Costs		
A. BENEFITS		
1. Ex-vessel	+49	+13
a. Increased profits		
b. Use of unemployed or redundant resources		
c. Reduction in harvesting costs of alternative species		
2. Processing	+38	+26
a. Increased profits		
b. Use of unemployed resources		
3. Administrative Cost Savings	+1/3 current management costs	
a. Management		
b. Foreign catch monitoring and Coast Guard enforcement		
4. Technological and market expansion	substantial	
B. COSTS		
1. Loss of foreign fees	-165	-44
2. Loss of State Department benefits	not substantial	
3. Loss of "fish and chips" flexibility	not substantial	
4. Increased administrative and enforcement costs from US fishery development	not substantial	
C. NET BENEFITS (BENEFITS - COSTS)	positive and potentially very substantial	

* Only minimum positive impacts, minimum benefits, maximum negative impacts, and maximum costs shown.
** Export prices F.O.B. Europe.
*** Export prices F.O.B. United States.

Table 26. TALFF, Foreign Allocation, and Foreign Catch of Atlantic Mackerel, Butterfish, Loligo, and Illex in the Northwest Atlantic FCZ (metric tons)

Fishing Year	Species	Final TALFF	Final Allocation	Catch	% TALFF Allocated	% TALFF Caught	% Allocation Caught
1979-80	Loligo	35,500	30,570	19,238	86	54	63
	Illex	24,730	23,165	15,966	94	65	69
	Mackerel	1,200	1,104	394	92	33	36
	Butterfish	4,000	3,338	1,247	83	31	37
1980-81	Loligo	37,000	35,075	20,194	95	55	58
	Illex	25,000	25,000	18,641	100	75	75
	Mackerel	10,000	9,950	5,312	100	53	53
	Butterfish	4,000	3,685	1,115	92	28	30
1981-82	Loligo	36,668	35,789	13,454	98	37	38
	Illex	25,000	24,429	14,982	98	60	61
	Mackerel	10,000	7,688	2,104	77	21	27
	Butterfish	1,418*	1,200	516	85	36	43
1982-83	Loligo	37,000	20,350	12,734	55	34	63
	Illex	22,777	21,100	12,940	93	57	61
	Mackerel	9,000	8,700	1,192	97	13	14
	Butterfish	6,582*	1,133	803	17	12	71

* The TALFF in both 1981-82 and 1982-83 was 4,000 mt. However, in 1981-82 the Council certified an Annual Fishing Level (AFL) for butterfish that resulted in the effective TALFF for that year being 1,418 mt. The portion of the TALFF withheld by the AFL not harvested by US fishermen may be made available to foreign fishermen the subsequent year. In 1981-82, 2,582 mt of butterfish were withheld from TALFF through the AFL but not harvested by US fishermen, so the effective 1982-83 TALFF was 6,582 mt.

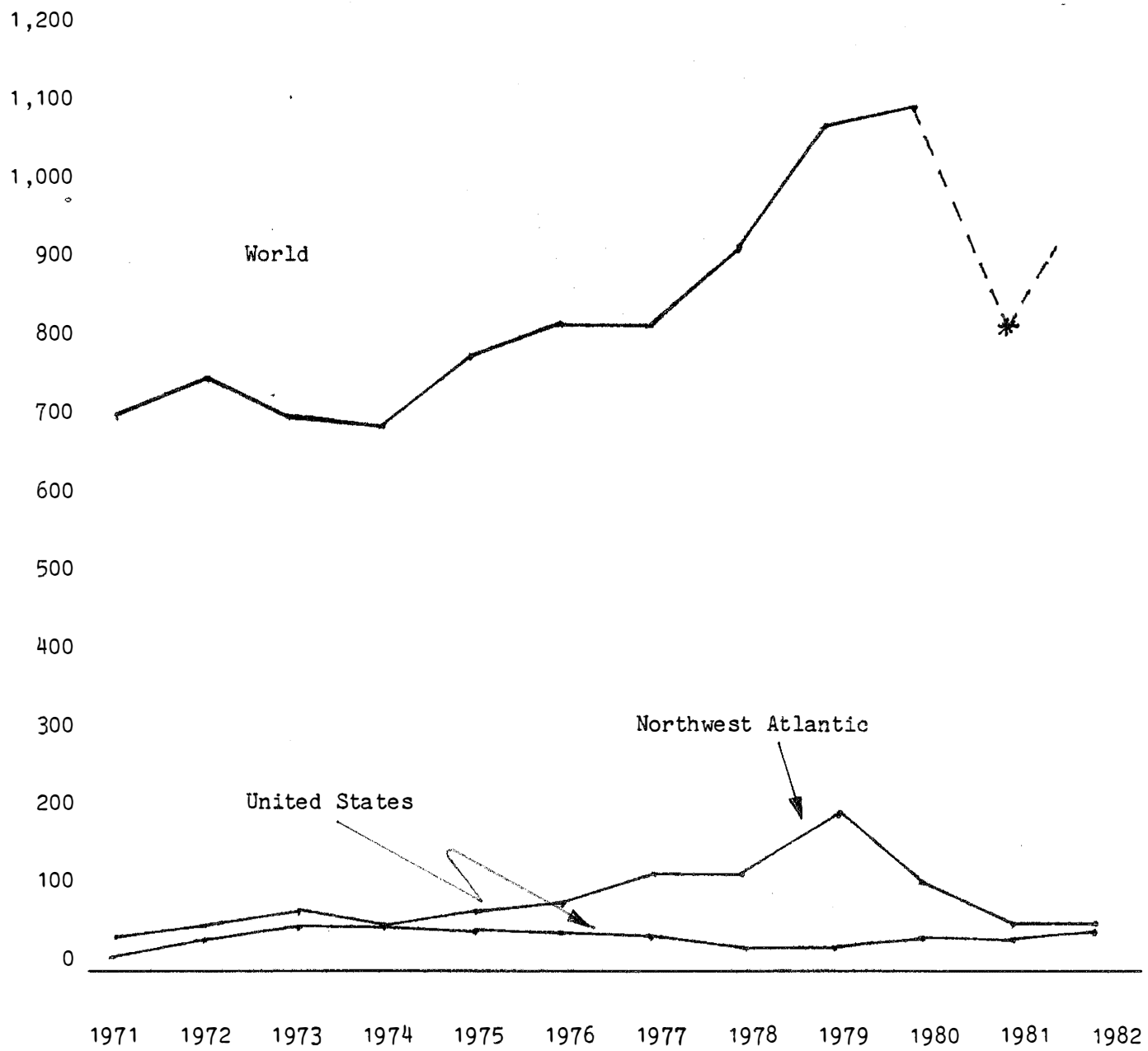


Figure 1.
Total World Squid Landings*, Total Northwest Atlantic Squid Landings, and Total Squid Landings from US Waters, 1971-1982 (thousands of metric tons)

* = 1981 world squid landings estimated.
Source: FAO statistics and Table 1.

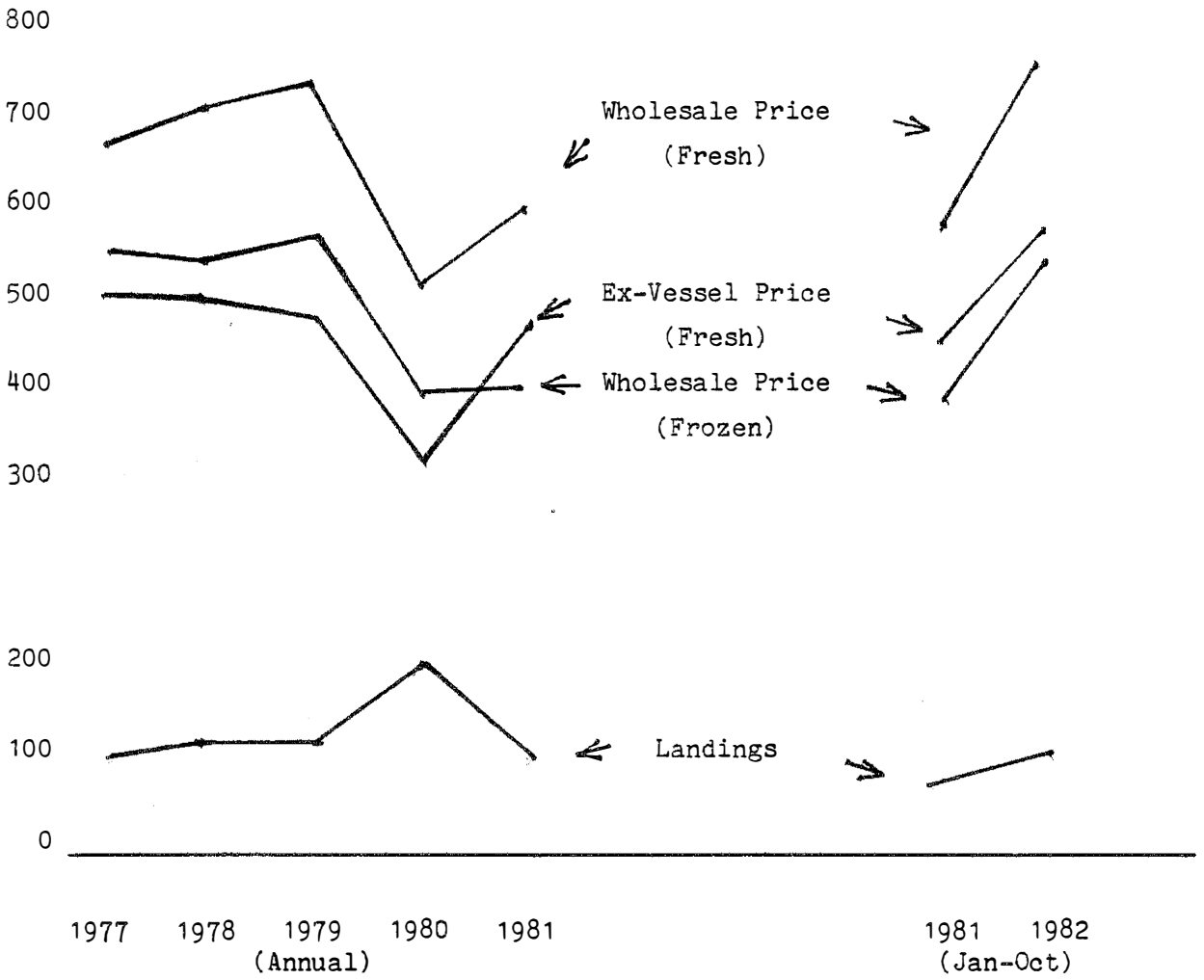
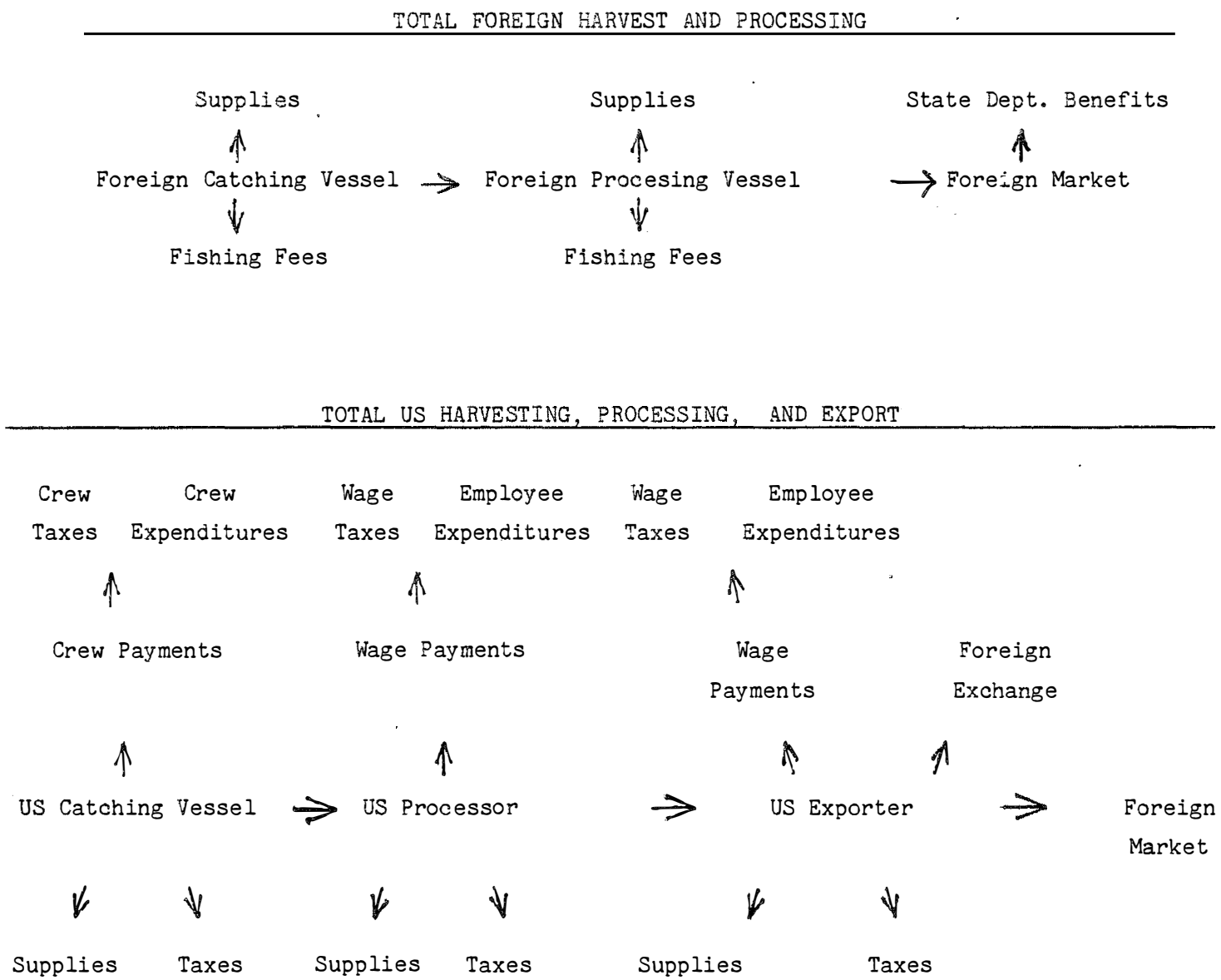


Figure 2. Japanese Domestic Market for Squid*
(prices in yen/kg, landings in thousands of metric tons)

* = Ex-vessel prices and landings are an average over 66 fishing ports except Tokyo, wholesale prices are average prices at the Tokyo wholesale market.

Source: Japan, 1982.

Figure 3. Expenditure Patterns for Foreign Harvest and US Export of Squid



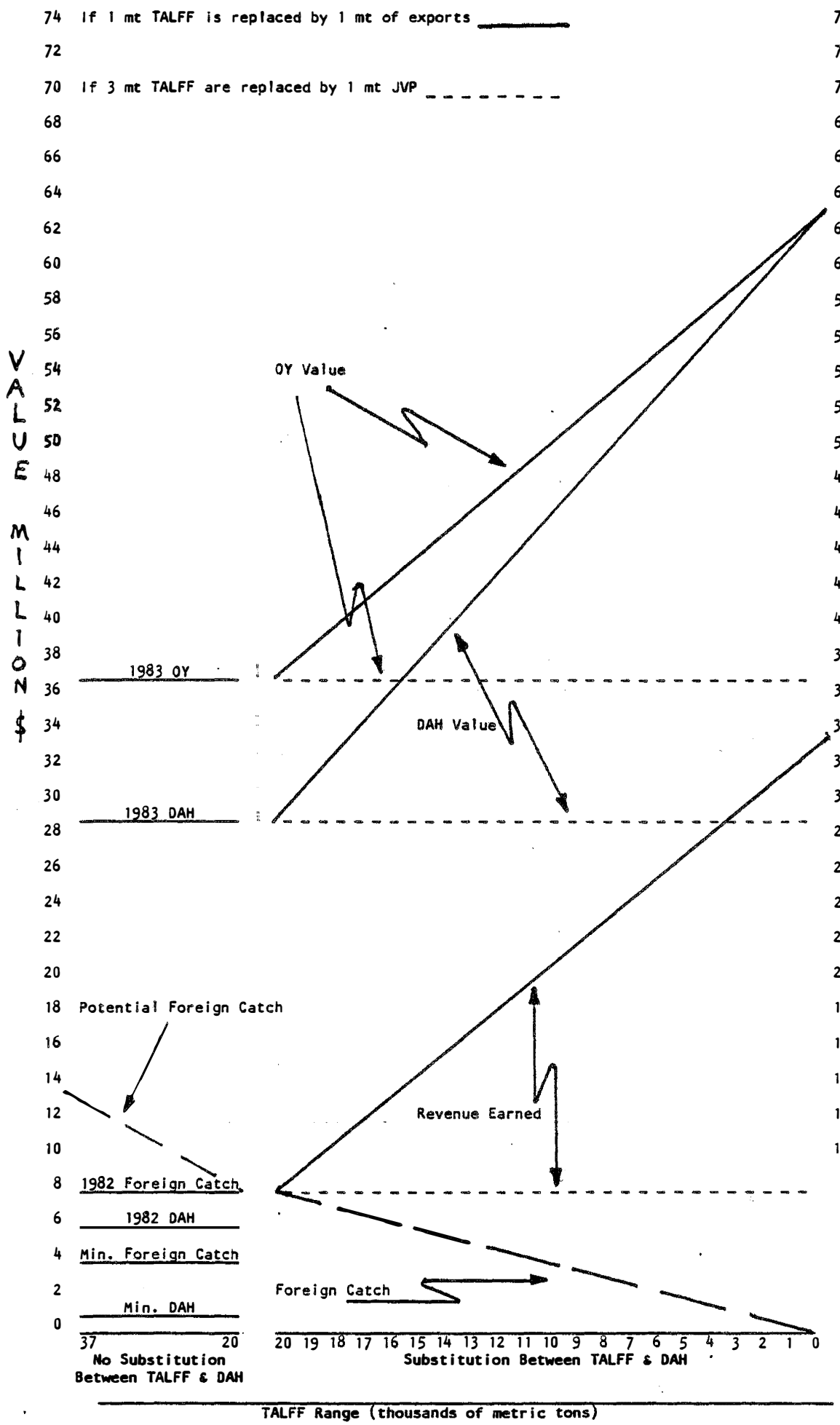


Figure 4. Trade-Off Relationships Between Loligo TALFF and DAH

48 FR 14554

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

AGENCY: National Oceanic and Atmospheric Administration (NOAA), Commerce.

50 CFR Parts 611, 655, 656, and 657

Foreign Fishing, and Atlantic Mackerel, Squid, and Butterfish Fisheries

[Docket No. 30105-03]

April 4, 1983

ACTION: Emergency interim rule; notice of approval and availability of an amendment to fishery management plans.

SUMMARY: The Assistant Administrator for Fisheries, NOAA, has initially approved Amendment No. 3 to the Fishery Management Plans for the Atlantic Mackerel, Squid, and Butterfish Fisheries. The amendment merges the management measures for these three fisheries into a single management regime, and extends management through March 31, 1986. The amendment is intended to promote development and orderly operation of the U.S. fishery. NOAA issues emergency regulations to implement the amendment and requests comment.

DATE: Interim rule effective from April 1, 1983, through June 29, 1983. Comments must be received on or before May 19, 1983.

ADDRESSES: Comments should be sent to Frank Grice, Chief, Management Division, National Marine Fisheries Service, State Fish Pier, Gloucester, Massachusetts 01930-3097. Mark the outside of the envelope, "Comments on Atlantic Mackerel, Squid, and Butterfish -- Amendment No. 3." Copies of Amendment No. 3, current regulations, the regulatory impact review, and the environmental assessment are available upon request.
FOR FURTHER INFORMATION CONTACT: Salvatore A. Testaverde, Plan Coordinator, 617-281-3600, Ext. 273.

TEXT:
SUPPLEMENTARY INFORMATION:

Background

The Assistant Administrator for Fisheries, NOAA (Assistant Administrator), has approved Amendment No. 3, which provides one plan for the management of the fisheries now managed under the following fishery management plans (FMPs): Squid Fishery of the Northwest Atlantic Ocean (approved June 6, 1979, extended indefinitely on July 3, 1980, at 45 FR 45296); Mackerel Fishery of the Northwest Atlantic Ocean (approved July 3, 1979, extended through March 31, 1983, on April 9, 1982, at 47 FR 15341); and the Fishery Management Plan for Atlantic Butterfish (approved November 9, 1979, also extended through March 31, 1983 on April 9, 1982 at 47 FR 15341).

The amendment, prepared by the Mid-Atlantic Fishery Management Council (Council), extends the management of the Atlantic mackerel, squid, and butterfish fisheries under a single management regime for three fishing years, ending on March 31, 1986. The management unit is all Atlantic mackerel (Scomber scombrus), squid (Loligo pealei and Illex illecebrosus) and butterfish (Peprilus triacanthus) under U.S. jurisdiction, excluding the Gulf of Mexico and the Caribbean Sea.

These regulations implement the amendment, which is designed to protect the fisheries from overfishing while promoting the growth and development of domestic recreational and commercial fisheries. Preparation of Amendment No. 3 and implementation of these regulations is authorized by the Magnuson Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) (Magnuson Act).

In addition to merging management of the mackerel, squid, and butterfish fisheries and extending the regulations for three years, key changes from the current individual FMPs include: (1) The Secretary of Commerce will make annual determinations of values (e.g., optimum yield): and (2) The total allowable levels of foreign fishing (TALFFs) for butterfish and mackerel are specified as percentages of allocations in other fisheries. The procedure and criteria for determination of values by the Secretary is discussed in detail below. A notice will be published soon proposing initial amounts for the 1983-84 fishing year of optimum yield, domestic annual harvest, domestic annual processing, TALFF, and Reserve. A comment period will be provided.

The amendment also adopts the Voluntary Three-Tier Fisheries Information Collection System (Three-Tier System) to collect data in the domestic squid, mackerel, and butterfish fisheries. The first two tiers (voluntary dealer/processor reports and interviews of vessel captains by National Marine Fisheries Service (NMFS) port agents) have been approved by the Office of Management and Budget (OMB). The third tier (voluntary reporting of specific tow information from a rotating sample of vessels) will be implemented at a later time; until then, section 655.5 is reserved. The Three-Tier System will provide uniform reporting procedures for all domestic fisheries within this area. The amendment and these regulations also require the Regional Director to continue to survey processors on anticipated processing capacity. This survey has been approved by OMB under the current FMPs for use through December 31, 1983.

Determining Optimum Yield, DAH, DAP, and TALFF

The Magnuson Act requires that a fishery management plan assess and specify the optimum yield (OY), domestic annual harvest (DAH), domestic annual processing (DAP), and TALFF. The Secretary determines these values in accordance with the procedures in the amendment, in consultation with the Council and with opportunity for public comment. The values are based on information gathered from an annual survey of processors, landings and catch reports, stock assessments prepared by NMFS, and other appropriate sources. More specifically, the amendment provides for determinations to be made for each species as follows:

A. Squid

The annual OY may not exceed 44,000 mt for Loligo and 30,000 mt for Illex. These limits are the same as the previous OYs. The regulations provide for a Reserve, equal to half of the difference between OY and DAH; the other half is the initial TALFF. The Council wishes to limit foreign allocations to give domestic fishermen an additional incentive to increase their catches and expand export markets. Thus, the OY determined annually may be less than the maximum possible value by the amount DAH is less than 7,000 mt for Loligo or 5,000 mt for Illex.

The Secretary considers the 1978-84 fishing year a trial period for domestic fishermen. Their performance this year will be analyzed carefully before DAH is determined for the 1984-85 fishing year.

The amendment establishes multiplication factors (which may be adjusted by the Regional Director) that, when applied to current U.S. harvests, would project the total amounts of squid that would be harvested by U.S. fishermen during the entire fishing year. After about six months of the fishing year has passed, actual U.S. catches (exclusive of joint venture harvests) are multiplied by these factors. Amounts authorized for joint ventures are then added to these projections. The resultant projection will be used to determine whether all or any part of the squid Reserve will be released to foreign fishermen.

B. Mackerel

The annual OY, DAH, DAP, and TALFF for Atlantic mackerel will be determined based upon the predicted mackerel spawning stock size.

The current OY is 30,000 mt. To continue rebuilding the stock, the amendment prohibits a directed foreign mackerel fishery unless the spawning stock size exceeds 600,000 mt after the entire predicted U.S. and Canadian harvests are taken. Two different procedures

are used to assure appropriate distribution of this resource, depending on whether the predicted spawning stock size is greater than or less than 600,000 mt.

1. If the spawning stock size is predicted to be less than or equal to 600,000 mt after the predicted U.S. and Canadian harvests during the upcoming year are taken, the OY equals the sum of the DAH and TALFF, not to exceed 30,000 mt. "Canadian harvest" refers to the estimated mackerel catch in Canadian waters by all nations. The mackerel TALFF will be incidental catch only, with the actual amount being two percent of the allocations of silver hake plus one percent of the allocations of Loligo, Illex, and red hake. There will be no Reserve. The limitations that OY not exceed 30,000 mt, and that only an incidental catch TALFF is allowed, are considered necessary to prevent overharvest of the resource and to promote the growth of the U.S. fishery.

2. If the spawning stock size is predicted to be greater than 600,000 mt after the predicted U.S. and Canadian harvests during the upcoming year are taken, the OY will be the amount which would result in a spawning stock size of 600,000 mt the following year after the predicted Canadian harvest is taken. The OY is limited, however, and would be adjusted downward, to prevent a total mackerel catch from exceeding the present best estimate of the optimum fishing mortality rate. Thus, in no case can the total mackerel harvest, all waters and all nations, exceed that which would result in a fishing mortality rate greater than of F[0].1 (a reference point on the yield curve). The limitation on OY of this fishing mortality rate continues the management strategy for mackerel initiated with the approval of the preliminary fishery management plan in 1977, and adopted by the Council in its previous mackerel plan. This fishing pressure corresponds to the optimum fishing mortality rate derived by the Northeast Fisheries Center, which has been used as a management objective in managing Northwest Atlantic fisheries for several years. (Refer to Amendment No. 3 for more discussion.) A minimum U.S. allocation of 30,000 mt is established (U.S. allocation is DAH or 30,000 mt, whichever is greater), except that the allocation cannot exceed OY.

C. Butterfish

The annual OY for butterfish will be the amount of fish U.S. fishermen harvest under the amendment, plus TALFF, the total not to exceed 16,000 mt, which is the level calculated to be the maximum sustainable yield (MSY) for this stock. (The current OY is 11,000 mt.) The TALFF will be six percent of the allocated portion of the Loligo TALFF plus one percent of the allocated portions of Illex, silver hake, and red hake TALFFs, plus one percent of the Atlantic mackerel TALFF if a directed fishery is allowed. Thus, allowable U.S. catch is whatever U.S. fishermen catch, not to exceed 16,000 mt, minus TALFF. This procedure will promote the growth of the U.S. butterfish fishery.

Emergency Action

Unless the regulations are implemented on an emergency basis, a regulatory hiatus will result during which mackerel and butterfish caught by foreign fishermen must be discarded, no joint ventures involving mackerel and butterfish could be authorized, and there would be no regulation of the domestic fishery.

The fishery resources would not be jeopardized by a short-term hiatus, but an on-going mackerel joint venture would be halted and no new ones could begin. This would adversely affect the domestic fishermen, and joint-venture companies, and the foreign processing interests. Foreign-caught mackerel and butterfish would be wasted by discard of the dead fish, and no foreign fees for these species would be received by the U.S. Treasury. The Council has consistently opposed treating mackerel and butterfish as prohibited species because this does not provide an incentive for minimizing the incidental catch.

Implementation of Amendment No. 3 will remove constraints under the previous FMPS: (1) Joint ventures for Illex will not be limited to 18,000 mt (5,000 initial DAH + 13,000 Reserve). There is strong interest in Illex joint ventures for the 1983-84 fishing year that could not be accommodated under the previous regulations.

(2) Domestic harvest of butterfish will not be limited to a 7,000 mt quota, which U.S. fishermen attained this year.

(3) A directed foreign fishery for mackerel will not be prescribed, as it is under the previous FMP.

The Assistant Administrator has determined, under section 305(e) of the Magnuson Act, that an emergency exists in the mackerel, squid, and butterfish fisheries, and that immediate implementation of Amendment No. 3 is necessary and consistent with the extent of the emergency. These regulations may be extended another 90 days if the Secretary and the Mid-Atlantic Council agree. Comments are requested which will be used in preparing final regulations.

Classification

The Assistant Administrator of NOAA has determined that Amendment No. 3 is necessary and appropriate for the conservation of Atlantic mackerel, squids, and butterfish, and that it is consistent with the national standards and other provisions of the Magnuson Act as well as other applicable law.

Executive Order 12291 and Regulatory Flexibility Act

The Administrator of NOAA has determined, after reviewing the criteria set forth in section 1(b) of E.O. 12291, that these regulations are not a major rule under E.O. 12291. A regulatory impact review (RIR) has been prepared. The RIR describes the problems

addressed by the amendments and presents an analysis of the proposed and alternative regulatory systems. The RIR supports the determination that these regulations will not have a significant economic impact on a substantial number of small entities. Certification of this determination has been made by the General Counsel, Department of Commerce, to the Small Business Administration. The RIR is available at the above address.

National Environmental Policy Act

The Council prepared an environmental assessment (EA) under Section 102(2)(C) of the National Environmental Policy Act of 1969. The EA describes the affected marine, coastal, and human environments and discusses the possible impacts from the preferred and alternate management measures presented in the amendment. Because the maximum harvest levels in Amendment No. 3 are the same as the maximum sustainable yields previously established, the amendment will not impact upon the environment. Environmental impact statements for the original plans were filed with the Environmental Protection Agency and notice of availability published as follows: mackerel plan, January 2, 1979; squid plan, January 22, 1979; and butterfish plan, December 26, 1978. The EA is available for review by the public at the above address.

Paperwork Reduction Act of 1980.

Amendment No. 3 adopts the voluntary Three-Tier Fisheries Information Collection System. Full implementation of the Three-Tier System is a separate action presently under review. Under the amendment, the current survey of fish processors will continue. This survey is conducted at least once each year to determine the amount of Atlantic mackerel, squid, and butterfish that will be processed during the season. This survey enables the Regional Director to determine DAP and the amounts that may later be made available to joint ventures. OMB has approved this survey (OMB Control #0648-0114). Also, the amendment continues the collection of information requirement for vessel permits, which has been approved though 1983 under OMB #0648-0097. Thus, under the amendment the paperwork burden is unchanged.

Administrative Procedure Act

For reasons stated in the "Emergency Action" section, the Assistant Administrator has found good cause to waive the period of delayed effectiveness under the APA.

List of Subjects

50 CFR Part 611

Fish, Fisheries, Foreign relations, Reporting requirements.

50 CFR Parts 655, 656 and 657

Fish, Fisheries, Fishing, Reporting requirements.

Dated: March 29, 1983.

Carmen J. Blondin,

Acting Deputy Assistant Administrator for Fisheries Resource Management, National Marine Fisheries Service.

For the reasons set forth in the preamble, 50 CFR Parts 611, 655, 656, and 657 are amended as follows:

PART 611 -- [AMENDED]

1. The authority citation for 50 CFR Part 611 is as follows:

Authority: 16 U.S.C. 1801 et seq; unless otherwise noted.

2. Amend 50 CFR 611 by removing § 611.51 and § 611.52, and redesignating § 611.53 as § 611.51, and by revising § 611.50(b)(3) to read as follows:

§ 611.50 Northwest Atlantic Ocean fishery.

* * * * *

(b) * * *

(3) TALFF. The TALFFs for the Northwest Atlantic Ocean fishery are published in the Federal Register. Current TALFFs are also available from the Regional Director. The procedures for determining and adjusting the squid, mackerel, and butterfish TALFFs are set forth in 50 CFR Part 655.

* * * * *

§§ 611.51 and 611.52 [Removed]

§ 611.53 [Redesignated as § 611.51]

4. The authority citation for 50 CFR Parts 655, 656, and 657 is as follows:

Authority: 16 U.S.C. 1801 et seq.

5. 50 CFR Parts 655, 656, and 657 are consolidated and redesignated as Part 655 and revised to read as follows:

PART 655 -- ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

Subpart A -- General Provisions

Sec.

Subpart B -- Management Measures

655.21 Allowable levels of harvest.

655.22 Procedures for determining initial annual amounts.

655.23 Reserve releases.

655.24 Closure of fishery.

Authority: 16 U.S.C. 1801 et seq.

Subpart A -- General Provisions

§ 655.1 Purpose and scope.

(a) The regulations in this part govern fishing for Atlantic mackerel, Illex, Loligo, and butterfish by fishing vessels of the United States in the fishery conservation zone off the coasts of the Atlantic States.

(b) The regulations governing fishing for Atlantic mackerel, Illex, Loligo, and butterfish by vessels other than vessels of the United States are contained in 50 CFR Part 611.

(c) This part implements the Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries of the Northwest Atlantic Ocean.

§ 655.2 Definitions.

In addition to the definitions in the Magnuson Act, the terms used in this part have the following meanings:

Area of custody means any vessel, building, vehicle, pier, or dock facility where Atlantic mackerel, squid, or butterfish may be found.

Assistant Administrator means the Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, or the individual to whom appropriate authority has been delegated.

Atlantic butterfish or butterfish means the species Peprilus triacanthus.

Atlantic mackerel or mackerel means the species Scomber scombrus.

Authorized officer means:

(a) Any commissioned, warrant, or petty officer of the U.S. Coast Guard;

(b) Any certified enforcement officer or special agent of the National Marine Fisheries Service;

(c) Any officer designated by the head of any Federal or State agency which has entered into an agreement with the Secretary of Commerce and the Commandant of the U.S. Goast Guard to enforce the provisions of the Magnuson Act; or

(d) Any U.S. Coast Guard personnel accompanying, and acting under the direction of, any person described in paragraph (a) of this definition.

Catch, take, or harvest includes, but is not limited to, any activity which results in the killing of any Atlantic mackerel, squid, or butterfish, or bringing any Atlantic mackerel, squid, or butterfish on board a vessel.

Charter or party boat means any vessel which carries passengers for hire to engage in fishing.

Fishery conservation zone (FCZ) means that area adjacent to the United States which, except where modified to accommodate international boundaries, encompasses all waters from the seaward boundary of each of the coastal States to a line on which each point is 200 nautical miles from the baseline used to measure the territorial sea.

Fishery management plan (FMP) means Amendment No. 3 to the Fishery Management Plans for the Atlantic Mackerel, Squid, and Butterfish Fisheries of the Northwest Atlantic Ocean, and any subsequent amendments.

Fishing means any activity, other than scientific research activity conducted by a scientific research vessel, which involves:

(a) The catching, taking, or harvesting of fish;

(b) The attempted catching, taking, or harvesting of fish;

(c) Any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or

(d) Any operations at sea in support of, or in preparation for, any activity described in paragraphs (a), (b), or (c) of this definition.

Fishing trip means a period of time during which fishing is conducted, beginning when the vessel leaves port and ending when the vessel returns to port.

Fishing vessel means any vessel, boat, ship, or other craft which is used for, equipped to be used for, or of a type which is normally used for (a) fishing; or (b) aiding or assisting

one or more vessels at sea in the performance of any activity relating to fishing, including, but not limited to, preparation, supply, storage, refrigeration, transportation, or processing.

Illex means the species Illex illecebrosus (short-finned or summer squid).

Joint venture harvest means U.S.-harvested Atlantic mackerel, squid, or butterfish transferred to foreign vessels in the FCZ or in the internal waters of a State.

Loligo means the species Loligo pealei (long-finned or bone squid).

Magnuson Act means the Magnuson Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq.

Metric ton (mt) means 1,000 kilograms, or 2.204.6 pounds.

Official number means the documentation number issued by the U.S. Coast Guard for documented vessels or the registration number issued by a State or the U.S. Coast Guard for undocumented vessels.

Operator, with respect to any vessel, means:

(a) Any person who owns that vessel in whole or in part;

(b) Any charterer of the vessel, whether bareboat, time, or voyage;

(c) Any person who acts in the capacity of a charterer, including but not limited to parties to a management agreement, operating agreement, or any similar agreement that bestows control over the destination, function, or operation of the vessel; or

(d) Any agent designated as such by a person described in paragraphs (a), (b), or (c) of this definition.

Person means any individual (whether or not a citizen or national of the United States), corporation, partnership, association, or other entity (whether or not organized or existing under the laws of any State), and any Federal, State, local or foreign government or any entity of any such government.

Regional Director means the Regional Director, Northeast Region, National Marine Fisheries Service, 14 Elm St., Federal Building, Gloucester, MA, or a designee.

Secretary means the Secretary of Commerce, or a designee.

Squid means Loligo pealei and Illex illecebrosus.

U.S.-harvested fish means fish caught, taken, or harvested by vessels of the United States within any fishery regulated under the Magnuson Act.

Vessel of the United States means:

(a) Any vessel documented or numbered by the U.S. Coast Guard under United States law; or

(b) Any vessel under five net tons which is registered under the laws of any State.

Vessel length means that length set forth in U.S. Coast Guard or State records.

§ 655.3 Relation to other laws.

(a) Persons affected by these regulations should be aware that other Federal and State statutes and regulations may apply to their activities.

(b) All fishing activity, regardless of species sought, is prohibited under 15 CFR Part 924 in the U.S.S. Monitor Marine Sanctuary, which is located approximately 15 miles off the coast of North Carolina (35 00 23 " N. latitude, 75 24 32 " W. longitude).

§ 655.4 Vessel permits.

(a) General. Every vessel subject to this part must have a permit issued under this section. A vessel is exempt from this requirement if it catches no more than 100 pounds each of Atlantic mackerel, Illex, Loligo, or butterfish per trip.

(b) Application. (1) An application for a permit under this part must be submitted to the Regional Director and signed by the owner or operator of the vessel, on an appropriate form obtained from the Regional Director, at least 30 days before the date on which the applicant desires to have the permit made effective.

(2) Applicants shall provide all the following information (approved by the Office of Management and Budget under OMB control number 0648-0097):

(i) The name, mailing address including zip code, and telephone number of the owner of the vessel;

(ii) The name of the vessel;

(iii) The vessel's U.S. Coast Guard documentation number, or the vessel's State registration number for vessels not required to be documented under provisions of Title 46 of the U.S. Code;

(iv) The home port or principal port of landing, gross tonnage, radio call sign, and length of the vessel;

(v) The engine horsepower of the vessel and the year the vessel was built;

(vi) The type of construction, type of propulsion, and the type of echo sounder of the vessel;

(vii) The permit number of any current or previous Federal fishing permit issued to the vessel;

(viii) The approximate fish hold capacity of the vessel;

(ix) The type and quantity of fishing gear used by the vessel;

(x) The average size of the crew, which may be stated in terms of a range; and

(xi) Any other information concerning vessel characteristics requested by the Regional Director.

(3) Any change in the information specified in paragraph (b)(2) of this section must be reported by the applicant in writing to the Regional Director within 15 days of the change.

(c) Issuance. The Regional Director will issue a permit to an applicant no later than 30 days from the receipt of a completed application.

(d) Expiration. A permit will expire upon any change in vessel ownership, registration, name, length, gross tonnage, fish hold capacity, home port, or the regulated fisheries in which the vessel is engaged.

(e) Duration. A permit will continue in effect until it expires or is revoked, suspended, or modified under 50 CFR Part 621.

(f) Alteration. Any permit which has been altered, erased, or multilated is invalid.

(g) Replacement. Replacement permits may be issued by the Regional Director when requested in writing by the owner or operator stating the need for replacement, the name of the vessel, and the fishing permit number assigned. An application for a replacement permit will not be considered a new application.

(h) Transfer. Permits issued under this part are not transferable or assignable. A permit is valid only for the fishing vessel and owner for which it is issued.

(i) Display. Any permit issued under this part must be carried on board the fishing vessel at all times. The operator of a fishing vessel shall present the permit for inspection upon request by any Authorized Officer.

(j) Sanctions. Subpart D of 50 CFR Part 621 governs the imposition of sanctions against a permit issued under this part. A permit may be revoked, modified, or suspended if the fishing vessel for which the permit is issued is used in the commission of an offense prohibited by the Magnuson Act or these regulations; or if a civil penalty or criminal fine imposed under the Magnuson Act is not paid.

(k) Fees. No fee is required for any permit issued under this part.

§ 655.5 Recordkeeping and reporting requirements. [Reserved]

§ 655.6 Vessel identification.

(a) Official number. Each fishing vessel subject to this part over 25 feet in length must display its official number on the port and starboard sides of the deckhouse or hull, and on an appropriate weather deck so as to be visible from above.

(b) Numerals. Number must contrast with the background and be in block Arabic numerals at least 18 inches in height for vessels equal to or over 65 feet, and at least 10 inches in height for all other vessels over 25 feet in length.

(c) The official number must be permanently affixed to or painted on the vessel. However, charter or party boats may use non-permanent markings to display the official number whenever the vessel is fishing for Atlantic mackerel, squid, or butterfish.

(d) Duties of operator. The operator of each vessel subject to this part shall:

(1) Keep the vessel name and official number clearly legible and in good repair; and

(2) Ensure that no part of the vessel, its rigging, its fishing gear, or any other object obstructs the view of the official number from an enforcement vessel or aircraft.

§ 655.7 General prohibitions.

It is unlawful for any person:

(a) To possess, have custody or control of, ship or transport, offer for sale, sell, purchase, import, or export any Atlantic mackerel, squid, or butterfish taken, retained, or landed in violation of the Magnuson Act, this part, or any other regulation under the Magnuson Act;

(b) To refuse to allow an authorized officer to board a fishing vessel or to enter an area of custody subject to such person's control, for purposes of conducting any search or inspection in connection with the enforcement of the Magnuson Act, this Part, or any other regulation or permit under the Magnuson Act;

(c) To forcibly assault, resist, oppose, impede, intimidate, or interfere with any authorized officer in the conduct of any inspection or search described in paragraph (b) of this section;

(d) To resist a lawful arrest for any act prohibited by this part;

(e) To interfere with, delay, or prevent by any means the apprehension or arrest of another person with the knowledge that such other person has committed any act prohibited by this part;

(f) To interfere with, obstruct, delay, or prevent by any means the lawful investigation or search conducted in the process of enforcing this part;

(g) To transfer or attempt to transfer, directly or indirectly, any U.S.-harvested fish to any foreign fishing vessel within the FCZ, unless the foreign vessel has been issued a permit which authorizes the receipt of U.S.-harvested fish of the species being transferred;

(h) To use any vessel for taking, catching, harvesting, or landing of any Altantic mackerel, squid, or butterfish (except as provided in § 655.4 (a)) unless the vessel has on board a valid permit issued under § 655.4;

(i) To fail to report to the Regional Director within 15 days any change in the information contained in the permit application for a vessel, as specified in § 655.4(b);

(j) To falsify or fail to affix and maintain vessel markings as required by § 655.6;

(k) To fail to comply immediately with enforcement and boarding procedures specified in § 655.8;

(l) To take and retain, or land more Atlantic mackerel, squid, or butterfish than specified under a notice issued under § 655.24;

(m) To violate any other provision of this part, the Magnuson Act, any notice issued under subpart B of this part, or any other regulation or permit promulgated under the Magnuson Act.

§ 655.8 Enforcement.

(a) General. The operator of any fishing vessel subject to this part shall immediately comply with instructions issued by an authorized officer to facilitate safe boarding and inspection of the vessel, its gear, equipment, and catch for the purposes of enforcing the Magnuson Act and this part.

(b) Signals. Upon being approached by a U.S. Coast Guard vessel or aircraft, or other vessel or aircraft authorized to enforce the Magnuson Act, the operator of the fishing vessel shall be alert for signals conveying enforcement instructions. The VHF-FM

radiotelephone is the normal method of communicating between vessels. Listen to VHF-FM channel 16 (emergency channel) for instructions to shift to another VHF-FM channel and to receive boarding instructions. Visual methods or loudhailer may also be used to communicate. The following signals, extracted from U.S. Hydrographic Office publication H.O. 102 International Code of Signals, may be communicated by flashing light or signal flags:

(1) "L", meaning "You should stop your vessel instantly.

(2) "SQ3", meaning "You should stop or heave to; I am going to board you".

(3) "AA AA AA etc.", is the call to an unknown station or general call. The operator should respond by identifying his vessel by radio, visual signs, or illuminating the vessels' official number.

(4) "RY -- CY", meaning "You should proceed at slow speed. A boat is coming to you."

(c) Boarding. The operator of a vessel signaled to stop or heave to for boarding shall:

(1) Stop immediately and lay to or maneuver in such a way as to allow the authorized officer and boarding party to come aboard;

(2) Provide a ladder, illumination, and a safety line when necessary or requested by the authorized officer to facilitate boarding and inspection; and

(3) Take such actions as the authorized officer deems necessary to facilitate and to ensure the safety of the authorized officer and the boarding party.

§ 655.9 Penalties.

Any person or fishing vessel found to be in violation of this part will be subject to the civil and criminal penalty provisions and forfeiture provisions prescribed in the Magnuson Act, and 50 CFR Part 620 (Citations), 50 CFR Part 621, 15 CFR Part 904 (Civil Procedures), and other applicable laws.

Subpart B -- Management Measures

§ 655.20 Fishing year.

The fishing year is the 12-month period beginning April 1, and ending on March 31 of the following year.

§ 655.21 Allowable levels of harvest.

(a) Maximum optimum yields. (1) The optimum yields (OYs) during a fishing year may not exceed the following amounts:

Illex 30,000 mt.
Loligo 44,000 mt.
Butterfish 16,000 mt.

(2) For Atlantic mackerel, the OY may not exceed 30,000 mt if the spawning stock at the end of the upcoming year is estimated, under the procedures specified in the FMP, to be less than or equal to 600,000 mt. If the spawning stock at the end of the upcoming year is estimated to exceed 600,000 mt, the maximum OY is determined in accordance with paragraph (b)(ii) of this section.

(b) Annual specifications. Initial OYs and amounts for domestic annual harvest (DAH), domestic annual processing (DAP), and total allowable level of foreign fishing (TALFF) for each species will be determined annually by the Secretary, under the procedures specified in § 655.22, consistent with the following:

(1) Squid. (i) Initial DAH is the amount of estimated domestic annual harvest.

(ii) Initial DAP is the estimated amount of initial DAH that domestic processors will process.

(iii) For Illex, TALFF plus Reserve equals 30,000 mt minus initial DAH, or 25,000 mt, whichever is less. For Loligo, TALFF plus Reserve equals 44,000 mt minus initial DAH, or 37,000 mt, whichever is less. TALFF and Reserve initially are equal amounts.

(iv) Initial OY is the sum of initial DAH and TALFF plus Reserve. However, OY may increase to the maximum OY specified in paragraph (a)(1) of this section if U.S. fishermen are able to harvest the difference between initial and maximum OY, in addition to the initial DAH and Reserve.

(2) Atlantic mackerel. In all cases, initial DAP is the estimated amount of initial DAH that domestic processors will process. In estimating the domestic annual harvest in the cases set forth below, the recreational catch will be predicted by the formula: $Y=(0.008)(x)-(1.15)$, where "x" is equal to the current spawning stock size, and "Y" is the estimated recreational catch in thousands of metric tons.

(i) Case 1. If the spawning stock size at the end of the upcoming fishing year, estimated in accordance with the procedures specified in the FMP, is less than or equal to 600,000 mt, then:

(A) TALFF is a fixed percentage of the amount of other species allocated to foreign fishing vessels, as follows: 2 percent of the silver hake allocation and 1 percent each of the allocations for red hake, Illex, and Loligo.

(B) DAH is the amount of estimated domestic annual harvest.

(C) Optimum yield equals DAH plus TALFF.

(ii) Case 2. If the spawning stock size at the end of the upcoming fishing year, estimated under the procedures specified in the FMP, is more than 600,000 mt, then OY during that fishing year may not exceed the acceptable catch (AC). AC is that amount which, when taken in addition to the predicted catch in the Canadian fishery, would result in a spawning stock size of 600,000 mt at the end of the upcoming fishing year. AC plus the predicted Canadian catch may not exceed a fishing mortality rate of 0.4.

(A) If AC is less than 30,000 mt, then:

(1) TALFF equals the fixed percentages specified in paragraph (b)(2)(i)(C) of this section.

(2) DAH equals AC minus TALFF.

(3) OY equals DAH plus TALFF.

(B) If AC is greater than or equal to 30,000 mt, and DAH is less than 30,000 mt, then:

(1) TALFF equals the fixed percentages specified in paragraph (b)(2)(i)(C) of this section.

(2) OY equals 30,000 mt plus TALFF.

(C) If AC is greater than or equal to 30,000 mt, and DAH is greater than or equal to 30,000 mt, then:

(1) OY equals AC.

(2) Initial DAH is the estimated domestic annual harvest.

(3) TALFF plus Reserve. If OY minus DAH is less than 10,000 mt, then TALFF equals OY minus DAH (but no less than the fixed percentages specified in paragraph (b)(2)(i)(C) of this section), and there is no Reserve. If OY minus initial DAH is greater than or equal to 10,000 mt, then the difference between OY and initial DAH is divided evenly between TALFF and Reserve.

(3) Butterfish. (i) DAH is the estimated domestic annual harvest.

(ii) DAP is the estimated amount of DAH that domestic processors will process.

(iii) TALFF is a fixed percentage of the amount of other species allocated to foreign fishing vessels, as follows: 6 percent of the Loligo allocation, and 1 percent each of the allocations for Illex, Atlantic mackerel (when a directed fishery is allowed), silver hake, and red hake.

(iv) OY is the sum of DAH plus TALFF.

(c) Allowable domestic harvest. Fish taken in territorial waters (0-3 nautical miles) will be counted against the DAHs specified under this section. The allowable domestic harvest for each species is the OY (including OY as increased under paragraph (b)(l)(iv) of this section) minus TALFF.

§ 655.22 Procedures for determining initial annual amounts.

(a) On or about January 15 of each year, the Mid-Atlantic Council and its Scientific and Statistical Committee will prepare and submit recommendations to the Regional Director of the initial annual amounts for the fishing year beginning April 1, based on information gathered from sources specified in paragraph (e) of this section.

(b) By February 1 of each year, the Secretary will publish a notice in the Federal Register that specifies preliminary initial amounts of OY, DAH, DAP, TALFF, and Reserve (if any) for each species. The amounts will be based on information submitted by the Council and from the sources specified in paragraph (e) of this section; in the absence of a Council report, the amounts will be based on information gathered from sources specified in paragraph (e) of this section and other information considered appropriate by the Regional Director. The Federal Register notice will provide for a 30-day comment period.

(c) The Council's recommendation and all relevant data will be available in aggregate form for inspection at the office of the Regional Director during the public comment period.

(d) On or about March 15 of each year, the Secretary will make a final determination of the initial amounts for each species, considering all relevant data and any public comments, and will publish a notice of the final determination and response to public comments in the Federal Register.

(e) Sources used to establish initial annual specifications include:

(1) Results of a survey of domestic processors and joint venture operators of estimated processing capacity and intent to use that capacity (approved by the Office of Management and Budget under OMB control number 0648-0114);

(2) Results of a survey of fishermen's trade associations of estimated fish harvesting capacity and intent to use that capacity (approved by OMB under OMB control number 0648-0114);

(3) Landings and catch statistics;

(4) Stock assessments; and

(5) Relevant scientific information.

§ 655.23 Reserve releases.

All or part of any Reserve may be allocated to TALFF following the procedures of this section.

(a) Projections. (1) Squid. (i) During August for Illex, and during September for Loligo, the Regional Director will project the total amounts of squid that will be harvested by U.S. fishermen during the entire fishing year. For Illex, catches from April through July (exclusive of joint venture harvest) will be multiplied by the factor determined under paragraph (a)(1)(ii) of this section to obtain a projected annual harvest. For Loligo, catches from April through August (exclusive of joint venture harvest) will be multiplied by the factor determined under paragraph (a)(1)(ii) of this section to obtain a projected annual harvest.

(ii) The multiplication factor for Illex will equal the proportion of the total U.S. landings (exclusive of joint venture harvest) during the previous fishing year, or the average annual U.S. landings since 1977, whichever is greater, compared to U.S. landings (exclusive of joint venture harvest) from April 1 through July 31 of the previous fishing year. The factor for Loligo will equal the proportion of the total U.S. landings (exclusive of joint venture harvest) during the previous fishing year, or the average annual U.S. landings since 1977, whichever is greater, compared to U.S. landings (exclusive of joint venture harvest) from April 1 through August 31 of the previous fishing year.

(iii) If any permits authorizing receipt of joint venture harvest have been issued to foreign processing vessels, or if the Secretary intends to issue such permits during the remainder of the fishing season, the Secretary will add to the projected annual harvest the amounts of Illex or Loligo authorized or expected to be authorized under such permits.

(iv) If the projected amount of Illex or Loligo to be harvested by U.S. fishermen, including joint venture harvest, exceeds the initial DAH specified under § 655.21(b)(1), the Secretary will leave the necessary amount in Reserve. The Secretary will allocate all of the remainder of the Reserve to TALFF. If the projected amount of Illex or Loligo to be harvested by U.S. fishermen, including joint venture harvest, does not exceed the initial DAH, the Secretary will allocate the entire Reserve to TALFF.

(2) Atlantic mackerel. If there is a Reserve, the Regional Director during October will project the total amount of mackerel that will be harvested by U.S. fishermen during the entire fishing year, based on U.S. landings through September and on the results of a survey of the intent of domestic fishermen to harvest mackerel during the remainder of the year. If the projected amount of mackerel to be harvested by U.S. fishermen exceeds the initial DAH specified in § 655.21(b)(2)(ii)(C), the Secretary will leave the necessary amount in Reserve. The Secretary will allocate all of the remainder of the Reserve to

TALFF. If the projected amount of mackerel to be harvested by U.S. fishermen does not exceed the initial DAH, the Secretary will allocate the entire reserve to TALFF.

(b) Notice of allocation. (1) Squid. On or about September 1 for Illex and October 1 for Loligo, the Secretary will:

(i) Notify the Executive Directors of the Mid-Atlantic, New England, and South Atlantic Fishery Management Councils of the decision whether to allocate any of the Reserve to TALFF; and

(ii) Publish a notice of the decision in the Federal Register.

(2) Atlantic mackerel. (i) If there is a Reserve, the Secretary, on or about November 1, will publish a notice in the Federal Register stating the amount of mackerel proposed to be allocated from Reserve to TALFF. The notice will contain the latest catch statistics available. The public may comment on the proposed allocation for 15 days after the date of publication.

(ii) The Secretary will publish a final notice of the Reserve allocation in the Federal Register. The notice will contain a summary of all comments and relevant information received during the comment period.

(c) Subsequent Reserve allocation. After the first Reserve allocation, the Secretary may allocate any remaining portion of the Reserve to TALFF, if he determines that the domestic harvest will not attain the level projected under paragraph (a) of this section. The Secretary will notify the Executive Directors of the Councils of any subsequent allocation, and will publish a notice in the Federal Register.

§ 655.24 Closure of the fishery.

(a) General. The Secretary shall close any fishery in the FCZ for any species when U.S. fishermen have harvested 80 percent of the allowable domestic harvest (see § 655.21(c)), if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure will be in effect for the remainder of the fishing year.

(b) Notice. If the Secretary determines that a closure is necessary, he will:

(1) Notify in advance the Executive Directors of the Mid-Atlantic, New England, and South Atlantic Councils;

(2) Mail notifications of the closure to all holders of permits issued under § 655.5 at least 72 hours before the effective date of the closure;

(3) Provide for adequate notice of the closure to recreational fishermen in the fishery; and

(4) Publish a notice of closure in the Federal Register.

(c) Incidental catches. During a period of closure, the trip limit for the species for which the fishery is closed is 10 percent by weight of the total amount of fish on board.
[FR Doc. 83-8666 Filed 3-31-83; 4:00 pm]

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48 FR 44834

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

AGENCY: National Oceanic and Atmospheric Administration (NOAA), Commerce.

50 CFR Parts 611 and 655

Foreign Fishing, and Atlantic Mackerel, Squid, and Butterfish Fisheries

[Docket No. 30920-192]

September 30, 1983

ACTION: Final rule.

SUMMARY: NOAA issues a final rule to implement Amendment No. 3 to the Fishery Management Plans for Atlantic Mackerel, Squid, and Butterfish Fisheries. This rule will provide a single regime for managing the Atlantic mackerel, squid, and butterfish fisheries until 1986. The regulations are intended to promote development and orderly operation of the U.S. fishery.

EFFECTIVE DATE: September 28, 1983, through March 31, 1986.

ADDRESS: Copies of the Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries, the environmental assessment, regulatory impact review, and the regulatory flexibility analysis are available from Executive Director, Mid-Atlantic Fishery Management Council, Room 2115 Federal Building, 300 South New Street, Dover, Delaware, 19901-6790.
FOR FURTHER INFORMATION CONTACT:Salvatore A. Testaverde, 617-281-3600, extension 273.

TEXT:
SUPPLEMENTARY INFORMATION: The Assistant Administrator for Fisheries, NOAA (Assistant Administrator) approved Amendment No. 3, which provided one plan for the management of fisheries formerly managed under the following fishery management plans: Squid Fishery of the Northwest Atlantic Ocean (approved June 6, 1979, extended indefinitely on July 3, 1980, at 45 FR 45296); Mackerel Fishery of the Northwest Atlantic Ocean (approved July 3, 1979, extended through March 31, 1983, on April 9, 1982, at 47 FR 15341); and the Fishery Management Plan for Atlantic Butterfish

(approved November 9, 1979, also extended through March 31, 1983, on April 9, 1982, at 47 FR 15341).

The new plan created by Amendment No. 3, the Fishery Management Plan for the Atlantic Mackerel, Squid, and Butterfish Fisheries (FMP) was prepared by the Mid-Atlantic Fishery Management Council (Council). It extends the management of the Atlantic mackerel, squid, and butterfish fisheries under a single management regime for three fishing years, ending on March 31, 1986. The management unit is all Atlantic mackerel (Scomber scombrus), squid (Loligo pealei and Illex illecebrosus) and butterfish (Peprilus triacanthus), under U.S. jurisdiction, excluding the Gulf of Mexico and the Caribbean Sea.

In addition to merging management of the mackerel, squid, and butterfish fisheries and extending their regulations for three more years, key changes from the individual fishery management plans include: (1) The Secretary of Commerce will make annual determinations of the optimum yields (OYs) and the amounts apportioned among the component parts of the OYs; and (2) the total allowable levels of foreign fishing (TALFFs) for butterfish and mackerel are specified as percentages of amounts of the species allocated for foreign fishing in other fisheries. The procedure and criteria for determination of these amounts by the Secretary are discussed in detail below. Final initial annual specifications for the 1983-84 fishing year of optimum yields, domestic annual harvests (DAH), domestic annual processing (DAP), TALFF, and Reserves were published on July 20, 1983 (48 FR 33001), following a 30-day comment period.

The FMP also adopts the Voluntary Three-Tier Fishery Information Collection System (Three-Tier System) to collect data in the domestic squid, mackerel, and butterfish fisheries. The first two tiers (voluntary dealer/processor reports and interviews of vessel captains by National Marine Fisheries Service (NMFS) port agents) were approved by the Office of Management and Budget (OMB). The third tier (voluntary reporting of specific tow information from a rotating sample of vessels) will be implemented at a later time; until then, § 655.5 is reserved. The Three-Tier System will provide uniform reporting procedures for all domestic fisheries within this area. The FMP and these regulations also require the Regional Director, in consultation with the Council, to continue to survey processors on anticipated processing capacity and the extent to which they intend to process the regulated species. This survey has been approved by OMB under the current FMPs for use through December 31, 1983 (OMB Control #0648-0114).

The Assistant Administrator approved the FMP on October 14, 1982. An emergency interim rule implemented the FMP for 90 days effective April 1, 1983 (48 FR 14554, April 4, 1983). The emergency interim rule proveded a 45-day period for public review and comment on the FMP and regulations, ending on May 19, 1983. The emergency interim rule was extended for an additional 90-day period through September 27, 1983 (48 FR 29703, June 28, 1983).

The preamble to the emergency interim rule provided a detailed discussion of the management measures imposed by the FMP. The discussion is not repeated here. This

final rule is essentially identical to the emergency interim rule, with several minor changes for clarity and to respond to public comments. The changes do not represent any significant differences in the provisions imposed under the emergency interim rule. Comments received on the rule, and NOAA's responses, are discussed below.

Response to Public Comment

Written comments were submitted by the Mid-Atlantic Fishery Management Council, the New England Fishery Management Council, the U.S. Coast Guard, the National Fisheries Institute, the Atlantic Offshore Fishermen's Association, the Government of Japan, the Association of Spanish Fishermen (ANAVAR), and the Japan Deep Sea Trawlers Association. A mailgram was received from the National Federation of Fishermen.

Comment 1: The Mid-Atlantic Fishery Management Council, the New England Fishery Management Council, the National Fisheries Institute, the Atlantic Offshore Fishermen's Association, and the National Federation of Fishermen stated that § 655.21(b)(1) of the interim regulations, pertaining to the determinations of annual OYs for squids, is inconsistent with the intent of the FMP as approved by the Assistant Administrator. The commenters maintained that the Council intended to have wide ranging flexibility in setting the annual OY's for squids, including the ability to adjust OYs to respond to biological and socio-economic circumstances in order to achieve the objectives of the FMP. The commenters argued that the constraint on the flexibility in setting annual OYs contained in § 655.21(b)(1) is inconsistent with the intent of the Council.

The Council suggested that the inconsistency could be remedied by revising the language of § 655.21(b)(1) to permit the setting of an "initial OY," which could then be adjusted for biological and socio-economic reasons based on the application of criteria which could be identified in the revised regulations.

Response: A review of Amendment No. 3 and its record shows that the Council has broad-ranging objectives for the FMP, with emphasis on improving the position of the U.S. fishing industry in the three fisheries covered by the FMP. Neither the FMP nor its record, however, contains the degree of flexibility indicated by the commenters for setting the annual OYs for squids.

NOAA has concluded that no foundation exists in the FMP to permit wider ranging flexibility in setting the annual OYs for squids than the flexibility incorporated in the interim regulations at § 655.21(b)(1). Flexibility provisions as contained in the FMP and implemented in this section allow the Secretary to lower OYs by as much as 7,000 and 5,000 metric tons (mt) of Loligo and Illex squids, respectively, in the event that either initial DAH or both in a given year will not reach these levels. In this circumstance, the annual OYs could be less than the maximum OYs only by the amount which the domestic harvests fall below 7,000 or 5,000 mt. The mechanism also effectively limits the maximum potential TALFFs for the two squid species to 37,000 and 25,000 mt, respectively.

No criteria or other mechanisms were provided in the FMP, however, to permit additional adjustments to the squids' OYs based on biological and socio-economic factors. The suggestion of the Mid-Atlantic Council to revise § 655.21(b)(1) to provide for "initial OYs" adjusted for biological and economic reasons based on identifiable criteria is being prepared by the Council as an amendment to the FMP.

Comment 2: Criticism was also raised by some of the above commenters to the designation of the Secretary rather than the Regional Director as the official to set final annual amounts under § 655.22(d). Commenters stated that this was at variance with the intent of the Council, which had designated in its FMP that the Regional Director would be the official responsible for setting annual amounts after consultation with the Council and after publication of notice and an invitation to comment on proposed amounts.

Response: No substantial effect is anticipated on determinations of the initial annual amounts because of the procedure outlined in § 655.22. Inseason adjustment authority will be exercised by the Regional Director, subject to the Secretary's approval. These decisions will be based on the Council's recommendations as to the annual amounts and information determined by the Regional Director to be appropriate for consideration. Public comments will be important factors in determining of the final initial annual amounts. Thus, the substantive nature of the procedure for determining the initial annual amounts remains basically regional in nature.

Comment 3: The Atlantic Offshore Fishermen's Association criticized the characterization in the preamble to the interim regulations of the years "1978-84" as a "trial period for domestic fishermen" during which "(t)heir performance . . . will be analyzed carefully before DAH is determined for the 1984-85 fishery year".

Response: The reference to the years "1978-84" in the April 4th preamble was a typographical error which should have read "1983-84". Since under the normal procedure, harvesters' performance in prior years is a standard reference point for setting annual amounts (§ 655.22(e)(3)), the intended reference in the preamble to 1983-84 as a "trial year" does not constitute a substantive change in the operation of the FMP.

Comment 4: ANAVAR challenged the validity of the interim regulations on the grounds that there was no basis for invoking section 305(e) of the Magnuson Act for promulgating regulations on a emergency basis for management of the squid fisheries. In the presumed absence of grounds for emergency promulgation of regulations, ANAVAR argued that the publication of the regulations was in violation of the Administrative Procedure Act, 5 U.S.C. 553 (b) and (c), for failure to provide notice and opportunity to comment upon the regulations prior to their being placed in effect.

Response: The explanation provided in the "Emergency Action" section of the preamble to the April 4th, interim regulations, indicated that the terms of Amendment No. 1 to the squid plan would constrain the operation of the fishery in fishing year 1983-84. Particularly, the prior management regime would have limited approval of joint ventures

for Illex to 13,000 mt because subsequent determinations indicated that of the total DAH and reserve, 5,000 mt were needed for DAP. At the same time, applications for joint ventures for Illex totalled over 42,000 mt. Under the interim regulations, NOAA had authority to approve Illex joint ventures for 22,100 mt, or 9,100 mt over the amount approvable under the former squid plan. Delaying implementation of the interim regulations but continuing management of the fishery under Amendment No. 1 to the squid plan would thus have inhibited an opportunity for full utilization of the fishery during the 1983-84 fishing year. The preamble to the interim rule provided adequate grounds for invoking section 305(e) of the Magnuson Act.

Moreover, the record of preparation of the FMP shows that there was opportunity for public comment on the terms of the FMP. The FMP was discussed at open meetings of the Council and at public hearings held by the Council in September, 1981. Subsequent revisions were discussed at Council meetings. Since the basis of the regulation is contained in its authorizing FMP, there was sufficient opportunity to comment on these regulations prior to emergency implementation.

Comment 5: Japan Deep Sea Trawlers Association also challenged the validity of the promulgation of the interim regulations. This association stated that the interim regulations contained a material change, a "floating" OY for squids, which had not been submitted for public hearing as required under the Magnuson Act.

Response: The interim regulations contain OY specifications for squid which may differ from, but which have substantially the same effect as those appearing in the Council's September, 1981, hearing document. No material change was made in the interim regulations which would have violated the Magnuson Act. The hearing draft discussed OY specifications of 44,000 mt and 30,000 mt for Loligo and Illex, respectively. That draft proposed minimum DAHs of 7,000 mt and 5,000 mt for the two species. Thus, under conditions of minimum U.S. harvest, maximum TALFFs of 37,000 mt and 25,000 mt would be available. In the interim regulations, instead of setting minimums for DAH, the same allowances for domestic harvest were built into the OY calculations. This was done by limiting TALFFs plus reserves to maximums of 37,000 mt and 25,000 mt and allowing the OYs for each species to be adjusted between the maximum TALFFs and the maximum OYs, if domestic harvest levels fell below minimum DAHs. Amounts available for foreign allocations and for domestic harvests remained the same; therefore, no material change was made by this change in the FMP.

The foreign commenters may have assumed the procedures for OY calculations for squids in the interim regulations were more flexible squid OY calculation methods. Such procedures had been discussed by the Council but were not included in the interim rule. The FMP and the interim rule do not allow the high degree of flexibility to vary from the maximum OYs for squids (44,000 mt Loligo, 30,000 mt Illex), as is suggested by the comments of the Government of Japan, and Japan Deep Sea Trawlers Association.

Comment 6: ANAVAR challenged NOAA's conclusion that the interim regulations are not a major rule under E.O. 12291. The Japan Deep Sea Trawlers made similar comments as to the adequacy of the draft regulatory impact review (RIR) analysis.

Response: Analysis provided by the Council in the final RIR prepared for the FMP supports NOAA's initial determination that the interim regulations are not a major rule within E.O. 12291. The Council's estimates of calculable costs totalled $5.4 million, including over $400,000 of loss of foreign fees and $5 million for loss of purchases of U.S. goods and services by foreign vessels. The Council concluded, based on a detailed analysis of market conditions and trends, that prices to consumers could be lower and that the competitive position of U.S. industry would be enhanced by implementation of the FMP.

In its comment, ANAVAR referred to a $43-45 million dollar value for potential loss of foreign fishing fees, presumably in relation to this FMP. This figure approximates the total of all foreign fishing fees for all fisheries in all sections of the country, not just fees related to the three Northwest Atlantic fisheries covered by the FMP.

Comment 7: ANAVAR criticized the squid regulations as violating provisions of the Magnuson Act requiring optimum utilization of species. ANAVAR specifically cited two provisions included in the regulations as potentially wasteful of the squid resources and wished to have provisions adopted which would require additional apportionments to TALFFs.

Response: NOAA concludes that the regulations are consistent with the Magnuson Act. ANAVAR first criticized as potentially wasteful, the flexibility to set 5,000 and 7,000 mt minimum DAHs in the OY calculations for Illex and Loligo , respectively. Landing statistics for fishing year 1982-83 indicate it is likely that these amounts will be caught by domestic harvesters since 5,772 mt of Illex and 4,894 mt of Loligo were caught by domestic harvesters by the end of fishing year 1982-83. Preliminary catches in the 1983-84 fishing year indicate U.S. fishermen have harvested over 8,700 mt of Loligo and 4,200 mt of Illex . The projected needs for domestic processors (DAP) and for joint venture processing (JVP) have caused NOAA to set initial annual estimates of DAHs for fishing year 1983-84 at 27,100 mt for Illex and 22,000 mt for Loligo . NOAA believes there is a potential to achieve the estimates this year, especially because of the lack of Illex availability in Canadian waters. Shortfalls in these harvests, however, may occur and be taken into account in future DAH projections.

This response also applies to the comments of the Government of Japan and of Japan Deep Sea Trawlers Association, who objected to "floating OYs" for squids. As discussed in an earlier response, the flexibility in the OY calculation is limited under the interim regulations which embody the FMP; also, if domestic harvests continue at recent levels, it is unlikely that the "floating OYs" as provided in the FMP will operate frequently to establish minimum domestic harvests. Moreover, the maximum TALFFs of 37,000 mt and 25,000 mt for Loligo and Illex , respectively, which are part of the OY calculations

described above, are not restrictive on foreign allocations when compared to recent foreign catches of these species.

ANAVAR and the Japan Deep Sea Trawlers Association also commented that a provision should have been included to permit the reallocation of unused portions of DAH to TALFF. Section 655.22 sets our procedures for determining the initial annual amounts including DAH, for squid, mackerel, and butterfish. This procedure requires NOAA consideration of various sources of information, consultation with the affected Regional Fishery Management Councils, public notice and comment on proposed amounts, and evaluation of all data and comments. Information pertaining to the DAP and JVP portions of DAH is also included in this review process. Since the DAH's are based on substantive data and reviews by various parties, a reallocation mechanism is not necessary. Reserves were created in Amendment No. 1 to the squid plan to account for uncertainties in the U.S. catch and in prior years substantial amounts were released to TALFF. The total combined TALFF and reserve amounts were not harvested by foreign vessels in any year, however.

Two of ANAVAR's comments were directed specifically at the methods for calculating TALFF. ANAVAR claimed that a disproportionately small amount of the potential annual TALFF allocations are made available at the outset of the fishing year because (1) § 655.21 with regard to squid requires half of the difference between OY and DAH to be assigned to reserve; and, (2) section 201(e)(1)(C) of the Magnuson Act which limits to 50 percent of the annual allocation, the amount which may initially be allocated to TALFF. Under the squid regulations, foreign fishing vessels have only a putative claim to the reserve portion of the difference between OY and DAH at the beginning of the fishing year. This reserve would first be available to supplement DAH, depending upon the experience of the fishing year. Thus, the reserve amounts should not be considered a withheld portion of the annual TALFF at the beginning of the fishing year, as ANAVAR has done.

Section 201(e)(1)(C) of the Magnuson Act is a statutory embodiment of an existing policy under which the last 50 percent of the aggregate annual foreign allocations to a foreign nation are distributed only after that nation has demonstrated a willingness to take steps which are beneficial to the United States and its fishing interests. To this extent, the actual effect of the statute on TALFF allocations is influenced by the foreign nation itself. Also, the statute allows allocations in excess of the initial 50 percent to accommodate discrete needs of a particular fishery. Thus, the restrictiveness of the Magnuson Act's allocations provisions specifically applicable to this FMP are not as rigid as described by ANAVAR.

ANAVAR and Japan Deep Sea Trawlers Association criticized the lack of an automatic regulatory provision for reallocating from reserve to TALFF. This criticism overlooks the requirements for NOAA to perform evaluative reviews which are not automatic in nature incident to reallocating reserve to TALFF. NOAA must gather and evaluate data to make an accurate projection of domestic annual harvest for the remaining portion of the fishing year. These evaluations cannot be performed on an "automatic" basis as suggested by

ANAVAR, and require the procedures included in § 655.23 for developing and issuing public notice on projections of the U.S. harvest.

Japan Deep Sea Trawlers Association also challenged the inclusion of joint venture harvest in projections of the domestic harvests for the entire fishing year on the grounds that the joint venture projections may not be reliable. NOAA does not accept a characterization of joint venture projections as unreliable. Projections are based upon data on the proposed joint ventures that are reviewed by both the Councils and the agency, and which are available for public comment prior to approval. (See 48 FR 33001, July 20, 1983. Final Initial Annual Specifications for the Squids, Atlantic Mackerel, and Butterfish fisheries.)

ANAVAR's criticisms of the interim regulations appear to assume that each metric ton identified for annual harvest in OY must be marked for domestic harvest by a point in time in the fishing year or be immediately apportioned to TALFF. This assumption is not correct. Achieving OY is not a quota but a goal. The management measures adopted for achieving OY on an annual basis need only approximate its achievement. Also, the OY which by definition can incorporate a number of objectives for the fishery, may be implemented by measures which favor the U.S. fishermen over foreign fishermen for the harvesting of certain species. Thus, NOAA concludes that ANAVAR's comment is in error in that taking steps to minimize foreign allocations is not contrary to provisions of the Magnuson Act.

Comment 8 : ANAVAR and Japan Deep Sea Trawlers Association argued that reduced squid OYs and foreign allocations run counter to NOAA's trade policies and to its obligations under GIFAs and the Trade Act of 1974, 19 U.S.C.A. 2118.

Response : The OYs for squid have only limited flexibility to range between the maximum TALFFs and the maximum OYs for Illex (i.e., between 25,000 mt and 30,000 mt) and Loligo (i.e., between 37,000 mt and 44,000 mt). The maximum TALFFs of 25,000 mt and 37,000 mt, respectively, are not restrictive and provide a generous margin for foreign allocations unless restricted by high DAH levels which must take precedence over the TALFFs. For the 1983-84 fishing season, DAHs have been set at higher levels than in previous years because of projected demands for domestic harvests for domestic processing and joint ventures. See notice, final initial annual specifications, (48 FR 33001, July 20, 1983). Resulting lower foreign allocations are, therefore, consitent with the Magnuson Act and are not in violation of NOAA's fishery trade policies and obligations.

Comment 9 : Japan Deep Sea Trawlers Association raised a number of objections to the specifications for butterfish. It objected to the specification of OY as the sum of DAH plus an incidental level TALFF. The Government of Japan and Japan Deep Sea Trawlers Association both criticized limiting the butterfish TALFF to an incidental catch level.

Response : The butterfish specifications in the FMP continue to reflect the objectives adopted in the butterfish plan promulgated in 1980, (45 FR 71358, October 28, 1980),

i.e., to promote the growth of the export market while providing foreign harvesters sufficient TALFF to pursue other fisheries in which butterfish is intermixed. The statute allows for incorporation of social, economic, and biological factors in the specification of OY. In this case, the OY is expressed as a sum of DAH and TALFF sufficient for the foreign incidental catch in other fisheries in order to promote export markets for the U.S. fishing industry.

Fostering growth in the U.S. butterfish fishery is continued as an objective in this plan. Domestic harvests have grown in recent years and were especially high in the 1982-83 fishing year. Interest of domestic processors in processing butterfish has grown as is evident from statements made at open Council meetings in which proposed joint ventures for butterfish were discussed. Domestic processors stated that they could process all butterfish harvested by U.S. harvesters. These statements were acknowledged in the initial annual specifications for butterfish for the 1983-84 fishing year. The specifications provide that joint ventures for butterfish, which would have a greater priority than that assigned to foreign fishing, would be considered only if domestic shoreside landings had concluded. The Japan Deep Sea Trawlers Association's comment that a "surplus" will exist, to which it should be granted access, is not correct because demand for the species for domestic processing has grown and there may be additional markets for U.S. fishermen if shoreside landings are terminated.

The TALFF level adopted is adequate to meet the incidental catch levels of foreign harvesters in intermixed fisheries. (Background Paper No. 2 prepared by the Mid-Atlantic Council, revised November, 1982.)

Comment 10: The Government of Japan and the Japan Deep Sea Trawlers Association both objected to § 655.21(b)(2) under which the TALFF for mackerel may be calculated at the incidental catch level. This term applies in both Case (1) for calculation of mackerel values if the spawning stock size is less than or equal to 600,000 mt and in Case (2) when the spawning stock size exceeds 600,000 mt if OY minus DAH is less than 10,000 mt.

Response: The TALFF for mackerel is reduced to incidental catch levels to promote the growth of the U.S. commercial fishery, including the fishery for export. If foreign nations are not permitted to harvest mackerel directly, they will have a greater incentive to purchase the fish from U.S. harvesters and processors. Reducing the foreign allocations to the incidental level also provides an incentive for developing joint ventures in this fishery. Recent experience shows that these ventures are developed randomly throughout the year and that their catch requirements cannot be forecast. Reducing the TALFF to the incidental catch level ensures that a sufficient DAH is available for these joint ventures to proceed immediately if they are approved. Sufficient U.S. harvesting capacity is available which could enter the fishery to harvest mackerel not apportioned to TALFF.

Comment 11: The Government of Japan commented that the closure provision in § 655.24 should not be applied to the foreign fishery.

Response: The closure provision of § 655.24 was not intended to apply to foreign fisheries and this has been clarified in the final rule. The regulation requires closure of the respective U.S. fisheries if U.S. fishermen have harvested 80 percent of the allowable domestic harvest. Accordingly, § 655.24 would not constrain foreign fishermen from harvesting a TALFF which had already been allocated.

Other Comments

Written comments were also received from the U.S. Coast Guard. Additionally, one verbal comment was received concerning definition of joint venture from the Division of Marine Fisheries, Commonwealth of Massachusetts. Changes were recommended to provide consistent regulations throughout the Northwest Atlantic Area. A number of comments were received concerning definitions in § 655.2. The commenters suggested adding the definitions of "fish" and "owner", and revising the wording for "fishing trip", "operator" and "joint venture harvest." Technical revisions were also made to clarify §§ 655.4(a)(b)(2)(xi), 655.6(b), 655.7, and 655.8(c)(2).

Additionally, the NMFS added to § 655.3 information on the Submarine Cable Act and the Large Mesh Area under the optional settlement.

Classification

The Administrator determined that implementation of Amendment No. 3 is necessary for the conservation and management of the Atlantic mackerel squid, and butterfish fisheries and that it is consistent with the Magnuson Act and other applicable law.

A final regulatory impact review prepared by the Council supported a determination by NOAA's Administrator that these regulations do not constitute a major rule requiring a regulatory impact analysis under Executive Order 12291. The General Counsel of the Department of Commerce certified to the Small Business Administration that the rule will not have a significant economic impact on a substantial number of small entities. (Summary published at 48 FR 14555, April 4, 1983.) As a result, a regulatory flexibility analysis was not prepared.

The Council prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act for this FMP amendment and concluded that there will be no significant impact on the environment as a result of this rule. Copies of the EA can be obtained from the Council at the address above.

This rule contains a collection of information requirement subject to the Paperwork Reduction Act. The collection of this information has been approved by the Office of Management and Budget, OMB Control Numbers 0648-0114 (until December 31, 1983) and 0648-0097 (until March 31, 1986). Section 655.5, Recordkeeping and reporting requirements, has been reserved pending the full implementation of the provisions of the

NMFS Three Tier Fishery Information Collection System to be used under this FMP. Section 655.4, Vessel permits, has been approved by OMB, OMB Control Number 0648-0097 (until March 31, 1986).

The Council determined that this rule will be implemented in a manner that is consistent to the maximum extent practicable with the approved coastal zone management programs of nine states on the eastern United States coast. This determination was submitted for review by the responsible State agencies under section 307 of the Coastal Zone Management Act. The Council received no negative findings from any of the nine states.

These final regulations must be effective on September 28, 1983, to continue management of the Atlantic mackerel, squid and butterfish fisheries. The regulations which would be contained at § 611.51 provide authority for current joint venture fisheries for Loligo and Illex squids. Additionally, unless final regulations are promulgated, there would be no codified regulatory authority to manage the foreign Loligo squid fishery which is expected to begin this fall. Therefore, a lapse in the regulations would have a detrimental effect on both U.S. and foreign fishermen. To avoid such a lapse, the Assistant Administrator finds for good cause that it would be contrary to the public interest to delay the effective date of these regulations for the 30-day period otherwise required under § 553(d) of the Administrative Procedure Act. Therefore, these regulations are effective September 28, 1983.

List of Subjects in 50 CFR Part 655

Administrative practice and procedure, Fish, Fisheries, Reporting and recordkeeping requirements.

Dated: September 27, 1983.

Carmen J. Blondin,

Deputy Assistant Administrator for Fisheries Resource and Management, National Marine Fisheries Service.

For the reasons set out in the preamble, the interim rule published on April 4, 1983 (48 FR 14554) amending 50 CFR Parts 611, 655, 656 and 657 is adopted as final with the following changes:

PART 655 -- ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERIES

1. The authority citation for 50 CFR Part 655 is as follows:

Authority: 16 U.S.C. 1801 et seq.

2. Section 655.2 is amended by revising the title of the definition "Operator " to read "Owner " and the title of the definition "Fishing trip " to read "Fishing trip or trip ", by adding in appropriate alphabetical order new definitions for "Fish " and "Operator ", and by revising the definition of "Joint venture harvest " to read as follows:

§ 655.2 Definitions.

* * * * *

Fish includes Atlantic mackerel (Scomber scombrus), squid (Loligo pealei and Illex illecebrosus), and Atlantic butterfish (Peprilus triacanthus).

Joint venture harvest means U.S.-harvested Atlantic mackerel, squid, or butterfish transferred to foreign vessels in the FCZ or in the internal waters of a State. Transfers to foreign vessels in the internal waters of a State are governed under Section 306(c), of the Magnuson Act, foreign fish processing in internal waters.

Operator, with respect to any vessel, means the master or other individual on board and in charge of that vessel.

* * * * *

3. Section 655.3 is amended by adding new paragraphs (c) and (d) to read as follows:

§ 655.3 Relation to other laws.

* * * * *

(c) Fishing vessel operators shall exercise due care in the conduct of fishing activities near submarine cables. Damage to submarine cables resulting from intentional acts or from the failure to exercise due care in the conduct of fishing operations subjects the fishing vessel operator to the criminal penalties prescribed by the Submarine Cable Act (47 U.S.C. 21) which implements the International Convention for the Protection of Submarine Cables. Fishing vessel operators also should be aware that fishing operations may not be conducted at a distance of less than one nautical mile from a vessel engaged in laying or repairing a submarine cable, or at a distance of less than one quarter nautical mile from a buoy intended to mark the position of a cable when being laid, or when out of order, or broken.

(d) Vessels fishing within the Large Mesh Area (47 FR 43705, October 4, 1982) for Atlantic mackerel, squid, and butterfish with cod-end mesh size of less than five and one-half inches must apply to fish under the optional settlement program under the interim groundfish regulations at 50 CFR 651.22 (47 FR 43705, October 4, 1982).

4. Section 655.4 is amended by revising paragraph (a) to read as follows:

§ 655.4 Vessel permits.

(a) General. Any vessel of the United States which catches 100 pounds or more each of Atlantic mackerel, Illex, Loligo, or butterfish per trip must have a permit issued under this section.

* * * * *

5. Section 655.6 is amended by revising paragraph (b) to read as follows:

§ 655.6 Vessel identification.

* * * * *

(b) Numerals. The official number must contrast with the background and be in block Arabic numerals at least 18 inches in height for vessels equal to or over 65 feet, and at least 10 inches in height for all other vessels over 25 feet in length.

* * * * *

6. Section 655.7 is changed by redesignating paragraphs (d) through (m) as paragraphs (e) through (n) and adding a new paragraph (d) to read as follows:

§ 655.7 General prohibitions.

* * * * *

(d) To make any false statement, written or oral, to an authorized officer, concerning the taking, catching, landing, purchase, sale, or transfer of any mackerel, squid, or butterfish.

* * * * *

7. Section 655.8 is amended by revising paragraph (c)(2) to read as follows:

§ 655.8 Enforcement.

* * * * *

(c) * * *

(2) Provide a safe ladder, illumination, and a safety line when necessary or requested by the authorized officer to facilitate boarding and inspection; and

* * * * *

8. Section 655.21 in changed by revising paragraph (b)(1)(iii) to read as follows:

§ 655.21 Allowable levels of harvest.

* * * * *

(b) * * *

(1) * * *

(iii) "For Illex, TALFF plus Reserve equals 30,000 mt minus initial DAH, or 25,000 mt, whichever is less. For Loligo, TALFF plus Reserve equals 440,000 mt minus initial DAH, or 37,000 mt, whichever is less. TALFF and Reserve initially will be equal amounts. If a larger TALFF is required for incidental catch, releases will then be made to it from the reserve as needed.

* * * * *

9. Section 655.24 is amended by revising paragraph (a) to read as follows:

§ 655.24 Closure of the fishery.

(a) General. The Secretary shall close any domestic fishery in the FCZ for any species when U.S. fishermen have harvested 80 percent of the allowable domestic harvest (see § 655.21(c)), if such closure is necessary to prevent the allowable domestic harvest from being exceeded. The closure will be in effect for the remainder of the fishing year.

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